Kendeil™

ALUMINIUM ELECTROLYTIC CAPACITORS

OVERVIEW

COMPANY PRESENTATION

Kendeil is an italian company with 40 years of experience in manufacturing high quality large can aluminium electrolytic capacitors.

Actual production range spreads from large can screw terminal type capacitors with high end performances to snap in terminal type capacitors mainly used on pcb boards, and to the motor start type for alternate current applications.

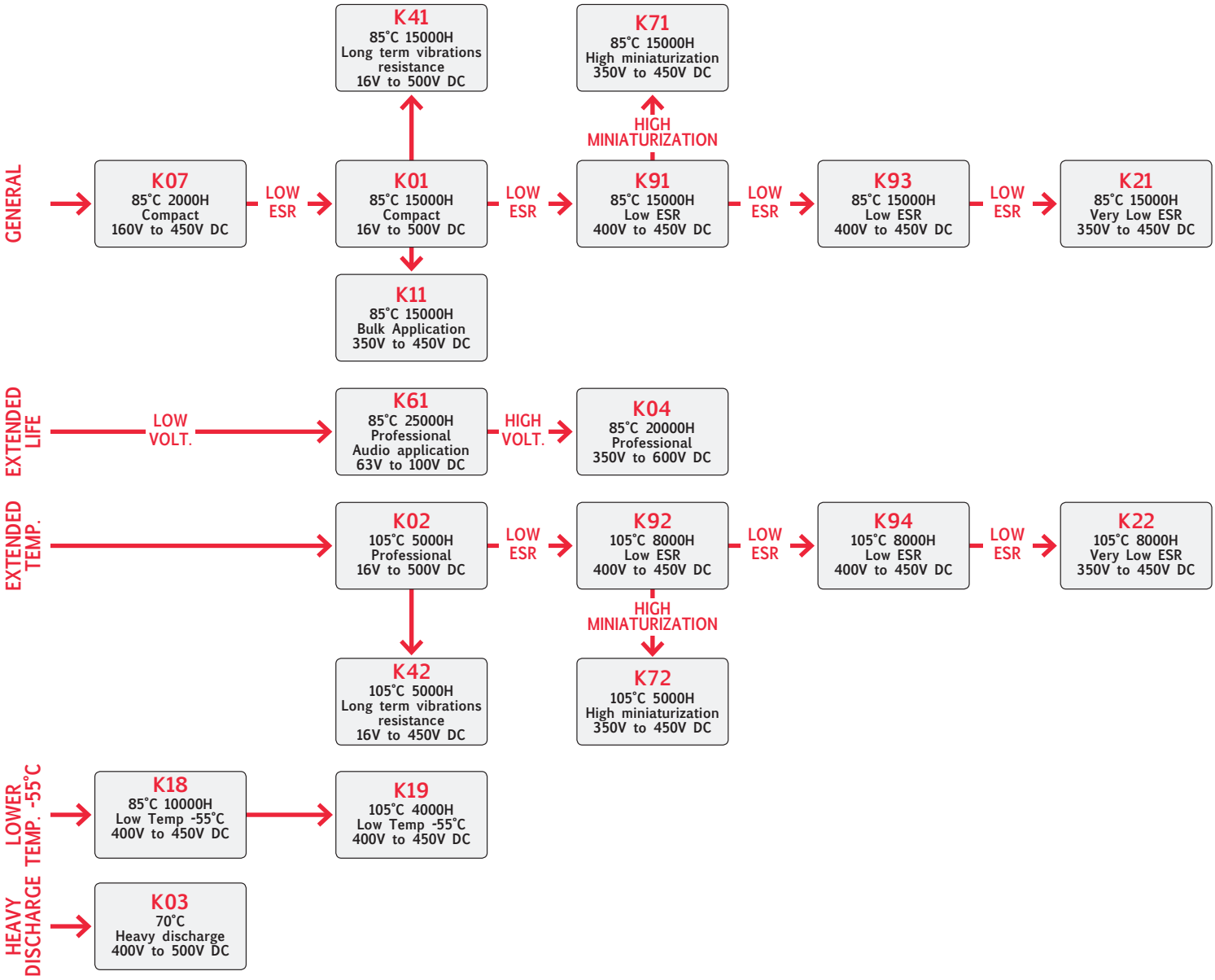
A continuous improvement in building technology and automatic computerized machines gives the company a leading role in the market of electronics components, along with competitive priced products and reliability performances.
Also the flexibility of its structure is able to meet any custom design requirement.

All capacitors are international standards compliants CECC, DIN, IEC, under a Quality Certification ISO 9001 System.

Visit our website:
www.kendeil.com

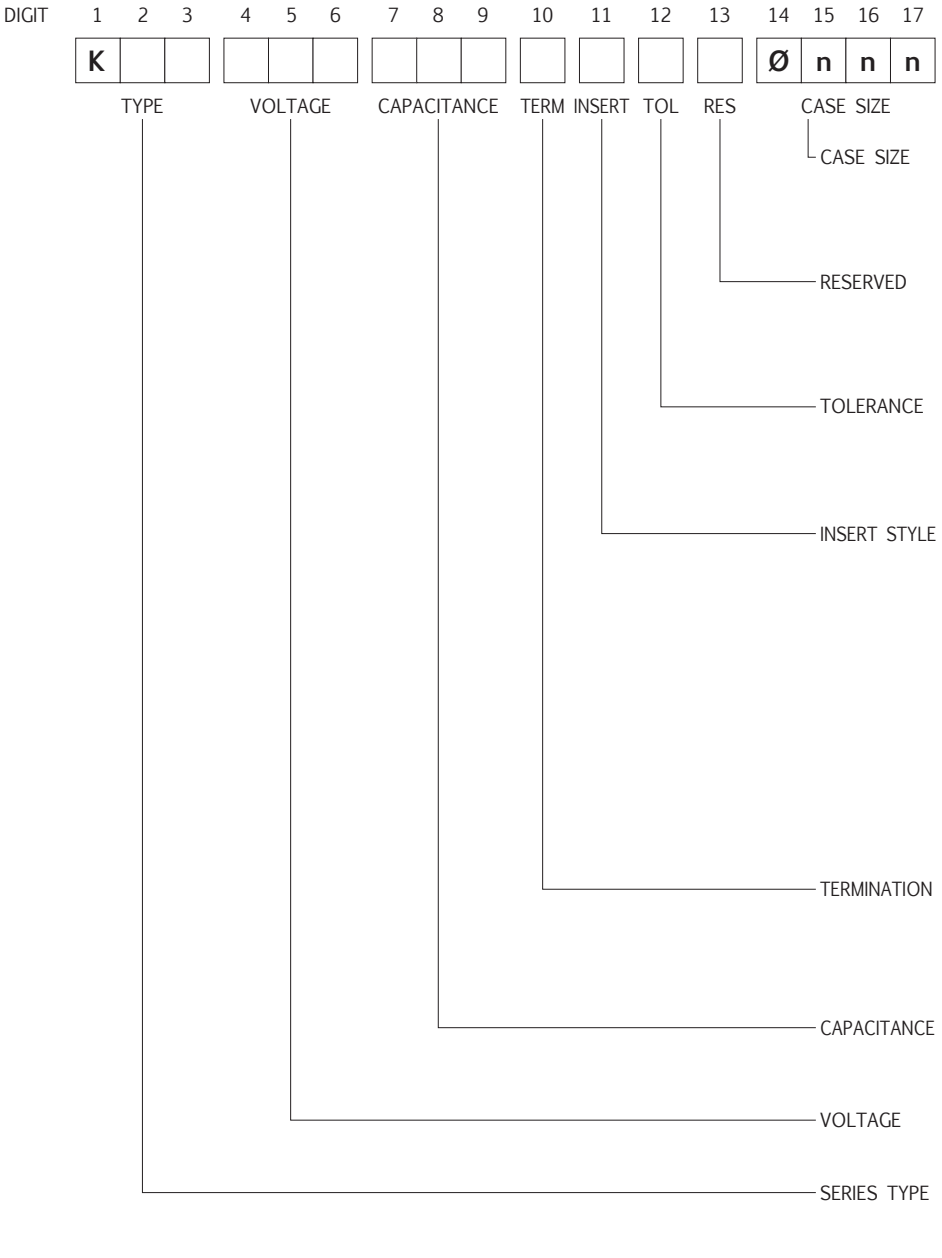
PRODUCT ROAD MAP
FOR SCREW TYPE CAPACITORS

Screw Terminals Type



PART NUMBER SYSTEM
FOR SCREW TYPE CAPACITORS

New PART-NUMBER CODE in use since Sep 2010. Total length is 17 digits.
Please see examples below and have a reference code from the standard ratings capacitors pages.



CASE SIZE: Ø=DIAMETER code: E=35 G=51 H=63 M=72 J=76 L=90; nnn=LENGTH (in mm)

RESERVED: 0 = standard ratings, 1= special, n= others
G = double sleeve
S = no end disk
W = special design charge/discharge welding apps

TOLERANCE: tolerance range as IEC62
M= ±20%, Q= -10% +30%, X= custom
T= -10% +50%
U= -10% +75%

INSERT STYLE: insert type on decks
0= diam 35 small diameter M5
H= STD High Ripple:
diam 51-63-76 (M5), diam.90 (M6)
I= small diameter M5
L= M5 long insert style (*)
6= M6 diam 76 ONLY
K= M5 PARP (Protection Against Reversal Polarity)
B= M5 PARP 76 ONLY
Q= M6 PARP (Protection Against Reversal Polarity)
U= thread size 10-32 UNF High Post
R= 1/4 28 UNF High Post
Z= thread size 10-32 UNF Low Post
W= 1/4 28 UNF Low Post

TERMINATION: terminal as follows:
0= no stud (flat bottom)
M= M8x12 stud ONLY diam 35 mm
S= M12x16 stud for diam 51-63-72-76-90 mm

CAPACITANCE: [µF] - 2 significant digits plus multiplying factor
1= x10, 2= x100, 3= x1000, 4= x10000

VOLTAGE: DC rated voltage [V]

SERIES TYPE: Kendeil Aluminium Electrolytic Capacitor Type:
K01, K02, K03, K04, K07, K11, K21, K22,
K41, K42, K61, K71, K72, K91, K92

EXAMPLES

K	0	1	1	0	0	2	2	3	0	H	M	0	H	1	0	5
K	0	1	0	6	3	2	2	3	S	H	Q	0	G	1	0	5
K	0	2	0	4	0	1	0	4	0	H	M	0	J	1	4	3

K01 100V 22000µF, Hi ripple, -20%+20%, 63x105

K01 63V 22000µF, stud M12x16, Hi rip. -10%+30%, 51x105

K02 40V 100000µF, Hi ripple, -20%+20%, 76x143

Specifications subject to change without notice

(*) Note for INSERT STYLE digit_11

M5 long insert style dedicated to not insulated bus bar (+2 mm height versus STD High Ripple code)

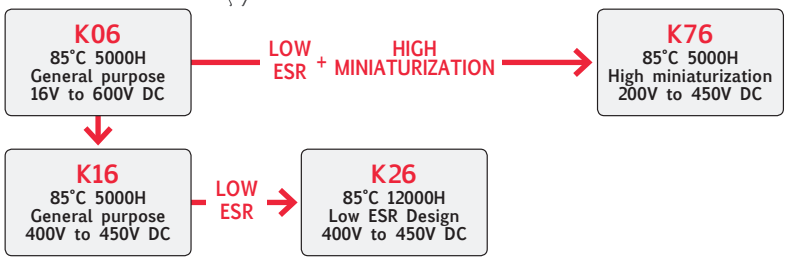
CAP WEIGHT TABLE
FOR SCREW TYPE CAPACITORS

SIZE Ø x L mm	SIZE Ø x L in	CASE CODE	APPROX UNIT WEIGHT grams	QTY/BOX pcs	BOX DIMENSIONS cm
35x51	1,38x2,01	E051	80	60	36 x 25 x 6
35x60	1,38x2,36	E060	70	60	36 x 25 x 8
35x79	1,38x3,11	E079	110	60	36 x 25 x 8
35x100	1,38x3,94	E100	121	50	38.5 x 38.5 x 14
35x120	1,38x4,72	E120	133	50	38.5 x 38.5 x 14
51x60	2,01x2,36	G060	110	42	38.5 x 38.5 x 14
51x79	2,01x3,11	G079	200	42	38.5 x 38.5 x 14
51x96	2,01x3,78	G096	252	42	38.5 x 38.5 x 14
51x105	2,01x4,13	G105	260	42	38.5 x 38.5 x 14
51x115	2,01x4,53	G115	270	42	38.5 x 38.5 x 20
51x130	2,01x5,12	G130	352	42	38.5 x 38.5 x 20
51x143	2,01x5,63	G143	370	42	38.5 x 38.5 x 20
63x60	2,48x2,36	H060	240	25	38.5 x 38.5 x 14
63x79	2,48x3,11	H079	280	25	38.5 x 38.5 x 14
63x96	2,48x3,78	H096	366	25	38.5 x 38.5 x 14
63x105	2,48x4,13	H105	420	25	38.5 x 38.5 x 14
63x115	2,48x4,53	H115	488	25	38.5 x 38.5 x 20
63x130	2,48x5,12	H130	527	25	38.5 x 38.5 x 20
63x143	2,48x5,63	H143	540	25	38.5 x 38.5 x 20
72x116	2,83x4,57	M116	576	16	38.5 x 38.5 x 20
76x79	2,99x3,11	J079	450	16	38.5 x 38.5 x 14
76x93	2,99x3,66	J093	540	16	38.5 x 38.5 x 14
76x105	2,99x4,13	J105	600	16	38.5 x 38.5 x 20
76x115	2,99x4,53	J115	616	16	38.5 x 38.5 x 20
76x130	2,99x5,12	J130	720	16	38.5 x 38.5 x 20
76x143	2,99x5,63	J143	940	16	38.5 x 38.5 x 20
76x150	2,99x5,91	J150	960	8	37 x 26 x 26
76x155	2,99x6,10	J155	980	8	37 x 26 x 26
76x170	2,99x6,69	J170	1070	8	37 x 26 x 26
76x194	2,99x7,64	J194	1210	8	37 x 26 x 26
76x214	2,99x8,43	J214	1540	8	37 x 26 x 26
76x220	2,99x8,66	J220	1560	8	37 x 26 x 26
90x98	3,54x3,86	L098	870	6	37 x 26 x 26
90x145	3,54x5,71	L145	1250	6	37 x 26 x 26
90x190	3,54x7,48	L190	1680	6	37 x 26 x 26
90x196	3,54x7,72	L196	1690	6	37 x 26 x 26
90x200	3,54x7,87	L200	1710	6	37 x 26 x 26
90x220	3,54x8,66	L220	1790	6	37 x 26 x 26
90x230	3,54x9,06	L230	1840	6	37 x 26 x 26
90x240	3,54x9,45	L240	1880	6	37 x 26 x 26

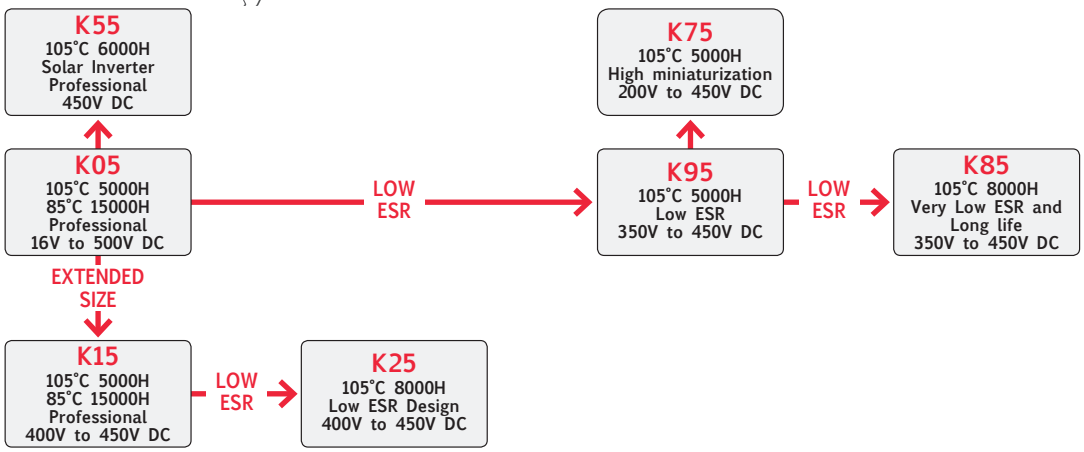
NOTE: Only main products listed

PRODUCT ROAD MAP
FOR SNAP-IN TYPE CAPACITORS

Snap In Type 85°C

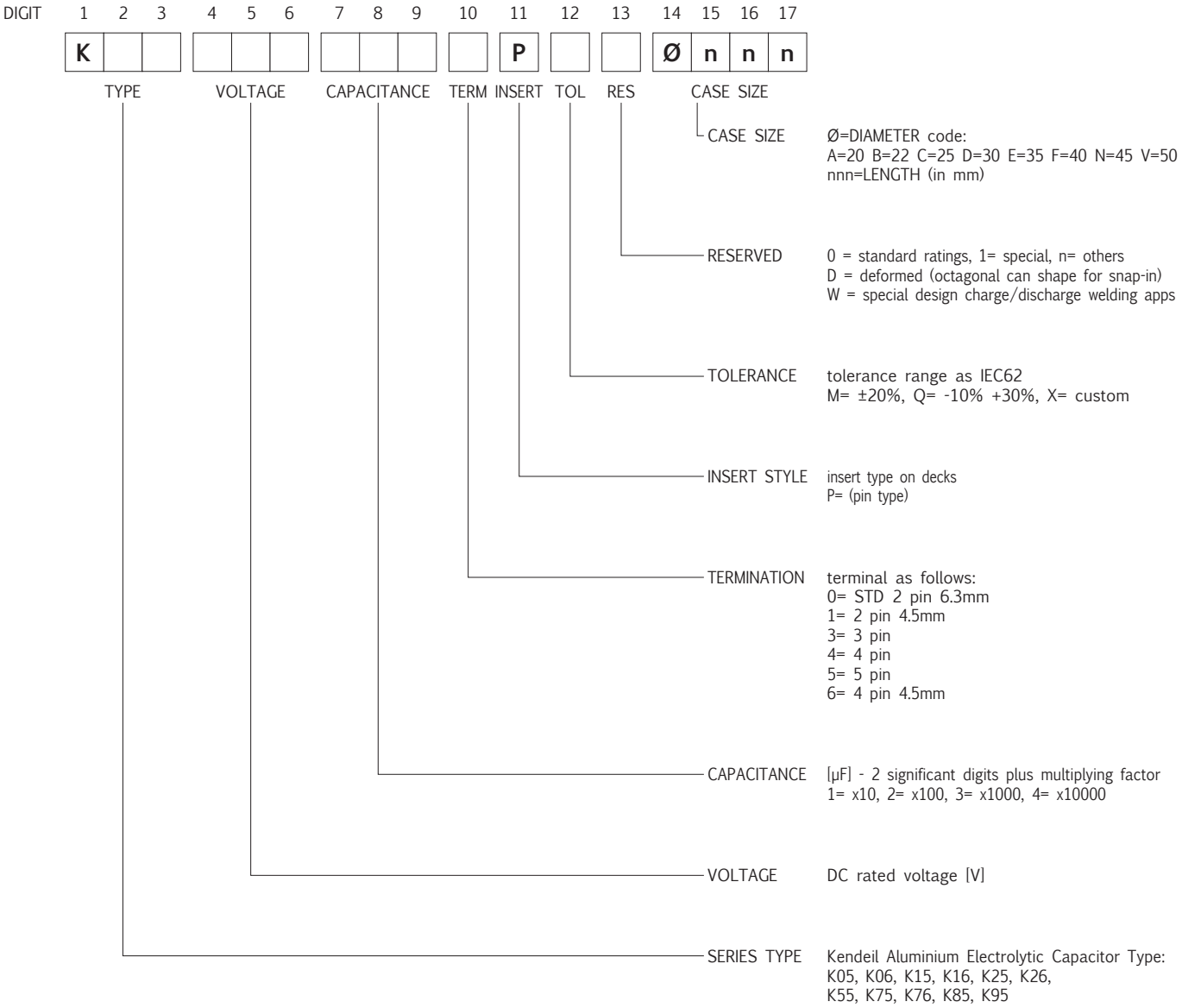


Snap In Type 105°C



PART NUMBER SYSTEM
FOR SNAP-IN TYPE CAPACITORS

New PART-NUMBER CODE in use since Sep 2010. Total length is 17 digits.
Please see examples below and have a reference code from the standard ratings capacitors pages.



EXAMPLES

K	0	5	4	5	0	4	7	1	0	P	M	0	E	0	5	0

K05 450V 470µF, standard pin, ±20%, 35x50

Specifications subject to change without notice

Kendeil™

CAP WEIGHT TABLE
FOR SNAP-IN TYPE CAPACITORS

SIZE Ø x L mm	SIZE Ø x L in	CASE CODE	APPROX UNIT WEIGHT grams	QTY/BOX pcs	BOX DIMENSIONS cm
22x25	0,87x0,98	B025	15	160	36 x 25 x 4
22x30	0,87x1,18	B030	19	160	36 x 25 x 4
22x40	0,87x1,57	B040	24	160	36 x 25 x 6
25x25	0,98x0,98	C025	16	126	36 x 25 x 4
25x30	0,98x1,18	C030	21	126	36 x 25 x 4
25x35	0,98x1,38	C035	27	126	36 x 25 x 6
25x40	0,98x1,57	C040	30	126	36 x 25 x 6
25x50	0,98x1,97	C050	38	126	36 x 25 x 6
30x25	1,18x0,98	D025	24	88	36 x 25 x 4
30x30	1,18x1,18	D030	27	88	36 x 25 x 4
30x35	1,18x1,38	D035	32	88	36 x 25 x 6
30x40	1,18x1,57	D040	43	88	36 x 25 x 6
30x45	1,18x1,77	D045	49	88	36 x 25 x 6
30x50	1,18x1,97	D050	55	88	36 x 25 x 6
30x60	1,18x2,36	D060	67	88	36 x 25 x 8
35x25	1,38x0,98	E025	42	60	36 x 25 x 4
35x30	1,38x1,18	E030	45	60	36 x 25 x 4
35x35	1,38x1,38	E035	50	60	36 x 25 x 6
35x40	1,38x1,57	E040	53	60	36 x 25 x 6
35x45	1,38x1,77	E045	70	60	36 x 25 x 6
35x50	1,38x1,97	E050	78	60	36 x 25 x 6
35x55	1,38x2,17	E055	83	60	36 x 25 x 8
35x60	1,38x2,36	E060	88	60	36 x 25 x 8
35x77	1,38x3,03	E077	114	60	36 x 25 x 9
40x50	1,57x1,97	F050	98	48	36 x 25 x 6
40x60	1,57x2,36	F060	117	48	36 x 25 x 8
40x77	1,57x3,03	F077	138	40	36 x 25 x 9
40x97	1,57x3,82	F097	181	50	38.5 x 38.5 x 14
40x105	1,57x4,13	F105	204	50	38.5 x 38.5 x 14
45x60	1,77x2,36	N060	170	35	36 x 25 x 8
45x77	1,77x3,03	N077	200	35	36 x 25 x 9
45x97	1,77x3,82	N097	240	49	38.5 x 38.5 x 14
45x105	1,77x4,13	N105	260	49	38.5 x 38.5 x 14
50x60	1,97x2,36	V060	97	42	38.5 x 38.5 x 14
50x77	1,97x3,03	V077	180	42	38.5 x 38.5 x 14
50x105	1,97x4,13	V105	240	42	38.5 x 38.5 x 14

NOTE: Only main products listed

CERTIFICATIONS:
n° IT-20662 ISO 9001:2015

IQNet
THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

CISQ/IMQ as an IQNet Partner hereby states that the organization

KENDEIL SRL
VIA IRLANDA 1 - 21013 GALLARATE (VA)

for the following scope:

Design and manufacturing of electrolytic capacitors

Further clarifications regarding the applicability of ISO 9001:2015 requirements may be obtained by consulting the organization.

has implemented and maintains a

Quality Management System

which fulfills the requirements of the following standard

ISO 9001:2015

Issued on: **2017 - 11 - 03**
First issued on: **2001 - 11 - 15**
for the validity date, please refer to the original certificate issued by IMQ*

Registration Number: IT - 20662

Alex Stoichitoiu
President of IQNet

Ing. Claudio Provetti
President of CISQ

IQNet Partners**:
AENOR *Spain* AFNOR Certification *France* APCER *Portugal* CCC *Cyprus* CISQ *Italy*
CQC *China* CQM *China* CQS *Czech Republic* Cro Cert *Croatia* DQS Holding GmbH *Germany* FCAV *Brazil*
FONDONORMA *Venezuela* ICONTEC *Colombia* Inspecta Certification *Finland* INTECO *Costa Rica*
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Quality Austria *Austria* RR *Russia* SIQ *Slovenia* SIRIM QAS International *Malaysia*
SQS *Switzerland* SRAC *Romania* TEST St Petersburg *Russia* TSE *Turkey* Vinçotte *Belgium* YUQS *Serbia*
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* This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document
** The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

CERTIFICATIONS:
n° 9170.KEND UNI EN
ISO 9001:2015

CISQ
www.imq.it

CISQ is a member of IQNet

CERTIFICATO N. / *CERTIFICATE N.* **9170.KEND**

SI CERTIFICA CHE IL SISTEMA QUALITA' DI / *WE HEREBY CERTIFY THAT THE QUALITY SYSTEM OPERATED BY*

KENDEIL SRL
VIA IRLANDA 1 - 21013 GALLARATE (VA)
UNITA' OPERATIVE / *OPERATIVE UNITS*

VIA IRLANDA 1 - 21013 GALLARATE (VA)

E' CONFORME ALLA NORMA / *IS IN COMPLIANCE WITH THE STANDARD*

ISO 9001:2015

PER LE SEGUENTI ATTIVITA' / *FOR THE FOLLOWING ACTIVITIES*

Progettazione e costruzione di condensatori elettrolitici
Design and manufacturing of electrolytic capacitors

Ulteriori informazioni riguardanti l'applicabilità dei requisiti ISO 9001:2015 possono essere ottenute consultando l'organizzazione
Further clarifications regarding the applicability of ISO 9001:2015 requirements may be obtained by consulting the organization

IL PRESENTE CERTIFICATO E' SOGGETTO AL RISPETTO DEL REGOLAMENTO PER LA CERTIFICAZIONE DEI SISTEMI DI GESTIONE
THE USE AND THE VALIDITY OF THE CERTIFICATE SHALL SATISFY THE REQUIREMENTS OF THE RULES FOR CERTIFICATION OF MANAGEMENT SYSTEMS

DATE:	PRIMA CERTIFICAZIONE / *FIRST CERTIFICATION*	EMISSIONE CORRENTE / *CURRENT ISSUE*	SCADENZA / *EXPIRY*
	2001-11-15	2017-11-03	2019-11-14

IMQ S.p.A.- VIA GUINTELLANO, 43 - 20138 MILANO (ITALY)
Management Systems Division - Paolo Ornago

ACCREDIA
IAF: 19

IMQ

FEDERAZIONE CISQ

RoHS Compliant

Kendeil™
ALUMINUM ELECTROLYTIC CAPACITORS

CSQ IQNet

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April 2018

RoHS Compliant

RoHS DECLARATION

The person here down signed as President of Kendeil srl, an Aluminium Electrolytic Capacitors company, declares that
all capacitors type produced do not contain any forbidden substance
(Lead, Quicksilver, Cadmium, Chromium VI, PBB and PBDE, etc),
being compliant to the following EC Directives:

Directive 2015/863/EC (RoHS-3), 2011/65/EC, 2002/95/EC [RoHS], 2005/717/EC and updates
ref. to dangerous substances in the area of electric and electronic articles
Directive 2003/11/EC dated 06.02.03 and updates
ref. to hazardous and dangerous substances
Directive 2002/96/EC and Directive 2003/108/EC [WEEE] and updates
ref. to Wasted Electrical and Electronic Equipment matter

Specifically the following table shows the components parts of the capacitor detailed in materials and exemption quotes.
As it is clearly seen, the Kendeil's products do not contain any forbidden substance.

PART	MATERIAL	Exemption limit	Detected
CASE	Aluminium 99.5%	-	-
SLEEVE	PVC/PET	None	-
END DISK	PVC/PET	None	-
DECK screw type	Phenolic /Silica Epoxy resin	None	-
DECK snap in type	Rubber / Bakelite	None	-
INSERTS screw type	Aluminium 99.5%	Pb in Alum alloy max = 0.4%	(Pb) 0.0006%
VENT PLUG screw type	Silicon	None	-
GASKET screw type	Elastomer EPDM	None	-
WASHERS	Aluminium 99.5% - 99.7%	-	-
ELECTROLYTE BLEND	Glycol based + chemicals	(Pb) (Hg) (Cr)	No remarkable traces
ANODE FOIL	Aluminium 99.99%	-	-
KATHODE FOIL	Aluminium 98%	-	-
TAB FOIL	Aluminium 99.99%	-	-
SEPARATOR	Tissue Paper	None	-
MOUNTING HARDWARE	Iron steel	-	-
GOLD MARKING INK	Matt pigment foil	-	-

For all the above materials a technical sheet has been provided from suppliers and deposited at Kendeil AQ for a period of 10 years.
Any further improvement or modification of the capacitor manufacturing process will be strictly adherent to the Directive and the materials list will be updated as well.
Also, about PCB (policlorobifenyl): no traces found in Kendeil capacitors.
Last update: Kendeil capacitors has never been produced using material containing the deca-BDE
Yours faithfully

President
Angelo Bonini

Kendeil RoHS DECLARATION APR-2018

Capitale Sociale € 99000 - Codice Fiscale P.IVA 04548440157 - REA di Varese n. 326513

BUILDING AN ELECTROLYTIC CAPACITOR

APPLICATIONS

A capacitor is an electrical component that stores a quantity of electrical charge defined with a linear relationship as:

$$Q = C \times V$$

where: **Q** = electrical charge [Coulomb] **C** = Capacitance [Farad] **V** = Voltage [Volt]

Usually values are indicated in a smaller unit called micro Farad [µF] that is one million times smaller. An aluminium electrolytic capacitor is composed of one anode of aluminium foil having a dielectric oxidation on its surface, with semiconductor characteristics to prevent the current flow in one direction, and another aluminium foil cathode. There is also an electrolyte impregnated paper layer positioned between the anode and the cathode in order to avoid short circuits. Both the aluminium foils have been etched to obtain active surfaces, increasing their effective area. Aluminium tabs are then connected to the two foils to act as terminals.
When in use the impregnated section is then closed inside an suitable case and sealed with a deck. The matching of thin dielectric and a large surface area allows to create capacitors with exceptional high capacitance per volume.

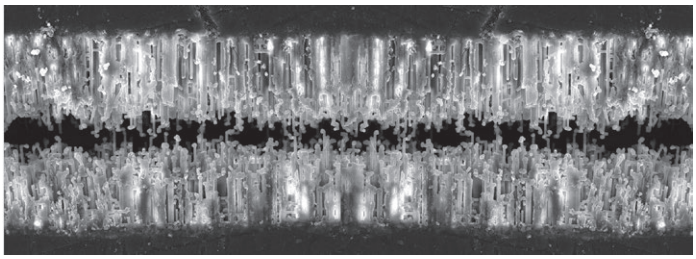
European (CECC) and International standards (IEC) have classified the capacitors in two categories. Electrolytic capacitors for high reliability applications (Long Life Grade): in addition of the possible over anodization (the difference between forming voltage and operating voltage) must generally satisfy high endurance requirements and a careful selection on materials is needed, such efforts are not required for capacitors standard version used for less severe reliability (General Purpose Grade).

The whole manufacturing process requested to build a Kendeil electrolytic capacitor could be reasonably split into the following phases:

- **Etching / Forming**
- **Winding**
- **Impregnation**
- **Sealing**
- **Ageing**
- **Production Inspections**

ETCHING / FORMING

Plates of electrodes are made of high purity, very thin aluminium foil (0.05 to 0.1 mm thickness). To get the maximum capacitance for a given electrode surface area, an electrochemical process called “etching” is used to dissolve metal and increase the surface area of the foil in the form of a dense network of microscopic channels.
The etching process consists of continuously running aluminium foil through a chloride solution with an AC, DC or AC/DC voltage applied between the etch solution and aluminium foil.
The increase in surface area is referred to as foil gain and can be increased as much as 100 times for foil being used in low voltage capacitor applications and 20 to 25 times for higher voltage applications.



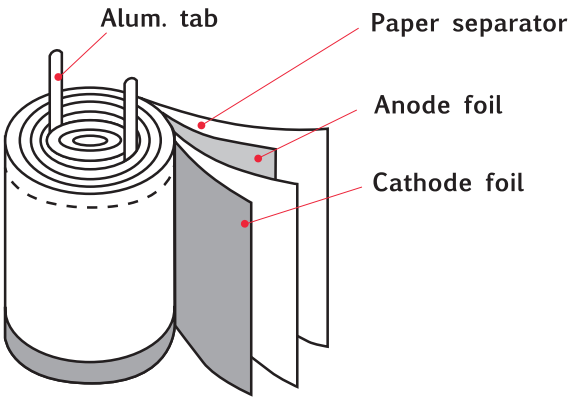
Micrographs view of etched aluminium foil

The dielectric of the aluminium electrolytic capacitor is composed of a thin layer of aluminium oxide (Al2O3) which “forms” on the surface of the etched aluminium foil during a process called “formation.”
Since capacitance is inversely proportional to the dielectric thickness and this is proportional to the forming voltage, the following relation is appliable:

Capacitance x Forming Voltage = Constant

This is true for high voltage foils with a relatively coarse etch structure. However, for foils with extremely fine structures, the process to convert aluminium to aluminium oxide has a significant smoothing effect on the structure that might be described by a non-linear relationship.

WINDING

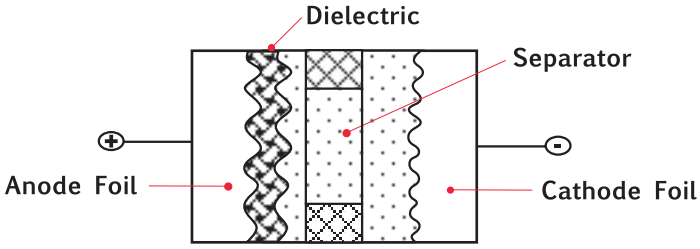


The capacitor element

Each capacitor contains two foils, the positive foil is called the ANODE and the negative is called the CATHODE. Both foils, along with a separator paper are rolled into a cylinder.
The paper serves various purposes, one is to prevent anode and cathode foils from coming into contact with each other and shorting, another is to serve as a container for the electrolyte, in fact during capacitor's life, the electrolyte liquid is consumed by the reforming reactions and also ensure the dielectric strength and mechanical stretch. As part of a highly automated winding process, aluminium tabs are attached to the anode and cathode foils. This completed assembly of etched and formed foil, together with separator paper and attached tabs is called the capacitor ELEMENT.

IMPREGNATION

The method of impregnation requires the winding element to be immersed into the electrolyte by either a vacuum/pressure cycle with or without applied heat or by simple absorption.
The electrolyte contains a solvent such as ethylene glycol and a solute such as ammonium borate.
Should the dielectric film be damaged, the presence of the electrolyte will allow the capacitor to heal itself by forming more oxide. By selecting different electrolytes, the capacitor characteristics such as operating temperature range, frequency response, shelf life and load life could be improved.



The cross section for a typical element

SEALING

After impregnation phase, the element is sealed into an aluminium can. Sealing deck materials may be rubber/bakelite or phenolic plastic.

AGEING

Before being sleeved and packed the capacitor is aged and tested, this being the final process of the production chain, usually called “ageing”. A voltage greater than the rated voltage is then applied at very high temperatures. The purpose is to reform or to repair any oxide film which may have been damaged during the slitting, winding and assembly processes, thus reducing the leakage current to an acceptable low level.

PRODUCTION INSPECTIONS

After ageing, capacitors are 100% tested. All electrical requirements are checked using highly advanced automated test equipment and any rejects are removed. Capacitors are also visually inspected, and only capacitors passing both tests are accepted for packaging.

TECHNICAL SPECIFICATION

Aluminum electrolytic capacitors produced by Kendeil are in line with the IEC 68-1 detail specifications and as presented in the next table, our series can roughly be grouped in these abbreviations:

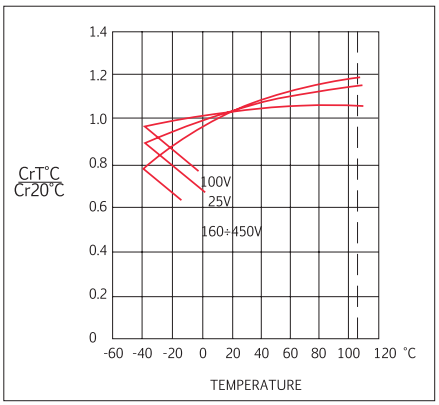
Capacitor	Type	IEC 68-1 code
K01-K04-K07-K11-K21-K24-K61-K71-K91	Screw	GP
K18	Screw type	GP
K02-K22-K42-K72-K92	Screw	GM
K19	Screw type	GM
K05-K15-K25-K55-K75-K85-K95	Snap-in	GM
K06-K16-K26-K76	Snap-in	GP
K13	Fast-on (lug)	HS

RATED CAPACITANCE

The rated capacitance, defined at 100 Hz and 20°C, is the capacitance of an equivalent circuit having capacitance and resistance series connected. The value is indicated on the external sleeve, specified in micro Farads [µF]. Typical curves for capacitance drift versus temperature and frequency, are shown in fig.1 e fig.2

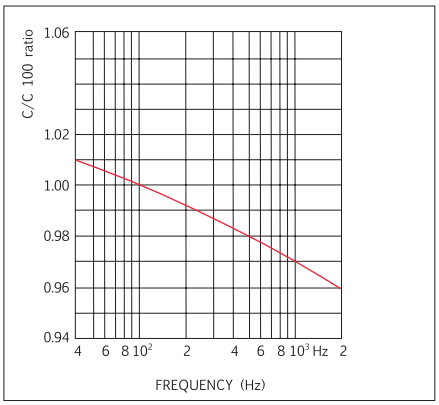
CAPACITANCE DRIFT VERSUS TEMPERATURE

Fig. 1



CAPACITANCE VERSUS FREQUENCY

Fig. 2



CAPACITANCE TOLLERANCE

Kendeil produces capacitors with various tolerance standard ranges, summarized in the next table.

CODE	TOLERANCE
M	±20%
Q	-10/+30%
T	-10/+50%
U	-10/+75%
X	CUSTOM

The capacitance of aluminium electrolytic capacitors changes with temperature and frequency of measurement, so the standard has been set to a frequency of 100Hz and temperature of 20°C.

RATED VOLTAGE (Vr)

The rated voltage is the value of voltage that could be applied continuously within the operating temperature range of capacitors. When using a capacitor with AC voltage superimposed on a DC voltage, care should be taken such that the peak value of AC voltage plus the DC voltage does not exceed the rated voltage.
Reverse polarization shall not exceed two times VDC value.
When capacitors are series connected, the voltage distribution across the series may not be the same.
This is due to normal DC leakage distribution and should be considered in the design process either using a higher rated voltage capacitor or using balancing resistors in parallel with each series capacitor.

SURGE VOLTAGE (Vp)

The surge voltage is the maximum overvoltage including DC, peak AC and transients to which the capacitor could be subjected for short periods of time (not more then 30 seconds in any 5 minute period).
Depending on applicable specifications, this test is usually performed at maximum operative temperature. A current limiting resistor of 1000 ohm should be used.
Charge is held for 30 seconds for 1000 cycles, then the capacitor is allowed to discharge without load for 5 minutes.
Rated and surge voltage values for Kendeil capacitors are listed in following table, where a different relation is applied depending on rated value (Vr).

	Vp = 1.15 Vr	Vp = 1.10 Vr	Vp = 1.05 Vr
RATED VOLTAGE [V]	16 25 40 50 63 75 80 100 160 200 250	350 400 420 450	500 550 600
SURGE VOLTAGE [V]	18 29 46 57 72 86 92 115 184 230 287	385 440 462 495	525 578 630

TRANSIENT VOLTAGE

Some capacitor's uses could require the application of voltage pulses exceeding the surge voltage Vs. Despite the fact that there is no general rule to match the overvoltage capability, Kendeil can satisfy customers requirements depending on the individual applications.
Please contact us to discuss the best capacitor for the application.

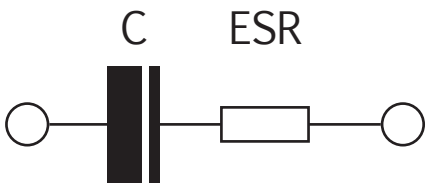
REVERSE VOLTAGE

Electrolytic capacitors are polar elements so they risk serious damages with inversed voltage application. Then always be sure to check polarity during and after assembly. Negative terminal is marked on the capacitor. For short periods of time capacitors can endure a low continuous reverse voltage (1.5V max). Where necessary, voltages of opposite polarity have to be prevented by connecting a diode.

EQUIVALENT SERIES RESISTANCE (ESR)

The equivalent series resistance is the resistance that a capacitor has to the alternating current flow.
Various resistive components such as: electrolyte, paper foil, aluminium foil, tabs, and others determine the total ESR value.
It is measured at 100 Hz and 20°C. It is related and dependant on temperature and frequency and generally when either these factors increase, a reduction in ESR results.

The construction technology of Kendeil capacitors reduces significantly the ESR value.



Equivalent Standard Circuit

ESR = R1 + R2 + R3
R1 = Resistance of aluminium oxide thickness
R2 = Resistance of electrolyte, spacer
R3 = Resistance due to materials: foil lenght, tabs, terminations
__ contact resistance

LEAKAGE CURRENT (LC)

The leakage current (LC) of an electrolytic capacitor is based on the physical properties that lead to electrical losses, in fact, when DC voltage is applied to it, the oxide layer acts as a dielectric and the electrolyte allows a small amount of electric current to flow in it.

However, once a steady-state voltage and temperature are reached, the leakage current decreases over long periods of time. Leakage current is a function of:

- **Capacitor Design**
- **Voltage**
- **Temperature**
- **Time of voltage application**
- **Storage Conditions**

Note that LC, decreasing with time, will reach a steady-state value (OPERATING LEAKAGE CURRENT). Therefore, the specifications of LC are defined as a value measured 5 minutes after the beginning of the application of the rated voltage at 20°C.

For typical leakage current versus time, temperature and voltage, see Fig. 3-4-5.

Fig. 3 LC DRIFT VERSUS TIME

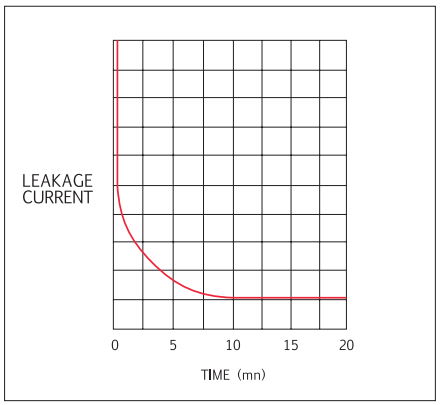
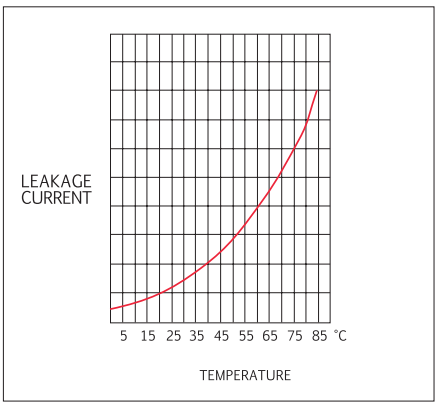
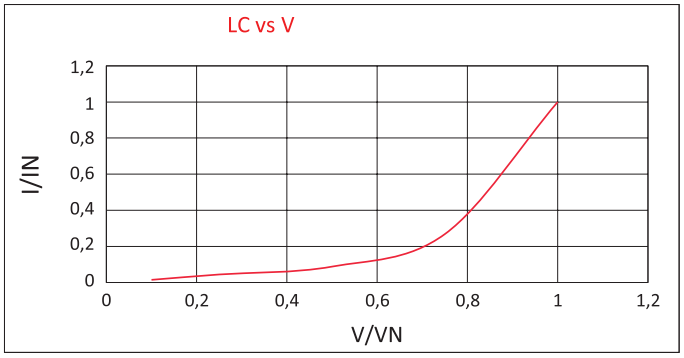


Fig. 4 LC DRIFT VERSUS TEMPERATURE



LC is an increasing function of the applied voltage V, and rises quite strongly when V exceeds the rated value Vr.

Fig. 5



REFORMING

Every aluminum electrolytic capacitors need to be reformed before acceptance test. The purpose of this preconditioning is to ensure that the same initial conditions are maintained when comparing and assessing different products.
For this purpose, the rated voltage is applied to the capacitors via a series resistance for a period of some hours.

SHELF LIFE (Voltage free storage)

Capacitors generally can be stored at temperatures up to 50°C without any reduction of their reliability.
Overall characteristics such as capacitance, ESR and impedance should show good performance with no sensitive changes while the leakage current will exhibit a slow drift upwords.

In practical use, we experienced the following scheme meaningful for voltage rated classes of capacitors:

Shelf life	Nominal Voltage	Diameter
Three years	≤ 100V DC	Ø < 76mm
Two years	≤ 100V DC	Ø ≥ 76mm
Two years	> 100V DC	All Ø
18 months	≥ 550V DC	All Ø

When designing application circuits, attention must be paid to the fact that after storage the leakage current may be up to 100 times higher than normal during the first few minutes following the application of power. This particular leakage current level increases with temperature and duration of storage.

After an extended storage period, the leakage current value may exceed the rated value and, before the output measurement, a reanodization process is required.

It could be realized by applying the rated voltage at room temperature for one hour.
In any case it is advisable to use a maximum charging current of 5mA or twice typical value specified for each series.

Before assembling a capacitor bank, it is always recommended to:
· Use items from the same batch to have similar values of electrical parameters (capacitance, ESR, leakage current)
· Ensure equal conditions (current, voltage, temperature) are applied to all items
This will ensure balanced stresses and will reduce the risk of reduced lifetime and failures.

DISSIPATION FACTOR (tan δ)

Dissipation factor or loss angle tangent (tan δ) is a main electrical characteristic of an electrolyte capacitor, a measure of the deviation from an ideal capacitance value. Relationship is included in the following formula:

$$\text{Tan}\delta = 2\,\pi\,f\,C\,ESR$$

where: **f** = frequency **C** = rated capacitance

Maximum values in the datasheets have been indicated at 100Hz and 20°C.
Drift versus frequency as Fig. 6-7.

Fig. 6 Tanδ DRIFT VERSUS FREQUENCY LOW VOLTAGE (≤ 100 Vr DC)

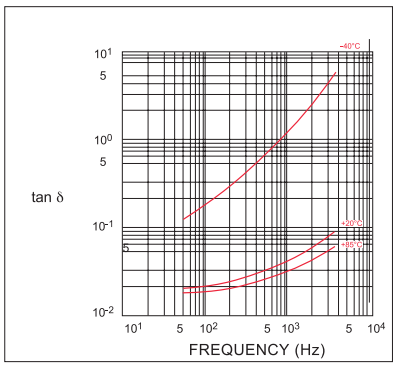
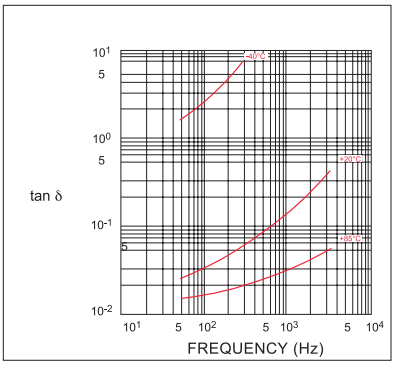


Fig. 7 Tanδ DRIFT VERSUS FREQUENCY HIGH VOLTAGE (> 100 Vr DC)



INDUCTANCE

Some inductance is present in aluminium electrolytic capacitors, but values are usually less then few tens of nH.

IMPEDANCE (Z)

$$Z = \sqrt{ESR^2 + (X_L - X_C)^2}$$

Impedance is dominated by the capacitive reactance (X_C) at low frequencies and by the inductive reactance (X_L) at high frequencies. At the point of series resonance Z=ESR.
The variation with frequency of individual resistive and reactive values determine the total impedance characteristic of the capacitor. Capacitive reactance predominates at low frequencies.
Fr is the self-resonant frequency. Defined as the frequency where X_L and X_C are equal.

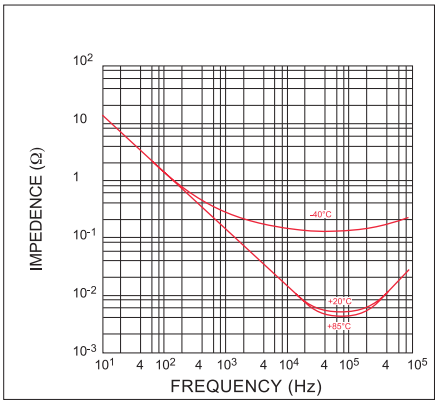
$$Fr = 1/[2x\pi x\sqrt{LxC}]$$

- **When frequency goes from 0 to Fr, the capacitive reactance ($X_C = 1/\omega CS$) decreases until it reaches the order of magnitude of the electrolyte resistance.**
- **At even higher the resistance of the electrolyte is the predominant term.**
- **Resonance frequency is reached when capacitive and inductive reactance mutually cancel each other.**
- **Above the self-resonant frequency the inductive component is dominant and the capacitor behaves more like an inductor**
- **The resistance of the electrolyte increases strongly with decreasing temperature.**

Specific impedance values are given in the individual data sheets.
Typical impedance drift versus frequency, see Fig. 8-9.

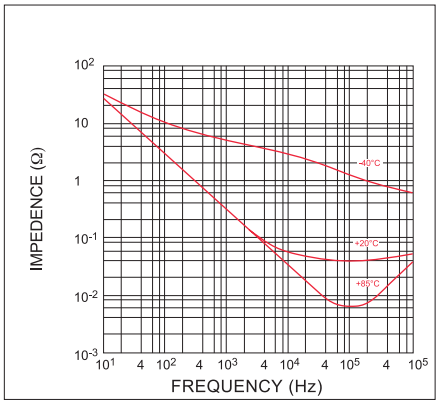
Z DRIFT VERSUS FREQUENCY LOW VOLTAGE (≤ 100 Vr DC)

Fig. 8



Z DRIFT VERSUS FREQUENCY HIGH VOLTAGE (> 100 Vr DC)

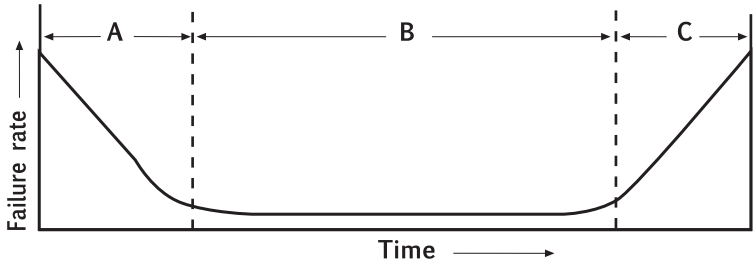
Fig. 9



RIPPLE CURRENT (RC)

It is defined as the superimposed alternated ripple current (sinusoidal alternating current at 100 Hz).
It depends mostly on an allowable temperature rise within a capacitor section due to the power relation formula: I^2 x R. Heating occurs, due to an alternating current flowing through the equivalent series resistance of capacitor. Actual power must be considered when defining ripple current capability. The thermal gradient of an aluminium foil capacitor in an aluminium can is 10^{-3} Watt/cm^2/°C. Since the ripple current raises the temperature of the capacitor it has a significant effect on the operational life of the component. A diagram of useful life specifies life under given operating conditions of different temperatures values and ripple current values.

With the advancements in aluminium electrolytic capacitor technology, the capacitors used in equipments must have a very long life characteristics and must operate even under severe conditions. A careful choice of a capacitor for a particular application and an adequate installation in the circuit will assure a good service life. In any case any component will eventually fail, usually this occurs due to a slow, steady drift of parameters called wear-out; sometimes there is a sharp change in capacitor properties also called catastrophic failure. In general terms the failure rate of aluminium electrolytic capacitors follows a bathtub curve with time as shown here.



The bathtub curve:
Three different areas are defined where capacitor life could be observed: A, B, C.

(A) Initial Failure Period

This is the period during which failures are caused by deficiencies in design, structure, manufacturing processes or severe applications. Such failures occur soon after the components are exposed to circuit conditions. In aluminium electrolytic capacitors, these failures are either corrected through aging or found during the 100% inspection processes and do not reach the field.
Initial failures due to a bad application of the capacitor such as inappropriate ambient conditions, over voltage, reverse voltage or excessive ripple current can be avoided with an adequate circuit design and careful installation.

(B) Random Failure Period (USEFUL LIFE)

Here the failure rate is low. During this period a constant failure rate is shown.
These failures are not related to operating time but to application conditions.
This period of useful life is normally calculated with a confidence level of 60%.

(C) Wear-Out Failure Period

In this period the properties of a component gradually deteriorate and the failure rate increases with time. Aluminium electrolytic capacitors end their useful life during this period.
Criteria for judging failures varies with application design factors.
Reliability represents this measure of the expected failure rate during the useful life of the capacitor.
Failure rate is defined as the number of components failing during a unit working time. It is expressed by following formula:
1 fit = 10^{-9}/hours (failure in time) also indicated as percentage of failures in 1000 hours.

λ= number of failures / (number of components tested x working time)

MTBF = 1/λ

MTBF (Mean Time Before Failure) could be calculated according to failure rate following the relashionship:
This value defines the failure frequency occurring on a large number of components inside an equipment, therefore is not suitable to predict failure on one single capacitor. Statistical calculations should be used instead. It is helpful as a design tool to determinate reliability features for components and complex systems.

EXAMPLE

A batch of 10000 capacitor tested, for 40000 operating hours, finding 4 failures. λ= 4/10000 x 1/40000 h = 10 fit = 0.001% /1000 hours

The failure rate calculation is derived from endurance tests at specified temperatures, taking into account all measurable and non-measurable defects arised. Kind of measurable defects are meant for each type of capacitor endurance test point. While non-measurable defects are meant to be open and short circuit, safety valve break or electrolyte leakage.
Ripple current and ambient temperature contribute to the internal temperature rise of the capacitor, so affecting its useful life. In general, every 10°C reduction in temperature carries a multiplier factor of two times the life value.

USEFUL LIFE

The typical useful life represents a period of time until the end of life of the capacitor. The end is caused by different incidents (or different failure modes) such as the following:

MECHANICAL FAILURES
Operation of safety vent due to overpressure, splitting of PVC sleeve and damaged insulation, unusable terminals, external short circuiting of terminals due to spilling of electrolyte.

OVER FAILURES
When a short or open circuit occurs.

ELECTRICAL CHARACTERISTICS FAILURES
In a group of capacitors considered to have reached the end when 3% of them have failed, useful life is influenced by following failure criteria:

END OF LIFE CRITERIA (for V ≤ 100V DC; all voltage capacitors with diameter ≤ 35 mm)
a) ESR > 3 times initial value
b) impedance > 3 times initial value
c) capacitance value change of greater than 30%
d) leakage current over initial limit

END OF LIFE CRITERIA (for V ≥ 160V DC and for capacitors with diameter ≥ 40 mm)
a) ESR > 1.75 times initial value
b) impedance > 1.75 times initial value
c) capacitance value change of greater than 15%
d) leakage current over initial limit

In some cases, it is possible that even larger values of the above indicated could be applied without leading to failure, but generally capacitors tested in the laboratory at Kendeil show standard behaviour around these limits.

Obviously, when operating at lower voltages together with moderate temperature as well as lower values of current, the final life expectation should be better.
When an adequate cooling system has been provided, the overall performance is substantially better and the life of the capacitor is improved.

In normal conditions, statistics are produced after extensive endurance tests compliant to standard specifications.
Depending of the type of capacitor, endurance tests have been undertaken over different lengths of time using capacitors coming from production batches. Data is collected and results summarized, so we have generated wide information displayed graphically for each model, which can be seen on each product datasheet. The useful lifetime regarding the ambient temperature is given by following practical formula:

$$\text{USEFUL LIFETIME} = L_{OPMAX} \times 2^{(Tmax+10-Tc)/10}$$

Where:
USEFUL LIFETIME expressed in hours
L_{OPMAX} = Lifetime at max rated operating temperature (eg.: 10000 hs at 85°C)
T_{max} = Actual operating temperature of the capacitors (eg.: 85°C for K01 type)
T_c = Temperature of the core = internal hot spot of the capacitor (°C)

EXAMPLE
For a capacitor that has an internal core temperature of 55.43 °C, at ambient temperature of 45 °C, the life, expected calculation gives the following:

USEFUL LIFETIME
= $10000 \times 2^{(85+10-55.43)/10}$
= $10000 \times 2^{3.956}$
= 155194 hours

NOTE
Applicable temperature range depends temperature on the capacitor type characteristics, usually situated in the operating range of -40°C to +85°C or 105°C . Typically, each 10°C step carries a reduction factor of 2 times the lifetime value.

Useful life is also determined by ripple current.
It is advisable not to apply a ripple current exceeding the max ripple current allowed as this will shorten capacitor life and may result in opening of the vent or catastrophic failure.
It often happens that heating due to ripple current is even more severe than ambient temperature stress.

SAFETY

Handling Terminals
Always be sure that a capacitor is totally discharged before handling it. To avoid any damage, don't overstress terminations during cutting, soldering or bending. If gas is detected while the product is in use, turn off the main power supply and unplug it.

Liquid Leakage
In case of activation of the safety vent, hot gas exceeding 100 °C will escape. Do not place your face in close proximity to the vent and avoid proximity to areas exposed to the gas. When an escape of electrolyte has occurred, wash the affected area with hot water. Use rubber gloves to avoid skin contact. Any contact with eyes should be immediately irrigated with water and medical advise is sought.
Kendeil electrolyte blends do not contain materials currently listed as carcinogetic or mutagenic such as polychlrolinated biphenyls (PCB) or dimethylformamide (DMF). No Butyrolactone used as solvent.
Under exposure to electrolyte skin could become dry. Other irritations or effects may be caused to the mucous membranes particularly eyes, where conjunctivitis may result.

FUMIGATION
In any case fumigation should not be done using halide compounds such as methyl bromide. Even when covered in plastic, chemicals may penetrate through small gaps, causing internal corrosion. Also when sterilizing against infectious diseases, do not spray it directly on or close to capacitors and equipment incorporating capacitors.

STORAGE
It is highly recommended to store capacitors at room temperature, in a dry place, out of direct sunlight.
Long-term storage atmosphere requires theese parameters: it should be free from halogen gases (like chlorine and fluorine) which presence could lead to internal corrosion, temperature range should stay between 5 °C and 40 °C at up to 75% relative humidity (non-condensing).
In case of having a capacitor exposed to high temperatures such as direct sunlight or heating elements, the capacitor life may be adversely affected. Also when capacitors have been stored under humid conditions for a long period of time, humidity will cause terminals to oxidize.
Note that in case of storage below the minimum temperatures, the electrolyte may has changed from liquid to solid and will need extra time to recover .
When capacitors have been stored above room temperature, the anode foil may react with the electrolyte causing increased leakage current values. Application of normal voltages to these capacitors may result in higher leakage current values, but in most cases, they will return to normal levels in short time.
However on occasion it is possible that a certain amount of gas will be generated which might cause the safety vent to open. Capacitors that have been stored for long time should be subjected to a voltage reforming process which will regenerate internal dielectric layers.

CLIMATIC CONDITIONS
All Kendeil capacitors maintain good behaviour under any climatic conditions when operating conditions are within the design specifications limits of each product type.
Since each capacitor is hermetically sealed, the wet element inside impregnated with electrolyte will not be exposed to external conditions such as high pressure or vacuum.
Furthermore, all electrical parameters such as impedance, leakage current, ESR and capacitance, will not be significantly changed by these external conditions.

Temperature range of Kendeil electrolytic capacitors (IEC 68-1):

Capacitor	Type	IEC 68-1 code	Temperature Range	
K01-K04-K07-K11-K21-K41-K61-K71-K91	screw type	GP	-40°C	85°C
K18	screw type	GP	-55°C	85°C
K02-K22-K42-K72-K92	screw type	GM	-40°C	105°C
K19	screw type	GM	-55°C	105°C
K05-K15-K25-K55-K75-K85-K95	snap in type	GM	-40°C	105°C
K06-K16-K26-K76	snap in type	GP	-40°C	85°C
K13	fast on (lug)	HS	-25°C	75°C

Air Pressure
When operating at low values of external air pressure, there could also be an increase in the pressure inside the case.
In case of an external vacuum, the pressure inside the capacitor could rise up to 1 bar, in these circumstances the internal vapour loss becomes greater resulting in an overall reduction in expected life.

Altitude
When in extreme altitude situations, consideration must be given to the shortening of capacitor life due to the reduced air density, preventing heat from being adequately dissipated from the external surfaces of the capacitor leading to an increase in internal temperatures.

CLEANING

Aluminium can be aggressively attacked by halide ions, particularly by chloride ions. Even small amounts of chloride ions inside the capacitor will cause corrosion which contributes to rapid capacitance drop and venting. Therefore, the prevention of chloride contamination is the most important check point for quality control in production. Solvent proof capacitors are required when halogenated hydrocarbons are used for cleaning. If aluminium electrolytic capacitors without the solvent-proof construction are present on the circuit board, alcohol-based solvents are recommended for cleaning.
In this case, solvents such as methanol, ethanol, propanol and isopropanol, isobutanol, propyleneglycolether, diethyleneglycol should be used. Normal tests show that any detrimental effect is eliminated. An alkaline detergent may damage the aluminium metal and marking.
Aqueous cleaning methods in conjunction with saponification are commonly used. However, it is advisable to dry immediately with hot air, which is best achieved at 85°C for few minutes.

MAINTENANCE AND SERVING

Periodical checkups should be conducted on capacitors. Before each examination, turn off the equipment and completely discharge the capacitor, then verify theese checkpoints:

- Appearance: condition of the vent (open, notably swollen), liquid leaks or other considerable abnormality.
- Electrical parameters: capacity, dissipation factor, leakage current, and other terms specified in the datasheets. Standard temperature for measuring electrical performance is 20 °C, reach this value before taking measurements.
- When finding a damaged capacitor or one that has reached the end of life, remember that mixing old and new capacitors may cause an imbalance in the ripple current or voltage sharing, risking failures such as activation of the vent or short circuit, so change them all.

INSULATION

The underlying notion is that our capacitors are projected with extended cathode, therefore current flow should be prevented through the can to either terminal and other surrounding circuit elements.
All capacitors are covered with a PVC sleeve that is used for marking, even if the sleeve present good accidental insulating properties, it degrades by oxidation over 65°C and after long period of time.
Kendeil's reccomendations for stud mounted capacitors are to use our approved plastic nut and washer, for snap in capacitors with non-electrified dummy pins, it is best not to ground them but rather to let them float.
We suggest you to provide an additional level of more durable insulation if permanent high voltage is applied.
For further informations conctact our technical department.

FLAMMABILITY OF CAPACITOR

Some component parts of a capacitor are suitable to burn depending on ambient temperature and adjacent elements, being made of plastic, PVC or other, even when classified as non flammable material.
In the table you find the main materials with self extinguish capability under normal circumstances:

PART	USE	MATERIAL	
DECK	for screw type terminal	Phenolic/Silica epoxy resin	No ignition non flammable
	for snap-in type terminal	Rubber bakelite coupled	No ignition non flammable
CAN	for Motor Start type K13 ONLY	Polycarbonate (plastic)	Ignition not self extinguishing
SLEEVE	all screw snap-in type	PVC or PET	No ignition
VENT PLUG	for screw type terminal only	Silicon	Ignition non flammable
ELECTROLYTE	all internal wound elements in each capacitor	Glycol based (*)	Not flammable

(*) NOTE FOR ELECTROLYTE
Kendeil uses glycol based electrolyte through all ranges of products.
The impregnation process is computer controlled with supervisor agent software to assure the correct time and level of electrolyte needed by each single capacitor.
Different kinds of electrolyte blends are being used, especially designed for low voltage, medium voltage and high voltage range.
Each production batch is controlled in the internal laboratory to test the specifications of recipes.

<120V	120V - 400V	>400V
LOW VOLTAGE	MEDIUM VOLTAGE	HIGH VOLTAGE

(*1) Flash point is defined as the lowest temperature at which a flame is ignited.
In our case, no flammable behaviour is possible as the rated class of capacitors are under that value.

FLAMMABILITY OF ELECTROLYTES

According to the European Directive 67/548/CEE, its annexes, its amendments and its supplements, flammability characteristics is defined as follows:

Flash point	Flammability characteristics
21-55°C	Flammable
0-21°C	Highly flammable
<0°C	Extremely flammable

All electrolytes used are Glycol based and have Flash Point > 55°C.
Therefore they can be considered as Non Flammable Electrolytes and Self extinguishing capacitors in accordance to below standards.
Kendeil is compliant to the followings IEC norms:
IEC 60695-2-2 and recent updates IEC 60695-11-5, IEC 60695-11-10 Fire hazard testing.

ACTIVE & PASSIVE FLAMMABILITY

Active: Although unlikely, there can be cases in which a capacitor auto ignite, some applications can produce high hydrogen quantities, in this condition a random spark start a fire. Other types of overload, faulty capacitor or exceptional situations can catch a fire. So this kind of condition cannot be 100% excluded and we warn to take special criteria when critical application are needed.

Passive: Our screw terminal and snap in capacitor (all with PVC insulation) fulfil the rigid A-category parameters from IEC-60384-1 standard. Of course when subjected to external hazard element (fire, electricity...) some part of capacitor could ignite, so we referee to clause 4.38 of IEC-60384-1 standard that also refers to IEC 60695-11-5 in passive flammability section.

POLARITY

In DC applications polarity is required; if polarity is reversed, the circuit life will be shortened or the capacitor may be damaged. Generally, an intermittent reverse voltage of 1V DC is allowed.
If during operation, it is possible that polarity could be reversed or unknown, extensive use of a bipolar capacitor is required.

CHARGE - DISCHARGE APPLICATIONS

Charge - Discharge Duty and High Peak-to-Peak Voltage
Charge - Discharge application can generate overheating or overpressure effects on electrolytic capacitors and reduce performances and life. Custom capacitor solutions designed for these specific uses are required, contact us to select the most appropriate item.
Kendeil aluminium electrolytic capacitors are suitable for circuits in which a charge and discharge cycle is requested. The frequent cycles due to a charge or discharge operation could take some drop of capacitance value. In general one million of switching with rated voltage one cycle for second a time costant of 0.1 carries an overall capacitance decrease less then 10%.

TRANSIENT

Ripple Current Transients and High Inrush Current
Transient current abuse, not detected by thermal transient parameters, can cause deterioration of Aluminium electrolytic capacitors resulting in failure. Please contact us to discuss the best capacitor for the application.
High inrush current, especially applied to snap-ins during the first charge cycle after soldering, can increase the leakage current of aluminium electrolytic capacitors causing circuital voltage and current unbalancing. Please contact us to discuss the best solution for the application.

Transient Overvoltage
Transient spikes over nominal voltage can generate a degradation of electrical performances of aluminium electrolytic capacitors with a high possibility of failure. Please contact us to discuss the best capacitor for the application.

BALANCING RESISTORS

In Series, Parallel and Group Connections.
The following explanation is given for a typical connection scheme, when two capacitors have been connected in series, this is a brief approach answering to the question “How much could be the maximum voltage applied to a capacitor?”
If we have two capacitors of 400V rated with ±20% tolerance range each.
Total voltage applied is 800V (Vcircuit), in the best situation each capacitor is well balanced.
Anyway the maximum and minimum values due to the tolerance range is then put in the formula.
It is easy to calculate the maximum exposing voltage to whom the minimum capacitor could be applied.

$$V_{MINCAP} = V_{CIRCUIT} \times (1+20\%) / (MIN_{TOLERANCE} + MAX_{TOLERANCE})$$

Using the values from example, we have: $V_{MINCAP} = 800 \times 1.2 / (0.8 + 1.2) = 480V$
This is the real maximum voltage value applied to the capacitor in a serial connection. It is strongly recommended to use a resistor that would share the over-voltage.
In the practical field of designing these kind of circuits, we have found that a good balancing system could be obtained using the following formula in which only the capacitor value is required.
We assume that a current from 15 to 20 times the leakage current value would be flowing in the resistor, therefore a simple relationship could be applied:

$$\text{Balancing Resistor [k}\Omega\text{]} = 60{,}000 / \text{Capacitance [}\mu\text{F]}$$

The resistor should have very good characteristic, usually with tolerance range of ±5% but better tolerance range is preferred when dealing with high transients and a top level performance is required. When designing high current applications, a parallel configuration should be preferred.

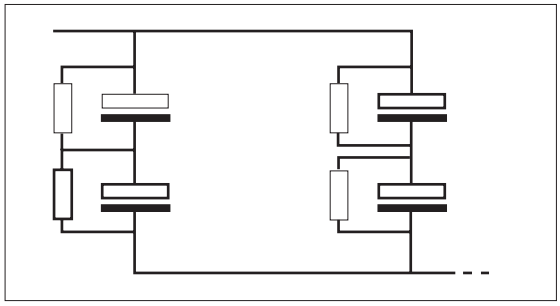
CONFIGURATION SCHEMES

Capacitor	Balancing Resistor
470 µF	127 k Ω
680 µF	88 k Ω
1000 µF	60 k Ω
2200 µF	27 k Ω
4700 µF	13 k Ω
6800 µF	9 k Ω
10000 µF	6 k Ω

Practical table

Three ways of connecting balancing resistors are implemented in the industry, depending on design and experience. They have important features that must be borne in mind for the appropriate performances required.

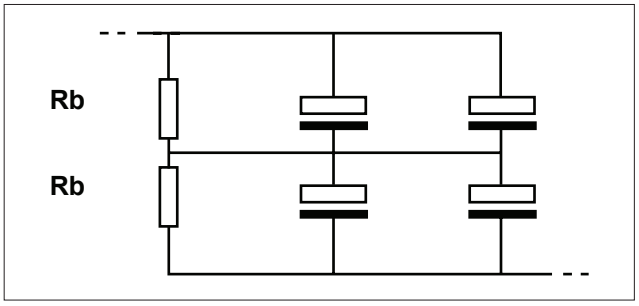
Single balancing resistor



(+) Plus features
When one capacitor fails, the adjacent capacitor will probably fail too, but the other capacitor will remain undamaged.

(-) Minus features
There are many resistors to be placed in the circuit.

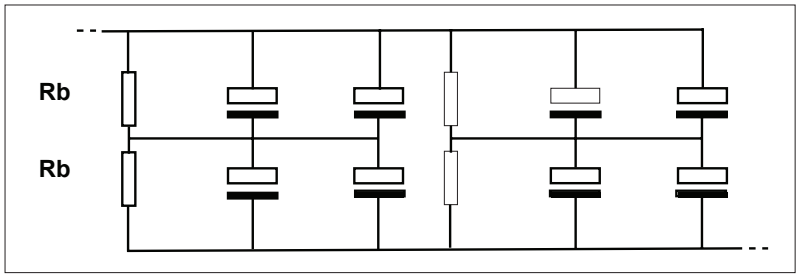
Two parallel resistors



(+) Plus features
A better balancing system is achieved with "the most parallel capacitors used". The total leakage current as the sum of the single branches components gives a very good balancing system.This configuration needs only two resistors and since the delta LC would be a very small value, it could be realized also without any resistor.

(-) Minus features
When one capacitor fails, the parallel branch in which it is operating will also fail as the total voltage will be applied under operating voltage conditions.

Group balancing resistors



This topology combines the advantages and disadvantages
Of the individual variants.

Before assembling a capacitor bank, it is always recommended to:
· Use items from the same batch to have similar values of electrical parameters (capacitance, ESR, leakage current)
· Ensure equal conditions (current, voltage, temperature) are applied to all items
This will ensure balanced stresses and will reduce the risk of reduced lifetime and failures.

MOUNTING HARDWARE GUIDELINES

BEFORE CAPACITORS INSTALLATION

Kendeil reccomends to follow below steps, please read the following information carefully:

- Prior to handling a capacitor be sure it is totally discharged.
- Check the specifications of the capacitors and compare them with the project's specifications.
- Do not reverse the polarity.
- Do not use a capacitor where reverse voltage is applied.
- Do not drop or otherwise impact a capacitor to avoid decline in its electric performances.
- Do not use any capacitor whose packaging has a noticeable abnormality on delivery.
- Do not deform the shape of the capacitor, this could lead major failures such as liquid leakage or short circuit.

Not taking these precautions could lead to a major failure.

INSTALLATION METHOD

Soldering Snap-In

Please read the following information carefully.

- When soldering a on PCB, the temperature should not be excessive while time taken should be short. Otherwise it could have adverse effects on the electrical characteristics and insulating sleeves.
- During the soldering process, the sleeve may melt or break if it gets in contact with circuit board traces. Try to avoid this problem and do not locate circuit board traces under capacitor body.
- The sleeves may be melted by solder which migrates up through terminations holes in the circuit board.
- Do not exert any mechanical force like bending, straightening, twisting or tilting of capacitors during and after soldering into a printed circuit board.
- When soldering adjacent components to the capacitor, preheated lead wires or terminals may tear the capacitor sleeve if they come in contact with it. Therefore, capacitors are to be mounted carefully so that adjacent components terminations do not come into contact, particularly when mounting on through-hole circuit boards. For snap-in type capacitors: our products are in line with IEC standard and it means a resistance to soldering heat defined for solder bath method 260°C 10 s.

Mounting Screw Type Capacitors:

To fix our flat bottom capacitor use clamping rings coupled with an insulating layer between capacitor's can and the ring.
Special attention has to be applied in assembling case of stud capacitors.
The threaded stud termination (M8 or M12) is the bottom part of capacitor's can and it's in electrycal contact with negative end termination of capacitor.
Please use our plastic nut and plastic washer or other well protected system in order to avoid short circuit between stud and assembling frame.
Can and stud are in electrical contact with negative end termination. Can is covered by sleeve, designed to prevent accidental short circuit during maintenances or assembling operation.
Air gap between capacitors and machinery's electrical parts, active parts or machinery's frame has to be taken into consideration for good insulation as defined to many standards of machines.

MECHANICAL STRESS

Snap-In

Improper insertion into the circuit boards may break the terminals or impair their electrical connections with the internal elements. When provided, blank terminals of a multi-terminal capacitor should be considered to be at the same potential as the electrolyte, or cathode, and should therefore be isolated from the circuit. The distance between terminations holes on the circuit board should be the same as the spacing between terminations on the capacitor, if the termination cannot be mounted easily don't use extra force to insert capacitors.

Screw Type

Excessive torque force applied in tightening the screws into terminals will result in stripping the threads and possibly increasing the contact resistance. On the other hand, if screws are not enough tightened enough, the high contact resistance will cause localized heating at terminals plus an early failure of the capacitor.

Terminal	Recommended Torque [N/m]
M5 Insert	2
M6 Insert	4
UNF 10-32 Insert	2
UNF ¼ 4-28 Insert	4
M8 Stud	4
M12 Stud	8

POSITION OF THE PRESSURE-RELIEF VENT

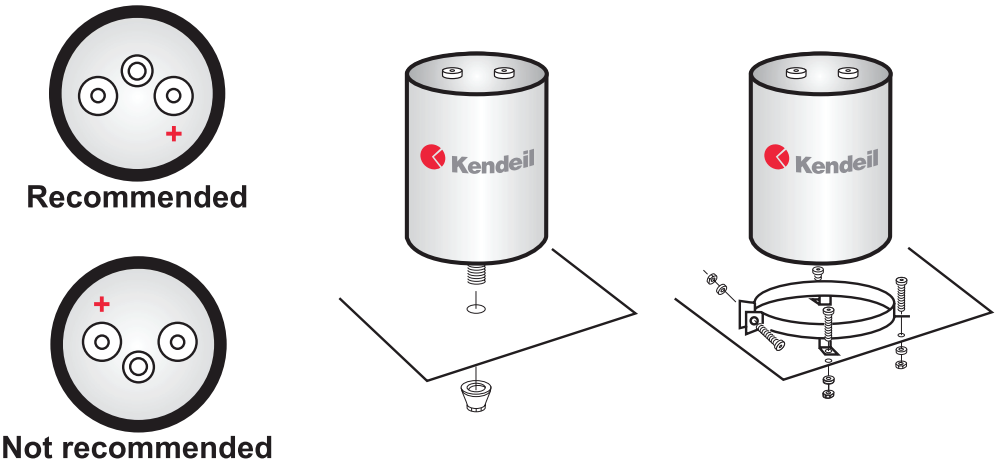
During normal operation electrolytic capacitors are subjected to an internal generation of gas due to heating combined with the inside pressure. Therefore a safety vent is provided to prevent catastrophic failure.
Place the capacitors so that anyone working on the equipment would be protected from the hot vapor in the event that a vent was to operate.
Do not install wiring or a circuit pattern near the vent. When the vent is activated, electrolyte may spurt out resulting in short circuit followed by fire or other secondary hazard.
Do not hinder the activation of the vent. Make room for clearance above the vent. If dissipation of gas is inhibited while the vent is in operation, the inner pressure will rise, with danger of explosion, fire or other major failure.
The overall characteristic parameters such as capacitance, ESR, currents, etc. remain the same whatever is the orientation, but once the vent has been blown, an eventual overflow of electrolyte could damage importants parts of the circuit.
Furthermore, a good cooling system must be designed. Consideration must be given as to where to place the circuits especially when dealing with high ripple currents; the area around electrolytic capacitors should be well aired with enough distance between the radiant elements, both for maintenance and for security reasons.

Snap-In

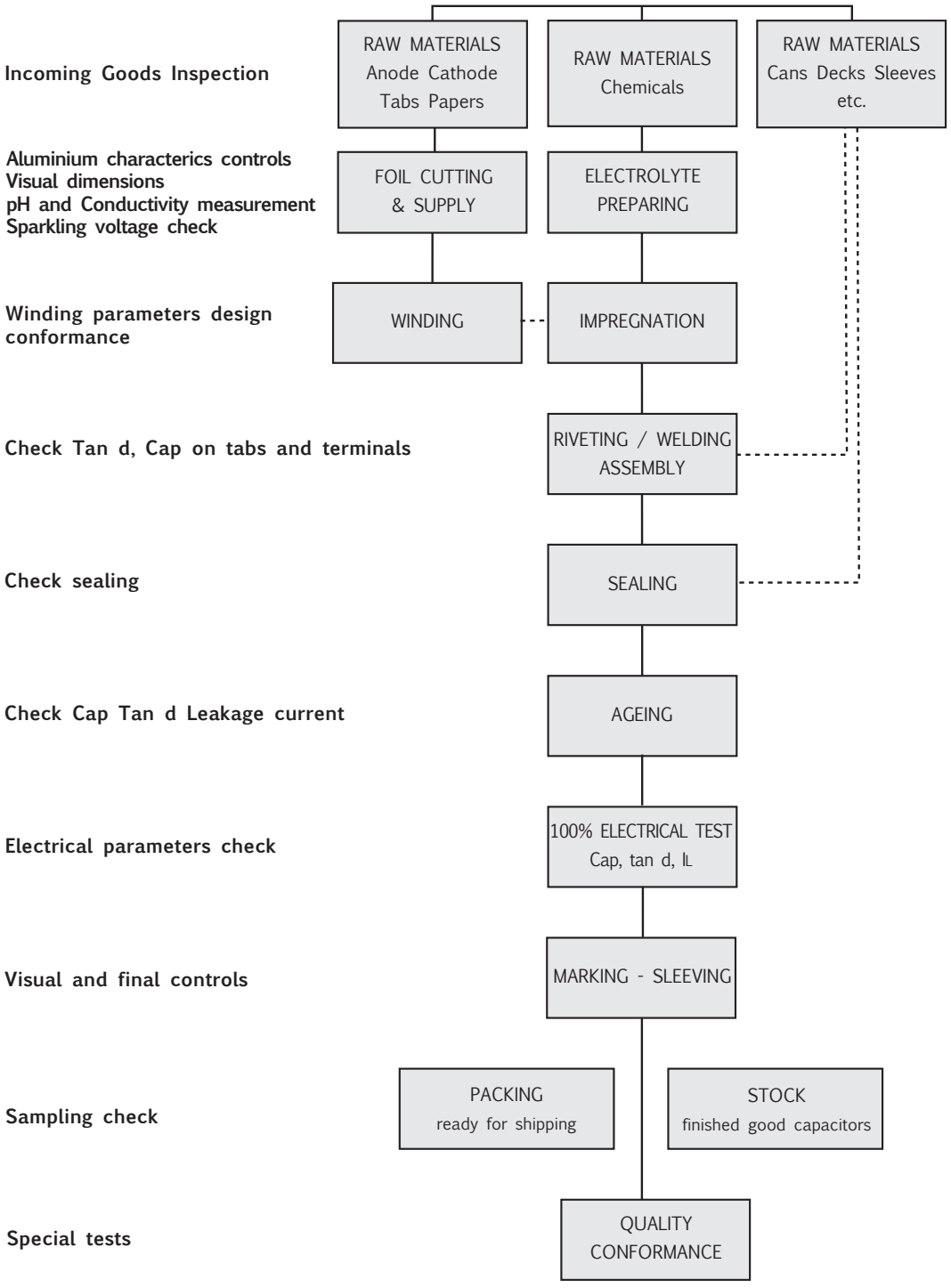
Do have a kind of vent, realized as a weakened area in the base of the alum can, sometimes also by side, that will release the possible growth of excess pressure. Usually board mounted type are easily fixed by their own terminals, and so no special mounting hardware is then required.
When mounting the capacitor, it should be borne in mind that in the event of the vent being blown under failure conditions, a small quantity of hot conductive electrolyte and vapours can, in some cases, flow out from the vent, so the position is important and the can should be carefully located. If possible, we recommend that capacitors are mounted with the safety vent uppermost.
M minimum air gap between capacitor's top and machinery's parts of 4 mm are needed due to safety vent position.

Screw Type

Have been provided with a safety vent plug on the deck, a tiny rubber capsule designed to support a critical bursting pressure up to 8 bar. To fix these capacitors use the appropriate mounting clamps furnished in different diameter size.
The best orientation is upright with terminals up. If mounted horizontally, orient the pressure-relief vent plug at the 12-o'clock position so that least amount of electrolyte will be expelled if the vent operates. Do not mount with terminals down as this may reduce the operating life and could impair the operation of the pressure-relief vent.
In any case, screws terminal capacitors can be mounted in any position so long as the vent is free to operate.



MANUFACTURING CONTROL FLOW



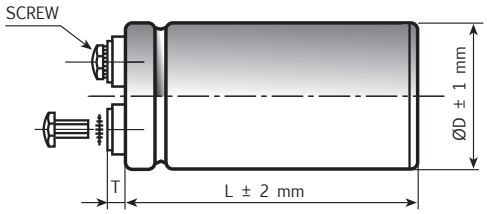
K01 TYPE -40°C +85°C 15000H

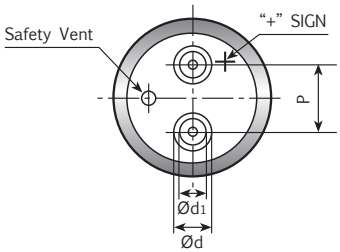
RoHS Compliant

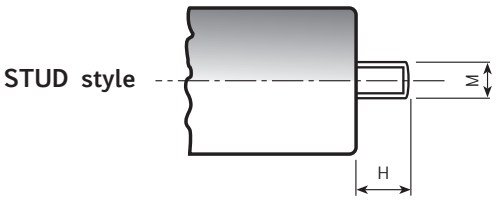
- Surge-proof capacitor in aluminium can with insulation sleeve.
- Poles brought out to heavy duty screw terminals.
- To be mounted with ring clips or with threaded stud.
- Very high CV for unit volume with low ESR.
- High ripple current.
- Excellent electrical data in small dimensions case size.

APPLICATIONS

Designed for professional power electronics.
Switch mode power supplies, converters, filtering devices.







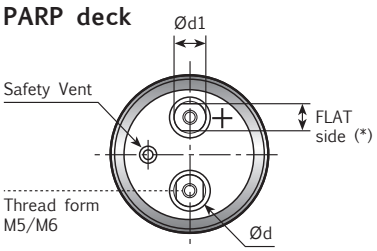


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K01 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 16V to 500V DC
Surge Voltage (V_p)	$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.15\ V_r$ ($V_r \leq$ 250V DC) $V_p = 1.10\ V_r$ (V_r > 250V DC)
Rated Capacitance Range	from 220 µF to 1500000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$ At 85°C max $I_L = 0.04\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz. For different temperature and frequency multiplier must be used as follows: FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Maximum internal temperature 98°C Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 35mm 51mm 63mm 76mm 90mm Maximum current 20A 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 200000 h at 40°C > 12000 h at 85°C for $V_r \leq$ 100V and for $V_r \geq$ 500V > 15000 h at 85°C for 100V < V_r < 500V
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 25 fit (25 10^{-9}/h) ($V_r \leq$ 160V DC) ≤ 33 fit (33 10^{-9}/h) (V_r > 160V DC)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
33000	35x79	0,4	15	13	10,2	K01016333__M0E079	16V
47000	35x79	0,55	13	12	10,8	K01016473__M0E079	
47000	51x79	0,55	13	12	12,5	K01016473__M0G079	
68000	51x79	0,6	12	11	15,7	K01016683__M0G079	
100000	51x79	0,8	10	11	16,5	K01016104__M0G079	
100000	51x105	0,8	10	10	18,7	K01016104__M0G105	
150000	51x105	1,1	10	9	19,5	K01016154__M0G105	
150000	63x105	1,1	10	9	21,5	K01016154__M0H105	
220000	63x105	1,5	8	8	22,4	K01016224__M0H105	
330000	63x105	1,9	8	8	23,3	K01016334__M0H105	
330000	76x105	1,9	8	8	25	K01016334__M0J105	
470000	76x105	1,9	5	5	28,5	K01016474__M0J105	
470000	76x143	1,9	5	5	32	K01016474__M0J143	
680000	76x143	2,5	4	4	32,5	K01016684__M0J143	
1000000	76x143	2,5	3	3	34,5	K01016105__M0J143	
1500000	90x220	3	3	3	48,7	K01016155__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0,25	27	21	5,9	K01025103__M0E060	25V
15000	35x60	0,28	16	12	9,3	K01025153__M0E060	
22000	35x60	0,3	17	15	10,2	K01025223__M0E060	
22000	35x79	0,35	18	16	11,8	K01025223__M0E079	
33000	35x60	0,38	16	15	12,5	K01025333__M0E060	
33000	35x79	0,4	15	14	12,1	K01025333__M0E079	
33000	51x79	0,4	15	14	13,3	K01025333__M0G079	
47000	35x79	0,47	14	15	13	K01025473__M0E079	
47000	51x79	0,5	12	10	15,7	K01025473__M0G079	
56000	35x79	0,55	11	10	17,1	K01025563__M0E079	
68000	51x79	0,6	10	9	16,4	K01025683__M0G079	
68000	51x105	0,6	10	9	18,7	K01025683__M0G105	
100000	51x79	0,7	10	9	18,5	K01025104__M0G079	
100000	51x105	0,7	10	9	19,5	K01025104__M0G105	
100000	63x105	0,7	10	9	21,5	K01025104__M0H105	
120000	51x79	0,75	10	9	19,2	K01025124__M0G079	
150000	51x105	0,8	10	9	20,9	K01025154__M0G105	
150000	63x105	1	9	9	22	K01025154__M0H105	
150000	76x105	1	9	9	23,5	K01025154__M0J105	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
220000	63x105	0,85	9	9	23,5	K01025224__M0H105	25V
220000	76x105	1,5	9	9	24,2	K01025224__M0J105	
220000	76x143	1,5	9	9	28,5	K01025224__M0J143	
330000	76x105	1,5	9	9	27,8	K01025334__M0J105	
330000	76x143	2	9	9	30,5	K01025334__M0J143	
470000	76x143	2	9	9	33,4	K01025474__M0J143	
470000	76x214	2	5	5	35,6	K01025474__M0J214	
680000	76x214	2,2	5	5	35,8	K01025684__M0J214	
1000000	90x220	2,5	5	4	38,3	K01025105__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0,2	18	12	6,5	K01040103__M0E060	40V
15000	35x60	0,25	13	10	7,4	K01040153__M0E060	
15000	35x79	0,25	13	10	8,6	K01040153__M0E079	
22000	35x79	0,3	16	14	8,9	K01040223__M0E079	
22000	51x79	0,3	16	14	10,4	K01040223__M0G079	
33000	35x79	0,3	15	14	10,6	K01040333__M0E079	
33000	51x79	0,35	15	13	13,5	K01040333__M0G079	
47000	51x79	0,4	10	9	14,2	K01040473__M0G079	
47000	51x105	0,4	10	9	15,1	K01040473__M0G105	
47000	63x105	0,4	10	9	17,6	K01040473__M0H105	
68000	51x79	0,4	14	13	14,4	K01040683__M0G079	
68000	51x105	0,5	10	8	18,2	K01040683__M0G105	
68000	63x105	0,5	10	8	19,5	K01040683__M0H105	
82000	51x105	0,55	9	8	18,4	K01040823__M0G105	
100000	63x105	0,6	9	8	21,2	K01040104__M0H105	
150000	63x105	0,8	9	8	19,1	K01040154__M0H105	
150000	76x105	0,9	9	8	25,7	K01040154__M0J105	
220000	76x105	1	8	7	26,8	K01040224__M0J105	
220000	76x143	1	6	6	31,5	K01040224__M0J143	
330000	76x143	1,1	5	5	35,5	K01040334__M0J143	
330000	76x214	1,2	5	5	38,5	K01040334__M0J214	
470000	76x214	1,3	3	3	42	K01040474__M0J214	
680000	90x220	1,3	3	3	45,6	K01040684__M0L220	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0,2	33	30	5,6	K01050472__M0E060	50V
6800	35x60	0,2	25	24	7	K01050682__M0E060	
10000	35x60	0,2	21	20	10	K01050103__M0E060	
12000	35x60	0,25	15	15	10,6	K01050123__M0E060	
15000	35x79	0,25	17	15	11,3	K01050153__M0E079	
22000	35x79	0,3	16	15	11,5	K01050223__M0E079	
22000	51x79	0,3	16	13	13,1	K01050223__M0G079	
33000	51x79	0,35	14	14	14,2	K01050333__M0G079	
33000	51x105	0,35	15	13	16	K01050333__M0G105	
47000	51x79	0,4	14	14	14,2	K01050473__M0G079	
47000	51x105	0,4	12	10	16,2	K01050473__M0G105	
47000	63x105	0,4	12	10	18,3	K01050473__M0H105	
68000	51x105	0,5	12	10	18,2	K01050683__M0G105	
68000	63x105	0,6	12	9	18	K01050683__M0H105	
68000	76x105	0,6	12	9	22,1	K01050683__M0J105	
100000	63x105	0,6	12	10	19,1	K01050104__M0H105	
100000	76x105	0,9	8	8	23,8	K01050104__M0J105	
100000	76x143	0,9	8	8	25,8	K01050104__M0J143	
150000	76x105	1	6	6	30,5	K01050154__M0J105	
150000	76x143	1	6	6	31,5	K01050154__M0J143	
220000	76x143	1,2	5	5	40,3	K01050224__M0J143	
330000	76x214	1,3	3	3	50,8	K01050334__M0J214	
470000	90x220	1,3	2	3	70,8	K01050474__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0,15	29	25	6,2	K01063472__M0E060	63V
6800	35x60	0,18	21	20	7	K01063682__M0E060	
10000	35x60	0,2	19	18	8,5	K01063103__M0E060	
10000	35x79	0,2	21	20	8,7	K01063103__M0E079	
10000	51x79	0,2	18	16	10,1	K01063103__M0G079	
15000	35x79	0,25	18	16	10	K01063153__M0E079	
15000	51x79	0,25	15	13	11,1	K01063153__M0G079	
22000	51x79	0,3	13	11	12,4	K01063223__M0G079	
22000	51x105	0,3	13	11	14,6	K01063223__M0G105	
33000	51x105	0,35	11	10	15,6	K01063333__M0G105	
33000	51x79	0,35	14	14	14,2	K01063333__M0G079	
33000	63x105	0,35	11	10	17,9	K01063333__M0H105	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
47000	51x105	0,45	10	9	15,8	K01063473__M0G105	63V
47000	63x105	0,45	11	10	18,8	K01063473__M0H105	
68000	76x105	0,5	11	10	25,7	K01063683__M0J105	
100000	76x105	0,55	8	8	31,5	K01063104__M0J105	
100000	76x143	0,55	8	8	34,5	K01063104__M0J143	
150000	76x143	0,6	6	6	36,1	K01063154__M0J143	
220000	76x214	0,7	5	5	38,2	K01063224__M0J214	
330000	90x220	0,9	2	3	56,3	K01063334__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0,15	29	25	5,4	K01075472__M0E060	75V
6800	35x60	0,2	22	21	6,7	K01075682__M0E060	
6800	35x79	0,18	20	20	8,5	K01075682__M0E079	
10000	35x79	0,25	19	18	9,2	K01075103__M0E079	
10000	51x79	0,2	18	16	11	K01075103__M0G079	
12000	35x79	0,25	19	18	9,7	K01075123__M0E079	
15000	51x105	0,25	15	13	12,7	K01075153__M0G105	
15000	51x79	0,25	12	11	15	K01075153__M0G079	
22000	51x79	0,3	12	11	13,9	K01075223__M0G079	
22000	51x105	0,3	12	11	15,2	K01075223__M0G105	
22000	63x105	0,3	12	11	16,2	K01075223__M0H105	
33000	63x105	0,35	11	10	16,8	K01075333__M0H105	
33000	51x105	0,35	11	10	18	K01075333__M0G105	
33000	76x105	0,35	11	10	18,5	K01075333__M0J105	
47000	63x105	0,4	10	10	20	K01075473__M0H105	
47000	76x105	0,45	10	10	20,1	K01075473__M0J105	
47000	76x143	0,45	10	10	22,1	K01075473__M0J143	
68000	63x105	0,6	10	10	18,7	K01075683__M0H105	
68000	76x143	0,6	10	10	26	K01075683__M0J143	
100000	76x105	0,6	8	8	24,8	K01075104__M0J105	
100000	76x143	0,6	8	8	34,9	K01075104__M0J143	
150000	76x143	0,7	5	5	38,8	K01075154__M0J143	
220000	76x143	0,75	3	2	40,1	K01075224__M0J143	
270000	90x220	0,76	3	3	48,6	K01075274__M0L220	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	35x60	0.15	84	65	4.0	K01100152__M0E060	100V
2200	35x60	0,15	57	47	5	K01100222__M0E060	
3300	35x60	0,15	48	39	5,3	K01100332__M0E060	
3300	35x79	0,15	48	39	6,8	K01100332__M0E079	
4700	35x79	0,15	30	26	7,5	K01100472__M0E079	
4700	51x79	0,15	30	26	10	K01100472__M0G079	
6800	51x79	0,2	23	20	11,1	K01100682__M0G079	
10000	51x79	0,2	16	14	11,9	K01100103__M0G079	
10000	51x105	0,2	16	14	13,9	K01100103__M0G105	
10000	63x105	0,2	16	14	14,5	K01100103__M0H105	
15000	51x105	0,25	13	12	14,8	K01100153__M0G105	
15000	63x105	0,25	13	12	17,5	K01100153__M0H105	
22000	63x105	0,25	12	12	18,2	K01100223__M0H105	
33000	76x105	0,25	10	10	23,1	K01100333__M0J105	
47000	76x143	0,3	10	9	30,2	K01100473__M0J143	
68000	76x143	0,3	8	8	36,5	K01100683__M0J143	
68000	76x214	0,4	6	5	39,5	K01100683__M0J214	
4700	35x60	0,15	30	26	6,6	K01100472__M0E060	
6800	35x79	0,18	24	21	9,3	K01100682__M0E079	
15000	51x79	0,25	15	14	13,5	K01100153__M0G079	
22000	51x105	0,3	13	12	17,2	K01100223__M0G105	
33000	63x105	0,3	13	13	18,6	K01100333__M0H105	
47000	76x105	0,4	9	9	29,8	K01100473__M0J105	
100000	76x214	0,4	5	5	46,4	K01100104__M0J214	
150000	90x220	0,45	3	3	62,4	K01100154__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	35x60	0,1	128	102	3,2	K01160681__M0E060	160V
820	35x60	0,12	113	88	3,5	K01160821__M0E060	
1000	35x60	0,12	94	76	3,9	K01160102__M0E060	
1000	35x79	0,1	98	90	4	K01160102__M0E079	
1500	35x60	0,2	107	86	3,9	K01160152__M0E060	
1500	35x79	0,12	72	70	5,3	K01160152__M0E079	
1500	51x79	0,1	62	71	5,3	K01160152__M0G079	
2200	35x79	0,19	70	66	5,1	K01160222__M0E079	
2200	51x79	0,1	50	43	7	K01160222__M0G079	
3300	51x79	0,14	41	36	6,6	K01160332__M0G079	
3300	51x105	0,12	35	30	8,6	K01160332__M0G105	
4700	51x79	0,14	40	35	8,3	K01160472__M0G079	
4700	51x105	0,12	25	25	10,9	K01160472__M0G105	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	63x105	0,12	25	25	11,9	K01160472__M0H105	160V
6800	51x105	0,12	21	22	11,4	K01160682__M0G105	
6800	63x105	0,12	20	22	13	K01160682__M0H105	
10000	63x105	0,14	27	25	12,9	K01160103__M0H105	
10000	76x105	0,15	13	12	17,4	K01160103__M0J105	
10000	76x143	0,15	13	12	19,4	K01160103__M0J143	
15000	76x105	0,3	16	14	16,9	K01160153__M0J105	
15000	76x143	0,15	11	10	20,9	K01160153__M0J143	
22000	76x143	0,2	10	10	26,4	K01160223__M0J143	
33000	76x214	0,2	8	8	34,1	K01160333__M0J214	
47000	90x220	0,3	5	5	30	K01160473__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	35X60	0,1	124	119	3,4	K01200681__M0E060	200V
820	35x60	0,11	113	77	3,4	K01200821__M0E060	
1000	35x79	0,1	86	88	3,5	K01200102__M0E079	
1000	35x60	0,12	65	66	3,9	K01200102__M0E060	
1500	35x60	0,2	106	85	3,7	K01200152__M0E060	
1500	35x79	0,12	62	44	5,4	K01200152__M0E079	
1500	51x79	0,1	60	63	5,8	K01200152__M0G079	
2200	35x79	0,19	69	55	5,1	K01200222__M0E079	
2200	51x105	0,1	40	37	7,2	K01200222__M0G105	
2200	51x79	0,13	46	33	7,8	K01200222__M0G079	
3300	51x105	0,12	32	30	9	K01200332__M0G105	
3300	63x105	0,12	31	29	10,2	K01200332__M0H105	
4700	51x79	0,24	41	35	8,3	K01200472__M0G079	
4700	51x105	0,12	28	26	10,4	K01200472__M0G105	
4700	63x105	0,12	27	25	11,1	K01200472__M0H105	
5600	63x105	0,12	21	18	12,1	K01200562__M0H105	
6800	63x105	0,12	20	16	13,9	K01200682__M0H105	
6800	76x105	0,12	19	15	14,3	K01200682__M0J105	
8200	76x105	0,12	16	14	14,8	K01200822__M0J105	
10000	63x105	0,28	23	20	14,4	K01200103__M0H105	
10000	76x105	0,15	13	12	15,8	K01200103__M0J105	
10000	76x143	0,15	13	12	18,6	K01200103__M0J143	
15000	76x105	0,3	16	14	19	K01200153__M0J105	
15000	76x143	0,18	12	12	21,4	K01200153__M0J143	
22000	76x143	0,18	9	9	28,9	K01200223__M0J143	
33000	76x214	0,22	8	8	36,1	K01200333__M0J214	
47000	90x220	0,29	5	5	35,4	K01200473__M0L220	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	35x60	0,1	211	200	2,8	K01250471__M0E060	250V
680	35x60	0,11	125	94	3,4	K01250681__M0E060	
680	35x79	0,1	127	121	3,5	K01250681__M0E079	
1000	35x60	0,11	120	91	3,5	K01250102__M0E060	
1000	35x79	0,1	86	88	4,1	K01250102__M0E079	
1500	35x79	0,11	79	70	4	K01250152__M0E079	
1500	51x79	0,1	64	56	5	K01250152__M0G079	
2200	51x105	0,1	40	36	7,5	K01250222__M0G105	
3300	51x105	0,12	31	26	9,8	K01250332__M0G105	
3300	63x105	0,12	30	25	11	K01250332__M0H105	
4700	51x105	0,11	30	26	10,5	K01250472__M0G105	
4700	63x105	0,12	24	21	11,8	K01250472__M0H105	
4700	76x105	0,12	20	18	13,2	K01250472__M0J105	
5600	76x105	0,12	17	16	13,8	K01250562__M0J105	
6800	63x105	0,15	20	19	14,1	K01250682__M0H105	
6800	76x105	0,12	15	13	14,7	K01250682__M0J105	
8200	76x143	0,12	14	13	16	K01250822__M0J105	
10000	76x105	0,17	14	10	15,8	K01250103__M0J105	
10000	76x143	0,13	13	12	19,7	K01250103__M0J143	
15000	76x143	0,13	11	11	21,9	K01250153__M0J143	
22000	76x214	0,14	10	9	34,2	K01250223__M0J214	
27000	90x220	0,22	6	6	38,9	K01250273__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	35X60	0,1	170	136	3,3	K01350471__M0E060	350V
680	35X79	0,1	108	95	4	K01350681__M0E079	
1000	35x79	0,11	85	68	4,8	K01350102__M0E079	
1000	51x79	0,1	79	62	5	K01350102__M0G079	
1000	51x105	0,1	79	62	5,5	K01350102__M0G105	
1500	51x79	0,11	60	53	6,3	K01350152__M0G079	
1500	51x105	0,1	60	52	7,4	K01350152__M0G105	
2200	51x79	0,11	46	42	8	K01350222__M0G079	
2200	51x105	0,1	44	40	9	K01350222__M0G105	
2200	63x105	0,1	37	34	9,5	K01350222__M0H105	
3300	63x105	0,12	26	22	10,1	K01350332__M0H105	
3300	76x105	0,12	26	22	12,8	K01350332__M0J105	
4700	63x105	0,12	27	21	13,1	K01350472__M0H105	
4700	76x105	0,12	17	16	14,5	K01350472__M0J105	
4700	76x143	0,12	17	16	17,5	K01350472__M0J143	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
5600	76x105	0,12	18	18	13,3	K01350562__M0J105	350V
5600	76x143	0,12	17	16	18,5	K01350562__M0J143	
6800	76x105	0,13	16	11	14	K01350682__M0J105	
6800	76x143	0,12	16	15	19,2	K01350682__M0J143	
8200	76x143	0,12	16	15	20,7	K01350822__M0J143	
10000	76x143	0,12	15	15	23	K01350103__M0J143	
10000	76x214	0,14	15	14	26,6	K01350103__M0J214	
15000	76x214	0,15	14	14	31,7	K01350153__M0J214	
22000	90x220	0,2	13	13	35,4	K01350223__M0L220	

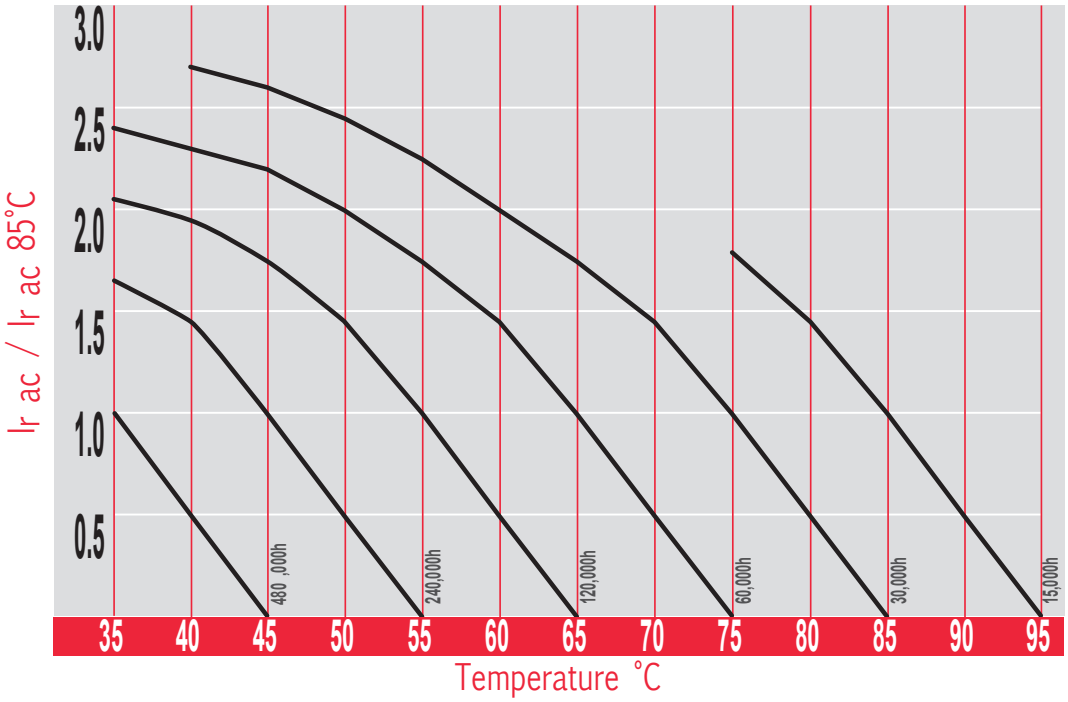
Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
220	35x60	0,1	350	288	2,1	K01400221__M0E060	400V
330	35x60	0,1	290	273	2,8	K01400331__M0E060	
470	35x60	0,1	160	149	3	K01400471__M0E060	
470	35x79	0,1	165	155	3,5	K01400471__M0E079	
680	35x79	0,11	142	104	3	K01400681__M0E079	
680	51x79	0,1	120	115	4,7	K01400681__M0G079	
680	51x105	0,1	124	120	5,1	K01400681__M0G105	
1000	51x79	0,1	105	95	5,8	K01400102__M0G079	
1000	51x105	0,1	110	85	6,3	K01400102__M0G105	
1500	51x79	0,11	72	53	6,2	K01400152__M0G079	
1500	51x105	0,1	65	55	7	K01400152__M0G105	
1500	63x105	0,1	65	55	7,9	K01400152__M0H105	
2200	51x105	0,1	50	47	8,3	K01400222__M0G105	
2200	63x105	0,1	50	47	9	K01400222__M0H105	
2200	76x105	0,1	50	47	10,7	K01400222__M0J105	
3300	63x105	0,12	35	30	11	K01400332__M0H105	
3300	76x105	0,12	35	30	13,1	K01400332__M0J105	
3300	76x143	0,12	35	30	14,2	K01400332__M0J143	
4700	76x105	0,15	30	29	14,9	K01400472__M0J105	
4700	76x143	0,15	30	29	16,8	K01400472__M0J143	
5600	76x143	0,15	26	25	19	K01400562__M0J143	
6800	76x143	0,15	20	18	19,5	K01400682__M0J143	
8200	76x143	0,15	22	20	19	K01400822__M0J143	
10000	76x143	0,15	22	20	19	K01400103__M0J143	
10000	76x214	0,15	20	19	26	K01400103__M0J214	
15000	90x220	0,2	15	12	33,5	K01400153__M0L220	

K01 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
220	35X60	0,1	360	300	2	K01450221__M0E060	450V
330	35X60	0,1	240	210	2,8	K01450331__M0E060	
470	51x79	0,1	200	179	4	K01450471__M0G079	
680	51X79	0,1	140	128	4,4	K01450681__M0G079	
680	51x105	0,1	140	128	5	K01450681__M0G105	
1000	51x79	0,1	100	88	4,8	K01450102__M0G079	
1000	51x105	0,1	100	88	6,4	K01450102__M0G105	
1500	51x79	0,15	70	57	5,5	K01450152__M0G079	
1500	51X105	0,1	67	55	7,1	K01450152__M0G105	
1500	63x105	0,1	67	55	8	K01450152__M0H105	
2200	63x105	0,1	60	55	9	K01450222__M0H105	
2200	76x105	0,1	60	47	11,2	K01450222__M0J105	
2200	76x143	0,1	60	47	12,5	K01450222__M0J143	
3300	76x105	0,12	35	30	11,2	K01450332__M0J105	
3300	76x143	0,12	35	30	12,9	K01450332__M0J143	
4700	76x105	0,15	28	25	10,1	K01450472__M0J105	
4700	76x143	0,15	32	30	15	K01450472__M0J143	
5600	76x143	0,15	26	25	19	K01450562__M0J143	
6800	76x143	0,15	23	22	19	K01450682__M0J143	
8200	76x143	0,15	22	20	19	K01450822__M0J143	
10000	76x143	0,2	22	20	19	K01450103__M0J143	
10000	76x214	0,2	20	19	23,1	K01450103__M0J214	
12000	76x214	0,2	15	12	23,8	K01450123__M0J214	
15000	90x220	0,2	14	12	32,6	K01450153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	51x105	0,15	125	114	4	K01500102__M0G105	500V
1500	51x105	0,15	64	58	5,2	K01500152__M0G105	
1500	63x105	0,15	81	67	5,2	K01500152__M0H105	
2200	76x105	0,15	62	61	7,4	K01500222__M0J105	
2200	76x143	0,15	55	54	8,2	K01500222__M0J143	
3300	76x105	0,15	31	28	9,1	K01500332__M0J105	
3300	76x143	0,15	39	37	10,3	K01500332__M0J143	
4700	76x143	0,15	30	29	11,6	K01500472__M0J143	
5600	76x214	0,15	26	22	19,8	K01500562__M0J214	
6800	76x214	0,15	24	22	20,2	K01500682__M0J214	

USEFUL LIFE K01



The graphs shows a typical trend of the standard capacitor load life.
For a more accurate calculation of the load life for a specific capacitor, please use our calculator on the website www.kendeil.com or enquiry our technical service.

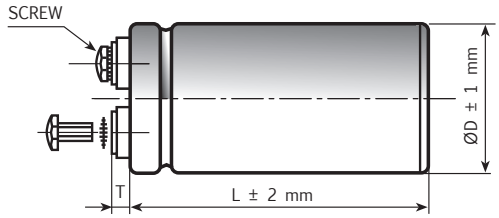
K02 TYPE -40°C +105°C 5000H

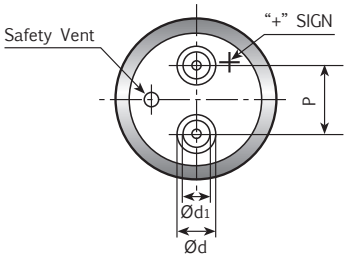
RoHS Compliant

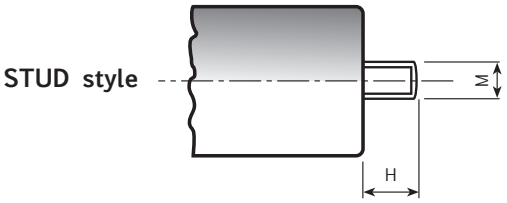
- Surge-proof capacitor in aluminium can with insulation sleeve.
- Poles brought out to heavy duty screw terminals.
- To be mounted with ring clips or with threaded stud.
- Very high CV for unit volume with low ESR and impedance.
- High ripple current capability. Extended temperature range.
- High level realiability with outstanding high frequency characteristics.

APPLICATIONS

High professional power supplies.
Switch power supplies, power converters, filtering devices, motor drive.







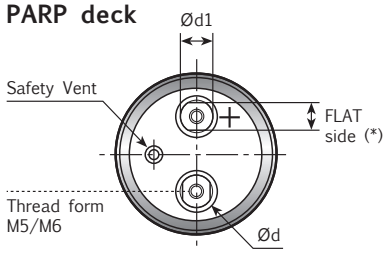


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K02 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +105°C [Environmental classification 40/105/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 16V to 500V DC
Surge Voltage (V_p)	$V_p = 1.15\ V_r$ ($V_r \leq 250$V DC) $V_p = 1.10\ V_r$ ($V_r > 250$V DC)
Rated Capacitance Range	from 100 µF to 470,000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.003\ C_r\ V_r + 4$ µA At 85°C max $I_L = 0.02\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows: FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C 110°C MULTIPLIER 3.0 2.80 2.60 2.40 2.20 1.80 1.5 1.0 0.5 Maximum internal temperature 108°C Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 35mm 51mm 63mm 76mm 90mm Maximum current 20A 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	250000 h at 40°C 5000 h at 105°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 30 fit (30 10^{-9}/h) ($V_r \leq 160$V DC) ≤ 40 fit (40 10^{-9}/h) ($V_r > 160$V DC)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K02 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0,25	25	24	3,3	K02016103__M0E060	16V
15000	35x60	0,3	16	16	3,5	K02016153__M0E060	
22000	35x60	0,35	12	12	4,4	K02016223__M0E060	
33000	35x60	0,4	12	12	4,6	K02016333__M0E060	
47000	35x79	0,55	9	10	7,5	K02016473__M0E079	
68000	51x79	0,6	8	8	11,9	K02016683__M0G079	
82000	51x79	0,7	8	8	12,1	K02016823__M0G079	
100000	51x79	0,8	8	8	12,2	K02016104__M0G079	
100000	51x105	0,8	8	8	12,3	K02016104__M0G105	
150000	63x105	1,1	7	7	15,4	K02016154__M0H105	
220000	76x105	1,5	7	7	18,8	K02016224__M0J105	
330000	76x105	1,9	7	7	19,7	K02016334__M0J105	
470000	76x143	2	6	6	22,5	K02016474__M0J143	
1000000	90x220	2,6	3	3	29,4	K02016105__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0,2	23	18	3,8	K02025103__M0E060	25V
15000	35x60	0,25	16	12	4,8	K02025153__M0E060	
22000	35x60	0,3	12	12	7	K02025223__M0E060	
33000	51x79	0,35	10	10	8,9	K02025333__M0G079	
47000	51x79	0,4	9	9	11,6	K02025473__M0G079	
68000	51x79	0,5	8	8	12	K02025683__M0G079	
68000	51x105	0,5	8	8	13	K02025683__M0G105	
100000	63x105	0,6	8	8	15,8	K02025104__M0H105	
150000	76x105	0,9	7	7	18,3	K02025154__M0J105	
220000	76x143	1,3	7	7	21,6	K02025224__M0J143	
330000	76x143	2	7	7	23,8	K02025334__M0J143	
680000	90x220	3	3	3	38,1	K02025684__M0L220	

K02 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0,2	31	29	3,3	K02040472__M0E060	40V
6800	35x60	0,2	23	20	3,9	K02040682__M0E060	
10000	35x60	0,2	16	12	4,4	K02040103__M0E060	
10000	35x79	0,2	16	12	4,8	K02040103__M0E079	
15000	35x79	0,2	12	10	5,4	K02040153__M0E079	
22000	35x79	0,25	10	10	6,6	K02040223__M0E079	
22000	51x79	0,25	10	10	8,9	K02040223__M0G079	
33000	51x79	0,35	10	10	9,9	K02040333__M0G079	
33000	51x105	0,35	10	10	11,2	K02040333__M0G105	
47000	51x105	0,45	9	9	13,8	K02040473__M0G105	
47000	63x105	0,45	9	9	14,5	K02040473__M0H105	
68000	63x105	0,6	7	7	15	K02040683__M0H105	
68000	76x105	0,6	7	7	15,9	K02040683__M0J105	
100000	63x105	0,9	7	7	17,2	K02040104__M0H105	
100000	76x105	0,9	7	7	19,1	K02040104__M0J105	
100000	76x143	0,9	7	7	21	K02040104__M0J143	
150000	76x105	1,3	7	7	18,9	K02040154__M0J105	
150000	76x143	1,3	7	7	25,9	K02040154__M0J143	
220000	76x143	1,5	5	5	25,7	K02040224__M0J143	
470000	90x220	2	3	3	36,3	K02040474__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
47000	63x105	0,45	9	8	12,4	K02063473__M0H105	63V
47000	76x105	0,45	9	8	17,7	K02063473__M0J105	
47000	76x143	0,45	9	8	19	K02063473__M0J143	
2200	35x60	0,15	72	60	2,5	K02063222__M0E060	
3300	35x60	0,15	48	39	3,5	K02063332__M0E060	
4700	35x60	0,15	33	28	4,2	K02063472__M0E060	
6800	35x60	0,18	18	13	5,2	K02063682__M0E060	
6800	35x79	0,18	18	13	6,3	K02063682__M0E079	
10000	35x79	0,2	15	11	7,6	K02063103__M0E079	
10000	51x79	0,2	15	11	8,2	K02063103__M0G079	
15000	51x79	0,25	15	13	8,9	K02063153__M0G079	
15000	51x105	0,25	13	10	18	K02063153__M0G105	
22000	51x79	0,3	11	10	9,5	K02063223__M0G079	
22000	51x105	0,3	11	10	11,8	K02063223__M0G105	
22000	63x105	0,3	11	10	13,5	K02063223__M0H105	
33000	51x105	0,35	11	10	11,1	K02063333__M0G105	
33000	63x105	0,35	11	10	14,8	K02063333__M0H105	
33000	76x105	0,35	11	8	16,6	K02063333__M0J105	

K02 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
68000	63x105	0,7	8	8	18,6	K02063683__M0H105	63V
68000	76x105	0,45	8	8	20,1	K02063683__M0J105	
68000	76x143	0,7	8	8	22,8	K02063683__M0J143	
100000	76x143	0,7	8	8	24,1	K02063104__M0J143	
150000	76x143	0,7	5	5	25,2	K02063154__M0J143	
220000	90x220	0,8	5	5	30	K02063224__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	35x60	0,15	110	100	2,9	K02100102__M0E060	100V
1500	35x60	0,15	80	73	3,2	K02100152__M0E060	
2200	35x60	0,15	59	53	4,4	K02100222__M0E060	
3300	35x60	0,15	33	32	3,9	K02100332__M0E060	
3300	35x79	0,15	33	31	5,8	K02100332__M0E079	
4700	51x79	0,15	25	22	7,2	K02100472__M0G079	
6800	51x79	0,15	19	17	8,9	K02100682__M0G079	
6800	51x105	0,15	19	17	8,9	K02100682__M0G105	
8200	51x79	0,15	18	15	9,7	K02100822__M0G079	
10000	51x79	0,15	17	15	10,1	K02100103__M0G079	
10000	51x105	0,15	17	15	11	K02100103__M0G105	
10000	63x105	0,15	17	15	12,5	K02100103__M0H105	
15000	51x105	0,15	12	12	13,2	K02100153__M0G105	
15000	63x105	0,15	12	12	15,1	K02100153__M0H105	
22000	63x105	0,18	10	9	15,3	K02100223__M0H105	
22000	76x105	0,18	10	9	16,5	K02100223__M0J105	
33000	76x105	0,22	8	8	18,7	K02100333__M0J105	
33000	76x143	0,22	8	8	20,9	K02100333__M0J143	
47000	76x143	0,25	5	5	23,4	K02100473__M0J143	
68000	90x220	0,25	3	3	32,8	K02100683__M0L220	

K02 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	35x79	0,11	105	90	3,3	K02160102__M0E079	160V
1500	35x79	0,11	65	60	3,1	K02160152__M0E079	
1500	51x79	0,11	65	60	4,1	K02160152__M0G079	
2200	51x79	0,11	46	43	4,6	K02160222__M0G079	
2200	51X105	0,11	46	43	4,8	K02160222__M0G105	
3300	51x79	0,11	32	30	5,5	K02160332__M0G079	
3300	63x105	0,11	32	30	6,8	K02160332__M0H105	
4700	63x105	0,11	27	25	8,5	K02160472__M0H105	
6800	63x105	0,13	23	20	8,8	K02160682__M0H105	
6800	76x105	0,13	23	20	11,3	K02160682__M0J105	
10000	76x105	0,14	22	20	14,2	K02160103__M0J105	
10000	76x143	0,15	17	16	14,9	K02160103__M0J143	
15000	76x143	0,2	16	12	17,2	K02160153__M0J143	
22000	76X214	0,2	11	10	19	K02160223__M0J214	
47000	90x220	0,3	6	5	24,9	K02160473__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	35X60	0,11	133	98	2,5	K02200681__M0E060	200V
820	35x60	0,11	97	72	3,2	K02200821__M0E060	
1000	51x79	0,11	85	64	4,6	K02200102__M0G079	
1500	51x79	0,11	65	58	4,4	K02200152__M0G079	
1500	51x105	0,11	65	58	5,1	K02200152__M0G105	
2200	51x79	0,11	60	53	5,1	K02200222__M0G079	
2200	51x105	0,11	60	53	6,1	K02200222__M0G105	
3300	51x105	0,11	40	35	6,8	K02200332__M0G105	
3300	63x105	0,11	40	35	7,9	K02200332__M0H105	
4700	63x105	0,11	25	23	8,7	K02200472__M0H105	
5600	63x105	0,11	22	20	9,8	K02200562__M0H105	
6800	63x105	0,11	18	16	8,7	K02200682__M0H105	
6800	76X105	0,11	18	16	11,8	K02200682__M0J105	
8200	76X105	0,11	17	15	12,8	K02200822__M0J105	
10000	76x105	0,13	15	13	14,5	K02200103__M0J105	
10000	76x143	0,15	13	12	16	K02200103__M0J143	
15000	76x143	0,2	12	11	17,3	K02200153__M0J143	
22000	76x214	0,2	11	10	18,9	K02200223__M0J214	
33000	90x220	0,25	6	5	28,8	K02200333__M0L220	

K02 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	35x60	0,11	211	193	2	K02250471__M0E060	250V
680	35x60	0,11	130	98	2,1	K02250681__M0E060	
680	35x79	0,11	130	98	2,2	K02250681__M0E079	
820	35x60	0,11	120	90	2,4	K02250821__M0E060	
820	35x79	0,11	120	91	2,8	K02250821__M0E079	
1000	51x79	0,11	110	85	4,1	K02250102__M0G079	
1500	51x79	0,11	74	65	4,5	K02250152__M0G079	
1500	51x105	0,11	74	65	5,4	K02250152__M0G105	
2200	51x105	0,11	41	39	6,8	K02250222__M0G105	
3300	51x105	0,11	30	26	7	K02250332__M0G105	
3300	63x105	0,11	30	26	8,2	K02250332__M0H105	
4700	63x105	0,11	18	17	9,5	K02250472__M0H105	
4700	76x105	0,11	18	17	11,9	K02250472__M0J105	
5600	63x105	0,11	24	19	10,2	K02250562__M0H105	
5600	76x105	0,11	17	16	13,2	K02250562__M0J105	
6800	76x105	0,15	16	14	13,3	K02250682__M0J105	
6800	76x143	0,15	15	14	14,3	K02250682__M0J143	
8200	76x143	0,15	14	14	15,2	K02250822__M0J143	
10000	76x143	0,2	14	13	16	K02250103__M0J143	
15000	76x214	0,2	12	10	17,4	K02250153__M0J214	
22000	76x214	0,22	11	10	20,2	K02250223__M0J214	
33000	90x220	0,24	6	5	27,1	K02250333__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
330	35x60	0,11	255	196	1,8	K02350331__M0E060	350V
470	35x79	0,11	170	141	2,1	K02350471__M0E079	
680	35x79	0,11	128	97	2,8	K01350681__M0E079	
680	51x79	0,11	128	96	3,8	K02350681__M0G079	
1000	51x79	0,11	110	85	4	K02350102__M0G079	
1000	51x105	0,11	85	68	5	K02350102__M0G105	
1500	51x79	0,11	74	66	5	K02350152__M0G079	
1500	51x105	0,11	59	52	5,6	K02350152__M0G105	
1500	63x105	0,11	59	52	6,4	K02350152__M0H105	
2200	63x105	0,11	44	40	7,2	K02350222__M0H105	
2200	76x105	0,11	44	40	8,1	K02350222__M0J105	
3300	76x105	0,11	26	23	10,2	K02350332__M0J105	
4700	76x105	0,11	18	17	11,1	K02350472__M0J105	
4700	76x143	0,11	18	16	13,5	K02350472__M0J143	

K02 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
5600	76x105	0,12	18	16	11,5	K02350562__M0J105	350V
5600	76x143	0,12	18	17	14,3	K02350562__M0J143	
6800	76x143	0,15	16	15	15,1	K02350682__M0J143	
8200	76x143	0,15	16	15	16,5	K02350822__M0J143	
8200	76x143	0,15	16	15	17,8	K02350822__M0J143	
10000	76x214	0,2	15	14	19,9	K02350103__M0J214	
20000	90x220	0,2	10	10	26	K02350203__M0L220	

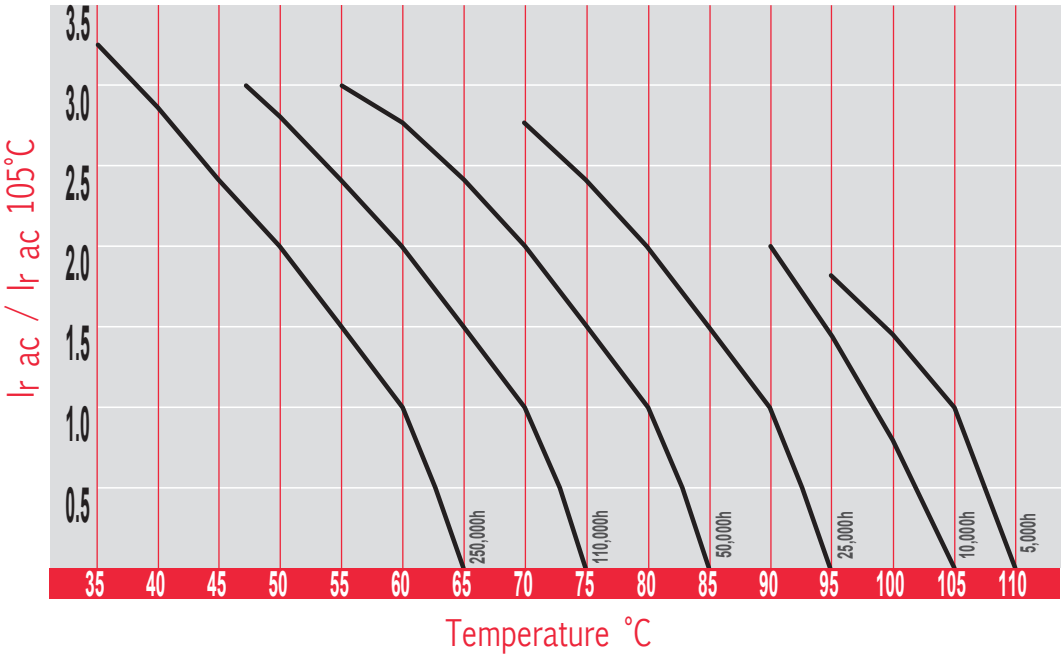
Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
220	35x60	0,11	350	280	1,4	K02400221__M0E060	400V
330	35x60	0,11	250	210	2,2	K02400331__M0E060	
470	51x79	0,11	170	150	2,8	K02400471__M0G079	
680	51x79	0,11	110	100	3,2	K02400681__M0G079	
820	51x79	0,11	108	82	3,2	K02400821__M0G079	
1000	51x79	0,11	95	82	3,4	K02400102__M0G079	
1000	51x105	0,11	95	82	4,1	K02400102__M0G105	
1500	51x105	0,11	64	53	4,7	K02400152__M0G105	
1500	63x105	0,11	64	53	5,8	K02400152__M0H105	
2200	63x105	0,11	45	53	6	K02400222__M0H105	
2200	76x105	0,11	45	39	7,3	K02400222__M0J105	
3300	76x105	0,11	28	25	8,3	K02400332__M0J105	
3300	76x143	0,11	28	25	11,1	K02400332__M0J143	
4700	76x143	0,11	24	23	12,8	K02400472__M0J143	
5600	76x143	0,12	21	17	12,9	K02400562__M0J143	
6800	76x214	0,15	19	15	15,5	K02400682__M0J214	
8200	76x214	0,15	18	16	18	K02400822__M0J214	
10000	90x220	0,2	16	14	22,5	K02400103__M0L220	
15000	90x220	0,22	12	10	23	K02400153__M0L220	

K02 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
100	35x60	0,11	800	650	1,2	K02450101__M0E060	450V
150	35x60	0,11	550	490	1,6	K02450151__M0E060	
220	35x60	0,11	370	310	1,8	K02450221__M0E060	
330	35x79	0,11	240	210	2,4	K02450331__M0E079	
470	51x79	0,11	200	179	3	K02450471__M0G079	
680	51x79	0,11	140	128	3,1	K02450681__M0G079	
680	51x105	0,11	140	128	4,2	K02450681__M0G105	
1000	51x105	0,11	100	88	4,4	K02450102__M0G105	
1000	63x105	0,11	100	88	5,3	K02450102__M0H105	
1500	63x105	0,11	63	57	5,7	K02450152__M0H105	
1500	76x105	0,11	63	57	6,6	K02450152__M0J105	
2200	76x105	0,11	48	38	7,6	K02450222__M0J105	
2200	76x143	0,11	48	38	8,8	K02450222__M0J143	
3300	76x143	0,15	35	30	10,4	K02450332__M0J143	
4700	76x143	0,15	28	25	10,9	K02450472__M0J143	
5600	76x143	0,15	21	17	11,2	K0245056 2__M0J143	
6800	76x214	0,15	21	16	15,5	K02450682__M0J214	
8200	76x214	0,15	18	16	19,2	K02450822__M0J214	
10000	90x220	0,2	16	14	22,5	K02450103__M0L220	
12000	90x220	0,2	15	13	23	K02450123__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	51x105	0,11	100	88	4	K02500102__M0G105	500V
1500	63x105	0,11	64	58	5,4	K02500152__M0H105	
1500	63x105	0,11	64	58	5,4	K02500152__M0H105	
1800	63x105	0,11	61	53	5,7	K02500182__M0H105	
2200	76x105	0,11	60	47	6,9	K02500222__M0J105	
2700	76x143	0,13	40	32	8,7	K02500272__M0J143	
3300	76x143	0,15	37	31	9,4	K02500332__M0J143	
3900	76x143	0,15	31	28	10,1	K02500392__M0J143	
4700	76x143	0,15	29	26	10,3	K02500472__M0J143	
5600	76x214	0,15	23	19	14,3	K02500562__M0J214	
6800	76x214	0,15	21	16	14,8	K02500682__M0J214	
6800	90x145	0,15	21	16	13,3	K02500682__M0L145	
8200	90x220	0,15	19	15	18,6	K02500822__M0L220	
10000	90x220	0,2	17	15	20	K02500103__M0L220	

USEFUL LIFE K02



The graphs shows a typical trend of the standard capacitor load life.
For a more accurate calculation of the load life for a specific capacitor, please use our calculator on the website www.kendeil.com or enquiry our technical service.

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

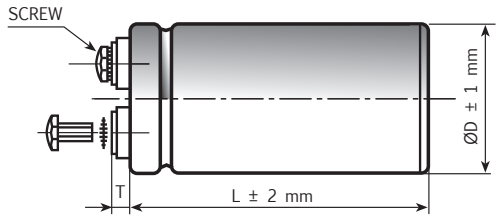
K03 TYPE -20°C +70°C

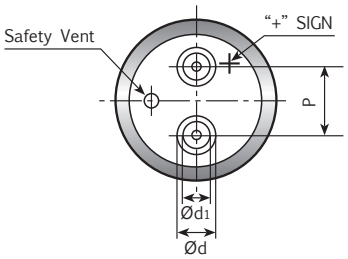
RoHS Compliant

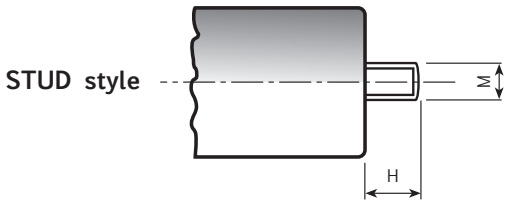
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Heavy charge/discharge duty.**
- **To be mounted with ring clips or with threaded stud.**

APPLICATIONS

Extreme application welding.
Strobe applications.







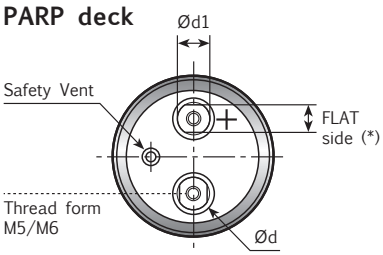


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K03 TYPE SPECIFICATIONS

Temperature Range	Operating: -20°C +70°C Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 500V DC
Surge Voltage (V_p)	V_p = 1.05 V_r ($V_r \geq$ 475V DC) V_p = 1.10 V_r ($V_r >$ 250V DC)
Rated Capacitance Range	from 560 µF to 3300 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Insulation Resistance	At 100V DC for 1 min is >100 M Ω across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Discharge Life	Test conditions: 10000 times at room temperatures (5-35°C) Charge and Discharge cycles: 30 sec Cap change ≤ 10% tan δ ≤ 150% Leakage current (I_L) < 150% of initial limit Impedance (Z) ≤ 200%
Shelf life	After leaving capacitors under no load for 500 hours at 55°C when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L)< initial limit
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h) ($V_r >$ 160V DC)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K03 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	51x105	0.10	K03400681__M0G105	400V
820	51x105	0.10	K03400821__M0G105	
1000	63x105	0.10	K03400102__M0H105	
1200	63x105	0.10	K03400122__M0H105	
1500	76x105	0.10	K03400152__M0J105	
2200	76x143	0.10	K03400222__M0J143	
3300	90x145	0.10	K03400332__M0L145	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	51x105	0.10	K03450681__M0G105	450V
820	51x105	0.10	K03450821__M0G105	
1000	63x105	0.10	K03450102__M0H105	
1200	63x105	0.10	K03450122__M0H105	
1500	76x105	0.10	K03450152__M0J105	
2200	76x143	0.10	K03450222__M0J143	
3300	90x145	0.10	K03450332__M0L145	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
560	51x105	0.15	K03475561__M0G105	475V
680	51x105	0.15	K03475681__M0G105	
820	51x105	0.15	K03475821__M0G105	
1000	63x105	0.15	K03475102__M0H105	
1000	63x105	0.15	K03475102__M0H105	
1000	76x105	0.15	K03475102__M0J105	
1000	76x143	0.15	K03475102__M0J143	
1500	76x143	0.15	K03475152__M0J143	
2200	90x145	0.15	K03475222__M0L145	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
560	51x105	0.15	K03500581__M0G105	500V
680	63x105	0.15	K03500681__M0H105	
820	63x105	0.15	K03500821__M0H105	
1000	63x105	0.15	K03500102__M0H105	
1000	63x105	0.15	K03500102__M0H105	
1000	63x143	0.15	K03500102__M0H143	
1500	76x143	0.15	K03500152__M0J143	
2200	90x145	0.15	K03500222__M0L145	

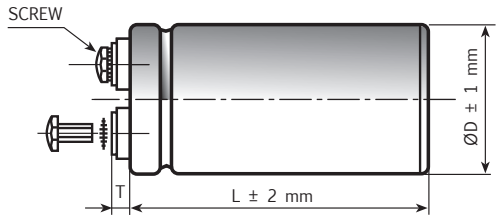
K04 TYPE -40°C +85°C 20000H

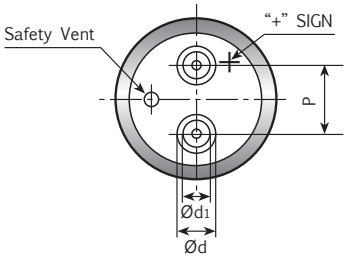
RoHS Compliant

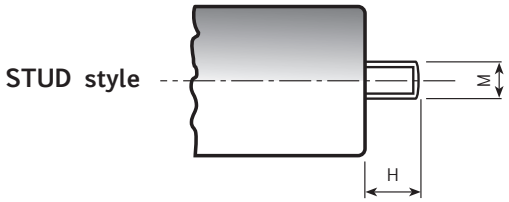
- Extended life.
- Surge-proof capacitor in aluminium can with insulation sleeve.
- To be mounted with ring clips or with threaded stud.
- Designed for high resistances to voltage spikes.

APPLICATIONS

Power supplies, motor drives, welding, energy storage.







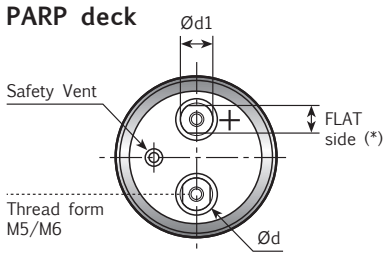


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K04 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C	
Rated Voltage Range (V_r)	from 350V to 600V DC	
Surge Voltage (V_p)	V_p = 1.10 V_r (V_r ≤ 500 V DC) V_p = 1.05 V_r (V_r > 500 V DC)	
Rated Capacitance Range	from 1500 µF to 15000 µF	
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]	
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA Kendeil product limit: I_L= 0.003 C_r V_r At 85°C max I_L = 0.04 C_r V_r µA	
Ripple current (I_r)	Refer to table at 85°C and 100Hz: FREQUENCY 50Hz 100 Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 63mm 76mm 90mm Maximum current 40A 50A 70A	
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.	
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h	
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min	
Life test	After 4,000 hours application of rated voltage at 85°C capacitors meet characteristics aside	Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside	Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 20000 h 85°C for V≤ 450V > 15000 h for V≤ 500V > 12000 h for V= 550V > 6000 h for V= 600V	Cap change ≤ ±25% tan δ ≤ 300% Leakage current (I_L) < initial limit
Failure percentage **Failure rate**	≤ 1% (during working life) ≤ 33 fit (33 10^{-9}/h)	
Self inductance	Approx. 20 nH	
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C	
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10	
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE	

K04 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	63x105	0.13	42	30	11.0	K04350222__M0H105	350V
3300	63x105	0.13	30	22	12.6	K04350332__M0H105	
3300	76x105	0.13	30	22	13.8	K04350332__M0J105	
4700	76x105	0.13	23	15	16.1	K04350472__M0J105	
4700	76x143	0.13	23	15	18.5	K04350472__M0J143	
5600	76x143	0.15	19	14	20.0	K04350562__M0J143	
6800	76x143	0.15	15	11	21.8	K04350682__M0J143	
8200	76x143	0.15	13	9	23.6	K04350822__M0J143	
10000	76x214	0.17	11	8	31.7	K04350103__M0J214	
15000	90x220	0.18	7	5	42.0	K04350153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	63x105	0.15	105	85	7.5	K04400152__M0H105	400V
2200	63x105	0.15	80	63	8.8	K04400222__M0H105	
2200	76x105	0.15	80	63	10.2	K04400222__M0J105	
3300	63x105	0.15	50	40	10.7	K04400332__M0H105	
3300	76x143	0.15	50	40	14.1	K04400332__M0J143	
4700	76x105	0.17	40	32	14.7	K04400472__M0J105	
4700	76x143	0.17	40	32	17.7	K04400472__M0J143	
6800	76x143	0.17	27	22	18.0	K04400682__M0J143	
10000	76x214	0.20	20	17	27.8	K04400103__M0J214	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	63x105	0.15	105	85	7.5	K04420152__M0H105	420V
2200	63x105	0.15	80	63	8.8	K04420222__M0H105	
2200	76x105	0.15	80	63	10.2	K04420222__M0J105	
3300	63x105	0.15	50	40	10.7	K04420332__M0H105	
3300	76x143	0.15	50	40	14.1	K04420332__M0J143	
4700	76x105	0.17	40	32	14.7	K04420472__M0J105	
4700	76x143	0.17	40	32	17.7	K04420472__M0J143	
6800	76x143	0.17	27	22	18.0	K04420682__M0J143	
10000	76x214	0.20	20	17	27.8	K04420103__M0J214	

K04 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	63x105	0.15	105	85	7.5	K04450152__M0H105	450V
2200	63x105	0.15	80	63	8.8	K04450222__M0H105	
2200	76x105	0.15	80	63	10.2	K04450222__M0J105	
3300	63x105	0.15	50	40	10.7	K04450332__M0H105	
3300	76x143	0.15	50	40	14.1	K04450332__M0J143	
4700	76x105	0.17	40	32	14.7	K04450472__M0J105	
4700	76x143	0.17	40	32	17.7	K04450472__M0J143	
6800	76x143	0.17	27	22	18.0	K04450682__M0J143	
10000	76x214	0.20	20	17	27.8	K04450103__M0J214	
12000	90x220	0.20	15	11	34.5	K04450123__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	63x105	0.15	95	76	7.7	K04500152__M0H105	500V
2200	63x105	0.15	65	55	8.9	K04500222__M0H105	
2200	76x105	0.15	65	55	10.0	K04500222__M0J105	
2200	76x143	0.15	65	55	11.4	K04500222__M0J143	
3300	76x143	0.15	40	39	13.9	K04500332__M0J143	
3900	76x143	0.17	38	34	14.7	K04500392__M0J143	
4700	76x143	0.17	33	33	16.1	K04500472__M0J143	
5600	76x143	0.17	30	26	17.5	K04500562__M0J143	
6800	76x214	0.17	27	22	23.0	K04500682__M0J214	
10000	90x220	0.20	20	17	30.4	K04500103__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	63x105	0.19	109	88	6.5	K04550152__M0H105	550V
1800	76x105	0.19	99	80	7.6	K04550182__M0J105	
2200	76x143	0.19	81	70	9.5	K04550222__M0J143	
3300	76x143	0.20	59	49	10.2	K04550332__M0J143	
4700	76x214	0.20	48	41	16.0	K04550472__M0J214	
6800	90x220	0.21	34	28	18.1	K04550682__M0L220	

K04 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1500	63x105	0.15	71	54	7.9	K04600152__HM0H105	600V
1800	76x105	0.15	61	47	9.5	K04600182__HM0J105	
2200	76x143	0.15	48	37	11.9	K04600222__HM0J143	
3300	76x143	0.15	36	27	14.1	K04600332__HM0J143	
3900	90x145	0.15	28	22	17.3	K04600392__HM0L145	
4700	76x214	0.15	21	17	18.7	K04600472__HM0J214	
4700	90x145	0.15	23	19	20.1	K04600472__HM0L145	
6800	90x220	0.15	16	13	26.9	K04600682__HM0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

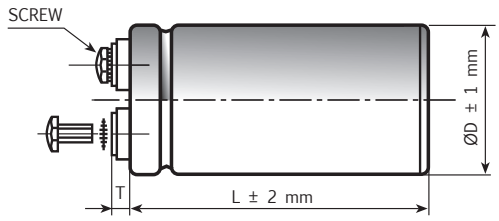
K07 TYPE -40°C +85°C 2000H

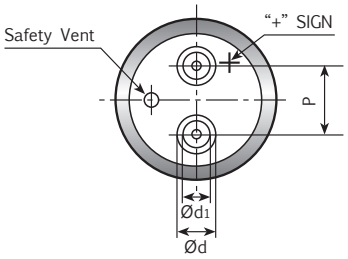
RoHS Compliant

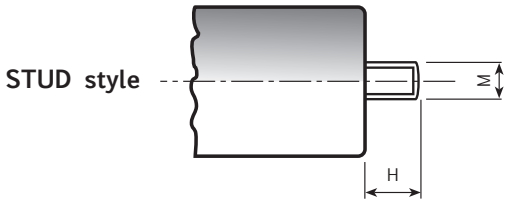
- Surge-proof capacitor in aluminium can with insulation sleeve.
- To be mounted with ring clips or with threaded stud.
- Case size optimized for Asian Market.

APPLICATIONS

Industrial Market, UPS, Frequency Converters.







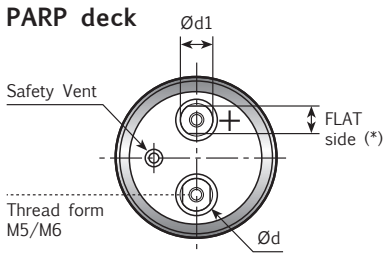


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K07 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 160V to 350V DC from 400V to 450V DC
Surge Voltage (V_p)	V_p = 1.15 V_r (V_r ≤ 250V DC) V_p = 1.10 V_r (V_r > 250V DC)
Rated Capacitance Range	from 1800 µF to 47000 µF
Capacitance Tolerance	±20% at 120 Hz, 20°C [M class IEC-62] on request: -10% +30% at 120 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) **(5 min, 20°C)**	max I_L= 0.008 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 85°C and 120Hz: FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.88 1.0 1.45 1.5 1.55 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 35mm 51mm 63mm 76mm 90mm Maximum current 20A 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage **(between terminals bundled and plate)**	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L)< initial limit
Self inductance	Approx. 20 nH
Damp heat test **(Vn applied, 2000 hours, 85% RH)**	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K07 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 120 Hz 20°C	ESR TYP m Ω 120 Hz 20°C	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
6800	51x96	0.15	21	23.4	10.9	K07160682__M0G096	160V
8200	51x105	0.15	18	27.5	12.8	K07160822__M0G105	
10000	51x115	0.15	13	29.0	13.5	K07160103__M0G115	
10000	63x96	0.15	13	26.6	12.4	K07160103__M0H096	
12000	51x130	0.15	13	34.1	15.8	K07160123__M0G130	
15000	63x105	0.15	13	31.3	14.6	K07160153__M0H105	
15000	63x115	0.15	13	32.4	15.1	K07160153__M0H115	
18000	63x130	0.15	12	38.1	17.7	K07160183__M0H130	
22000	63x143	0.20	10	48.1	22.4	K07160223__M0H143	
22000	76x105	0.20	10	48.1	22.4	K07160223__M0J105	
22000	76x115	0.20	10	49.7	23.1	K07160223__M0J115	
27000	76x130	0.20	10	54.4	25.3	K07160273__M0J130	
33000	76x143	0.20	8	65.7	30.6	K07160333__M0J143	
47000	76x214	0.25	7	81.5	37.6	K07160473__M0J214	
47000	76x220	0.25	7	81.5	37.6	K07160473__M0J220	

Cap µF	Ø x L mm	Tan δ MAX 120 Hz 20°C	ESR TYP m Ω 120 Hz 20°C	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
5600	51x96	0.15	27	23.0	10.7	K07200562__M0G096	200V
6800	51x105	0.15	22	27.0	12.6	K07200682__M0G105	
6800	63x96	0.15	22	26.4	12.3	K07200682__M0H096	
8200	51x115	0.15	18	28.5	13.2	K07200822__M0G115	
10000	51x130	0.15	13	33.4	15.5	K07200103__M0G130	
10000	63x105	0.15	13	31.3	14.6	K07200103__M0H105	
12000	63x115	0.15	13	31.9	14.8	K07200123__M0H115	
14000	63x130	0.15	12	37.6	17.5	K07200143__M0H130	
15000	63x143	0.15	12	40.4	18.8	K07200153__M0H143	
15000	76x105	0.15	12	40.4	18.8	K07200153__M0J105	
18000	76x115	0.15	12	44.5	20.7	K07200183__M0J115	
22000	76x130	0.18	10	50.0	23.4	K07200223__M0J130	
27000	76x143	0.18	9	64.6	30.0	K07200273__M0J143	
33000	76x214	0.22	8	75.7	35.2	K07200333__M0J214	
33000	76x220	0.22	8	75.7	35.2	K07200333__M0J220	

K07 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 120 Hz 20°C	ESR TYP m Ω 120 Hz 20°C	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
3900	51x96	0.15	32	22.0	10.2	K07250392__M0G096	250V
4700	51x105	0.15	25	25.7	11.9	K07250472__M0G105	
5600	51x115	0.15	24	27.5	12.8	K07250562__M0G115	
6800	51x130	0.15	19	32.1	14.9	K07250682__M0G130	
4700	63x96	0.15	30	25.7	12.0	K07250472__M0H096	
8200	63x105	0.15	22	30.9	14.4	K07250822__M0H105	
10000	63x115	0.15	20	31.6	14.7	K07250103__M0H115	
12000	63x130	0.15	19	37.1	17.2	K07250123__M0H130	
12000	63x143	0.15	19	45.8	21.3	K07250123__M0H143	
12000	76x105	0.15	19	45.8	21.3	K07250123__M0J105	
12000	76x115	0.15	19	47.4	22.0	K07250123__M0J115	
15000	76x130	0.15	16	46.3	21.5	K07250153__M0J130	
18000	76x143	0.20	10	47.6	22.1	K07250183__M0J143	
27000	76x214	0.25	8	70.0	32.6	K07250273__M0J214	
27000	76x220	0.25	8	70.0	32.6	K07250273__M0J220	

Cap µF	Ø x L mm	Tan δ MAX 120 Hz 20°C	ESR TYP m Ω 120 Hz 20°C	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	51x96	0.15	31	19.4	9.0	K07315222__M0G096	315V
2700	51x105	0.15	24	22.6	10.5	K07315272__M0G105	
2700	51x115	0.15	24	23.4	10.9	K07315272__M0G115	
3300	51x130	0.15	20	27.3	12.7	K07315332__M0G130	
2700	63x96	0.15	24	23.2	10.8	K07315272__M0H096	
3900	63x105	0.15	20	28.1	13.1	K07315392__M0H105	
4700	63x115	0.15	20	29.8	13.9	K07315472__M0H115	
5600	63x130	0.15	17	34.7	16.1	K07315562__M0H130	
6800	63x143	0.15	14	39.8	18.5	K07315682__M0H143	
5600	76x105	0.15	14	39.0	18.1	K07315562__M0J105	
6800	76x115	0.15	12	42.5	19.8	K07315682__M0J115	
8200	76x130	0.15	10	49.2	22.9	K07315822__M0J130	
10000	76x143	0.15	8	49.4	23.0	K07315103__M0J143	
15000	76x214	0.20	8	67.6	31.4	K07315153__M0J214	
15000	76x220	0.25	8	67.6	31.4	K07315153__M0J220	

K07 TYPE STANDARD RATINGS

RATED VOLTAGE VDC

350V

Cap µF	Ø x L mm	Tan δ MAX 120 Hz 20°C	ESR TYP m Ω 120 Hz 20°C	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
1800	51x96	0.15	33	18.8	8.7	K07350182__M0G096
2200	51x105	0.15	26	21.8	10.1	K07350222__M0G105
2700	51x115	0.15	23	23.9	11.1	K07350272__M0G115
3300	51x130	0.15	19	27.9	13.0	K07350332__M0G130
3300	63x96	0.15	27	23.5	10.9	K07350332__M0H096
3900	63x105	0.15	20	27.8	12.9	K07350392__M0H105
3900	63x115	0.15	20	28.8	13.4	K07350392__M0H115
4700	63x130	0.15	17	33.6	15.6	K07350472__M0H130
5600	63x143	0.15	13	39.8	18.5	K07350562__M0H143
5600	76x105	0.15	13	39.8	18.5	K07350562__M0J105
5600	76x115	0.15	13	41.1	19.2	K07350562__M0J115
6800	76x130	0.15	12	41.1	19.2	K07350682__M0J130
8200	76x143	0.15	12	45.2	21.0	K07350822__M0J143
10000	76x143	0.15	12	46.3	21.5	K07350103__M0J143
12000	76x214	0.20	8	66.1	30.7	K07350123__M0J214
12000	76x220	0.25	8	66.1	30.7	K07350123__M0J220

RATED VOLTAGE VDC

400V

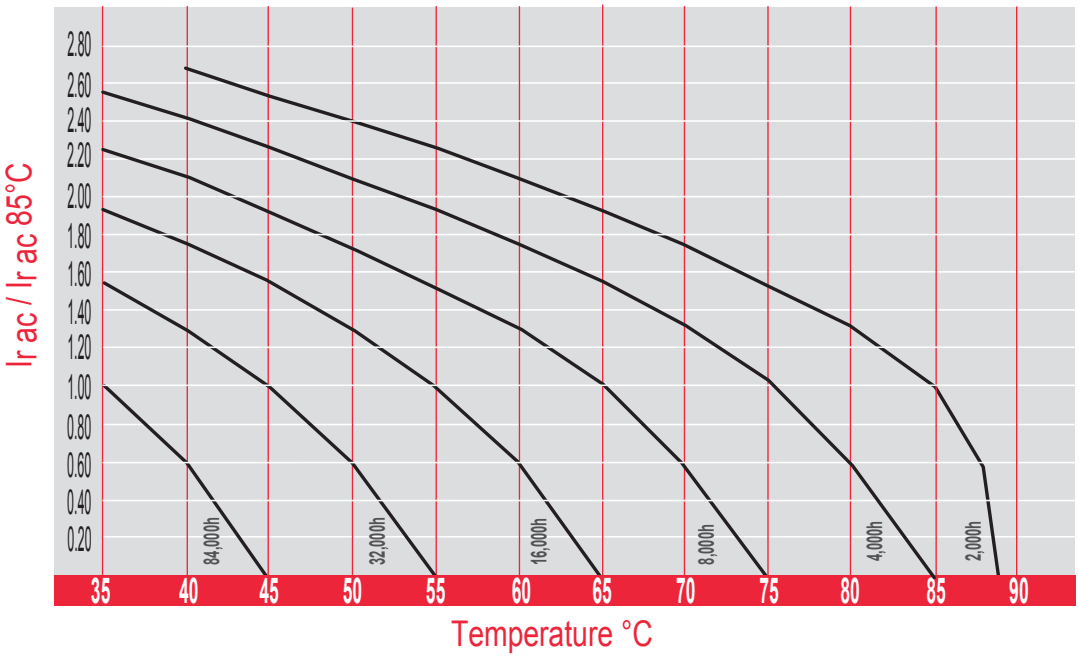
Cap µF	Ø x L mm	Tan δ MAX 120 Hz 20°C	ESR TYP m Ω 120 Hz 20°C	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°C	PART NUMBER stud and insert style excluded
2200	51x130	0.20	77	17.37	6.53	K07400222__M0G130
2200	63x96	0.20	84	17.03	6.40	K07400222__M0H096
2700	63x96	0.20	75	19.02	7.15	K07400272__M0H096
3300	63x105	0.20	59	22.75	8.40	K07400332__M0H105
3300	63x115	0.20	59	22.75	8.55	K07400332__M0H115
3900	63x130	0.20	49	26.06	9.80	K07400392__M0H130
4700	76x105	0.20	41	28.60	10.60	K07400472__M0J105
4700	76x115	0.20	41	28.60	10.75	K07400472__M0J115
5600	76x130	0.20	34	32.45	12.20	K07400562__M0J130
6800	76x143	0.20	24	38.84	14.50	K07400682__M0J143
6800	76x155	0.20	24	38.84	14.60	K07400682__M0J155
8200	90x157	0.20	22	44.74	16.82	K07400822__M0L157
10000	90x157	0.20	19	49.29	18.53	K07400103__M0L157
12000	90x196	0.20	16	59.87	22.51	K07400123__M0L196
15000	90x220	0.20	13	69.90	26.28	K07400153__M0L220

K07 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 120 Hz 20°C	ESR TYP m Ω 120 Hz 20°C	Ir a.c. A max 120 Hz 40°C	Ir a.c. A max 120 Hz 85°	PART NUMBER stud and insert style excluded
						RATED VOLTAGE VDC
						450V
1800	51x130	0.20	84	16.25	6.11	K07450182__M0G130
2200	63x96	0.20	80	17.35	6.52	K07450222__M0H096
2700	63x105	0.20	62	20.74	7.60	K07450272__M0H105
2700	63x115	0.20	62	20.74	7.80	K07450272__M0H115
3300	63x130	0.20	51	24.22	9.11	K07450332__M0H130
3900	76x105	0.20	44	26.25	9.70	K07450392__M0J105
3900	76x115	0.20	44	26.25	9.87	K07450392__M0J115
4700	76x130	0.20	36	30.90	11.62	K07450472__M0J130
5600	76x143	0.20	30	35.69	13.22	K07450562__M0J143
5600	76x155	0.20	30	35.69	13.42	K07450562__M0J155
6800	90x157	0.20	25	41.36	15.55	K07450682__M0L157
8200	90x157	0.20	22	45.09	16.95	K07450822__M0L157
10000	90x196	0.20	18	54.75	20.60	K07450103__M0L196
12000	90x220	0.20	15	63.15	23.75	K07450123__M0L220

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

LOAD LIFE K07



The graphs shows a typical trend of the standard capacitor load life.
For a more accurate calculation of the load life for a specific capacitor, please use our calculator on the website **www.kendeil.com** or enquiry our technical service.

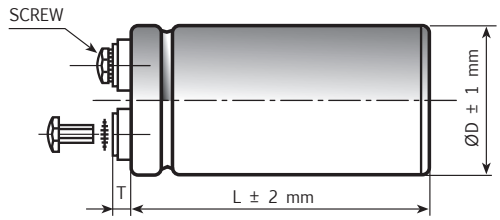
K11 TYPE -40°C +85°C 15000H

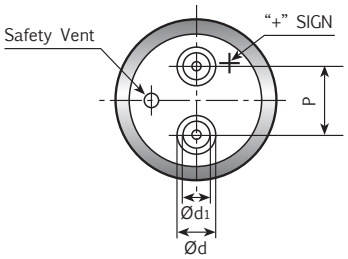
RoHS Compliant

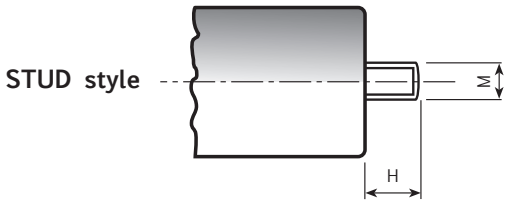
- Surge-proof capacitor in aluminium can with insulation sleeve.
- To be mounted with ring clips or with threaded stud.
- Design optimized for parallel connection and high density of energy.

APPLICATIONS

Energy Storage, Bulk.







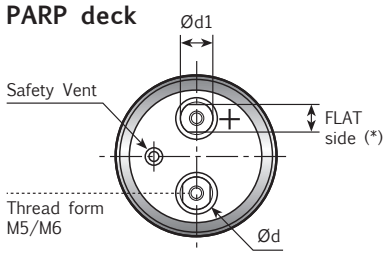


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K11 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 350V to 450V DC
Surge Voltage (V_p)	V_p = 1.10 V_r ($V_r \geq$ 250V DC)
Rated Capacitance Range	from 12000 µF to 34000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA Kendeil product limit: I_L= 0.003 C_r V_r At 85°C max I_L = 0.04 C_r V_r µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz: FREQUENCY 50Hz 100 Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 76mm 90mm Maximum current 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz max acceleration 0.75mm or 10g for 3x2 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L)< initial limit
Useful life (Vn, Temp rated I ripple applied)	> 15000 h at 85°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K11 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
19000	76x214	0,25	18	K11350193__M0J214	350V
20000	76x240	0,25	18	K11350203__M0J240	
22000	76x214	0,25	18,4	K11350223__M0J214	
24000	76x240	0,25	18,5	K11350243__M0J240	
27000	90x220	0,25	21	K11350273__M0L220	
30000	90x220	0,25	21,4	K11350303__M0L220	
30000	90x240	0,25	22	K11350303__M0L240	
34000	90x240	0,25	22,5	K11350343__M0L240	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
12000	76x214	0,2	16	K11400123__M0J214	400V
13000	76x240	0,2	17,5	K11400133__M0J240	
15000	76x214	0,2	16,4	K11400153__M0J214	
16000	76x240	0,2	18	K11400163__M0J240	
17000	90x220	0,2	20,9	K11400173__M0L220	
18000	90x240	0,2	22,5	K11400183__M0L240	
20000	90x220	0,2	21,6	K11400203__M0L220	
23000	90x240	0,2	23,1	K11400233__M0L240	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
15000	76x214	0,25	16	K11450153__M0J214	450V
16000	76x240	0,25	17,7	K11450163__M0J240	
18000	76x214	0,25	16,3	K11450183__M0J214	
20000	76x240	0,25	18,1	K11450203__M0J240	
21000	90x220	0,25	21,5	K11450213__M0L220	
23000	90x240	0,25	23,2	K11450233__M0L240	
25000	90x220	0,25	21,9	K11450253__M0L220	
29000	90x240	0,25	23,7	K11450293__M0L240	

K18 TYPE -55°C +85°C 10000H

RoHS Compliant

- **Design optimized for low equivalent series resistance and high ripple current.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**

APPLICATIONS

Designed for professional application. Switch mode power suppliers, high ripple current converters, motor drives.

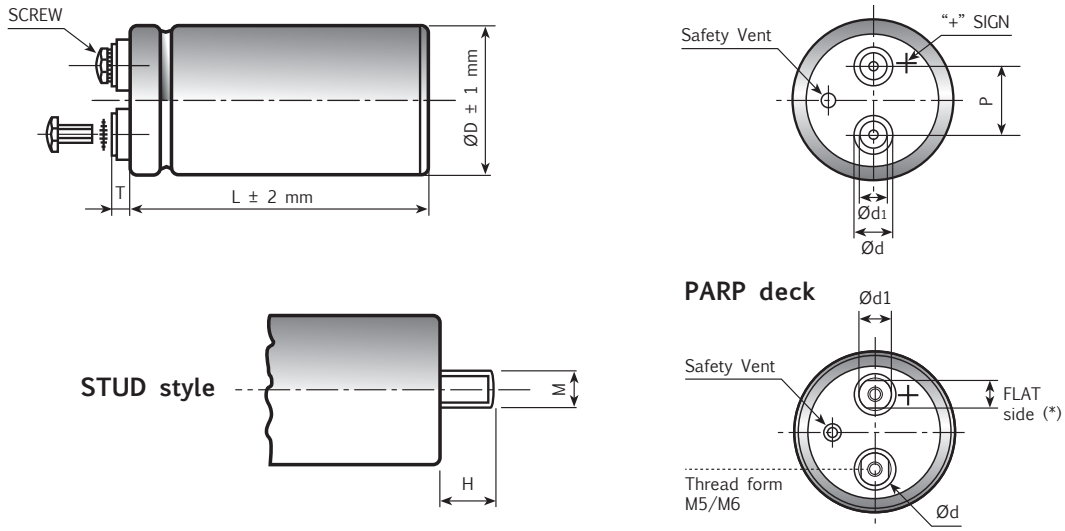


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K18 TYPE SPECIFICATIONS

Temperature Range	Operating: -55°C +85°C [Environmental classification 55/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 450V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 330 µF to 15000 µF
Capacitance Tolerance	±20% at 100 Hz,20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz : FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (85°C, Vn, Ir applied) Operation up to 105° C with voltage derating 0,88 x Vr	> 10000 h at 85°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)
Self inductance	Approx. 20 nH
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K18 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
330	35x60	0.10	290	273	2.8	K18400331__M0E060	400V
470	35x60	0.10	160	150	3.0	K18400471__M0E060	
560	35x79	0.10	145	125	3.3	K18400561__M0E079	
680	35x79	0.10	120	115	3.8	K18400681__M0E079	
1000	51x79	0.10	105	95	5.8	K18400102__M0G079	
1500	51x79	0.10	65	55	6.3	K18400152__M0G079	
2200	51x105	0.10	50	47	8.3	K18400222__M0G105	
3300	63x105	0.12	35	30	11.0	K18400332__M0H105	
4700	76x105	0.15	30	29	14.9	K18400472__M0J105	
4700	76x143	0.15	30	29	16.8	K18400472__M0J143	
5600	76x143	0.15	26	25	19.0	K18400562__M0J143	
6800	76x143	0.15	22	18	19.5	K18400682__M0J143	
8200	76x143	0.15	22	18	19.5	K18400822__M0J143	
10000	76x143	0.15	21	17	19.6	K18400103__M0J143	
15000	76x214	0.20	15	12	26.0	K18400153__M0J214	
15000	90x220	0.20	15	12	33.5	K18400153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
330	35x60	0.10	240	210	2.8	K18450331__M0E060	450V
470	35x79	0.10	200	179	3.1	K18450471__M0E079	
680	35x79	0.10	140	128	3.2	K18450681__M0E079	
820	51x79	0.10	120	102	4.8	K18450821__M0G079	
1000	51x79	0.10	100	88	4.9	K18450102__M0G079	
1500	51x79	0.10	67	55	5.4	K18450152__M0G079	
2200	51x105	0.10	60	55	7.2	K18450222__M0G105	
3300	63x105	0.12	35	30	9.3	K18450332__M0H105	
4700	76x105	0.15	32	30	14.0	K18450472__M0J105	
4700	76x143	0.15	32	30	15.0	K18450472__M0J143	
5600	76x143	0.15	26	25	18.0	K18450562__M0J143	
6800	76x143	0.15	23	22	19.2	K18450682__M0J143	
8200	76x143	0.15	22	20	19.5	K18450822__M0J143	
10000	76x214	0.15	20	19	23.1	K18450103__M0J214	
12000	76x214	0.15	15	12	23.8	K18450123__M0J214	
15000	90x220	0.20	14	12	32.6	K18450153__M0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K19 TYPE -55°C +105°C 4000H

RoHS Compliant

- **Design optimized for low equivalent series resistance and high ripple current.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**

APPLICATIONS

Designed for professional application. Switch mode power suppliers, high ripple current converters, motor drives.

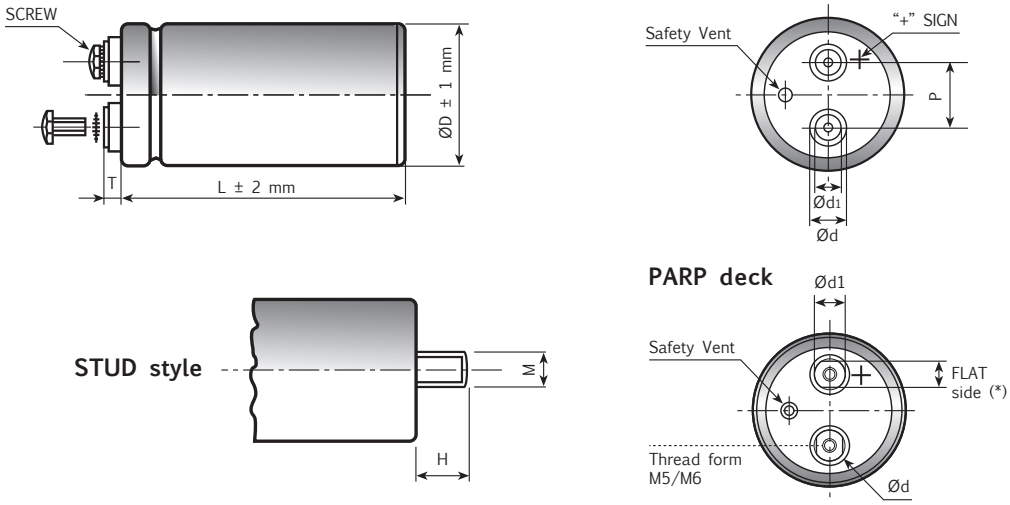


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K19 TYPE SPECIFICATIONS

Temperature Range	Operating: -55°C +105°C [Environmental classification 55/105/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 450V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 330 µF to 15000 µF
Capacitance Tolerance	±20% at 100 Hz,20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz : FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C 110°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (105°C, Vn, Ir applied)	> 4000 h at 105°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 20 nH
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K19 TYPE STANDARD RATINGS

Cap µF	Ø x L Mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10KHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER Stud and insert style excluded	RATED VOLTAGE VDC
330	35x60	0.11	250	210	2.1	K19400331__M0E060	400V
470	35x79	0.11	170	150	2.2	K19400471__M0E079	
680	51x79	0.11	110	100	3.2	K19400681__M0G079	
1000	51x79	0.11	95	82	3.4	K19400102__M0G079	
1500	51x79	0.11	64	53	3.8	K19400152__M0G079	
2200	51x105	0.11	45	39	4.5	K19400222__M0G105	
3300	63x105	0.11	28	25	6.6	K19400332__M0H105	
4700	76x105	0.11	24	23	9.5	K19400472__M0J105	
4700	76x143	0.11	24	23	10.9	K19400472__M0J143	
5600	76x143	0.12	21	17	11.2	K19400562__M0J143	
6800	76x143	0.15	19	15	15.5	K19400682__M0J143	
10000	76x214	0.15	16	14	19.2	K19400103__M0J214	
15000	90x220	0.20	15	12	23.0	K19400153__M0L220	

Cap µF	Ø x L Mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10KHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER Stud and insert style excluded	RATED VOLTAGE VDC
330	35x60	0.11	240	210	1.5	K19450331__M0E060	450V
470	35x79	0.11	200	179	2.1	K19450471__M0E079	
680	51x79	0.11	140	128	3.1	K19450681__M0G079	
1000	51x105	0.11	100	88	4.4	K19450102__M0G105	
1500	51x105	0.11	63	57	4.8	K19450152__M0G105	
2200	63x105	0.11	48	38	6.3	K19450222__M0H105	
3300	76x105	0.11	35	30	10.4	K19450332__M0J105	
4700	76x143	0.11	28	25	10.9	K19450472__M0J143	
5600	76x143	0.12	21	17	11.2	K19450562__M0J143	
6800	76x214	0.15	21	16	15.5	K19450682__M0J214	
8200	76x214	0.15	18	16	19.2	K19450822__M0J214	
10000	90x220	0.15	16	14	22.5	K19450103__M0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

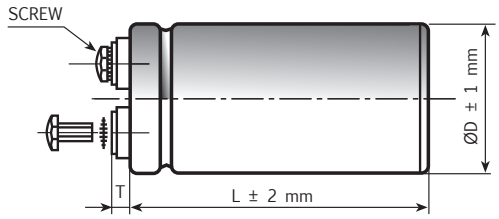
K21 TYPE -40°C +85°C 15000H

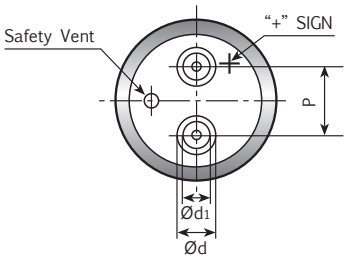
RoHS Compliant

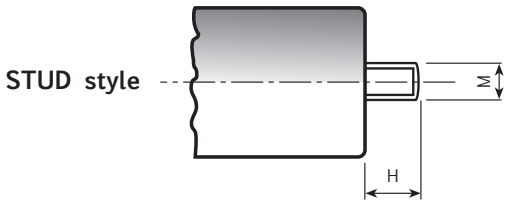
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**
- **Design optimized for high ripple current applications.**

APPLICATIONS

Designed for professional application.
Switch mode power suppliers, high ripple current converters, motor drives.







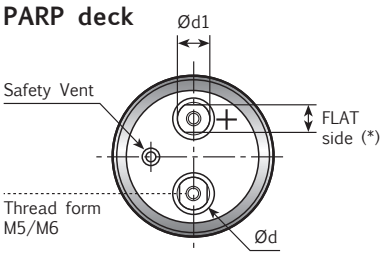


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

Kendeil™

K21 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 350V to 450V DC
Surge Voltage (V_p)	$V_p = 1.10\ V_r$
Rated Capacitance Range	from 1200 µF to 15000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$ At 85°C max $I_L = 0.04\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz: FREQUENCY 50Hz 100 Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Maximum internal temperature 98°C Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 200000 h at 40°C > 15000 h at 85°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K21 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	51x79	0.08	40	24	9.30	K21350152__M0G079	350V
1500	51x105	0.08	40	24	10.10	K21350152__M0G105	
2200	51x105	0.08	29	20	11.90	K21350222__M0G105	
2200	63x105	0.08	29	20	14.50	K21350222__M0H105	
2200	76x79	0.08	29	20	14.20	K21350222__M0J079	
2200	76x98	0.08	29	20	15.30	K21350222__M0J098	
3300	63x105	0.08	17	13	17.70	K21350332__M0H105	
3300	76x79	0.08	21	16	16.00	K21350332__M0J079	
3300	76x105	0.08	20	13	18.80	K21350332__M0J105	
4700	76x105	0.09	13	10	22.10	K21350472__M0J105	
4700	76x143	0.09	13	10	25.80	K21350472__M0J143	
4700	90x98	0.09	14	11	22.50	K21350472__M0L098	
5600	76x143	0.09	10	8	27.40	K21350562__M0J143	
6800	76x143	0.09	9.5	7	30.00	K21350682__M0J143	
6800	90x145	0.09	9.5	7	32.20	K21350682__M0L145	
8200	90x145	0.09	8.5	6	35.30	K21350822__M0L145	
10000	76x214	0.09	7	5	41.80	K21350103__M0J214	
10000	90x145	0.10	7	5	36.70	K21350103__M0L145	
12000	76x214	0.10	7	5	41.90	K21350123__M0J214	
15000	90x220	0.10	5.5	4	52.50	K21350153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	51x79	0.08	40	24	9.30	K21400152__M0G079	400V
1500	51x105	0.08	40	24	10.10	K21400152__M0G105	
2200	51x105	0.08	29	20	11.90	K21400222__M0G105	
2200	76x79	0.08	29	20	14.20	K21400222__M0J079	
2200	76x98	0.08	29	20	15.30	K21400222__M0J098	
3300	63x105	0.08	17	13	17.70	K21400332__M0H105	
3300	76x79	0.08	21	16	16.00	K21400332__M0J079	
3300	76x98	0.08	21	16	17.20	K21400332__M0J098	
3300	76x105	0.08	20	13	18.80	K21400332__M0J105	
3900	76x105	0.08	16	11	20.90	K21400392__M0J105	
4400	90x98	0.08	14	11	22.20	K21400442__M0L098	
4700	76x105	0.09	13	10	22.10	K21400472__M0J105	
4700	76x143	0.09	13	10	25.80	K21400472__M0J143	
4700	90x98	0.09	13	11	22.50	K21400472__M0L098	
5600	76x143	0.09	10	8	27.40	K21400562__M0J143	
6800	76x143	0.09	9.5	7	30.00	K21400682__M0J143	
6800	90x145	0.09	9.5	7	32.20	K21400682__M0L145	
8200	90x145	0.09	8.5	6	35.30	K21400822__M0L145	
10000	76x214	0.09	7	5	41.80	K21400103__M0J214	
10000	90x145	0.10	7	5	36.70	K21400103__M0L145	
14000	90x220	0.10	6	5	50.10	K21400143__M0L220	
15000	90x220	0.10	5.5	4	52.50	K21400153__M0L220	

K21 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	51x79	0.08	40	24	9.30	K21420152__M0G079	420V
1500	51x105	0.08	40	24	10.10	K21420152__M0G105	
2200	51x105	0.08	29	20	11.90	K21420222__M0G105	
2200	76x79	0.08	29	20	14.20	K21420222__M0J079	
2200	76x98	0.08	29	20	15.30	K21420222__M0J098	
3300	63x105	0.08	17	13	17.70	K21420332__M0H105	
3300	76x79	0.08	21	16	16.00	K21420332__M0J079	
3300	76x98	0.08	21	16	17.20	K21420332__M0J098	
3300	76x105	0.08	20	13	18.80	K21420332__M0J105	
3900	76x105	0.08	16	11	20.90	K21420392__M0J105	
4400	90x98	0.08	16	12	22.20	K21420442__M0L098	
4700	76x105	0.09	13	10	22.10	K21420472__M0J105	
4700	76x143	0.09	13	10	25.80	K21420472__M0J143	
4700	90x98	0.09	13	11	22.50	K21420472__M0L098	
5600	76x143	0.09	10	8	27.40	K21420562__M0J143	
6800	76x143	0.09	9.5	7	30.00	K21420682__M0J143	
6800	90x145	0.09	9.5	7	32.20	K21420682__M0L145	
8200	90x145	0.09	8.5	6	35.30	K21420822__M0L145	
10000	76x214	0.09	7	5	41.80	K21420103__M0J214	
10000	90x145	0.10	7	5	36.70	K21420103__M0L145	
14000	90x220	0.10	6	5	50.10	K21420143__M0L220	
15000	90x220	0.10	5.5	4	52.50	K21420153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1200	51x79	0.08	60	36	8.90	K21450122__M0G079	450V
1200	51x105	0.08	60	36	9.49	K21450122__M0G105	
1500	51x105	0.08	49	29	10.70	K21450152__M0G105	
2200	63x105	0.08	30	17	15.40	K21450222__M0H105	
2200	76x79	0.08	32	20	14.30	K21450222__M0J079	
2200	76x98	0.08	32	20	15.40	K21450222__M0J098	
3300	76x105	0.08	26	16	18.80	K21450332__M0J105	
3300	90x98	0.08	26	16	20.50	K21450332__M0L098	
3900	76x105	0.08	21	13	21.10	K21450392__M0J105	
4700	76x143	0.09	17	10	26.00	K21450472__M0J143	
4700	90x98	0.09	19	13	22.10	K21450472__M0L098	
5600	76x143	0.09	15	10	28.30	K21450562__M0J143	
6800	76x214	0.09	11	8	37.20	K21450682__M0J214	
6800	90x145	0.09	13	10	31.90	K21450682__M0L145	
8200	90x145	0.09	11	8	34.90	K21450822__M0L145	
10000	90x220	0.10	9	6	46.50	K21450103__M0L220	
12000	90x220	0.10	8	6	49.80	K21450123__M0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

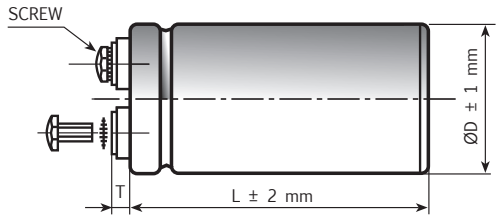
K22 TYPE -40°C +105°C 8000H

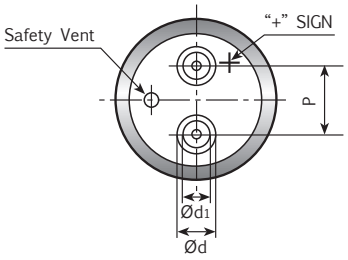
RoHS Compliant

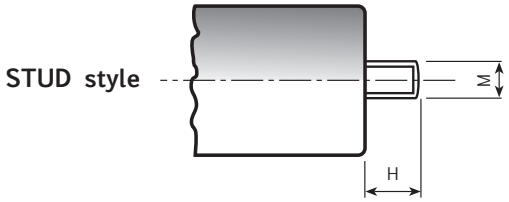
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**
- **Design optimized for high ripple current applications.**

APPLICATIONS

Designed for professional application.
Switch mode power suppliers, high ripple current converters, motor drives.







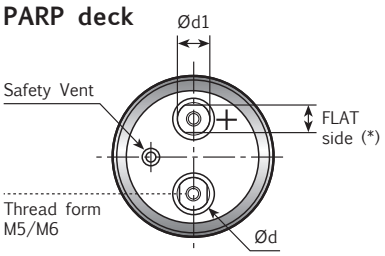


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

Kendeil™

K22 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +105°C [Environmental classification 40/105/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 350V to 450V DC
Surge Voltage (V_p)	$V_p = 1.10\ V_r$
Rated Capacitance Range	from 1000 µF to 12000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.003\ C_r\ V_r + 4$ µA At 85°C max $I_L = 0.02\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz: FREQUENCY 50Hz 100 Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C 110°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1.0 0.5 Maximum internal temperature 110°C Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 250000 h at 40°C > 8000 h at 105°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K22 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1200	51x79	0.08	44	26	5.44	K22350122__M0G079	350V
1200	51x105	0.08	44	26	6.08	K22350122__M0G105	
1500	51x105	0.08	40	24	6.78	K22350152__M0G105	
1800	51x105	0.08	40	24	6.78	K22350182__M0G105	
2200	63x105	0.08	24	15	9.93	K22350222__M0H105	
2200	76x79	0.08	24	15	9.15	K22350222__M0J079	
2200	76x98	0.08	24	15	9.86	K22350222__M0J098	
2800	63x105	0.08	22	14	10.90	K22350282__M0H105	
3300	76x79	0.08	20	13	10.20	K22350332__M0J079	
3300	76x105	0.08	20	13	12.00	K22350332__M0J105	
3900	76x105	0.08	16	11	13.40	K22350392__M0J105	
3900	90x98	0.08	16	11	13.50	K22350392__M0L098	
4700	76x143	0.09	13	10	16.70	K22350472__M0J143	
5600	76x143	0.09	10	8	18.20	K22350562__M0J143	
6800	76x214	0.09	9	6	23.00	K22350682__M0J214	
6800	90x145	0.09	9	6	20.40	K22350682__M0L145	
8200	76x214	0.09	8	6	23.30	K22350822__M0J214	
8200	90x145	0.09	8.5	6	22.30	K22350822__M0L145	
10000	76x214	0.09	7	5	24.70	K22350103__M0J214	
10000	90x145	0.09	7	5	22.70	K22350103__M0L145	
12000	90x220	0.10	6.5	4	31.80	K22350123__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1200	51x79	0.08	44	26	5.44	K22400122__M0G079	400V
1200	51x105	0.08	44	26	6.08	K22400122__M0G105	
1500	51x105	0.08	40	24	6.78	K22400152__M0G105	
2200	63x105	0.08	24	15	9.93	K22400222__M0H105	
2200	76x79	0.08	24	15	9.15	K22400222__M0J079	
2200	76x98	0.08	24	15	9.86	K22400222__M0J098	
3300	76x105	0.08	20	13	12.00	K22400332__M0J105	
3900	76x105	0.08	16	11	13.40	K22400392__M0J105	
4400	90x98	0.08	15	10	14.00	K22400442__M0L098	
4700	76x143	0.09	13	10	16.70	K22400472__M0J143	
5600	76x143	0.09	10	8	18.20	K22400562__M0J143	
6800	76x214	0.09	9	6	23.00	K22400682__M0J214	
6800	90x145	0.09	9	6	20.40	K22400682__M0L145	
8200	90x145	0.09	8.5	6	22.30	K22400822__M0L145	
10000	90x220	0.09	7	5	29.70	K22400103__M0L220	
12000	90x220	0.10	6.5	4	31.80	K22400123__M0L220	

K22 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1200	51x79	0.08	44	26	5.44	K22420122__M0G079	420V
1200	51x105	0.08	44	26	6.08	K22420122__M0G105	
1500	51x105	0.08	40	24	6.78	K22420152__M0G105	
2200	63x105	0.08	24	15	9.93	K22420222__M0H105	
2200	76x79	0.08	24	15	9.15	K22420222__M0J079	
2200	76x98	0.08	24	15	9.86	K22420222__M0J098	
3300	76x105	0.08	20	13	12.00	K22420332__M0J105	
3900	76x105	0.08	16	11	13.40	K22420392__M0J105	
4400	90x98	0.08	15	10	14.00	K22420442__M0L098	
4700	76x143	0.09	13	10	16.70	K22420472__M0J143	
5600	76x143	0.09	10	8	18.20	K22420562__M0J143	
6800	76x214	0.09	9	6	23.00	K22420682__M0J214	
6800	90x145	0.09	9	6	20.40	K22420682__M0L145	
8200	90x145	0.09	8.5	6	22.30	K22420822__M0L145	
10000	90x220	0.09	7	5	29.70	K22420103__M0L220	
12000	90x220	0.10	6.5	4	31.80	K22420123__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	51x79	0.08	67	40	5.20	K22450102__M0G079	450V
1000	51x105	0.08	67	40	5.61	K22450102__M0G105	
1200	51x105	0.08	56	32	6.23	K22450122__M0G105	
2200	63x105	0.08	30	18	9.75	K22450222__M0H105	
2200	76x79	0.08	36	20	8.90	K22450222__M0J079	
2200	76x98	0.08	36	20	8.90	K22450222__M0J098	
2800	90x98	0.08	28	16	12.20	K22450282__M0L098	
3300	76x105	0.08	26	16	11.60	K22450332__M0J105	
3900	76x143	0.08	19	14	15.30	K22450392__M0J143	
4700	76x143	0.09	16	9	16.70	K22450472__M0J143	
5600	90x145	0.09	15	9	18.80	K22450562__M0L145	
6800	76x214	0.09	11	6	23.70	K22450682__M0J214	
6800	90x145	0.09	11	7	20.60	K22450682__M0L145	
8200	90x220	0.09	10	6	27.40	K22450822__M0L220	
10000	90x220	0.10	9	6	29.60	K22450103__M0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

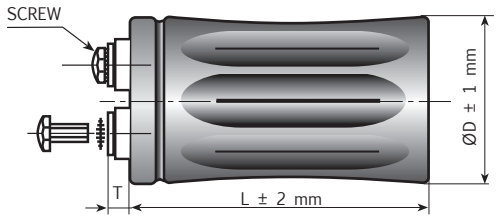
K41 TYPE -40°C +85°C 15000H

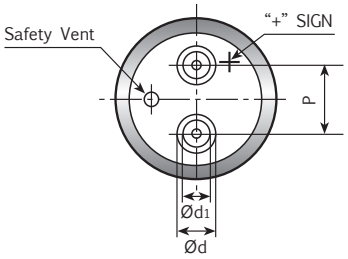
RoHS Compliant

- Surge-proof capacitor in aluminium can with insulation sleeve.
- To be mounted with ring clips or with threaded stud.
- Design optimized for long term vibration stress, traction market.
- Octagonal can shape.

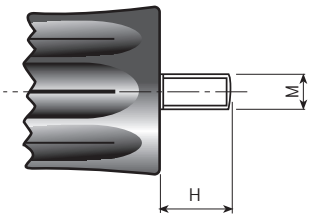
APPLICATIONS

Designed for professional application under high mechanical stress.





STUD style



PARP deck

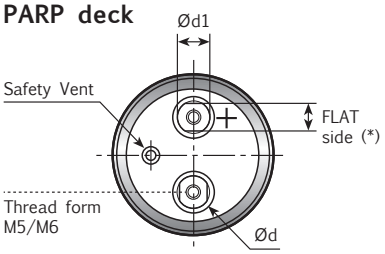


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K41 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 16V to 500V DC
Surge Voltage (V_p)	$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.15\ V_r$ ($V_r \leq$ 250V DC) $V_p = 1.10\ V_r$ (V_r > 250V DC)
Rated Capacitance Range	from 220 µF to 1500000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit: $I_L = 0.003\ C_r\ V_r$ At 85°C max $I_L = 0.04\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz. For different temperature and frequency multiplier must be used as follows: FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Maximum internal temperature 98°C Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 35mm 51mm 63mm 76mm 90mm Maximum current 20A 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h Centrifugal acceleration 20g for 48 hours
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 200000 h at 40°C > 12000 h at 85°C for $V_r \leq$ 100V and for $V_r \geq$ 500V > 15000 h at 85°C for 100V < V_r < 500V
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 25 fit (25 10^{-9}/h) ($V_r \leq$ 160V DC) ≤ 33 fit (33 10^{-9}/h) (V_r > 160V DC)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K41 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
22000	35x60	0.35	18	16	6.6	K41016223__M0E060	16V
33000	35x79	0.40	15	13	10.2	K41016333__M0E079	
47000	51x79	0.55	13	12	12.5	K41016473__M0G079	
68000	51x79	0.60	12	11	15.7	K41016683__M0G079	
100000	51x79	0.80	10	11	16.5	K41016104__M0G079	
100000	51x105	0.80	10	10	18.7	K41016104__M0G105	
150000	51x105	1.10	10	9	19.5	K41016154__M0G105	
150000	63x105	1.10	10	9	21.5	K41016154__M0H105	
220000	63x105	1.50	8	8	22.4	K41016224__M0H105	
330000	63x105	1.90	8	8	23.3	K41016334__M0H105	
330000	76x105	1.90	8	8	25.0	K41016334__M0J105	
470000	76x105	1.90	5	5	28.5	K41016474__M0J105	
470000	76x143	1.90	5	5	32.0	K41016474__M0J143	
680000	76x143	2.50	4	4	32.5	K41016684__M0J143	
1000000	76x214	2.50	3	3	44.5	K41016105__M0J214	
1500000	90x220	3.00	3	3	48.7	K41016155__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0.25	27	21	5.9	K41025103__M0E060	25V
15000	35x60	0.28	16	12	9.3	K41025153__M0E060	
22000	35x79	0.35	18	16	11.8	K41025223__M0E079	
33000	35x79	0.40	15	14	12.1	K41025333__M0E079	
33000	51x79	0.40	15	14	13.3	K41025333__M0G079	
47000	51x79	0.50	12	10	15.7	K41025473__M0G079	
68000	51x79	0.60	10	9	16.4	K41025683__M0G079	
68000	51x105	0.60	10	9	18.7	K41025683__M0G105	
100000	51x105	0.70	10	9	19.5	K41025104__M0G105	
100000	63x105	0.70	10	9	21.5	K41025104__M0H105	
150000	63x105	1.00	9	9	22.0	K41025154__M0H105	
150000	76x105	1.00	9	9	23.5	K41025154__M0J105	
220000	76x105	1.50	9	9	24.2	K41025224__M0J105	
220000	76x143	1.50	9	9	28.5	K41025224__M0J143	
330000	76x143	2.00	9	9	30.5	K41025334__M0J143	
470000	76x214	2.00	5	5	35.6	K41025474__M0J214	

K41 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0.20	18	12	6.5	K41040103__M0E060	40V
15000	35x60	0.25	13	10	7.4	K41040153__M0E060	
15000	35x79	0.25	13	10	8.6	K41040153__M0E079	
22000	35x79	0.30	16	14	8.9	K41040223__M0E079	
22000	51x79	0.30	16	14	10.4	K41040223__M0G079	
33000	51x79	0.35	15	13	13.5	K41040333__M0G079	
47000	51x79	0.40	10	9	14.2	K41040473__M0G079	
47000	51x105	0.40	10	9	15.1	K41040473__M0G105	
47000	63x105	0.40	10	9	17.6	K41040473__M0H105	
68000	51x105	0.50	10	8	18.2	K41040683__M0G105	
68000	63x105	0.50	10	8	19.5	K41040683__M0H105	
100000	63x105	0.60	9	8	21.2	K41040104__M0H105	
150000	76x105	0.90	9	8	25.7	K41040154__M0J105	
220000	76x143	1.00	6	6	31.5	K41040224__M0J143	
330000	76x214	1.20	5	5	38.5	K41040334__M0J214	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0.20	33	30	5.6	K41050472__M0E060	50V
6800	35x60	0.20	25	24	7.0	K41050682__M0E060	
10000	35x60	0.20	21	20	10.0	K41050103__M0E060	
15000	35x79	0.25	17	15	11.3	K41050153__M0E079	
22000	51x79	0.30	16	13	13.1	K41050223__M0G079	
33000	51x105	0.35	15	13	16.0	K41050333__M0G105	
33000	63x105	0.35	15	13	17.5	K41050333__M0H105	
47000	51x105	0.40	12	10	16.2	K41050473__M0G105	
47000	63x105	0.40	12	10	18.3	K41050473__M0H105	
68000	63x105	0.60	12	9	18.0	K41050683__M0H105	
68000	76x105	0.60	12	9	22.1	K41050683__M0J105	
100000	76x105	0.90	8	8	23.8	K41050104__M0J105	
100000	76x143	0.90	8	8	25.8	K41050104__M0J143	
150000	76x143	1.00	6	6	31.5	K01050154__M0J143	

K41 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0.15	29	25	6.2	K41063472__M0E060	63V
6800	35x60	0.18	21	20	7.0	K41063682__M0E060	
6800	35x79	0.18	21	20	8.2	K41063682__M0E079	
10000	35x79	0.20	21	20	8.7	K41063103__M0E079	
10000	51x79	0.20	18	16	10.1	K41063103__M0G079	
15000	51x79	0.25	15	13	11.1	K41063153__M0G079	
22000	51x79	0.30	13	11	12.4	K41063223__M0G079	
22000	51x105	0.30	13	11	14.6	K41063223__M0G105	
33000	51x105	0.35	11	10	15.6	K41063333__M0G105	
33000	63x105	0.35	11	10	17.9	K41063333__M0H105	
47000	63x105	0.45	11	10	18.8	K41063473__M0H105	
68000	76x105	0.50	11	10	25.7	K41063683__M0J105	
100000	76x105	0.55	8	8	31.5	K41063104__M0J105	
100000	76x143	0.55	8	8	34.5	K41063104__M0J143	
150000	76x143	0.60	6	6	36.1	K41063154__M0J143	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0.15	29	25	5.4	K41075472__M0E060	75V
6800	35x79	0.18	20	20	8.5	K41075682__M0E079	
10000	51x79	0.20	18	16	11.0	K41075103__M0G079	
15000	51x105	0.25	15	13	12.7	K41075153__M0G105	
22000	51x105	0.30	12	11	15.2	K41075223__M0G105	
22000	63x105	0.30	12	11	16.2	K41075223__M0H105	
33000	63x105	0.35	11	10	16.8	K41075333__M0H105	
33000	76x105	0.35	11	10	18.5	K41075333__M0J105	
47000	76x105	0.45	10	10	20.1	K41075473__M0J105	
47000	76x143	0.45	10	10	22.1	K41075473__M0J143	
68000	76x143	0.60	10	10	26.0	K41075683__M0J143	
100000	76x143	0.60	8	8	34.9	K41075104__M0J143	

K41 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	35x60	0.15	84	65	4.0	K41100152__M0E060	100V
2200	35x60	0.15	57	47	5.0	K41100222__M0E060	
3300	35x60	0.15	48	39	5.3	K41100332__M0E060	
3300	35x79	0.15	48	39	6.8	K41100332__M0E079	
4700	35x79	0.15	30	26	7.5	K41100472__M0E079	
4700	51x79	0.15	30	26	10.0	K41100472__M0G079	
6800	51x79	0.20	23	20	11.1	K41100682__M0G079	
10000	51x79	0.20	16	14	11.9	K41100103__M0G079	
10000	51x105	0.20	16	14	13.9	K41100103__M0G105	
10000	63x105	0.20	16	14	14.5	K41100103__M0H105	
15000	51x105	0.25	13	12	14.8	K41100153__M0G105	
15000	63x105	0.25	13	12	17.5	K41100153__M0H105	
22000	63x105	0.25	12	12	18.2	K41100223__M0H105	
33000	76x105	0.25	10	10	23.1	K41100333__M0J105	
47000	76x143	0.30	10	9	30.2	K41100473__M0J143	
68000	76x143	0.30	8	8	36.5	K41100683__M0J143	
68000	76x214	0.40	6	5	39.5	K41100683__M0J214	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	35x79	0.10	98	90	4.0	K41160102__M0E079	160V
1500	51x79	0.10	62	71	5.3	K41160152__M0G079	
2200	51x79	0.10	50	43	7.0	K41160222__M0G079	
3300	51x105	0.12	35	30	8.6	K41160332__M0G105	
4700	51x105	0.12	25	25	10.9	K41160472__M0G105	
4700	63x105	0.12	25	25	11.9	K41160472__M0H105	
6800	63x105	0.12	20	22	13.0	K41160682__M0H105	
10000	76x105	0.15	13	12	17.4	K41160103__M0J105	
10000	76x143	0.15	13	12	19.4	K41160103__M0J143	
15000	76x143	0.15	11	10	20.9	K41160153__M0J143	
22000	76x143	0.20	10	10	26.4	K41160223__M0J143	
33000	76x214	0.20	8	8	34.1	K41160333__M0J214	

K41 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	35X60	0.10	124	119	3.4	K41200681__M0E060	200V
1000	51x79	0.10	86	88	4.2	K41200102__M0G079	
1500	51x79	0.10	60	63	5.8	K41200152__M0G079	
2200	51x105	0.10	40	37	7.2	K41200222__M0G105	
3300	51x105	0.12	32	30	9.0	K41200332__M0G105	
3300	63x105	0.12	31	29	10.2	K41200332__M0H105	
4700	51x105	0.12	28	26	10.4	K41200472__M0G105	
4700	63x105	0.12	27	25	11.1	K41200472__M0H105	
5600	63x105	0.12	21	18	12.1	K41200562__M0H105	
6800	63x105	0.12	20	16	13.9	K41200682__M0H105	
6800	76x105	0.12	19	15	14.3	K41200682__M0J105	
8200	76x105	0.12	16	14	14.8	K41200822__M0J105	
10000	76x105	0.15	13	12	15.8	K41200103__M0J105	
10000	76x143	0.15	13	12	18.6	K41200103__M0J143	
15000	76x143	0.18	12	12	21.4	K41200153__M0J143	
22000	76x143	0.18	9	9	28.9	K41200223__M0J143	
33000	76x214	0.22	8	8	36.1	K41200333__M0J214	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	35x60	0.10	211	200	2.8	K41250471__M0E060	250V
680	35x79	0.10	127	121	3.5	K41250681__M0E079	
1000	51x79	0.10	110	95	4.5	K41250102__M0G079	
1500	51x79	0.10	64	56	5.0	K41250152__M0G079	
2200	51x105	0.10	40	36	7.5	K41250222__M0G105	
3300	51x105	0.12	31	26	9.8	K41250332__M0G105	
3300	63x105	0.12	30	25	11.0	K41250332__M0H105	
4700	63x105	0.12	24	21	11.8	K41250472__M0H105	
4700	76x105	0.12	20	18	13.2	K41250472__M0J105	
5600	76x105	0.12	17	16	13.8	K41250562__M0J105	
6800	76x105	0.12	15	13	14.1	K41250682__M0J105	
8200	76x143	0.12	14	13	16.0	K41250822__M0J143	
10000	76x143	0.13	13	12	19.7	K41250103__M0J143	
15000	76x143	0.13	11	11	21.9	K41250153__M0J143	
22000	76x214	0.14	10	9	34.2	K41250223__M0J214	

K41 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	35x79	0.10	108	95	4.0	K41350471__M0E079	350V
680	35x79	0.10	108	95	4.0	K41350681__M0E079	
1000	51x79	0.10	79	62	5.0	K41350102__M0G079	
1000	51x105	0.10	79	62	5.5	K41350102__M0G105	
1500	51x105	0.10	60	52	7.4	K41350152__M0G105	
2200	51x105	0.10	44	40	9.0	K41350222__M0G105	
2200	63x105	0.10	37	34	9.5	K41350222__M0H105	
3300	63x105	0.12	26	22	10.1	K41350332__M0H105	
3300	76x105	0.12	26	22	12.8	K41350332__M0J105	
4700	76x105	0.12	17	16	14.5	K41350472__M0J105	
4700	76x143	0.12	17	16	17.5	K41350472__M0J143	
5600	76x143	0.12	17	16	18.5	K41350562__M0J143	
6800	76x143	0.12	16	15	19.2	K41350682__M0J143	
8200	76x143	0.12	16	15	20.7	K41350822__M0J143	
10000	76x214	0.14	15	14	26.6	K41350103__M0J214	
15000	76x214	0.15	14	14	31.7	K41350153__M0J214	
22000	90x220	0.20	13	13	35.4	K41350223__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
220	35x60	0.10	350	288	2.1	K41400221__M0E060	400V
330	35x60	0.10	290	273	2.8	K41400331__M0E060	
470	35x79	0.10	165	155	3.5	K41400471__M0E079	
680	51x79	0.10	120	115	4.7	K41400681__M0G079	
680	51x105	0.10	124	120	5.1	K41400681__M0G105	
1000	51x79	0.10	105	95	5.8	K41400102__M0G079	
1000	51x105	0.10	110	85	6.3	K41400102__M0G105	
1500	51x105	0.10	65	55	7.0	K41400152__M0G105	
1500	63x105	0.10	65	55	7.9	K41400152__M0H105	
2200	63x105	0.10	50	47	9.0	K41400222__M0H105	
2200	76x105	0.10	50	47	10.7	K41400222__M0J105	
3300	63x105	0.12	35	30	11.0	K41400332__M0H105	
3300	76x105	0.12	35	30	13.1	K41400332__M0J105	
3300	76x143	0.12	35	30	14.2	K41400332__M0J143	
4700	76x105	0.15	30	29	14.9	K41400472__M0J105	
4700	76x143	0.15	30	29	18.8	K41400472__M0J143	
5600	76x143	0.15	26	25	19.0	K41400562__M0J143	
6800	76x143	0.15	20	18	19.5	K41400682__M0J143	
10000	76x214	0.15	20	19	26.0	K41400103__M0J214	
15000	90x220	0.20	15	12	33.5	K41400153__M0L220	

K41 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	51x79	0.10	200	179	4.0	K41450471__M0G079	450V
680	51x79	0.10	140	128	4.4	K41450681__M0G079	
680	51x105	0.10	140	128	5.0	K41450681__M0G105	
1000	51x79	0.10	100	88	4.8	K41450102__M0G079	
1000	51x105	0.10	100	88	6.4	K41450102__M0G105	
1500	51x105	0.10	67	55	7.1	K41450152__M0G105	
1500	63x105	0.10	67	55	8.0	K41450152__M0H105	
2200	63x105	0.10	60	55	9.0	K41450222__M0H105	
2200	76x105	0.10	60	47	11.2	K41450222__M0J105	
2200	76x143	0.10	60	47	12.5	K41450222__M0J143	
3300	76x105	0.12	35	30	11.2	K41450332__M0J105	
3300	76x143	0.12	35	30	12.9	K41450332__M0J143	
4700	76x143	0.15	32	30	15.0	K41450472__M0J143	
5600	76x143	0.15	26	25	19.0	K41450562__M0J143	
6800	76x214	0.15	23	22	19.0	K41450682__M0J214	
8200	76x214	0.15	22	20	19.0	K41450822__M0J214	
10000	76x143	0.20	22	20	19.0	K41450103__M0J143	
10000	76x214	0.20	20	19	23.1	K41450103__M0J214	
12000	76x214	0.20	15	12	29.8	K41450123__M0J214	
15000	90x220	0.20	14	12	32.6	K41450153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	51x105	0.15	125	114	4.0	K41500102__M0G105	500V
1500	63x105	0.15	100	91	5.2	K41500152__M0H105	
2200	76x105	0.15	70	66	7.4	K41500222__M0J105	
2200	76x143	0.15	70	66	8.2	K41500222__M0J143	
3300	76x143	0.15	55	53	10.3	K41500332__M0J143	
4700	76x214	0.20	40	37	18.5	K41500472__M0J214	
5600	76x214	0.15	26	22	19.8	K41500562__M0J214	
6800	76x214	0.15	24	22	20.2	K41500682__M0J214	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

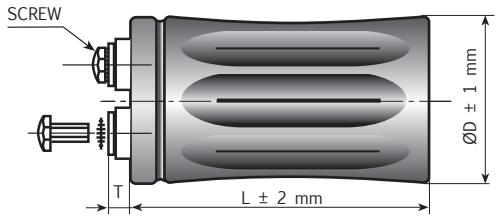
K42 TYPE -40°C +105°C 5000H

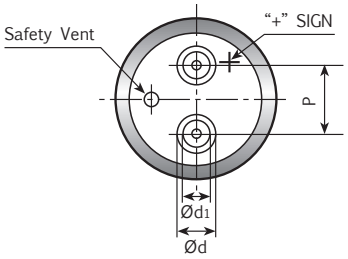
RoHS Compliant

- Surge-proof capacitor in aluminium can with insulation sleeve.
- To be mounted with ring clips or with threaded stud.
- Design optimized for long term vibration stress, traction market.
- Octagonal can shape.

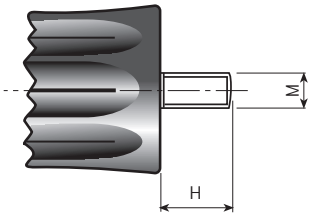
APPLICATIONS

Designed for professional application under high mechanical stress.





STUD style



PARP deck

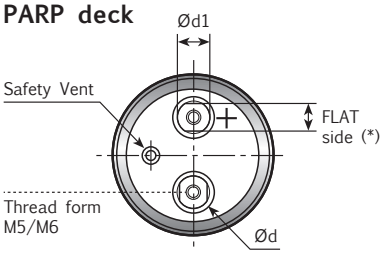


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K42 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +105°C [Environmental classification 40/105/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 16V to 450V DC
Surge Voltage (V_p)	$V_p = 1.15\ V_r$ ($V_r \leq 250$V DC) $V_p = 1.10\ V_r$ ($V_r > 250$V DC)
Rated Capacitance Range	from 100 µF to 470,000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.003\ C_r\ V_r + 4$ µA At 85°C max $I_L = 0.02\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows: FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C 110°C MULTIPLIER 3.0 2.80 2.60 2.40 2.20 1.80 1.5 1.0 0.5 Maximum internal temperature 108°C Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 35mm 51mm 63mm 76mm 90mm Maximum current 20A 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h Centrifugal acceleration 20g for 48 hours
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	250000 h at 40°C 5000 h at 105°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K42 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0.25	25	24	3.3	K42016103__M0E060	16V
15000	35x60	0.30	16	16	3.5	K42016153__M0E060	
22000	35x60	0.35	12	12	4.4	K42016223__M0E060	
33000	35x79	0.40	12	12	5.9	K42016333__M0E079	
47000	35x79	0.55	9	10	7.5	K42016473__M0E079	
68000	51x79	0.60	8	8	11.9	K42016683__M0G079	
100000	51x105	0.80	8	8	12.3	K42016104__M0G105	
150000	63x105	1.10	7	7	15.4	K42016154__M0H105	
220000	76x105	1.50	7	7	18.8	K42016224__M0J105	
330000	76x105	1.90	7	7	19.7	K42016334__M0J105	
470000	76x143	2.00	6	6	22.5	K42016474__M0J143	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	35x60	0.20	23	18	3.8	K42025103__M0E060	25V
15000	35x60	0.25	16	12	4.8	K42025153__M0E060	
22000	35x79	0.30	12	12	7.2	K42025223__M0E079	
33000	51x79	0.35	10	10	8.9	K42025333__M0G079	
47000	51x79	0.40	9	9	11.6	K42025473__M0G079	
68000	51x105	0.50	8	8	13.0	K42025683__M0G105	
100000	63x105	0.60	8	8	15.8	K42025104__M0H105	
150000	76x105	0.90	7	7	18.3	K42025154__M0J105	
220000	76x143	1.30	7	7	21.6	K42025224__M0J143	
330000	76x143	2.00	7	7	23.8	K42025334__M0J143	

K42 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
4700	35x60	0.20	31	29	3.3	K42040472__M0E060	40V
6800	35x60	0.20	23	20	3.9	K42040682__M0E060	
10000	35x79	0.20	16	12	4.8	K42040103__M0E079	
15000	35x79	0.20	12	10	5.4	K42040153__M0E079	
22000	51x79	0.25	10	10	8.9	K42040223__M0G079	
33000	51x105	0.35	10	10	11.2	K42040333__M0G105	
47000	51x105	0.45	9	9	13.8	K42040473__M0G105	
47000	63x105	0.45	9	9	14.5	K42040473__M0H105	
68000	63x105	0.60	7	7	15.0	K42040683__M0H105	
68000	76x105	0.60	7	7	15.9	K42040683__M0J105	
100000	76x105	0.90	7	7	19.1	K42040104__M0J105	
100000	76x143	0.90	7	7	21.0	K42040104__M0J143	
150000	76x143	1.30	7	7	25.9	K42040154__M0J143	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	35x60	0.15	72	60	2.5	K42063222__M0E060	63V
3300	35x60	0.15	48	39	3.5	K42063332__M0E060	
4700	35x60	0.15	33	28	4.2	K42063472__M0E060	
6800	35x79	0.18	18	13	6.3	K42063682__M0E079	
10000	51x79	0.20	15	11	8.2	K42063103__M0G079	
15000	51x79	0.25	15	13	8.9	K42063153__M0G079	
15000	51x105	0.25	13	10	18.0	K42063153__M0G105	
22000	51x105	0.30	11	10	11.8	K42063223__M0G105	
22000	63x105	0.30	11	10	13.5	K42063223__M0H105	
33000	63x105	0.35	11	10	14.8	K42063333__M0H105	
33000	76x105	0.35	11	8	16.6	K42063333__M0J105	
47000	76x105	0.45	9	8	17.7	K42063473__M0J105	
47000	76x143	0.45	9	8	19.0	K42063473__M0J143	
68000	76x105	0.45	8	8	20.1	K42063683__M0J105	
68000	76x143	0.70	8	8	22.8	K42063683__M0J143	
100000	76x143	0.70	8	8	24.1	K42063104__M0J143	

K42 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	35x60	0.15	110	100	2.9	K42100102__M0E060	100V
1500	35x60	0.15	80	73	3.2	K42100152__M0E060	
2200	35x60	0.15	59	53	4.4	K42100222__M0E060	
3300	35x79	0.15	33	31	5.8	K42100332__M0E079	
4700	51x79	0.15	25	22	7.2	K42100472__M0G079	
6800	51x79	0.15	19	17	8.9	K42100682__M0G079	
6800	51x105	0.15	19	17	8.9	K42100682__M0G105	
10000	51x105	0.15	17	15	11.0	K42100103__M0G105	
10000	63x105	0.15	17	15	12.5	K42100103__M0H105	
15000	63x105	0.15	12	12	15.1	K42100153__M0H105	
22000	76x105	0.18	10	9	16.5	K42100223__M0J105	
33000	76x143	0.22	8	8	20.9	K42100333__M0J143	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1000	35x79	0.11	105	90	3.3	K42160102__M0E079	160V
1500	51x79	0.11	65	60	4.1	K42160152__M0G079	
2200	51x105	0.11	46	43	4.8	K42160222__M0G105	
3300	63x105	0.11	32	30	6.8	K42160332__M0H105	
4700	63x105	0.11	27	25	8.5	K42160472__M0H105	
6800	76x105	0.13	23	20	11.3	K42160682__M0J105	
10000	76x105	0.14	22	20	14.2	K42160103__M0J105	
10000	76x143	0.15	17	16	14.9	K42160103__M0J143	
15000	76x143	0.20	16	12	17.2	K42160153__M0J143	
22000	76x214	0.20	11	10	19.0	K42160223__M0J214	

K42 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	35x60	0.11	133	98	2.5	K42200681__M0E060	200V
1000	51x79	0.11	85	64	4.6	K42200102__M0G079	
1500	51x105	0.11	65	58	5.1	K42200152__M0G105	
2200	51x105	0.11	60	53	6.1	K42200222__M0G105	
3300	63x105	0.11	40	35	7.9	K42200332__M0H105	
4700	63x105	0.11	25	23	8.7	K42200472__M0H105	
6800	76x105	0.11	18	16	11.8	K42200682__M0J105	
8200	76x105	0.11	17	15	12.8	K42200822__M0H105	
10000	76x105	0.13	15	13	14.5	K42200103__M0J105	
10000	76x143	0.15	13	12	16.0	K42200103__M0J143	
15000	76x143	0.20	12	11	17.3	K42200153__M0J143	
22000	76x214	0.20	11	10	18.9	K42200223__M0J214	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	35x60	0.11	211	193	2.0	K42250471__M0E060	250V
680	35x79	0.11	130	98	2.2	K42250681__M0E079	
1000	51x79	0.11	110	85	4.1	K42250102__M0G079	
1500	51x105	0.11	74	65	5.4	K42250152__M0G105	
2200	51x105	0.11	41	39	6.8	K42250222__M0G105	
3300	63x105	0.11	30	26	8.2	K42250332__M0H105	
4700	76x105	0.11	18	17	11.9	K42250472__M0J105	
6800	76x143	0.15	15	14	14.3	K42250682__M0J143	
8200	76x143	0.15	14	14	15.2	K42250822__M0J143	
10000	76x143	0.20	14	13	16.0	K42250103__M0J143	
15000	76x214	0.20	12	10	17.4	K42250153__M0J214	

K42 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
330	35x60	0.11	255	196	1.8	K42350331__M0E060	350V
470	35x79	0.11	170	141	2.1	K42350471__M0E079	
680	51x79	0.11	128	96	3.8	K42350681__M0G079	
1000	51x105	0.11	85	68	5.0	K42350102__M0G105	
1500	63x105	0.11	59	52	6.4	K42350152__M0H105	
2200	76x105	0.11	44	40	8.1	K42350222__M0J105	
3300	76x105	0.11	26	23	10.2	K42350332__M0J105	
4700	76x143	0.11	18	16	13.5	K42350472__M0J143	
5600	76x143	0.12	18	17	14.3	K42350562__M0J143	
6800	76x143	0.15	16	15	15.1	K42350682__M0J143	
10000	76x214	0.20	15	14	19.9	K42350103__M0J214	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
220	35x60	0.11	350	280	1.4	K42400221__M0E060	400V
330	35x60	0.11	250	210	2.2	K42400331__M0E060	
470	51x79	0.11	170	150	2.8	K42400471__M0G079	
680	51x79	0.11	110	100	3.2	K42400681__M0G079	
1000	51x105	0.11	95	82	4.1	K42400102__M0G105	
1500	63x105	0.11	64	53	5.8	K42400152__M0H105	
2200	63x105	0.11	45	53	6.0	K42400222__M0H105	
2200	76x105	0.11	45	39	7.3	K42400222__M0J105	
3300	76x143	0.11	28	25	11.1	K42400332__M0J143	
4700	76x143	0.11	24	23	12.8	K42400472__M0J143	
6800	76x214	0.15	19	15	15.0	K42400682__M0J214	
10000	90x220	0.20	16	14	22.5	K42400103__M0L220	

K42 TYPE STANDARD RATINGS

RATED VOLTAGE VDC

450V

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded
100	35x60	0.11	800	650	1.2	K42450101__M0E060
150	35x60	0.11	550	490	1.6	K42450151__M0E060
220	35x60	0.11	370	310	1.8	K42450221__M0E060
330	35x79	0.11	240	210	2.4	K42450331__M0E079
470	51x79	0.11	200	179	3.0	K42450471__M0G079
680	51x105	0.11	140	128	4.2	K42450681__M0G105
1000	51x105	0.11	100	88	4.4	K42450102__M0G105
1000	63x105	0.11	100	88	5.3	K42450102__M0H105
1500	63x105	0.11	63	57	5.7	K42450152__M0H105
1500	76x105	0.11	63	57	6.6	K42450152__M0J105
2200	76x105	0.11	48	38	7.6	K02450222__M0J105
2200	76x143	0.11	48	38	8.8	K02450222__M0J143
3300	76x143	0.15	35	30	10.4	K42450332__M0J143
4700	76x143	0.15	28	25	10.9	K42450472__M0J143
6800	76x214	0.15	21	16	23.7	K42450682__M0J214
10000	90x220	0.20	16	14	22.5	K42450103__M0L220

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

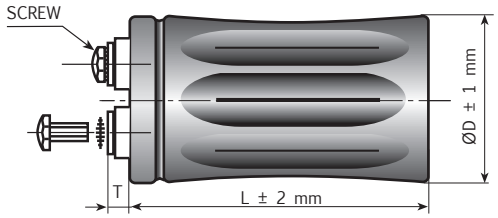
K61 TYPE -40°C +85°C 25000H

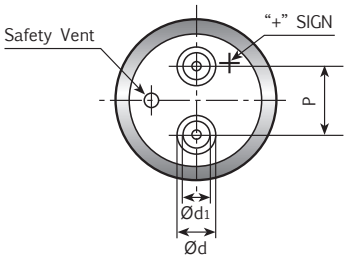
RoHS Compliant

- Surge-proof capacitor in aluminium can with insulation sleeve.
- Extremely linear characteristic between 20Hz to 22KHz.
- Design optimized for Audio application.
- No effects of sound compression.
- Precisely and realistic dynamic of sound..

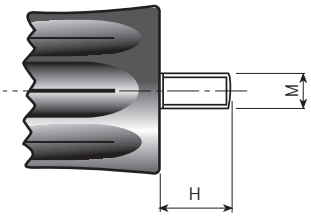
APPLICATIONS

Designed for professional application.
Linear amplifiers, audio filtering.





STUD style



PARP deck

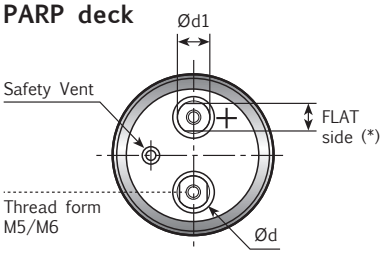


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K61 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 63V to 100V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 6800 µF to 47000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA Kendeil product limit: I_L= 0.003 C_r V_r At 85°C max I_L = 0.04 C_r V_r µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz. : FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.85 1.0 1.2 1.25 1.3 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Maximum internal temperature 98°C Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 4,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	250000 h at 40°C 25000 h at 85°C
Failure percentage Failure rate I ripple applied)	≤ 1% (during useful life) ≤ 25 fit (25 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K61 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
10000	51x79	0.10	11	9	14.6	K61063103__M0G079	63V
14000	51x105	0.10	9	8	18.7	K61063143__M0G105	
22000	63x105	0.11	6	6	28.7	K61063223__M0H105	
33000	76x105	0.12	5.5	5.5	31.2	K61063333__M0J105	
47000	76x143	0.17	4	4	41.3	K61063473__M0J143	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
8200	51x79	0.10	12	8	14.4	K61080822__M0G079	80V
10000	51x105	0.10	10	8	17.9	K61080103__M0G105	
18000	63x105	0.11	6	6	28.9	K61080183__M0H105	
28000	76x105	0.15	6	6	30.2	K61080283__M0J105	
42000	76x143	0.17	4	4	41.3	K61080423__M0J143	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
6800	51x79	0.10	14	12	14.1	K61100682__M0G079	100V
8200	51x105	0.10	11	8	17.9	K61100822__M0G105	
10000	51x105	0.10	10	8	17.9	K61100103__M0G105	
12000	63x105	0.10	7	7	28.0	K61100123__M0H105	
15000	63x105	0.10	6	6	28.7	K61100153__M0H105	
22000	76x105	0.11	6	6	30.2	K61100223__M0J105	
33000	76x143	0.15	5	5	41.0	K61100333__M0J143	

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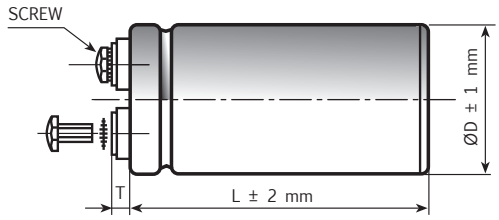
K71 TYPE -40°C +85°C 15000H

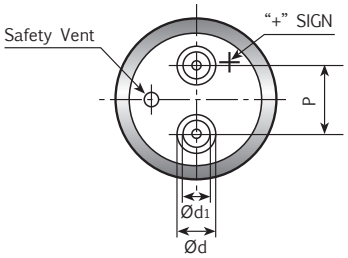
RoHS Compliant

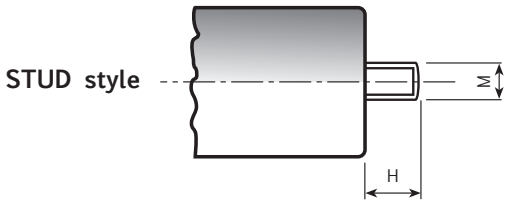
- **Design optimized for extremely high miniaturization.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**

APPLICATIONS

Designed for professional application.
Switch mode power suppliers, high ripple current converters, motor drives.







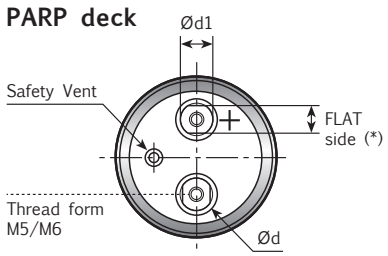


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K71 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 350V to 450V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 2200 µF to 36000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request : -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range : 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (85°C, Vn, Ir applied) Operation up to 105°C with voltage derating 0,88 x V rated	> 15.000 h at 85°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K71 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
3300	51x79	0.09	25	20	9.00	K71350332__M0G079	350V
3500	51x79	0.09	24	17	9.05	K71350352__M0G079	
4700	51x105	0.09	17	13	11.60	K71350472__M0G105	
6800	63x105	0.09	15	11	17.60	K71350682__M0H105	
7600	63x105	0.09	14	10	18.00	K71350762__M0H105	
10000	76x105	0.10	12	11	22.20	K71350103__M0J105	
11000	76x105	0.10	12	11	22.30	K71350113__M0J105	
16000	90x105	0.11	10	8	26.10	K71350163__M0L105	
17000	76x143	0.11	9	8	30.80	K71350173__M0J143	
24000	76x214	0.11	7	5	44.00	K71350243__M0J214	
24000	90x145	0.11	7	5	35.90	K71350243__M0L145	
36000	90x220	0.13	5	4	51.30	K71350363__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	51x79	0.09	42	33	8.21	K71400222__M0G079	400V
2900	51x79	0.09	38	30	8.64	K71400292__M0G079	
3300	51x105	0.09	29	22	10.80	K71400332__M0G105	
3900	51x105	0.09	28	19	11.10	K71400392__M0G105	
4700	63x79	0.09	21	17	9.97	K71400472__M0H079	
5600	63x105	0.09	19	15	16.60	K71400562__M0H105	
6200	63x105	0.09	18	14	17.10	K71400622__M0H105	
6800	76x105	0.09	17	13	18.60	K71400682__M0J105	
8200	76x105	0.09	16	12	19.00	K71400822__M0J105	
9200	76x105	0.09	14	11	21.20	K71400922__M0J105	
13000	76x143	0.10	9	8	29.30	K71400133__M0J143	
13000	90x105	0.10	10	9	25.20	K71400133__M0L105	
20000	76x214	0.11	8	7	41.90	K71400203__M0J214	
20000	90x145	0.11	8	7	34.50	K71400203__M0L145	
30000	90x220	0.13	6	5	49.50	K71400303__M0L220	

K71 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	51x79	0.09	42	33	8.21	K71420222__M0G079	420V
2500	51x79	0.09	40	22	8.42	K71420252__M0G079	
3300	51x105	0.09	29	22	10.80	K71420332__M0G105	
4700	63x79	0.09	21	17	9.97	K71420472__M0H079	
5600	63x105	0.09	19	15	16.60	K71420562__M0H105	
6800	76x105	0.09	17	13	18.60	K71420682__M0J105	
8200	76x105	0.09	16	12	19.00	K71420822__M0J105	
12000	76x143	0.09	9	8	28.60	K71420123__M0J143	
12000	90x105	0.09	9	8	24.50	K71420123__M0L105	
15000	90x145	0.09	8.5	7	32.60	K71420153__M0L145	
18000	76x214	0.10	8	7	40.90	K71420183__M0J214	
23000	90x220	0.13	7	6	46.80	K71420233__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	51x79	0.09	43	34	8.07	K71450222__M0G079	450V
3100	51x105	0.09	32	24	10.40	K71450312__M0G105	
4700	63x105	0.09	23	19	15.80	K71450472__M0H105	
5600	76x105	0.09	21	18	17.60	K71450562__M0J105	
6800	76x105	0.09	18	12	17.70	K71450682__M0J105	
10000	90x105	0.09	14	11	22.90	K71450103__M0L105	
11000	76x143	0.09	12	10	27.30	K71450113__M0J143	
15000	90x145	0.09	9	8	32.60	K71450153__M0L145	
16000	76x214	0.09	11	9	39.10	K71450163__M0J214	
23000	90x220	0.13	7	6	46.80	K71450233__M0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

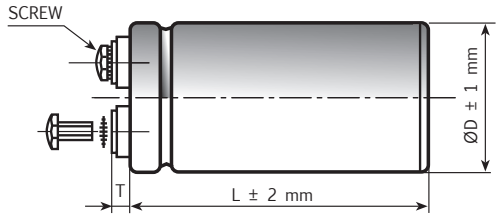
K72 TYPE -40°C +105°C 5000H

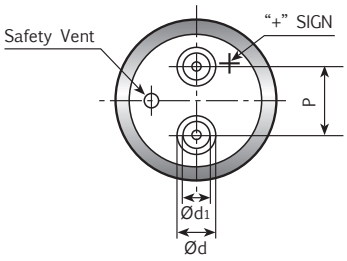
RoHS Compliant

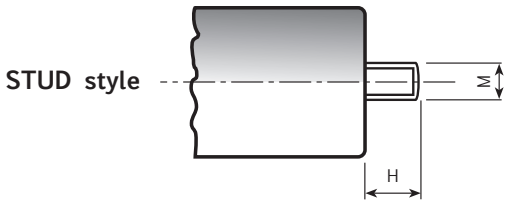
- **Design optimized for extremely high miniaturization.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**

APPLICATIONS

Designed for professional application.
Switch mode power suppliers, high ripple current converters, motor drives.







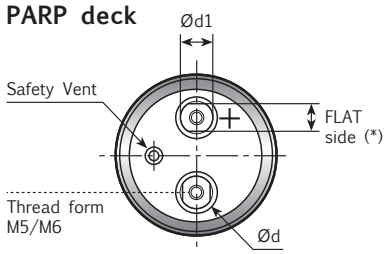


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K72 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +105°C [Environmental classification 40/105/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 350V to 450V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 1500 µF to 30000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request : -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C 110°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range : 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test (105°C, Vn, Ir applied)	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (105°C, Vn, Ir applied)	> 5.000 h at 105°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K72 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	51x79	0.09	42	33	5.12	K72350222__M0G079	350V
2900	51x79	0.09	38	29	5.36	K72350292__M0G079	
3300	51x105	0.09	25	20	6.77	K72350332__M0G105	
3900	51x105	0.09	23	17	6.87	K72350392__M0G105	
4700	63x79	0.09	17	13	8.32	K72350472__M0H079	
5600	63x105	0.09	16	12	10.40	K72350562__M0H105	
6200	63x105	0.09	15	11	10.60	K72350622__M0H105	
6800	76x105	0.09	15	11	12.50	K72350682__M0J105	
8200	76x105	0.09	13	12	13.10	K72350822__M0J105	
9200	76x105	0.09	12	11	13.30	K72350922__M0J105	
10000	76x143	0.09	12	11	17.10	K72350103__M0J143	
13000	76x143	0.09	9	8	18.20	K72350133__M0J143	
13000	90x105	0.09	9	8	15.60	K72350133__M0L105	
19000	90x145	0.11	8	7	21.40	K72350193__M0L145	
20000	76x214	0.13	8	7	26.00	K72350203__M0J214	
30000	90x220	0.13	6	5	30.70	K72350303__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	51x79	0.09	42	33	5.08	K72400222__M0G079	400V
3100	51x105	0.09	29	22	6.54	K72400312__M0G105	
3300	63x79	0.09	29	22	7.66	K72400332__M0H079	
4700	63x105	0.09	21	17	9.93	K72400472__M0H105	
5600	76x105	0.09	19	15	11.70	K72400562__M0J105	
6800	76x105	0.09	18	14	12.50	K72400682__M0J105	
8200	76x143	0.09	16	12	16.00	K72400822__M0J143	
10000	76x143	0.09	14	11	17.10	K72400103__M0J143	
10000	90x145	0.09	14	11	15.00	K72400103__M0L105	
11000	76x143	0.09	12	10	17.20	K72400113__M0J143	
16000	76x214	0.09	9	8	24.60	K72400163__M0J214	
16000	90x145	0.09	9	8	20.50	K72400163__M0L145	
23000	90x220	0.11	8	7	29.40	K72400233__M0L220	

K72 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
2200	51x79	0.09	42	33	5.08	K72420222__M0G079	420V
2700	51x105	0.09	40	29	6.39	K72420272__M0G105	
3300	63x79	0.09	29	22	7.66	K72420332__M0H079	
4700	63x105	0.09	21	17	9.93	K72420472__M0H105	
5600	76x105	0.09	16	8	11.70	K72420562__M0J105	
6800	76x105	0.09	19	15	12.50	K72420682__M0J105	
10000	76x143	0.09	14	11	17.10	K72420103__M0J143	
10000	90x105	0.09	14	11	15.00	K72420103__M0L105	
12000	90x145	0.09	11	9	18.30	K72420123__M0L145	
15000	76x214	0.09	9	8	24.00	K72420153__M0J214	
19000	90x220	0.09	9	8	27.20	K72420193__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	51x79	0.09	53	42	4.54	K72450152__M0G079	450V
1700	51x79	0.09	50	38	4.66	K72450172__M0G079	
2200	51x105	0.09	43	34	5.94	K72450222__M0G105	
2400	51x105	0.09	39	31	6.00	K72450242__M0G105	
2900	63x79	0.09	35	29	7.14	K72450292__M0H079	
3300	63x105	0.09	32	24	8.75	K72450332__M0H105	
3900	63x105	0.09	30	22	9.07	K72450392__M0H105	
4700	76x105	0.09	23	19	11.10	K72450472__M0J105	
5600	76x105	0.09	21	18	11.50	K72450562__M0J105	
6800	76x143	0.09	19	12	15.00	K72450682__M0J143	
8200	76x143	0.09	17	13	15.70	K72450822__M0J143	
8200	90x105	0.09	17	13	13.90	K72450822__M0L105	
10000	76x214	0.09	15	12	21.40	K72450103__M0J214	
12000	76x214	0.09	11	9	22.50	K72450123__M0J214	
12000	90x145	0.09	11	9	19.00	K72450123__M0L145	
18000	90x220	0.09	9	8	27.40	K72450183__M0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

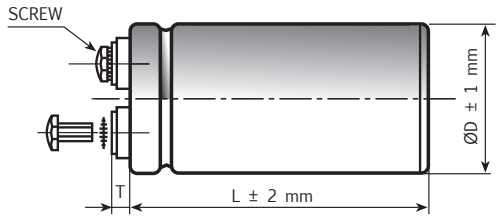
K91 TYPE -40°C +85°C 15000H

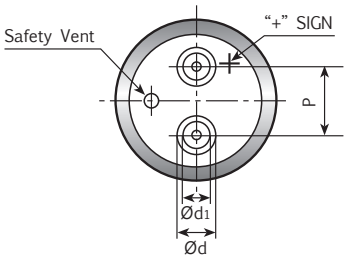
RoHS Compliant

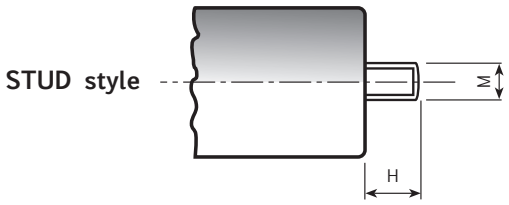
- **Design optimized for low equivalent series resistance and high ripple current.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**

APPLICATIONS

Designed for professional application.
Switch mode power suppliers, high ripple current converters, motor drives.







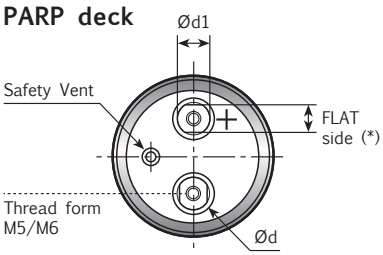


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3/8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1/2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1/4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3/8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K91 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 500V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 470 µF to 15000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request : -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range : 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 2000 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (85°C, Vn, Ir applied) Operation up to 105°C with voltage derating 0,88 x V rated	> 15.000 h at 85°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K91 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	51x79	0.08	97	75	5.11	K91400681__M0G079	400V
680	51x105	0.08	97	75	5.74	K91400681__M0G105	
1000	51x79	0.08	75	67	6.06	K91400102__M0G079	
1000	51x105	0.08	75	67	6.87	K91400102__M0G105	
1500	51x105	0.08	53	40	8.18	K91400152__M0G105	
1500	63x105	0.08	53	40	9.29	K91400152__M0H105	
2200	51x105	0.08	40	31	9.40	K91400222__M0G105	
2200	63x105	0.08	40	31	10.70	K91400222__M0H105	
2200	76x105	0.08	40	31	12.30	K91400222__M0J105	
3300	63x105	0.08	25	16	13.60	K91400332__M0H105	
3300	76x105	0.08	25	16	14.50	K91400332__M0J105	
3300	76x143	0.08	25	16	16.80	K91400332__M0J143	
4700	76x105	0.08	20	15	16.40	K91400472__M0J105	
4700	76x143	0.08	20	15	19.50	K91400472__M0J143	
5600	76x143	0.08	17	11	20.90	K91400562__M0J143	
6800	76x143	0.08	15	10	22.20	K91400682__M0J143	
10000	76x143	0.09	13	10	23.00	K91400103__M0J143	
10000	76x214	0.09	13	10	28.70	K91400103__M0J214	
15000	90x220	0.10	9	8	36.50	K91400153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
680	51x79	0.08	97	75	5.11	K91420681__M0G079	420V
680	51x105	0.08	97	75	5.74	K91420681__M0G105	
1000	51x79	0.08	75	67	6.06	K91420102__M0G079	
1000	51x105	0.08	75	67	6.87	K91420102__M0G105	
1500	51x105	0.08	53	40	8.18	K91420152__M0G105	
1500	63x105	0.08	53	40	9.29	K91420152__M0H105	
2200	51x105	0.08	40	31	9.40	K91420222__M0G105	
2200	63x105	0.08	40	31	10.70	K91420222__M0H105	
2200	76x105	0.08	40	31	12.30	K91420222__M0J105	
3300	63x105	0.08	25	16	13.60	K91420332__M0H105	
3300	76x105	0.08	25	16	14.50	K91420332__M0J105	
3300	76x143	0.08	25	16	16.80	K91420332__M0J143	
4700	76x105	0.08	20	15	16.40	K91420472__M0J105	
4700	76x143	0.08	20	15	19.50	K91420472__M0J143	
5600	76x143	0.08	17	11	20.90	K91420562__M0J143	
6800	76x143	0.08	15	10	22.20	K91420682__M0J143	
10000	76x143	0.09	13	10	23.00	K91420103__M0J143	
10000	76x214	0.09	13	10	28.70	K91420103__M0J214	
15000	90x220	0.10	9	8	36.50	K91420153__M0L220	

K91 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	51x79	0.08	159	120	4.36	K91450471__M0G079	450V
680	51x79	0.08	114	105	4.94	K91450681__M0G079	
680	51x105	0.08	114	105	5.57	K91450681__M0G105	
1000	51x79	0.08	83	70	5.84	K91450102__M0G079	
1000	51x105	0.08	83	70	6.60	K91450102__M0G105	
1500	51x105	0.08	57	42	7.89	K91450152__M0G105	
1500	63x105	0.08	57	42	8.97	K91450152__M0H105	
2200	63x105	0.08	44	33	10.20	K91450222__M0H105	
2200	76x105	0.08	44	33	11.90	K91450222__M0J105	
2200	76x143	0.08	44	33	13.60	K91450222__M0J143	
3300	76x105	0.08	30	18	14.00	K91450332__M0J105	
3300	76x143	0.08	30	18	16.30	K91450332__M0J143	
4700	76x143	0.08	21	15	18.80	K91450472__M0J143	
5600	76x143	0.08	18	12	20.20	K91450562__M0J143	
6800	76x143	0.08	16	11	21.30	K91450682__M0J143	
8200	76x143	0.08	14	10	23.00	K91450822__M0J143	
10000	76x143	0.09	13	10	23.10	K91450103__M0J143	
10000	76x214	0.09	13	10	26.20	K91450103__M0J214	
12000	76x214	0.09	13	10	26.20	K91450123__M0J214	
15000	90x220	0.10	11	9	35.00	K91450153__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	51x105	0.12	59	44	8.00	K91500152__M0G105	500V
2200	63x105	0.12	47	37	10.20	K91500222__M0H105	
2900	63x105	0.12	45	35	10.50	K91500292__M0H105	
3300	76x105	0.12	33	22	14.00	K91500332__M0J105	
3900	76x105	0.12	26	18	15.00	K91500392__M0J105	
4700	76x143	0.12	23	17	19.20	K91500472__M0J143	
5600	76x143	0.12	20	14	20.30	K91500562__M0J143	
6800	76x143	0.12	17	12	21.10	K91500682__M0J143	
8200	76x214	0.12	16	11	28.50	K91500822__M0J214	
10000	90x220	0.12	13	10	34.10	K91500103__M0L220	
12000	90x220	0.12	12	9	34.30	K91500123__M0L220	
15000	90x220	0.12	12	9	34.30	K91500153__M0L220	

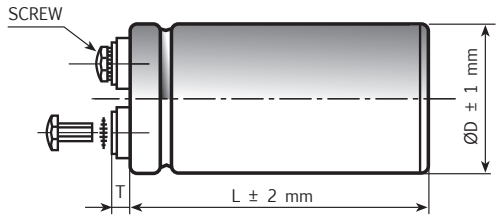
K92 TYPE -40˚C +105˚C 8000H

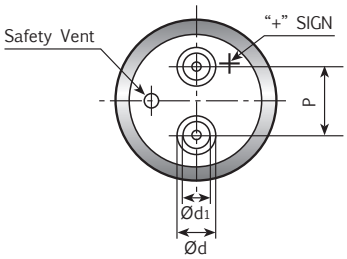
RoHS Compliant

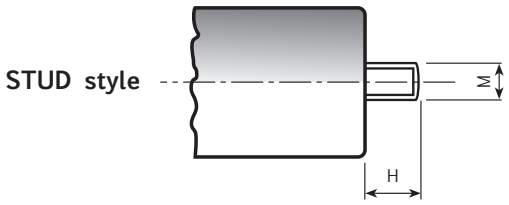
- **Design optimized for low equivalent series resistance and high ripple current.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **To be mounted with ring clips or with threaded stud.**

APPLICATIONS

Designed for professional application.
Switch mode power suppliers, high ripple current converters, motor drives.







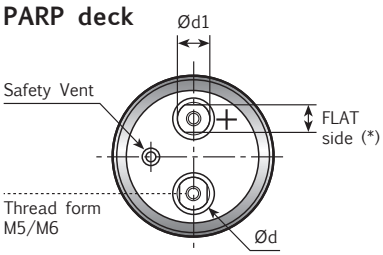


Diagram of dimensions (unit=mm) - Insert and screw threads: Metric (mm), UNF (inches)

ØD	d ±0.3	d1 ±0.3	P ±0.5	T ±2.0	STUD M	STUD H	INSERT	SCREW	INSERT STYLE CODE
35	11.6	7.9	12.7	6.5	M8	12	M5	5MA x 9.5	0
51	18.2	13	22.2	5	M12	16	M5	5MA x 9.5	H
63	18.2	13	28.5	5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	4.5	M12	16	M5	5MA x 9.5	H
76	18.2	13	31.8	6.5	M12	16	M5 long	5MA x 9.5	L
76	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	6
90	23.2	17.7	31.8	5	M12	16	M6	6MA x 10	H
51	13	13(10)*	22.2	5	M12	16	PARP M5	5MA x 9.5	K
63	13	13(10)*	28.5	5	M12	16	PARP M5	5MA x 9.5	B
63	19	15(13)*	28.5	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M5	5MA x 9.5	K
76	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
90	19	15(13)*	31.8	6	M12	16	PARP M6	6MA x 10	Q
35	11.6	7.9	12.7	6.5	M12	16	UNF 10-32 High Post	10-32 x 3⁄8"	U
63	17.3	17.3	28.5	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3⁄8"	W
63	17.3	17.3	28.5	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1⁄2"	R
63	7.9	7.9	28.5	2	M12	16	UNF 10-32 Low Post	10-32 x 1⁄4"	Z
63	12	7.9	28.5	6.5	M12	16	UNF 10-32 High Post	10-32 x 3⁄8"	U
76	17.3	17.3	31.8	2.5	M12	16	UNF 1/4-28 Low Post	1/4-28 x 3⁄8"	W
76	17.3	17.3	31.8	6	M12	16	UNF 1/4-28 High Post	1/4-28 x 1⁄2"	R
76	7.9	7.9	31.8	2	M12	16	UNF 10-32 Low Post	10-32 x 1⁄4"	Z
76	12	7.9	31.8	6.5	M12	16	UNF 10-32 High Post	10-32 x 3⁄8"	U

Note: (*) quote on the PARP deck of the flat side (PARP = Protection Against Reverse Polarity).

K92 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +105°C [Environmental classification 40/105/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 500V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 470 µF to 10000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request : -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.8 1.0 1.2 1.3 1.5 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C 110°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1.0 0.5 Due to the current load capability of the contact elements, the following limits must not be exceeded: CAPACITOR DIAMETER 51mm 63mm 76mm 90mm Maximum current 30A 40A 50A 70A
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range : 10 Hz to 55 Hz Capacitor length ≤ 143 : max acceleration 0.75mm or 10g for 3x2 h Capacitor length > 143 : max acceleration 0.35mm or 5g for 3x0.5 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test (105°C, Vn, Ir applied)	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (105°C, Vn, Ir applied)	> 8.000 h at 105°C
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K92 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	51x79	0.08	139	112	3.45	K92400471__M0G079	400V
680	51x79	0.08	107	100	3.90	K92400681__M0G079	
1000	51x79	0.08	75	67	4.50	K92420102__M0G079	
1000	51x105	0.08	75	67	4.90	K92400102__M0G105	
1500	63x105	0.08	53	40	6.00	K92400152__M0H105	
2200	63x105	0.08	40	31	7.50	K92400222__M0H105	
2200	76x105	0.08	40	31	8.50	K92400222__M0J105	
3300	76x143	0.08	25	16	11.30	K92400332__M0J143	
4700	76x143	0.08	20	15	14.10	K92400472__M0J143	
5600	76x143	0.08	17	11	14.30	K92400562__M0J143	
6800	76x143	0.08	15	10	18.00	K92400682__M0J143	
8200	76x214	0.08	14	10	20.10	K92400822__M0J214	
10000	90x220	0.09	13	9	25.10	K92400103__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	51x79	0.08	139	112	3.45	K92420471__M0G079	420V
680	51x79	0.08	107	100	3.90	K92420681__M0G079	
1000	51x79	0.08	75	67	4.50	K92420102__M0G079	
1000	51x105	0.08	75	67	4.90	K92420102__M0G105	
1500	63x105	0.08	53	40	6.00	K92420152__M0H105	
2200	63x105	0.08	40	31	7.50	K92420222__M0H105	
2200	76x105	0.08	40	31	8.50	K92420222__M0J105	
3300	76x143	0.08	25	16	11.30	K92420332__M0J143	
4700	76x143	0.08	20	15	14.10	K92420472__M0J143	
5600	76x143	0.08	17	11	14.30	K92420562__M0J143	
6800	76x143	0.08	15	10	18.00	K92420682__M0J143	
8200	76x214	0.08	14	10	20.10	K92420822__M0J124	
10000	90x220	0.09	13	9	25.10	K92420103__M0L220	

K92 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
470	51x79	0.08	159	120	3.20	K92450471__M0G079	450V
680	51x105	0.08	114	105	4.40	K92450681__M0G105	
1000	51x105	0.08	83	70	5.10	K92450102__M0G105	
1000	63x105	0.08	83	70	5.40	K92450102__M0H105	
1500	63x105	0.08	57	42	6.50	K92450152__M0H105	
1500	76x105	0.08	57	42	7.20	K92450152__M0J105	
2200	76x143	0.08	44	33	9.50	K92450222__M0J143	
3300	76x143	0.08	30	18	12.30	K92450332__M0J143	
4700	76x143	0.08	21	15	13.20	K92450472__M0J143	
5600	76x143	0.08	18	12	14.10	K92450562__M0J143	
6800	76x214	0.08	16	11	19.30	K92450682__M0J214	
8200	76x214	0.08	15	11	20.10	K92450822__M0J214	
10000	90x220	0.09	12	10	26.10	K92450103__M0L220	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER stud and insert style excluded	RATED VOLTAGE VDC
1500	51x105	0.12	59	44	5.1	K92500152__M0G105	500V
2200	63x105	0.12	47	37	6.4	K92500222__M0H105	
3300	76x105	0.12	33	22	9.0	K92500332__M0J105	
4700	76x143	0.12	22	16	12.0	K92500472__M0J143	
5600	76x143	0.12	20	14	12.4	K92500562__M0J143	
6800	76x214	0.12	17	12	17.3	K92500682__M0J214	
8200	76x214	0.12	16	11	20.1	K92500822__M0J214	
10000	90x220	0.12	13	10	21.2	K92500103__M0L220	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K05 TYPE -40°C +105°C 5000H

RoHS Compliant

- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Safety vent at bottom case or aside case.**
- **Snap in terminals for PCB mounting.**
- **Very high CV for unit volume with low ESR.**
- **High ripple current, in small dimensions case size.**
- **Extended temperature range with outstanding reliability.**

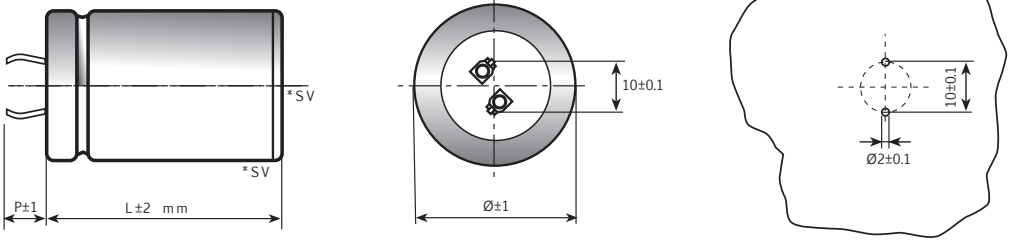
APPLICATIONS

Professional switch mode power supplies. Professional power electronics.

Dimensions in mm.

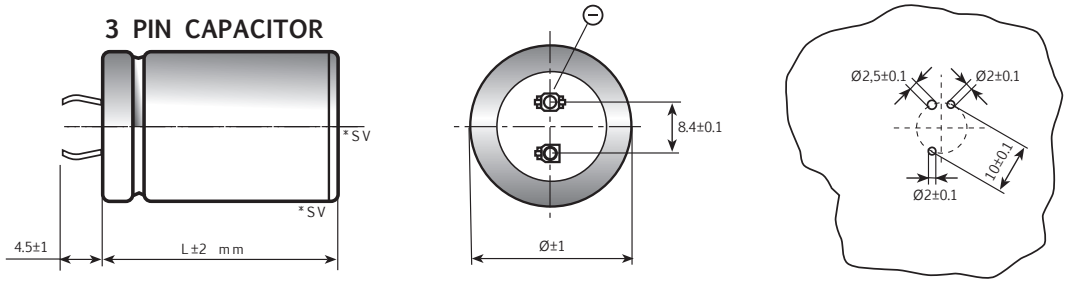
Circuit board hole dimensions

2 PIN CAPACITOR

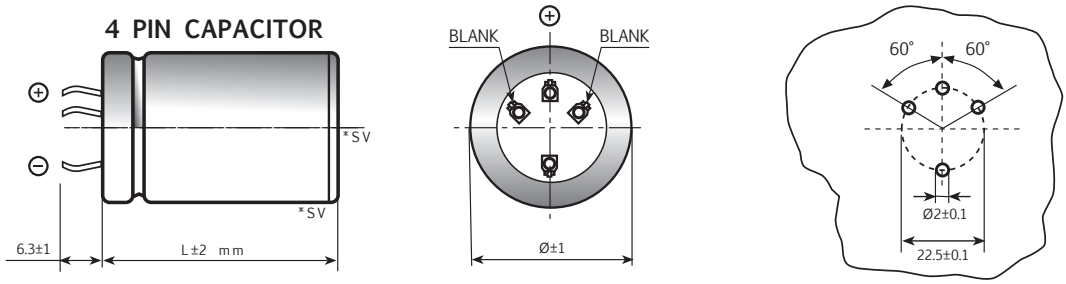


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

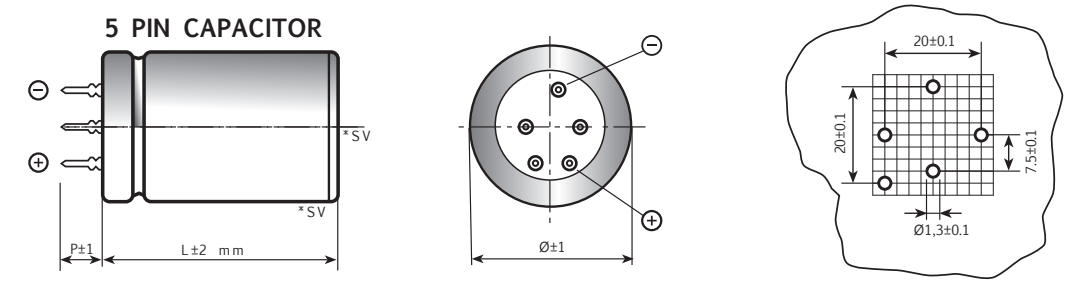
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K05 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +105°C [Environmental classification 40/105/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 16V to 550V DC
Surge Voltage (V_p)	V_p = 1.05 V_r (V_r > 450V DC) V_p = 1.15 V_r (V_r ≤ 250V DC) V_p = 1.10 V_r (V_r > 250V DC)
Rated Capacitance Range	from 68 µF to 47,000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA Kendeil product limit : I_L= 0.003 C_r V_r At 85°C max I_L = 0.02 C_r V_r µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz. For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50Hz	100Hz	500 Hz	1000Hz	>10kHz
MULTIPLIER (0-25V V_r DC)	0.91	1.0	1.15	1.15	1.2
MULTIPLIER (40-100V V_r DC)	0.88	1.0	1.35	1.40	1.45
MULTIPLIER (160-450V V_r DC)	0.88	1.0	1.45	1.50	1.55

AMBIENT TEMP.	35°C	45°C	55°C	65°C	75°C	85°C	95°C	105°C	110°C
MULTIPLIER	3.0	2.80	2.60	2.40	2.20	1.80	1.50	1.0	0.5

Maximum internal temperature 108°C

Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside: for all sizes with V 100V; all voltage capacitors with diameter 35mm — Cap change ≤ ±20%; tan δ ≤ 200%; Leakage current (I_L) < initial limit; Impedance (Z) ≤ 200% for V 160V and for capacitors with diameter 40mm — Cap change ≤ ±10%; tan δ ≤ 130%; Leakage current (I_L) < initial limit; Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside — Cap change ≤ ±15%; tan δ ≤ 150%; Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	250,000 h at 40°C 15,000 h at 85°C 5,000 h at 105°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 30 fit (30 10^{-9}/h) (V_r ≤ 160V DC) ≤ 40 fit (40 10^{-9}/h) (V_r > 160V DC)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Marking information	minus pole band aside within an angle of 41° ± 25°
Reference standards	CECC 30.301 - IEC 60384-4 LONG LIFE GRADE

K05 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
6800	25x30	0.30	55	40	1.9	K05016682_PM0C030	16V
10000	25x40	0.40	45	35	2.0	K05016103_PM0C040	
10000	30x30	0.40	40	35	2.0	K05016103_PM0D030	
15000	25x40	0.45	40	35	2.6	K05016153_PM0C040	
15000	30x40	0.45	40	35	2.8	K05016153_PM0D040	
22000	30x40	0.60	35	24	3.1	K05016223_PM0D040	
22000	35x40	0.60	35	24	3.3	K05016223_PM0E040	
33000	35x50	0.70	25	20	3.6	K05016333_PM0E050	
47000	35x50	0.90	22	20	4.9	K05016473_PM0E050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
4700	25x30	0.25	53	45	1.8	K05025472_PM0C030	25V
6800	25x30	0.25	50	38	2.0	K05025682_PM0C030	
6800	30x30	0.30	50	38	2.2	K05025682_PM0D030	
10000	25x40	0.40	40	35	2.4	K05025103_PM0C040	
10000	30x30	0.40	40	35	2.3	K05025103_PM0D030	
15000	30x40	0.45	39	28	2.9	K05025153_PM0D040	
15000	35x40	0.45	39	28	3.2	K05025153_PM0E040	
22000	35x50	0.60	30	22	3.3	K05025223_PM0E050	
33000	35x50	0.70	22	18	4.3	K05025333_PM0E050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
3300	25x30	0.20	72	58	1.5	K05040332_PM0C030	40V
4700	25x30	0.20	50	38	1.8	K05040472_PM0C030	
4700	30x25	0.20	50	38	1.8	K05040472_PM0D025	
6800	25x40	0.30	48	33	2.3	K05040682_PM0C040	
6800	30x30	0.30	48	33	2.4	K05040682_PM0D030	
10000	30x40	0.40	39	28	2.8	K05040103_PM0D040	
10000	35x30	0.40	39	28	2.9	K05040103_PM0E030	
10000	35x40	0.40	39	28	3.1	K05040103_PM0E040	
15000	30x40	0.45	32	22	2.8	K05040153_PM0D040	
15000	35x40	0.45	32	22	3.7	K05040153_PM0E040	
22000	35x40	0.55	28	20	5.1	K05040223_PM0E040	
22000	35x50	0.55	28	20	5.4	K05040223_PM0E050	

K05 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
2200	25x30	0.20	72	58	1.5	K05050222_PM0C030	50V
3300	25x30	0.20	48	38	1.6	K05050332_PM0C030	
4700	25x30	0.20	50	35	2.0	K05050472_PM0C030	
4700	30x25	0.20	50	35	2.0	K05050472_PM0D025	
6800	30x30	0.30	46	28	2.9	K05050682_PM0D030	
6800	30x40	0.30	46	28	3.2	K05050682_PM0D040	
10000	30x40	0.35	31	22	3.4	K05050103_PM0D040	
10000	35x30	0.35	31	22	3.2	K05050103_PM0E030	
15000	35x50	0.45	26	18	4.7	K05050153_PM0E050	
22000	40x50	0.50	25	18	5.5	K05050223_PM0F050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
2200	25x30	0.15	79	60	1.5	K05063222_PM0C030	63V
3300	25x40	0.15	50	40	2.3	K05063332_PM0C040	
3300	30x30	0.15	50	40	2.1	K05063332_PM0D030	
4700	25x40	0.20	40	29	2.2	K05063472_PM0C040	
4700	30x30	0.20	40	29	2.4	K05063472_PM0D030	
4700	30x40	0.20	40	29	2.8	K05063472_PM0D040	
6800	30x40	0.30	35	25	3.0	K05063682_PM0D040	
6800	35x40	0.30	35	25	4.4	K05063682_PM0E040	
10000	35x40	0.35	35	25	4.4	K05063103_PM0E040	
10000	35x50	0.35	30	23	5.3	K05063103_PM0E050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1000	22x30	0.10	127	100	1.3	K05100102_PM0B030	100V
1000	25x30	0.10	127	100	1.7	K05100102_PM0C030	
1000	30x25	0.10	127	100	1.7	K05100102_PM0D025	
1500	25x40	0.12	105	82	2.0	K05100152_PM0C040	
1500	30x30	0.12	105	82	1.8	K05100152_PM0D030	
2200	30x30	0.15	71	60	2.7	K05100222_PM0D030	
2200	30x40	0.15	71	60	2.7	K05100222_PM0D040	
3300	30x50	0.15	48	39	3.0	K05100332_PM0D050	
3300	35x40	0.15	48	39	3.3	K05100332_PM0E040	
4700	35x40	0.15	42	30	3.6	K05100472_PM0E040	
4700	35x50	0.20	33	26	4.4	K05100472_PM0E050	
5600	35x50	0.20	33	24	4.5	K05100562_PM0E050	
5600	40x50	0.20	33	24	4.8	K05100562_PM0F050	
6800	35x50	0.20	32	23	4.5	K05100682_PM0E050	
6800	40x50	0.20	33	24	4.9	K05100682_PM0F050	

K05 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	22x30	0.10	440	340	0.9	K05200221_PM0B030	200V
220	25x30	0.10	440	340	1.1	K05200221_PM0C030	
330	22x30	0.10	240	133	1.1	K05200331_PM0B030	
330	25x25	0.10	240	133	0.7	K05200331_PM0C025	
330	25x30	0.10	240	133	1.2	K05200331_PM0C030	
470	25x30	0.10	169	98	1.6	K05200471_PM0C030	
680	25x40	0.10	145	87	1.7	K05200681_PM0C040	
680	30x40	0.10	145	87	2.0	K05200681_PM0D040	
1000	30x40	0.10	95	63	2.1	K05200102_PM0D040	
1000	35x30	0.10	95	63	2.4	K05200102_PM0E030	
1500	30x50	0.10	70	41	2.4	K05200152_PM0D050	
1500	35x50	0.10	70	41	2.6	K05200152_PM0E050	
2200	35x50	0.12	45	33	2.8	K05200222_PM0E050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
100	25x30	0.10	950	730	0.7	K05250101_PM0C030	250V
150	25x30	0.10	530	290	0.7	K05250151_PM0C030	
220	25x30	0.10	370	240	0.9	K05250221_PM0C030	
330	30x30	0.10	260	153	1.2	K05250331_PM0D030	
470	25x40	0.10	180	110	1.5	K05250471_PM0C040	
470	30x30	0.10	180	110	1.5	K05250471_PM0D030	
680	35x40	0.10	145	95	1.8	K05250681_PM0E040	
1000	35x40	0.10	98	65	2.0	K05250102_PM0E040	
1000	35x50	0.10	98	65	2.6	K05250102_PM0E050	
1500	35x50	0.12	75	43	2.8	K05250152_PM0E050	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K05 TYPE STANDARD RATINGS

RATED VOLTAGE VDC

400V

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded
68	22x30	0.10	1405	1050	0.47	K05400680_PM0B030
100	22x30	0.10	796	550	0.5	K05400101_PM0B030
100	25x30	0.10	796	550	0.5	K05400101_PM0C030
150	25x30	0.10	530	380	0.6	K05400151_PM0C030
150	30x30	0.10	530	380	0.8	K05400151_PM0D030
220	25x40	0.10	360	250	1.0	K05400221_PM0C040
220	30x30	0.10	360	250	1.1	K05400221_PM0D030
270	25x40	0.10	320	199	1.2	K05400271_PM0C040
330	25x50	0.10	249	170	1.3	K05400331_PM0C050
330	30x40	0.10	240	170	1.4	K05400331_PM0D040
330	35x30	0.10	240	170	1.4	K05400331_PM0E030
470	30x50	0.10	170	125	1.9	K05400471_PM0D050
470	35x40	0.10	170	125	1.9	K05400471_PM0E040
470	35x50	0.10	170	125	2.2	K05400471_PM0E050
680	35x50	0.10	158	110	2.2	K05400681_PM0E050
680	40x50	0.10	158	110	2.4	K05400681_PM0F050
820	35x60	0.10	121	97	2.5	K05400821_PM0E060
1000	40x60	0.10	110	90	3.1	K05400102_PM0F060
1500	40x97	0.10	99	68	5.8	K05400152_PM0F097

RATED VOLTAGE VDC

450V

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded
68	22x30	0.10	1405	1050	0.47	K05450680_PM0B030
100	25x30	0.10	796	710	0.5	K05450101_PM0C030
100	30x25	0.10	796	550	0.7	K05450101_PM0D025
100	30x30	0.10	796	550	0.8	K05450101_PM0D030
150	25x40	0.10	660	490	0.9	K05450151_PM0C040
150	30x30	0.10	530	380	0.8	K05450151_PM0D030
150	30x40	0.10	530	380	1.0	K05450151_PM0D040
220	25x50	0.10	380	310	0.9	K05450221_PM0C050
220	30x40	0.10	360	250	1.1	K05450221_PM0D040
220	35x30	0.10	360	250	1.0	K05450221_PM0E030
330	30x50	0.10	240	170	1.25	K05450331_PM0D050
330	35x40	0.10	240	170	1.3	K05450331_PM0E040
330	35x50	0.10	240	170	1.4	K05450331_PM0E050
470	35x50	0.10	170	125	1.8	K05450471_PM0E050
680	35x50	0.15	160	116	2.1	K05450681_PM0E050
680	35x60	0.12	158	110	2.2	K05450681_PM0E060
820	40x60	0.13	125	100	2.3	K05450821_PM0F060
1000	40x60	0.13	110	90	3.2	K05450102_PM0F060
1500	40x97	0.15	90	80	5.1	K05450152_PM0F097

K05 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER Termination digit excluded	RATED VOLTAGE VDC
68	25x30	0.10	1490	1070	0.42	K05500680_PM0C030	500V
100	30x30	0.10	935	620	0.55	K05500101_PM0D030	
150	30x40	0.10	620	410	0.75	K05500151_PM0D040	
180	30x50	0.10	512	340	0.90	K05500181_PM0D050	
220	35x40	0.10	455	295	0.95	K05500221_PM0E040	
270	35x50	0.11	320	214	1.60	K05500271_PM0E050	
330	35x50	0.11	296	203	1.65	K05500331_PM0E050	
330	35x60	0.11	296	203	1.78	K05500331_PM0E060	
330	40x50	0.11	296	203	1.80	K05500331_PM0F050	
470	40x60	0.13	211	156	2.00	K05500471_PM0F060	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER Termination digit excluded	RATED VOLTAGE VDC
150	25x50	0.15	1040	611	0.90	K05550151_PM0C050	550V
150	30x40	0.15	841	503	1.00	K05550151_PM0D040	
180	30x40	0.15	841	503	1.05	K05550181_PM0D040	
220	30x50	0.15	690	412	1.30	K05550221_PM0D050	
270	35x40	0.15	565	370	1.40	K05550271_PM0E040	
330	35x50	0.15	399	304	1.70	K05550331_PM0E050	
390	35x60	0.15	385	280	1.80	K05550391_PM0E060	
390	40x50	0.15	385	280	1.80	K05550391_PM0F050	
470	40x60	0.15	277	270	1.90	K05550471_PM0F060	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K06 TYPE -40°C +85°C 5000H

RoHS Compliant

- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Safety vent at bottom case or aside case.**
- **Snap in terminals for PCB mounting.**
- **Very high CV for unit volume with low ESR.**
- **High ripple current, in small dimensions case size.**
- **Operation up to 105°C permissible.**

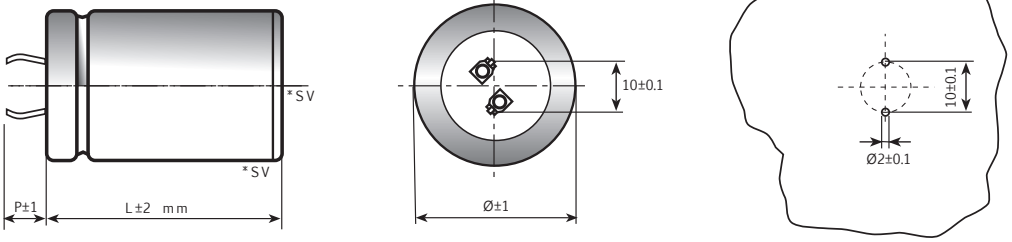
APPLICATIONS

Professional switch mode power supplies. Professional power electronics.

Dimensions in mm.

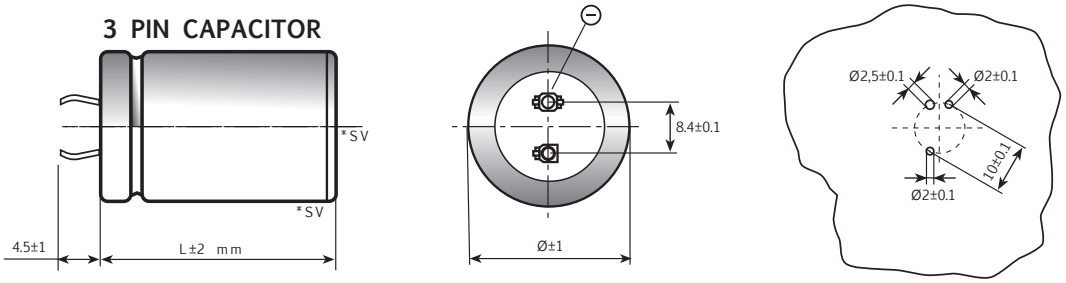
Circuit board hole dimensions

2 PIN CAPACITOR

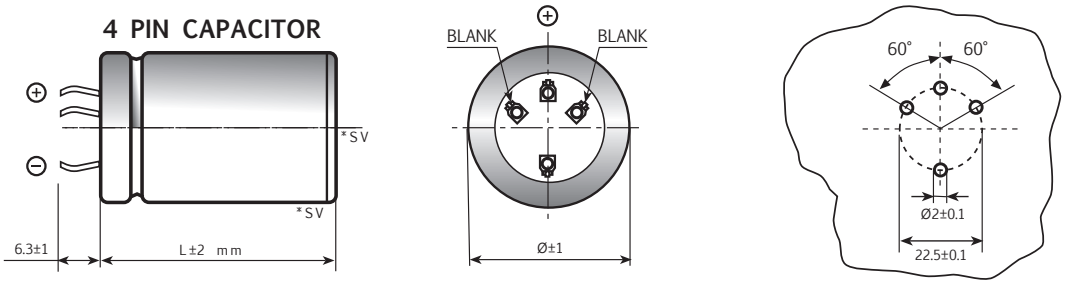


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

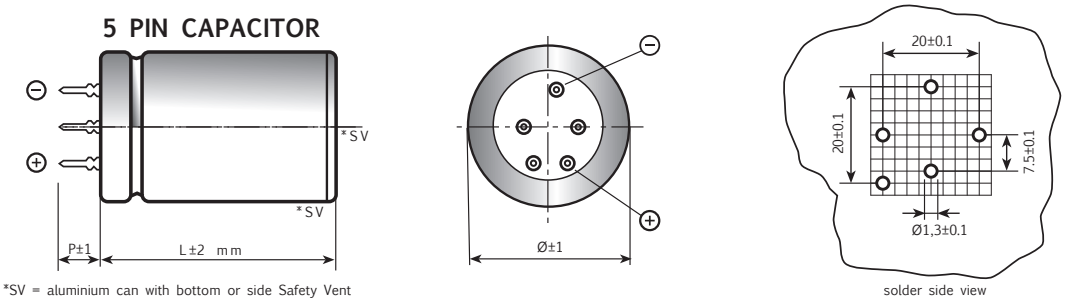
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K06 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 16V to 600V DC
Surge Voltage (V_p)	$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.15\ V_r$ ($V_r \leq$ 250V DC) $V_p = 1.10\ V_r$ (V_r > 250V DC)
Rated Capacitance Range	from 68 µF to 47000 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.006\ C_r\ V_r + 4$ µA Kendeil product limit : $I_L = 0.003\ C_r\ V_r$ At 85°C max $I_L = 0.04\ C_r\ V_r$ µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz For different temperature and frequency multiplier must be used as follows:

FREQUENCY	50Hz	100Hz	500 Hz	1000Hz	>10kHz
MULTIPLIER (0-25V V_r DC)	0.91	1.0	1.15	1.15	1.2
MULTIPLIER (40-100V V_r DC)	0.88	1.0	1.35	1.40	1.45
MULTIPLIER (160-450V V_r DC)	0.88	1.0	1.45	1.50	1.55

AMBIENT TEMP.	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5

Maximum internal temperature 98°C

Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside for all sizes with V 100V; all voltage capacitors with diameter 35mm: Cap change ≤ ±20%; tan δ ≤ 200%; Leakage current (I_L) < initial limit; Impedance (Z) ≤ 200% for V 160V and for capacitors with diameter 40mm: Cap change ≤ ±10%; tan δ ≤ 130%; Leakage current (I_L) < initial limit; Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside: Cap change ≤ ±15%; tan δ ≤ 150%; Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 200,000 h at 40°C > 5,000 h at 85°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 25 fit (25 10^{-9}/h) ($V_r \leq$ 160V DC) ≤ 33 fit (33 10^{-9}/h) (V_r > 160V DC)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Marking information	minus pole band aside within an angle of 41° ± 25°
Reference standards	CECC 30.301 - IEC 60384-4 LONG LIFE GRADE

K06 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
4700	22x30	0.30	55	40	1.5	K06016472_PM0B030	16V
6800	22x30	0.30	45	38	1.8	K06016682_PM0B030	
10000	25x30	0.40	40	35	2.4	K06016103_PM0C030	
15000	30x30	0.45	33	25	2.6	K06016153_PM0D030	
22000	30x40	0.60	27	22	3.5	K06016223_PM0D040	
22000	35x30	0.60	27	22	3.5	K06016223_PM0E030	
22000	35x40	0.60	27	22	3.5	K06016223_PM0E040	
33000	35x50	0.70	25	20	4.8	K06016333_PM0E050	
47000	35x50	0.90	22	20	5.8	K06016473_PM0E050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
4700	22x30	0.20	53	45	1.8	K06025472_PM0B030	25V
6800	25x30	0.25	50	38	2.7	K06025682_PM0C030	
10000	25x40	0.40	40	35	3.3	K06025103_PM0C040	
10000	30x30	0.40	40	35	3.3	K06025103_PM0D030	
15000	30x40	0.45	39	28	4.1	K06025153_PM0D040	
15000	35x30	0.45	39	28	4.1	K06025153_PM0E030	
22000	35x40	0.60	30	22	5.0	K06025223_PM0E040	
33000	35x50	0.70	22	18	6.1	K06025333_PM0E050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
3300	22x30	0.15	72	58	2.1	K06040332_PM0B030	40V
4700	25x30	0.20	50	38	2.8	K06040472_PM0C030	
6800	25x40	0.30	48	33	3.4	K06040682_PM0C040	
6800	30x30	0.30	48	33	3.4	K06040682_PM0D030	
10000	25x40	0.40	38	28	3.8	K06040103_PM0C040	
10000	30x40	0.40	39	28	4.3	K06040103_PM0D040	
10000	35x30	0.40	39	28	4.3	K06040103_PM0E030	
15000	30x40	0.45	32	22	4.0	K06040153_PM0D040	
15000	35x40	0.45	32	22	4.8	K06040153_PM0E040	
22000	35x50	0.60	28	20	5.4	K06040223_PM0E050	

K06 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
2200	22x30	0.20	72	58	1.9	K06050222_PM0B030	50V
3300	25x30	0.20	48	38	2.5	K06050332_PM0C030	
4700	25x30	0.20	50	35	2.8	K06050472_PM0C030	
6800	25x40	0.30	48	28	3.2	K06050682_PM0C040	
6800	30x30	0.30	48	28	3.2	K06050682_PM0D030	
10000	30x40	0.35	31	22	3.8	K06050103_PM0D040	
10000	35x30	0.35	31	28	3.8	K06050103_PM0E030	
10000	35x40	0.35	31	28	4.1	K06050103_PM0E040	
15000	35x50	0.45	26	18	4.9	K06050153_PM0E050	
22000	40x50	0.50	25	18	7.3	K06050223_PM0F050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
2200	25x30	0.20	79	58	2.2	K06063222_PM0C030	63V
3300	25x40	0.20	50	38	2.6	K06063332_PM0C040	
3300	30x30	0.20	50	38	2.6	K06063332_PM0D030	
4700	25x40	0.20	41	29	2.8	K06063472_PM0C040	
4700	30x40	0.20	41	29	3.5	K06063472_PM0D040	
4700	35x30	0.20	41	29	3.5	K06063472_PM0E030	
6800	30x40	0.30	35	25	3.6	K06063682_PM0D040	
6800	35x40	0.30	35	25	4.0	K06063682_PM0E040	
10000	35x50	0.35	32	23	5.8	K06063103_PM0E050	
15000	40x50	0.45	30	20	6.8	K06063153_PM0F050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1000	22x30	0.12	150	100	1.3	K06100102_PM0B030	100V
1000	25x30	0.12	150	100	1.6	K06100102_PM0C030	
1000	30x25	0.12	150	100	1.6	K06100102_PM0D025	
1500	30x30	0.12	105	82	2.1	K06100152_PM0D030	
2200	30x30	0.15	71	60	2.4	K06100222_PM0D030	
2200	30x40	0.15	71	60	3.1	K06100222_PM0D040	
2200	35x30	0.15	71	60	2.4	K06100222_PM0E030	
3300	30x50	0.20	48	39	4.0	K06100332_PM0D050	
3300	35x40	0.20	48	39	4.0	K06100332_PM0E040	
4700	35x50	0.20	33	26	5.6	K06100472_PM0E050	
6800	35x50	0.25	33	25	5.8	K06100682_PM0E050	

K06 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	22x30	0.10	440	340	0.9	K06200221_PM0B030	200V
330	22x30	0.10	240	133	1.3	K06200331_PM0B030	
470	25x30	0.10	169	98	1.5	K06200471_PM0C030	
680	25x40	0.10	145	87	2.0	K06200681_PM0C040	
680	30x30	0.10	145	87	2.0	K06200681_PM0D030	
680	35x30	0.10	145	87	2.0	K06200681_PM0E030	
1000	30x40	0.10	95	63	2.6	K06200102_PM0D040	
1000	35x40	0.10	95	63	2.8	K06200102_PM0E040	
1500	35x40	0.10	70	41	2.9	K06200152_PM0E040	
1500	35x50	0.10	70	41	3.7	K06200152_PM0E050	
2200	35x50	0.10	45	33	3.90	K06200222_PM0E050	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
150	22x30	0.12	530	290	0.9	K06250151_PM0B030	250V
220	25x30	0.12	370	240	1.3	K06250221_PM0C030	
330	25x40	0.12	260	153	1.4	K06250331_PM0C040	
330	30x30	0.12	260	153	1.4	K06250331_PM0D030	
470	25x40	0.12	180	110	1.6	K06250471_PM0C040	
470	30x30	0.12	180	110	1.6	K06250471_PM0D030	
680	30x40	0.12	145	95	1.9	K06250681_PM0D040	
680	35x40	0.12	145	95	2.2	K06250681_PM0E040	
1000	35x40	0.12	98	65	2.6	K06250102_PM0E040	
1000	35x50	0.12	98	65	3.20	K06250102_PM0E050	
1500	35x50	0.15	75	43	4.00	K06250152_PM0E050	
2200	40x50	0.15	50	35	5.20	K06250222_PM0F050	

K06 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
68	22x25	0.10	1405	1050	0.6	K06400680_PM0B025	400V
68	22x30	0.10	1405	1050	0.6	K06400680_PM0B030	
100	22x30	0.10	796	550	0.7	K06400101_PM0B030	
100	25x25	0.10	796	550	0.7	K06400101_PM0C025	
100	25x30	0.10	796	550	1.0	K06400101_PM0C030	
150	25x30	0.10	530	380	1.0	K06400151_PM0C030	
150	30x25	0.10	530	380	1.0	K06400151_PM0D025	
220	25x40	0.10	360	250	1.2	K06400221_PM0C040	
220	30x30	0.10	360	250	1.2	K06400221_PM0D030	
330	30x40	0.10	240	170	1.7	K06400331_PM0D040	
330	35x30	0.10	240	170	1.7	K06400331_PM0E030	
470	35x40	0.10	170	125	2.2	K06400471_PM0E040	
470	35x50	0.10	170	125	2.60	K06400471_PM0E050	
560	35x50	0.10	165	122	2.60	K06400561_PM0E050	
680	35x50	0.10	158	110	2.80	K06400681_PM0E050	
680	40x50	0.10	158	110	3.20	K06400681_PM0F050	
820	35x60	0.10	140	106	3.50	K06400821_PM0E060	
1000	35x60	0.12	103	91	4.40	K06400102_PM0E060	
1500	40x97	0.12	65	50	5.79	K06400152_PM0F097	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
68	22x25	0.12	1405	1050	0.6	K06450680_PM0B025	450V
68	22x30	0.12	1405	1050	0.6	K06450680_PM0B030	
100	25x30	0.12	800	560	0.7	K06450101_PM0C030	
100	30x25	0.12	800	560	0.7	K06450101_PM0D025	
150	30x25	0.12	550	400	1.1	K06450151_PM0D025	
150	30x30	0.12	550	400	1.1	K06450151_PM0D030	
220	30x40	0.12	380	265	1.3	K06450221_PM0D040	
220	35x30	0.12	380	265	1.3	K06450221_PM0E030	
330	30x50	0.12	255	175	1.7	K06450331_PM0D050	
330	35x40	0.12	255	175	1.7	K06450331_PM0E040	
470	35x50	0.12	175	125	2.40	K06450471_PM0E050	
560	35x50	0.12	165	122	2.50	K06450561_PM0E050	
680	35x50	0.12	158	110	2.60	K06450681_PM0E050	
680	40x50	0.12	158	110	3.10	K06450681_PM0F050	
820	40x60	0.12	110	95	4.00	K06450821_PM0F060	
1000	40x77	0.12	110	95	4.90	K06450102_PM0F077	
1500	40x97	0.12	110	95	5.56	K06450152_PM0F097	

K06 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
68	25x30	0.15	1870	1380	0.60	K06500680_PM0C030	500V
100	30x30	0.15	1050	790	0.70	K06500101_PM0D030	
150	30x40	0.15	750	580	1.10	K06500151_PM0D040	
220	30x50	0.15	579	440	1.40	K06500221_PM0D050	
220	35x40	0.15	579	440	1.40	K06500221_PM0E040	
330	35x50	0.15	386	290	2.10	K06500331_PM0E050	
470	40x50	0.15	271	200	2.50	K06500471_PM0F050	
560	40x60	0.15	230	190	3.00	K06500561_PM0F060	
680	40x77	0.15	205	155	3.50	K06500681_PM0F077	
820	40x97	0.15	141	119	3.90	K06500821_PM0F097	
1000	40x77	0.15	135	112	4.00	K06500102_PM0F077	
1200	40x97	0.15	125	105	4.90	K06500122_PM0F097	
1500	45x97	0.15	115	98	5.14	K06500152_PM0N097	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
68	25x30	0.15	1898	1443	0.75	K06550680_PM0C030	550V
100	30x30	0.15	1271	970	0.95	K06550101_PM0D030	
150	30x40	0.15	879	670	1.20	K06550151_PM0D040	
180	30x50	0.15	722	550	1.40	K06550181_PM0D050	
180	35x40	0.15	722	550	1.41	K06550181_PM0E040	
220	35x40	0.15	584	445	1.55	K06550221_PM0E040	
270	35x50	0.15	491	377	1.70	K06550271_PM0E050	
330	35x60	0.15	400	306	2.45	K06550331_PM0E060	
330	40x50	0.15	409	316	2.45	K06550331_PM0F050	
470	40x60	0.15	290	223	2.62	K06550471_PM0F060	
560	40x77	0.15	234	180	3.10	K06550561_PM0F077	
680	40x97	0.15	192	147	3.70	K06550681_PM0F097	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
82	30x30	0.15	1427	1020	0.88	K06600820_PM0D030	600V
100	30x40	0.15	1152	902	1.07	K06600101_PM0D040	
150	30x50	0.15	820	630	1.32	K06600151_PM0D050	
150	35x40	0.15	820	630	1.34	K06600151_PM0E040	
220	35x50	0.15	574	415	1.87	K06600221_PM0E050	
270	35x60	0.15	474	353	2.25	K06600271_PM0E060	
270	40x50	0.15	474	353	2.25	K06600271_PM0F050	
330	40x60	0.15	387	280	2.42	K06600331_PM0F060	
470	40x77	0.15	277	193	2.95	K06600471_PM0F077	
560	40x97	0.15	229	179	3.50	K06600561_PM0F097	

K15 TYPE -40˚C +105˚C 5000H

RoHS Compliant

- **High temperature 105˚C.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Safety vent at bottom case or aside case.**
- **Snap in terminals for PCB mounting.**
- **2-4 pins available (d=45mm: 4 pins only).**
- **Large size snap in.**

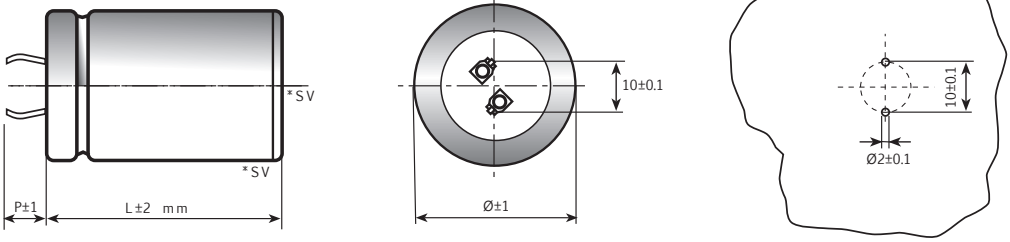
APPLICATIONS

Professional switch mode power supplies. Professional power electronics.

Dimensions in mm.

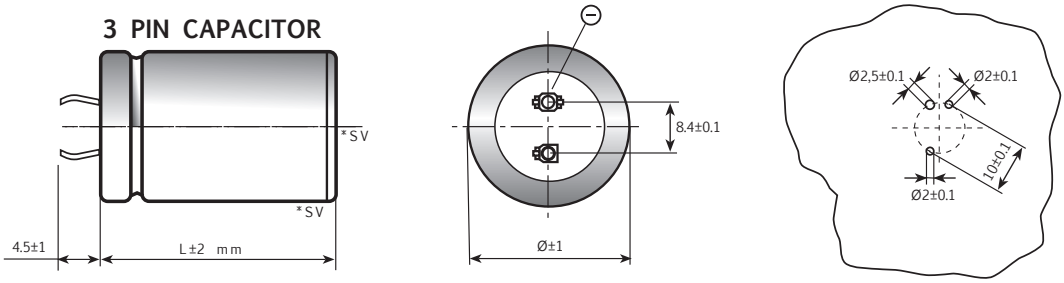
Circuit board hole dimensions

2 PIN CAPACITOR

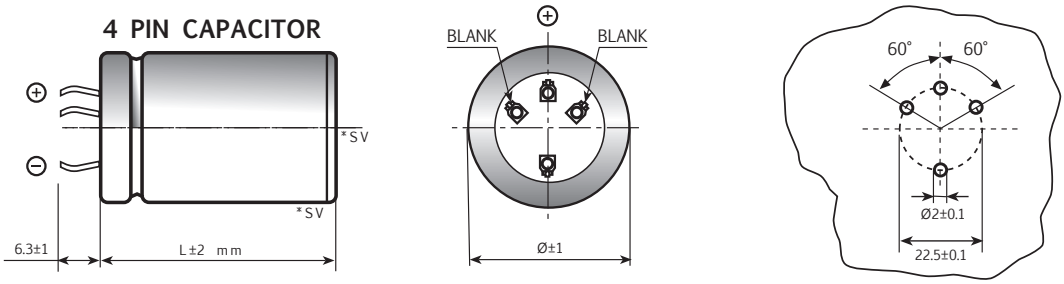


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

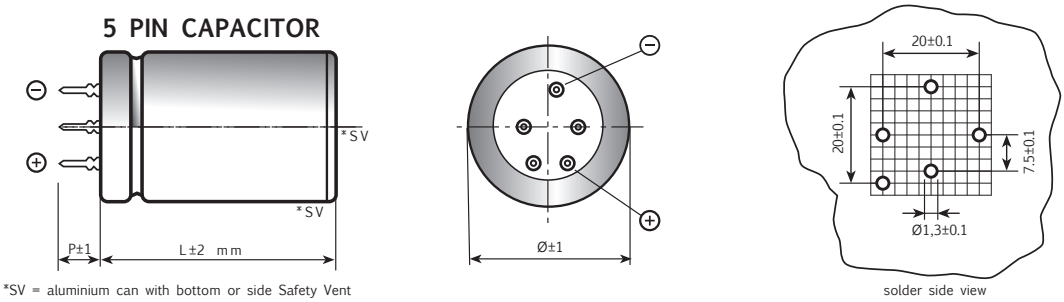
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K15 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +105°C Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 450V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 820 µF to 2200 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.003 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz : FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.88 1.0 1.45 1.5 1.55 AMBIENT TEMP. 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1.0 Maximum internal temperature 110°C
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 250,000 h at 40°C > 15,000 h at 85°C > 5,000 h at 105°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Marking information	minus pole band aside within an angle of 41° ± 25°
Reference standards	CECC 30.301 - IEC 60384-4 LONG LIFE GRADE

K15 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1200	40x77	0.10	89	80	3.58	K15400122_PM0F077	400V
1200	45x60	0.10	89	80	3.40	K15400122_PM0N060	
1500	40x97	0.10	80	71	4.76	K15400152_PM0F097	
1500	45x77	0.10	85	76	4.70	K15400152_PM0N077	
1500	50x60	0.10	85	76	4.2	K15400152_PM0V060	
1800	45x97	0.10	69	60	5.55	K15400182_PM0N097	
1800	50x77	0.10	69	60	4.9	K15400182_PM0V077	
2200	45x105	0.10	59	49	6.00	K15400222_PM0N105	
2700	50x105	0.10	45	35	6.2	K15400272_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
820	35x77	0.15	215	195	3.00	K15420821_PM0E077	420V
1000	40x60	0.15	195	165	3.60	K15420102_PM0F060	
1200	40x77	0.15	183	142	3.70	K15420122_PM0F077	
1200	45x60	0.15	180	140	3.60	K15420122_PM0N060	
1500	40x97	0.15	140	110	4.60	K15420152_PM0F097	
1500	45x77	0.15	150	120	4.43	K15420152_PM0N077	
1500	50x60	0.10	140	110	4.1	K15420152_PM0V060	
1800	45x97	0.15	118	98	5.55	K15420182_PM0N097	
1800	50x77	0.10	118	98	4.5	K15420182_PM0V077	
2200	45x105	0.15	112	94	6.03	K15420222_PM0N105	
2700	50x105	0.10	101	89	6.2	K15420272_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
820	40x60	0.15	216	195	3.25	K15450821_PM0F060	450V
1000	40x77	0.15	195	165	3.76	K15450102_PM0F077	
1000	45x60	0.15	195	165	3.56	K15450102_PM0N060	
1200	40x97	0.15	180	140	4.54	K15450122_PM0F097	
1200	45x77	0.15	184	145	4.24	K15450122_PM0N077	
1200	50x60	0.10	180	145	4.0	K15450122_PM0V060	
1500	45x97	0.15	140	110	5.06	K15450152_PM0N097	
1500	50x77	0.10	140	110	4.9	K15450152_PM0V077	
1800	45x105	0.15	126	106	5.10	K15450182_PM0N105	
2200	50x105	0.10	114	95	5.9	K15450222_PM0V105	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K16 TYPE -40°C +85°C 5000H

RoHS Compliant

- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Safety vent at bottom case or aside case.**
- **Snap in terminals for PCB mounting.**
- **2-4 pins available (d=45mm: 4 pins only).**
- **Large size snap in.**

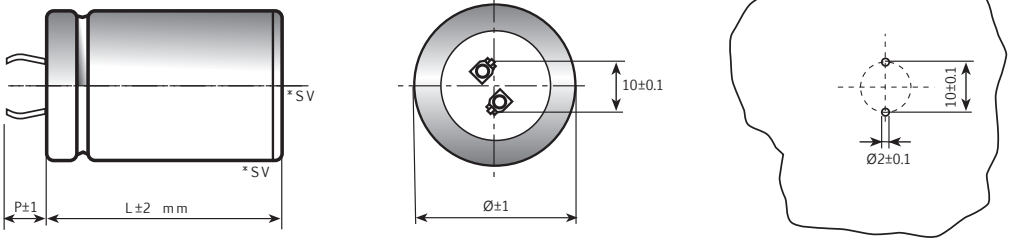
APPLICATIONS

Professional switch mode power supplies. Professional power electronics.

Dimensions in mm.

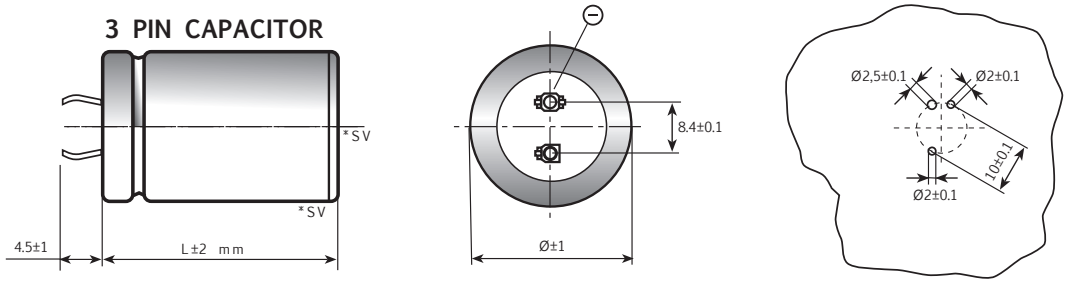
Circuit board hole dimensions

2 PIN CAPACITOR

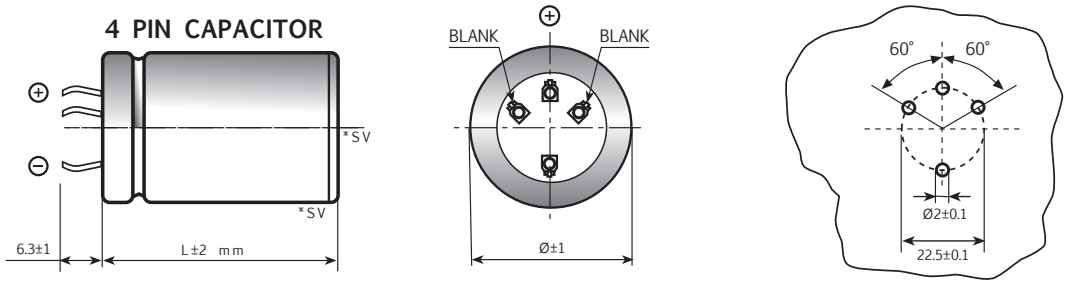


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

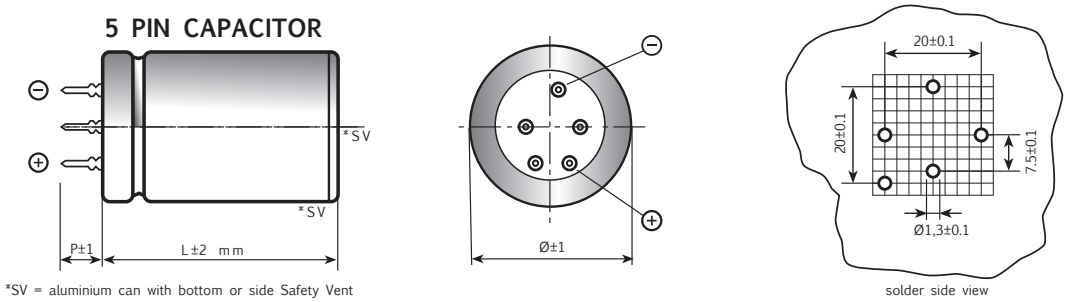
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K16 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 450V DC
Surge Voltage (V_p)	V_p = 1.10 V_r
Rated Capacitance Range	from 820 µF to 2700 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA Kendeil product limit: I_L= 0.003 C_r V_r At 85°C max I_L = 0.04 C_r V_r µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz :

FREQUENCY	50Hz	100Hz	500 Hz	1000Hz	>10kHz		
MULTIPLIER	0.88	1.0	1.45	1.5	1.55		
AMBIENT TEMP.	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5
Maximum internal temperature	98°C						

Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.		
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h		
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min		
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside	Cap change tan δ Leakage current (I_L) Impedance (Z)	≤ 10% ≤ 130% < initial limit ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside	Cap change tan δ Leakage current (I_L)	≤ ±15% ≤ 150% < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 5,000 h at 85°C > 200000 h at 40°C		
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)		
Self inductance	Approx. 20 nH		
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C		
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10		
Marking information	minus pole band aside within an angle of 41° ± 25°		
Reference standards	CECC 30.301 - IEC 60384-4 LONG LIFE GRADE		

K16 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1000	35x77	0.10	90	80	4.50	K16400102_PM0E077	400V
1200	40x60	0.10	89	79	4.50	K16400122_PM0F060	
1500	40x77	0.10	75	64	5.80	K16400152_PM0F077	
1500	45x60	0.10	80	70	4.90	K16400152_PM0N060	
1800	40x97	0.10	60	50	6.60	K16400182_PM0F097	
1800	45x77	0.10	70	60	6.00	K16400182_PM0N077	
1800	50x60	0.10	70	60	6.30	K16400182_PM0V060	
2000	40x105	0.10	45	35	7.60	K16400202_PM0F105	
2200	45x97	0.10	55	45	7.30	K16400222_PM0N097	
2200	50x77	0.10	55	45	7.40	K16400222_PM0V077	
2700	45x105	0.10	39	27	9.00	K16400272_PM0N105	
3300	50x105	0.10	37	25	10.00	K16400332_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
820	35x77	0.15	220	200	3.65	K16420821_PM0E077	420V
1000	40x60	0.15	200	170	4.90	K16420102_PM0F060	
1200	40x77	0.15	190	150	4.90	K16420122_PM0F077	
1200	45x60	0.15	180	140	4.90	K16420122_PM0N060	
1500	40x97	0.15	140	110	5.56	K16420152_PM0F097	
1500	45x77	0.15	150	120	5.36	K16420152_PM0N077	
1500	50x60	0.10	150	110	4.70	K16420152_PM0V060	
1800	40x105	0.15	120	100	6.40	K16420182_PM0F105	
1800	50x77	0.10	120	106	5.60	K16420182_PM0V077	
2200	45x97	0.15	112	102	6.70	K16420222_PM0N097	
2200	50x105	0.10	112	100	7.00	K16420222_PM0V105	
2700	50x105	0.10	101	102	7.40	K16420272_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
820	35x77	0.15	215	195	3.65	K16450821_PM0E077	450V
1000	40x60	0.15	195	165	4.90	K16450102_PM0F060	
1200	40x77	0.15	183	142	4.90	K16450122_PM0F077	
1200	45x60	0.15	180	140	4.90	K16450122_PM0N060	
1500	40x97	0.15	140	110	5.56	K16450152_PM0F097	
1500	45x77	0.15	150	120	5.36	K16450152_PM0N077	
1500	50x60	0.10	140	110	4.7	K16450152_PM0V060	
1800	45x97	0.15	128	110	6.50	K16450182_PM0N097	
1800	50x77	0.10	128	108	5.6	K16450182_PM0V077	
2200	45x105	0.15	112	102	6.80	K16450222_PM0N105	
2700	50x105	0.10	112	102	7.4	K16450272_PM0V105	

K25 TYPE -40˚C +105˚C 8000H

RoHS Compliant

- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Snap in terminals for PCB mounting.**
- **Design optimized for high ripple current applications.**

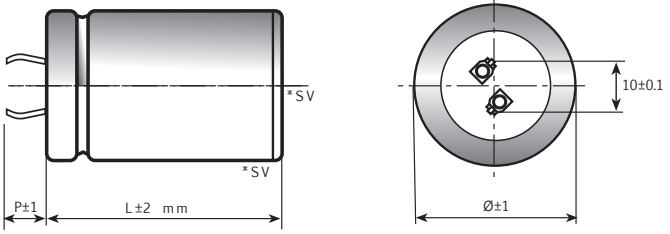
APPLICATIONS

Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

Dimensions in mm.

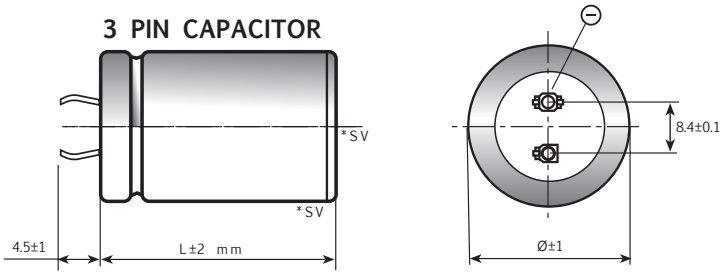
Circuit board hole dimensions

2 PIN CAPACITOR

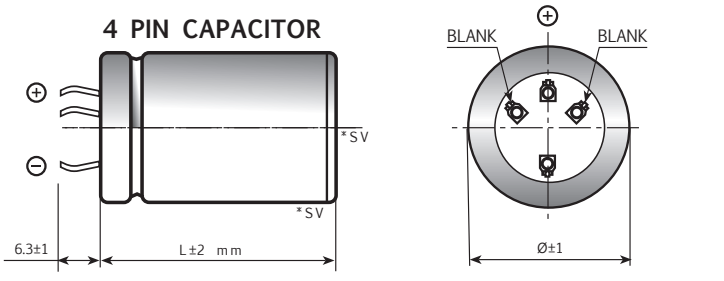


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

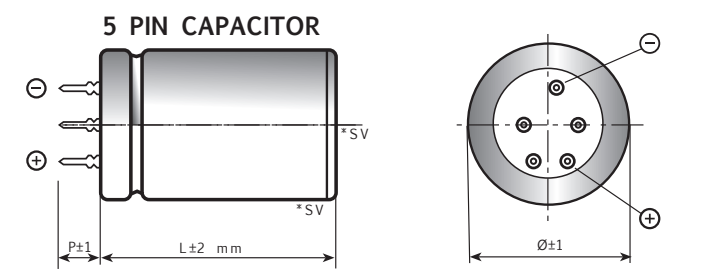
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K25 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +105°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 500V DC
Surge Voltage (V_p)	$V_p = 1.05\ V_r$ (V_r > 450V DC) $V_p = 1.10\ V_r$ ($V_r \leq$ 450V DC)
Rated Capacitance Range	from 820 µF to 2200 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max $I_L = 0.003\ C_r\ V_r + 4$ µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz: FREQUENCY: 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER: 0.88 1.0 1.45 1.50 1.55 AMBIENT TEMP.: 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C 110°C MULTIPLIER: 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1.0 0.5 Maximum internal temperature 110°C
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105° C when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 250000 h at 40°C > 8000 h at 105°C
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 20 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Marking information	minus pole band aside within an angle of 41° ± 25°
Reference standards	CECC 30.300 - IEC 60384-4 LONG LIFE GRADE

K25 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1200	40x77	0.10	89	64	3.6	K25400122_PM0F077	400V
1200	45x60	0.10	89	64	3.6	K25400122_PM0N060	
1500	40x97	0.10	75	55	4.8	K25400152_PM0F097	
1500	45x77	0.10	75	55	4.7	K25400152_PM0N077	
1500	50x60	0.10	75	55	4.4	K25400152_PM0V060	
1800	45x97	0.10	69	60	5.6	K25400182_PM0N097	
1800	50x77	0.10	69	60	5.5	K25400182_PM0V077	
2200	45x105	0.10	47	40	6.1	K25400222_PM0N105	
2700	50x105	0.10	37	30	6.5	K25400272_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
820	35x77	0.10	104	85	3.0	K25420821_PM0E077	420V
1000	40x60	0.10	99	74	3.6	K25420102_PM0F060	
1200	40x77	0.10	94	64	3.7	K25420122_PM0F077	
1200	45x60	0.10	94	64	3.6	K25420122_PM0N060	
1500	40x97	0.10	75	55	4.6	K25420152_PM0F097	
1500	45x77	0.11	75	55	4.5	K25420152_PM0N077	
1500	50x60	0.10	75	55	4.4	K25420152_PM0V060	
1800	45x97	0.11	69	51	5.6	K25420182_PM0N097	
1800	50x77	0.10	69	51	5.5	K25420182_PM0V077	
2200	45x105	0.12	47	40	6.1	K25420222_PM0N105	
2700	50x105	0.10	37	30	6.5	K25420272_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
820	40x60	0.10	104	85	3.3	K25450821_PM0F060	450V
1000	40x77	0.10	99	74	3.8	K25450102_PM0F077	
1000	45x60	0.10	99	74	3.6	K25450102_PM0N060	
1200	40x97	0.10	94	64	4.6	K25450122_PM0F097	
1200	45x77	0.10	94	64	4.3	K25450122_PM0N077	
1200	50x60	0.10	94	64	4.2	K25450122_PM0V060	
1500	45x97	0.11	75	55	5.1	K25450152_PM0N097	
1500	50x77	0.10	75	55	5.3	K25450152_PM0V077	
1800	45x105	0.11	69	51	5.1	K25450182_PM0N105	
2200	50x105	0.10	47	40	6.2	K25450222_PM0V105	

K25 TYPE STANDARD RATINGS

RATED VOLTAGE VDC

500V

Cap µF	Ø x L Mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10KHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER Termination digit excluded
220	35x40	0.12	390	280	1.2	K25500221_PM0E040
330	35x50	0.12	280	180	1.9	K25500331_PM0E050
470	40x50	0.12	187	153	2.1	K25500471_PM0F050
470	35x60	0.12	187	153	2.1	K25500471_PM0E060
560	35x77	0.12	176	134	2.4	K25500561_PM0E077
560	40x60	0.12	176	134	2.4	K25500561_PM0F060
680	40x77	0.12	165	120	2.8	K25500681_PM0F077
820	40x97	0.12	138	108	3.5	K25500821_PM0F097
1000	45x97	0.12	115	95	4.1	K25500102_PM0N097
1200	45x105	0.12	96	64	4.5	K25500122_PM0N105

K26 TYPE -40°C +85°C 12000H

RoHS Compliant

- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Snap in terminals for PCB mounting.**
- **Design optimized for high ripple current applications.**

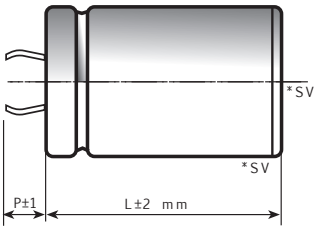
APPLICATIONS

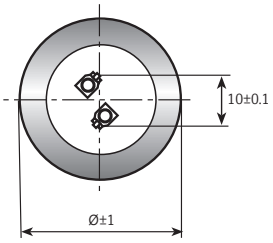
Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

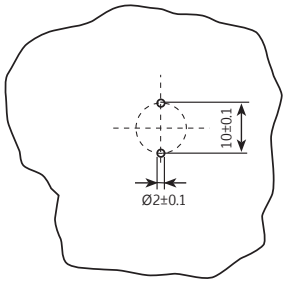
Dimensions in mm.

Circuit board hole dimensions

2 PIN CAPACITOR

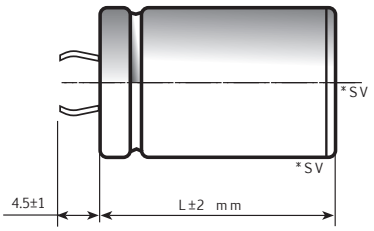


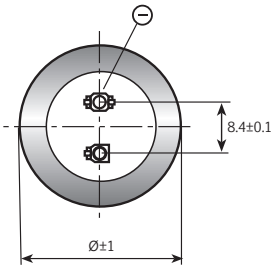


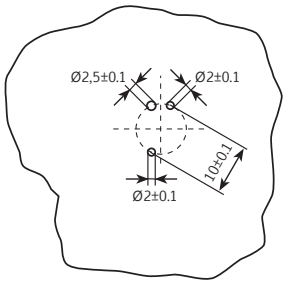


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

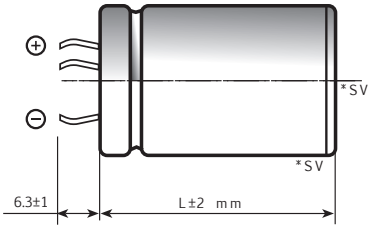
3 PIN CAPACITOR

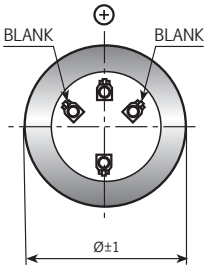


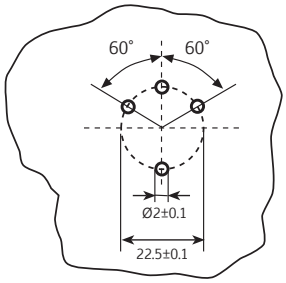




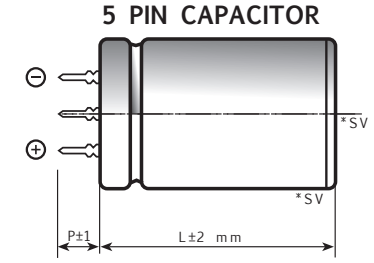
4 PIN CAPACITOR

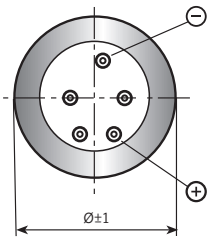


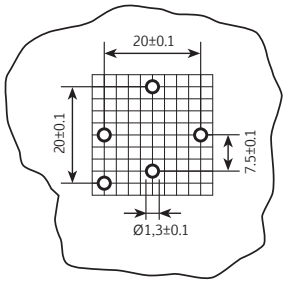




5 PIN CAPACITOR







*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K26 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 400V to 500V DC
Surge Voltage (V_p)	V_p = 1.05 V_r (V_r > 450V DC) V_p = 1.10 V_r (V_r ≤ 450V DC)
Rated Capacitance Range	from 1000 µF to 2700 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request: -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA Kendeil product limit: I_L= 0.003 C_r V_r At 85°C max I_L = 0.04 C_r V_r µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz:

FREQUENCY	50Hz	100Hz	500 Hz	1000Hz	>10kHz		
MULTIPLIER	0.88	1.0	1.45	1.50	1.55		
AMBIENT TEMP.	35°C	45°C	55°C	65°C	75°C	85°C	95°C
MULTIPLIER	2.2	2.1	1.8	1.6	1.4	1.0	0.5
Maximum internal temperature	98°C						

Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.		
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h		
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min		
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside	Cap change tan δ Leakage current (I_L) Impedance (Z)	≤ 10% ≤ 130% < initial limit ≤ 200%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside	Cap change tan δ Leakage current (I_L)	≤ ±15% ≤ 150% < initial limit
Useful life (Vn, Temp rated I ripple applied)	> 200000 h at 40°C > 12000 h at 85°C		
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 33 fit (33 10^{-9}/h)		
Self inductance	Approx. 20 nH		
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C		
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10		
Marking information	minus pole band aside within an angle of 41° ± 25°		
Reference standards	CECC 30.300 - IEC 60384-4 LONG LIFE GRADE		

K26 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1000	40x60	0.12	99	74	5.1	K26400102_PM0F060	400V
1200	40x77	0.12	94	64	5.2	K26400122_PM0F077	
1500	45x60	0.12	84	61	5.4	K26400152_PM0N060	
1800	45x77	0.12	70	51	6.2	K26400182_PM0N077	
1800	50x60	0.10	70	51	6.5	K26400182_PM0V060	
2000	40x105	0.12	61	44	7.6	K26400202_PM0F105	
2200	45x105	0.13	47	40	7.8	K26400222_PM0N105	
2200	50x77	0.10	47	40	7.6	K26400222_PM0V077	
2700	45x105	0.13	46	39	9.2	K26400272_PM0N105	
3300	50x105	0.10	37	30	10.2	K26400332_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1000	40x60	0.11	99	74	5.1	K26420102_PM0F060	420V
1200	40x77	0.11	94	64	5.2	K26420122_PM0F077	
1200	45x60	0.11	94	64	5.2	K26420122_PM0N060	
1500	40x105	0.12	75	55	6.3	K26420152_PM0F105	
1500	45x77	0.12	75	55	5.6	K26420152_PM0N077	
1500	50x60	0.10	75	55	5.7	K26420152_PM0V060	
1800	50x77	0.10	67	50	6.9	K26420182_PM0V077	
2200	45x105	0.13	47	40	7.8	K26420222_PM0N105	
2700	50x105	0.10	37	30	9.5	K26420272_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1000	40x60	0.11	99	74	5.1	K26450102_PM0F060	450V
1200	40x77	0.11	94	64	5.2	K26450122_PM0F077	
1200	45x60	0.11	94	64	5.2	K26450122_PM0N060	
1500	40x105	0.12	75	55	6.3	K26450152_PM0F105	
1500	45x77	0.12	75	55	5.6	K26450152_PM0N077	
1500	50x60	0.10	75	55	5.7	K26450152_PM0V060	
1800	50x77	0.10	67	50	6.9	K26450182_PM0V077	
2200	45x105	0.13	47	40	7.8	K26450222_PM0N105	
2700	50x105	0.10	37	30	9.5	K26450272_PM0V105	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K26 TYPE STANDARD RATINGS

Cap µF	Ø x L Mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10KHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER Termination digit excluded	RATED VOLTAGE VDC
							500V
330	35x40	0.12	250	180	2.2	K26500331_PM0E040	
470	35x50	0.12	187	153	2.6	K26500471_PM0E050	
560	40x50	0.12	176	134	3.1	K26500561_PM0F050	
560	35x60	0.12	176	134	3.2	K26500561_PM0E060	
680	35x77	0.12	165	120	3.8	K26500681_PM0E077	
680	40x60	0.12	165	120	3.8	K26500681_PM0F060	
820	40x77	0.12	138	108	4.7	K26500821_PM0F077	
1000	40x97	0.12	115	95	6.0	K26500102_PM0F097	
1500	45x97	0.12	90	80	7.1	K26500152_PM0N097	
1700	45x105	0.12	77	72	7.3	K26500172_PM0N105	

K55 TYPE -40˚C +105˚C 6000H

RoHS Compliant

- **Design optimized for Solar inverter.**
- **Very high CV for unit volume.**
- **Low ESR, High ripple current and long file.**
- **Safety vent at bottom case or aside case.**

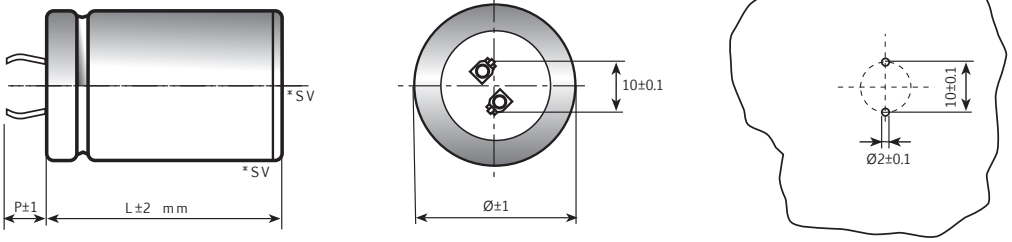
APPLICATIONS

Designed for Solar inverters and professional power supplies.

Dimensions in mm.

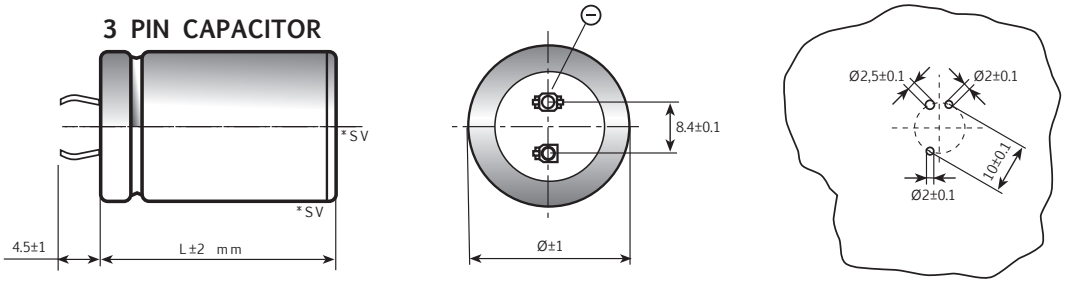
Circuit board hole dimensions

2 PIN CAPACITOR

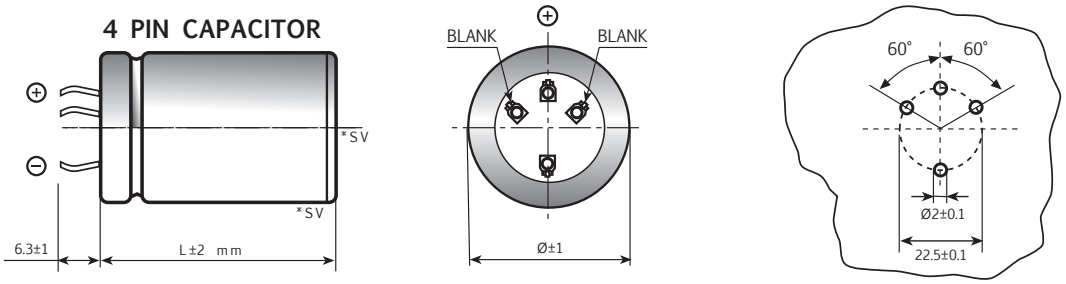


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

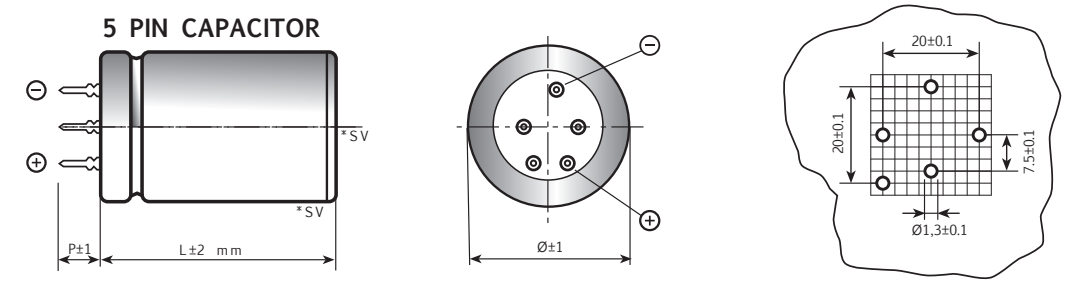
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K55 TYPE SPECIFICATIONS

Temperature Range	Operating: -40°C +105°C Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	450V DC at 105°C, 500V DC at 50°C
Surge Voltage (V_p)	500V
Rated Capacitance Range	from 330 µF to 820 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.003 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 105°C and 100Hz: FREQUENCY 50Hz 100Hz 500 Hz 1000Hz >10kHz MULTIPLIER 0.88 1.0 1.45 1.5 1.55 AMBIENT TEMP. 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1 Maximum internal temperature 110°C
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside for all sizes with V 100V; all voltage capacitors with diameter 35mm: Cap change ≤ ±20%, tan δ ≤ 200%, Leakage current (I_L) < initial limit, Impedance (Z) ≤ 200% for V 160V and for capacitors with diameter 40mm: Cap change ≤ ±10%, tan δ ≤ 130%, Leakage current (I_L) < initial limit, Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside: Cap change ≤ ±15%, tan δ ≤ 150%, Leakage current (I_L) < initial limit
Useful life (Vn, Temp rated I ripple applied)	250,000 h at 40°C - 450V with ripple current applied 6,000 h at 105°C - 450V with ripple current applied 5,000 h at 50°C - 500V without ripple current applied
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)
Self inductance	Approx. 15 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Marking information	minus pole band aside within an angle of 41° ± 25°
Reference standards	CECC 30.300 - IEC 60384-4 LONG LIFE GRADE

K55 TYPE STANDARD RATINGS

RATED VOLTAGE VDC

450V

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP m Ω 100 Hz 20°C	Z TYP m Ω 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded
330	30x40	0.09	240	170	1.80	K55450331_PM0D040
330	35x40	0.09	240	170	2.10	K55450331_PM0E040
390	30x50	0.09	197	149	2.20	K55450391_PM0D050
470	30x50	0.09	195	147	2.25	K55450471_PM0D050
470	35x50	0.09	195	147	2.67	K55450471_PM0E050
560	35x50	0.09	150	103	2.80	K55450561_PM0E050
560	35x60	0.09	150	103	3.10	K55450561_PM0E060
680	35x50	0.09	149	115	2.85	K55450681_PM0E050
680	35x60	0.09	149	115	3.25	K55450681_PM0E060
820	40x60	0.09	120	92	3.60	K55450821_PM0F060

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K75 TYPE -40˚C +105˚C 5000H

RoHS Compliant

- **Design optimized for extremely high miniaturization.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Snap in terminals for PCB mounting.**

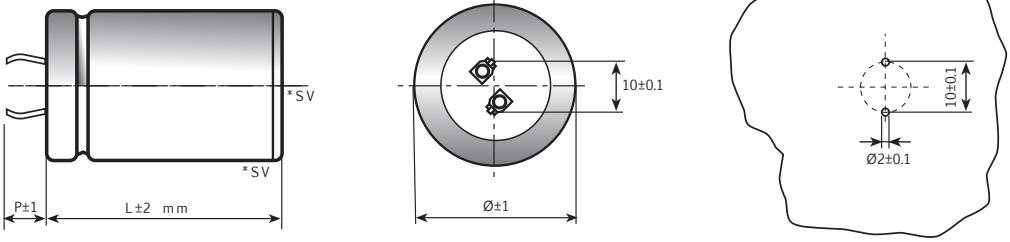
APPLICATIONS

Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

Dimensions in mm.

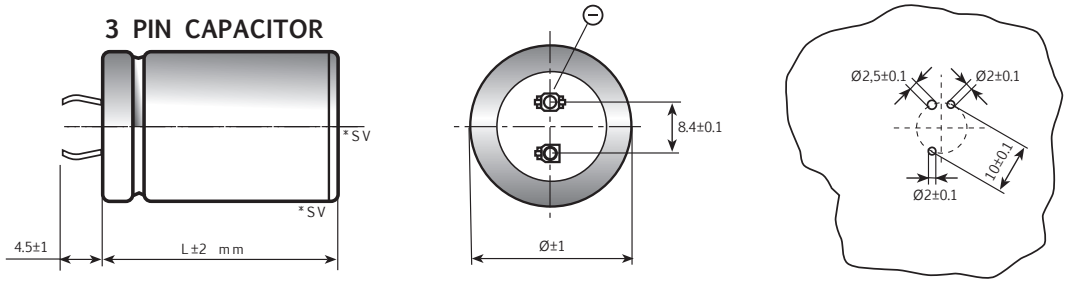
Circuit board hole dimensions

2 PIN CAPACITOR

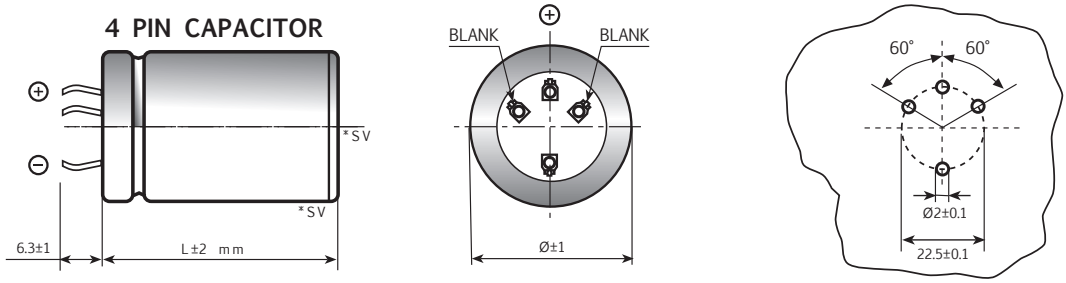


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

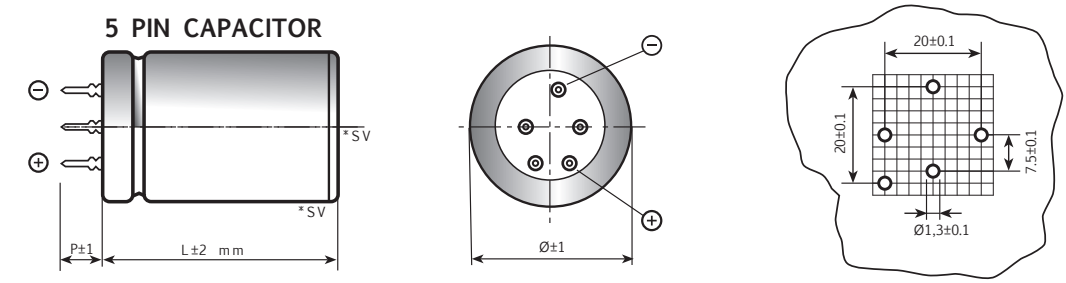
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K75 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +105°C Storage : Preferably below +25°C, not exceeding +40°C	
Rated Voltage Range (V_r)	from 200V to 500V DC	
Surge Voltage (V_p)	V_p = 1.05 V_r (V_r > 450V DC) V_p = 1.10 V_r (V_r ≤ 450V DC)	
Rated Capacitance Range	from 220 µF to 5600 µF	
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]	
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA	
Ripple current (I_r)	Refer to table at 105°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.88 1.0 1.45 1.5 1.55 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1	
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.	
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h	
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min	
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside	Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside	Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (105°C, Vn, Ir applied)	≥ 5.000 h at 105°C	Cap change ≤ 20% tan δ ≤ 200% Leakage current (I_L) < initial limit Impedance (Z) ≤ 200%
Failure percentage **Failure rate**	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)	
Self inductance	Approx. 15 nH	
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C	
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10	
Marking information	minus pole band aside within an angle of 41° ± 25°	
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE	

K75 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
560	25x30	0.09	106	39	1.90	K75200561_PM0C030	200V
680	25x35	0.09	85	32	2.25	K75200681_PM0C035	
820	25x40	0.09	67	25	2.52	K75200821_PM0C040	
820	30x30	0.09	84	34	2.40	K75200821_PM0D030	
1000	25x45	0.10	61	23	2.93	K75200102_PM0C045	
1000	30x35	0.10	68	30	2.83	K75200102_PM0D035	
1000	35x30	0.10	75	37	2.75	K75200102_PM0E030	
1200	25x50	0.10	53	22	3.27	K75200122_PM0C050	
1200	30x40	0.10	58	25	3.19	K75200122_PM0D040	
1200	35x30	0.10	69	33	2.86	K75200122_PM0E030	
1500	30x45	0.10	50	22	3.64	K75200152_PM0D045	
1500	35x35	0.10	58	26	3.24	K75200152_PM0E035	
1800	35x40	0.10	53	27	3.70	K75200182_PM0E040	
2200	35x45	0.10	46	24	4.17	K75200222_PM0E045	
2200	35x50	0.10	46	24	4.61	K75200222_PM0E050	
2700	35x60	0.10	33	17	5.51	K75200272_PM0E060	
3300	40x60	0.10	32	18	6.00	K75200332_PM0F060	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
390	25x30	0.09	141	52	1.65	K75250391_PM0C030	250V
470	25x35	0.09	111	42	1.96	K75250471_PM0C035	
560	30x30	0.09	106	44	2.14	K75250561_PM0D030	
680	25x45	0.09	80	33	2.54	K75250681_PM0C045	
760	30x35	0.09	82	35	2.51	K75250761_PM0D035	
820	30x40	0.09	75	30	2.84	K75250821_PM0D040	
820	35x30	0.09	84	36	2.53	K75250821_PM0E030	
1000	30x45	0.10	60	26	3.30	K75250102_PM0D045	
1000	35x35	0.10	66	32	3.04	K75250102_PM0E035	
1200	30x50	0.10	55	22	3.60	K75250122_PM0D050	
1200	35x40	0.10	55	22	3.50	K75250122_PM0E040	
1500	35x50	0.10	48	22	4.22	K75250152_PM0E050	
2200	35x60	0.10	39	18	5.03	K75250222_PM0E060	
2500	40x60	0.10	31	18	5.98	K75250252_PM0F060	

K75 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
330	25x35	0.09	238	117	1.34	K75350331_PM0C035	350V
370	25x35	0.09	238	115	1.34	K75350371_PM0C035	
390	30x30	0.09	225	114	1.47	K75350391_PM0D030	
470	30x30	0.09	208	107	1.53	K75350471_PM0D030	
560	30x35	0.09	169	87	1.79	K75350561_PM0D035	
620	30x40	0.09	149	76	2.00	K75350621_PM0D040	
620	35x30	0.09	161	86	2.00	K75350621_PM0E030	
680	30x45	0.09	127	66	2.26	K75350681_PM0D045	
680	35x35	0.09	142	79	2.16	K75350681_PM0E035	
780	30x45	0.09	123	63	2.30	K75350781_PM0D045	
780	35x35	0.09	139	77	2.19	K75350781_PM0E035	
820	30x50	0.09	111	57	2.51	K75350821_PM0D050	
900	35x40	0.09	118	65	2.48	K75350901_PM0E040	
1000	35x45	0.10	102	56	2.78	K75350102_PM0E045	
1200	35x50	0.10	88	49	3.12	K75350122_PM0E050	
1500	35x60	0.10	72	40	3.71	K75350152_PM0E060	
2000	40x60	0.10	68	38	4.29	K75350202_PM0F060	
2200	45x60	0.10	48	26	4.80	K75350222_PM0N060	
2700	45x77	0.10	39	22	6.22	K75350272_PM0N077	
2700	50x60	0.10	43	26	5.40	K75350272_PM0V060	
2900	40x97	0.10	42	25	6.22	K75350292_PM0F097	
3300	50x77	0.10	36	22	6.00	K75350332_PM0V077	
3700	45x105	0.10	27	15	7.60	K75350372_PM0N105	
4700	50x105	0.10	25	15	8.30	K75350472_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	25x35	0.09	328	148	1.15	K75400221_PM0C035	400V
270	25x35	0.09	270	125	1.26	K75400271_PM0C035	
330	25x40	0.09	240	110	1.39	K75400331_PM0C040	
330	30x30	0.09	240	110	1.43	K75400331_PM0D030	
370	30x30	0.09	238	108	1.44	K75400371_PM0D030	
470	30x35	0.09	190	91	1.69	K75400471_PM0D035	
470	30x40	0.09	168	81	1.88	K75400471_PM0D040	
510	30x40	0.09	166	80	1.89	K75400511_PM0D040	
510	35x30	0.09	189	89	1.78	K75400511_PM0E030	
560	30x45	0.09	140	68	2.15	K75400561_PM0D045	
560	35x35	0.09	156	81	2.06	K75400561_PM0E035	
630	30x45	0.09	139	66	2.17	K75400631_PM0D045	
630	35x35	0.09	154	80	2.07	K75400631_PM0E035	

K75 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
680	30x50	0.09	126	60	2.37	K75400681_PM0D050	400V
680	35x40	0.09	132	68	2.35	K75400681_PM0E040	
820	30x60	0.09	102	49	2.82	K75400821_PM0D060	
820	35x45	0.09	114	59	2.64	K75400821_PM0E045	
1000	35x50	0.10	97	51	2.96	K75400102_PM0E050	
1200	35x60	0.10	79	41	3.54	K75400122_PM0E060	
1500	40x60	0.10	68	39	4.10	K75400152_PM0F060	
1800	45x60	0.10	53	27	5.03	K75400182_PM0N060	
2000	45x77	0.10	44	23	5.10	K75400202_PM0N077	
2200	40x97	0.10	46	26	5.10	K75400222_PM0F097	
2200	50x60	0.10	48	27	4.80	K75400222_PM0V060	
2700	50x77	0.10	39	22	5.70	K75400272_PM0V077	
2900	45x105	0.10	31	16	7.90	K75400292_PM0N105	
3900	50x105	0.10	27	16	8.20	K75400392_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	25x35	0.09	329	144	1.14	K75420221_PM0C035	420V
250	25x35	0.09	292	129	1.21	K75420251_PM0C035	
330	30x30	0.09	256	118	1.38	K75420331_PM0D030	
390	30x35	0.09	206	96	1.62	K75420391_PM0D035	
470	30x40	0.09	178	81	1.83	K75420471_PM0D040	
470	35x30	0.09	198	98	1.73	K75420471_PM0E030	
560	30x45	0.09	149	69	2.09	K75420561_PM0D045	
560	35x35	0.09	165	82	2.01	K75420561_PM0E035	
620	30x50	0.09	135	62	2.28	K75420621_PM0D050	
650	35x40	0.09	140	66	2.28	K75420651_PM0E040	
680	35x45	0.09	121	60	2.55	K75420681_PM0E045	
820	35x50	0.09	105	53	2.85	K75420821_PM0E050	
1000	35x60	0.10	84	44	3.41	K75420102_PM0E060	
1300	40x60	0.10	73	40	4.00	K75420132_PM0F060	
1500	45x60	0.10	56	28	4.50	K75420152_PM0N060	
1800	45x77	0.10	47	24	5.30	K75420182_PM0N077	
2000	40x97	0.10	48	26	5.50	K75420202_PM0F097	
2000	50x60	0.10	50	27	4.80	K75420202_PM0V060	
2400	50x77	0.10	42	23	5.70	K75420242_PM0V077	
2700	45x105	0.10	32	16	7.05	K75420272_PM0N105	
3500	50x105	0.10	28	16	7.90	K75420352_PM0V105	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION.

K75 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	25x35	0.09	325	145	1.10	K75450221_PM0C035	450V
270	30x30	0.09	283	132	1.28	K75450271_PM0D030	
330	30x35	0.09	228	107	1.50	K75450331_PM0D035	
390	30x40	0.09	200	92	1.70	K75450391_PM0D040	
470	30x45	0.09	165	80	1.94	K75450471_PM0D045	
470	35x35	0.09	180	90	1.88	K75450471_PM0E035	
560	30x50	0.09	150	70	2.12	K75450561_PM0D050	
560	35x40	0.09	154	76	2.12	K75450561_PM0E040	
680	35x45	0.09	133	65	2.38	K75450681_PM0E045	
820	35x50	0.09	115	57	2.66	K75450821_PM0E050	
1000	35x60	0.10	91	45	3.31	K75450102_PM0E060	
1200	40x60	0.10	79	43	3.74	K75450122_PM0F060	
1500	45x60	0.10	59	32	4.30	K75450152_PM0N060	
1800	40x97	0.10	52	30	5.10	K75450182_PM0F097	
1800	45x77	0.10	50	25	5.20	K75450182_PM0N077	
1800	50x60	0.10	53	29	4.60	K75450182_PM0V060	
2200	50x77	0.10	44	24	5.60	K75450222_PM0V077	
2700	45x105	0.10	34	17	6.50	K75450272_PM0N105	
3300	50x105	0.10	30	17	7.50	K75450332_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
150	25x30	0.12	550	395	1.00	K75500151_PM0C030	500V
220	25x40	0.12	399	253	1.20	K75500221_PM0C040	
220	30x30	0.12	399	253	1.30	K75500221_PM0D030	
270	25x50	0.12	355	235	1.50	K75500271_PM0C050	
270	30x40	0.12	355	235	1.40	K75500271_PM0D050	
330	30x40	0.12	305	210	1.60	K75500331_PM0D040	
390	30x50	0.12	260	190	1.85	K75500391_PM0D050	
390	35x40	0.12	260	190	1.80	K75500391_PM0E040	
470	35x50	0.12	200	180	2.05	K75500471_PM0E050	
560	35x50	0.12	183	150	2.10	K75500561_PM0E050	
560	35x60	0.12	183	150	2.20	K75500561_PM0E060	
680	35x60	0.12	155	115	2.35	K75500681_PM0E060	
820	40x60	0.12	142	110	2.60	K75500821_PM0F060	
1000	40x77	0.15	125	105	3.30	K75500102_PM0F077	
1200	40x97	0.15	107	90	3.70	K75500122_PM0F097	
1500	45x97	0.15	75	55	4.40	K75500152_PM0N097	
1800	45x105	0.15	73	52	4.60	K75500182_PM0N105	

*** 5% more is the ripple current value at 120Hz**

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K76 TYPE -40˚C +85˚C 5000H

RoHS Compliant

- **Design optimized for extremely high miniaturization.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Snap in terminals for PCB mounting.**

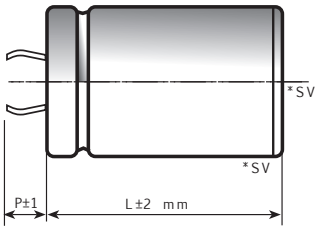
APPLICATIONS

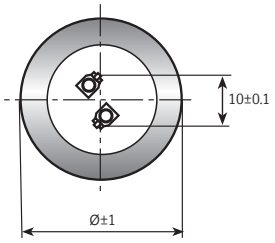
Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

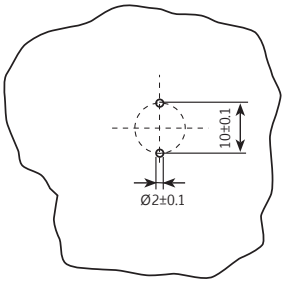
Dimensions in mm.

Circuit board hole dimensions

2 PIN CAPACITOR

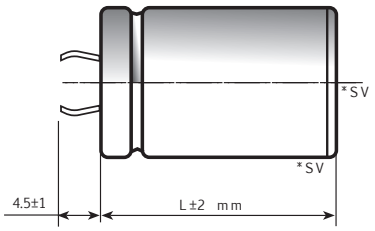


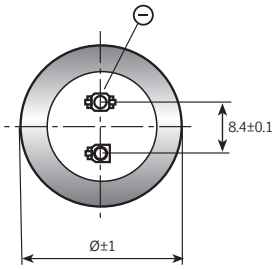


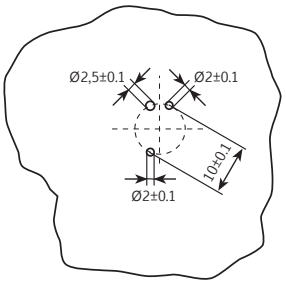


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

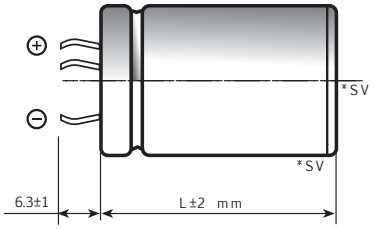
3 PIN CAPACITOR

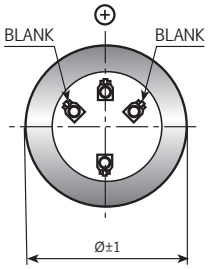


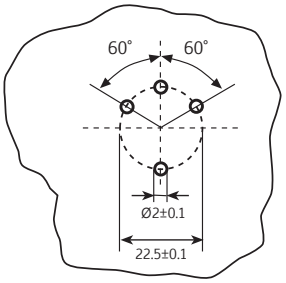




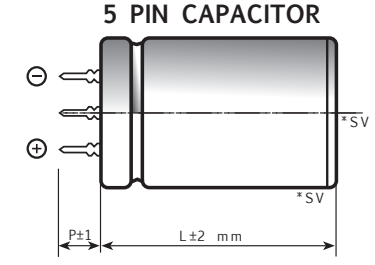
4 PIN CAPACITOR

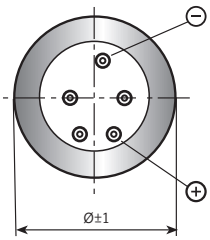


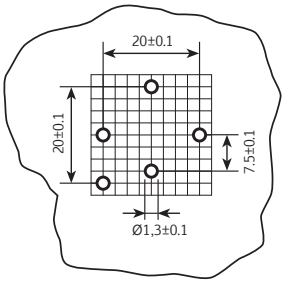




5 PIN CAPACITOR







*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K76 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +85°C [Environmental classification 40/85/56 IEC-68] Storage : Preferably below +25°C, not exceeding +40°C
Rated Voltage Range (V_r)	from 200V to 500V DC
Surge Voltage (V_p)	V_p = 1.05 V_r (V_r > 450V DC) V_p = 1.10 V_r (V_r ≤ 450V DC)
Rated Capacitance Range	from 220 µF to 5600 µF
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62] on request : -10% +30% at 100 Hz, 20°C [Q class IEC-62]
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA
Ripple current (I_r)	Refer to table at 85°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.88 1.0 1.45 1.50 1.55 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C MULTIPLIER 2.2 2.1 1.8 1.6 1.4 1.0 0.5
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min
Life test	After 2,000 hours application of rated voltage at 85°C capacitors meet characteristics aside Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 85°C, when restored at 20°C meet specifications aside Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (85°C, Vn, Ir applied)	≥ 5,000 h at 85°C D≤35mm ≥ 12,000 h at 85°C D>40mm Cap change ≤ 20% tan δ ≤ 200% Leakage current (I_L) < initial limit Impedance (Z) ≤ 200%
Failure percentage Failure rate	≤ 1% (during working life) ≤ 33 fit (33 10^{-9}/h)
Self inductance	Approx. 15 nH
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Marking information	minus pole band aside within an angle of 41° ± 25°
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE

K76 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
560	25x30	0.09	106	39	3.05	K76200561_PM0C030	200V
680	25x35	0.09	85	32	3.63	K76200681_PM0C035	
820	25x40	0.09	67	25	4.04	K76200821_PM0C040	
820	30x30	0.09	84	34	3.87	K76200821_PM0D030	
1000	25x45	0.10	61	23	4.72	K76200102_PM0C045	
1000	30x35	0.10	68	30	4.56	K76200102_PM0D035	
1000	35x30	0.10	75	37	4.43	K76200102_PM0E030	
1200	25x50	0.10	53	22	5.23	K76200122_PM0C050	
1200	30x40	0.10	58	25	5.15	K76200122_PM0D040	
1200	35x30	0.10	69	33	4.45	K76200122_PM0E030	
1500	30x45	0.10	50	22	5.86	K76200152_PM0D045	
1500	35x35	0.10	58	26	5.22	K76200152_PM0E035	
1800	35x40	0.10	53	27	5.97	K76200182_PM0E040	
2200	35x45	0.10	46	24	6.72	K76200222_PM0E045	
2200	35x50	0.10	46	24	7.43	K76200222_PM0E050	
2700	35x60	0.10	33	17	8.89	K76200272_PM0E060	
3300	40x60	0.10	32	18	9.64	K76200332_PM0F060	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
390	25x30	0.09	141	52	2.68	K76250391_PM0C030	250V
470	25x35	0.09	111	42	3.17	K76250471_PM0C035	
560	30x30	0.09	106	44	3.45	K76250561_PM0D030	
680	25x45	0.09	80	33	4.09	K76250681_PM0C045	
760	30x35	0.09	82	35	4.05	K76250761_PM0D035	
820	30x40	0.09	75	30	4.50	K76250821_PM0D040	
820	35x30	0.09	84	36	4.07	K76250821_PM0E030	
1000	30x45	0.10	60	26	5.25	K76250102_PM0D045	
1000	35x35	0.10	66	32	4.80	K76250102_PM0E035	
1200	30x50	0.10	55	22	5.75	K76250122_PM0D050	
1200	35x40	0.10	55	22	5.44	K76250122_PM0E040	
1500	35x50	0.10	48	22	6.80	K76250152_PM0E050	
2200	35x60	0.10	39	18	8.12	K76250222_PM0E060	
2500	40x60	0.10	31	18	9.50	K76250252_PM0F060	

K76 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
330	25x30	0.09	238	117	1.91	K76350331_PM0C030	350V
390	25x35	0.09	225	114	2.25	K76350391_PM0C035	
470	30x30	0.09	208	107	2.53	K76350471_PM0D030	
520	30x30	0.09	195	105	2.55	K76350521_PM0D030	
560	30x35	0.09	169	87	2.93	K76350561_PM0D035	
560	30x40	0.09	169	87	3.14	K76350561_PM0D040	
620	30x35	0.09	149	76	3.00	K76350621_PM0D035	
680	30x40	0.09	127	66	3.34	K76350681_PM0D040	
680	35x40	0.09	142	79	3.11	K76350681_PM0E040	
820	30x45	0.09	111	57	3.77	K76350821_PM0D045	
820	35x35	0.09	134	77	3.59	K76350821_PM0E035	
880	30x45	0.09	110	57	3.78	K76350881_PM0D045	
920	30x50	0.09	104	56	4.19	K76350921_PM0D050	
1000	35x40	0.10	102	56	4.12	K76350102_PM0E040	
1200	35x45	0.10	88	49	4.63	K76350122_PM0E045	
1400	35x50	0.10	83	46	5.18	K76350142_PM0E050	
1700	35x60	0.10	68	40	6.17	K76350172_PM0E060	
2200	40x60	0.10	60	38	7.10	K76350222_PM0F060	
2400	45x60	0.10	45	26	7.60	K76350242_PM0N060	
2900	45x77	0.10	42	25	9.50	K76350292_PM0N077	
2900	50x60	0.10	41	26	8.85	K76350292_PM0V060	
3100	40x97	0.10	40	24	9.00	K76350312_PM0F097	
3700	50x77	0.10	34	22	9.80	K76350372_PM0V077	
4400	45x105	0.10	26	15	12.50	K76350442_PM0N105	
4700	50x105	0.10	25	15	13.60	K76350472_PM0V105	
5600	50x105	0.10	23	15	14.00	K76350562_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	25x30	0.09	328	148	1.70	K76400221_PM0C030	400V
330	25x35	0.09	240	115	2.10	K76400331_PM0C035	
390	30x30	0.09	230	112	2.35	K76400391_PM0D030	
470	30x35	0.09	190	91	2.75	K76400471_PM0D035	
560	30x40	0.09	160	78	3.11	K76400561_PM0D040	
560	35x30	0.09	183	97	2.92	K76400561_PM0E030	
680	30x45	0.09	126	60	3.55	K76400681_PM0D045	
680	35x35	0.09	140	64	3.44	K76400681_PM0E035	
720	30x50	0.09	121	59	3.89	K76400721_PM0D050	
780	35x40	0.09	128	67	3.85	K76400781_PM0E040	
820	35x45	0.09	114	59	4.32	K76400821_PM0E045	
1000	35x50	0.10	97	51	4.85	K76400102_PM0E050	

K76 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
1200	35x60	0.10	79	41	5.77	K76400122_PM0E060	400V
1700	40x60	0.10	67	39	6.70	K76400172_PM0F060	
2000	45x60	0.10	49	28	8.36	K76400202_PM0N060	
2200	45x77	0.10	46	26	8.8	K76400222_PM0N077	
2200	50x60	0.10	45	26	8.1	K76400222_PM0V060	
2400	40x97	0.10	43	25	8.8	K76400242_PM0F097	
2400	45x77	0.10	42	23	8.8	K76400242_PM0N077	
2400	50x60	0.10	45	26	8.8	K76400242_PM0V060	
2900	50x77	0.10	38	22	10.0	K76400292_PM0V077	
3300	45x105	0.10	30	18	11.8	K76400332_PM0N105	
3300	50x105	0.10	28	16	12.80	K76400332_PM0V105	
4400	50x105	0.10	26	15	13.40	K76400442_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
290	25x35	0.09	273	123	2.02	K76420291_PM0C035	420V
330	30x30	0.09	256	118	2.30	K76420331_PM0D030	
470	30x35	0.09	178	81	2.76	K76420471_PM0D035	
520	30x40	0.09	170	80	3.02	K76420521_PM0D040	
520	35x30	0.09	180	87	2.86	K76420521_PM0E030	
560	30x45	0.09	149	69	3.48	K76420561_PM0D045	
560	35x35	0.09	165	82	3.33	K76420561_PM0E035	
620	30x45	0.09	150	72	3.50	K76420621_PM0D045	
620	35x35	0.09	150	72	3.40	K76420621_PM0E035	
680	30x50	0.09	127	60	3.80	K76420681_PM0D050	
680	35x45	0.09	127	60	3.80	K76420681_PM0E045	
820	35x45	0.09	115	55	4.23	K76420821_PM0E045	
920	35x50	0.09	100	51	4.73	K76420921_PM0E050	
1000	35x60	0.10	84	44	5.51	K76420102_PM0E060	
1200	35x60	0.10	80	42	5.65	K76420122_PM0E060	
1500	40x60	0.10	69	38	6.58	K76420152_PM0F060	
1700	45x60	0.10	53	28	7.5	K76420172_PM0N060	
2000	45x77	0.10	44	23	8.2	K76420202_PM0N077	
2200	40x97	0.10	45	26	8.3	K76420222_PM0F097	
2200	50x60	0.10	47	27	8.0	K76420222_PM0V060	
2700	50x77	0.10	40	22	9.5	K76420272_PM0V077	
3100	45x105	0.10	31	16	11.41	K76420312_PM0N105	
3300	50x105	0.10	28	16	12.80	K76420332_PM0V105	
3900	50x105	0.10	27	16	13.00	K76420392_PM0V105	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION.

K76 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	25x35	0.09	325	145	1.87	K76450221_PM0C035	450V
270	25x35	0.09	283	132	1.89	K76450271_PM0C035	
330	30x30	0.09	228	107	2.13	K76450331_PM0D030	
390	30x35	0.09	200	92	2.51	K76450391_PM0D035	
470	30x40	0.09	165	80	2.85	K76450471_PM0D040	
560	30x45	0.09	150	70	3.24	K76450561_PM0D045	
560	35x35	0.09	154	76	3.12	K76450561_PM0E035	
620	30x50	0.09	140	66	3.53	K76450621_PM0D050	
680	35x40	0.09	133	65	3.56	K76450681_PM0E040	
750	35x45	0.09	126	64	3.95	K76450751_PM0E045	
820	35x50	0.09	109	56	4.41	K76450821_PM0E050	
1000	35x60	0.10	91	45	5.33	K76450102_PM0E060	
1500	40x60	0.10	74	32	6.22	K76450152_PM0F060	
1600	45x60	0.10	58	30	6.5	K76450162_PM0N060	
2000	40x97	0.10	50	27	7.2	K76450202_PM0F097	
2000	45x77	0.10	48	25	7.6	K76450202_PM0N077	
2000	50x60	0.10	52	29	7.3	K76450202_PM0V060	
2400	50x77	0.10	43	24	9.70	K76450242_PM0V077	
2700	45x105	0.10	33	17	10.50	K76450272_PM0N105	
3300	50x105	0.10	30	17	12.10	K76450332_PM0V105	
3600	50x105	0.10	29	16	12.20	K76450362_PM0V105	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 85°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
180	25x30	0.12	560	398	1.10	K76500181_PM0C030	500V
220	25x40	0.12	399	253	1.40	K76500221_PM0C040	
220	30x30	0.12	399	253	1.45	K76500221_PM0D030	
330	25x50	0.12	305	210	1.80	K76500331_PM0C050	
330	30x40	0.12	305	210	1.80	K76500331_PM0D040	
470	30x50	0.12	200	180	2.30	K76500471_PM0D050	
470	35x40	0.12	200	180	2.25	K76500471_PM0E040	
560	35x50	0.12	183	150	2.70	K76500561_PM0E050	
680	35x55	0.12	170	125	2.90	K76500681_PM0E055	
680	35x60	0.12	170	125	2.92	K76500681_PM0E060	
820	35x60	0.12	142	110	3.30	K76500821_PM0E060	
1000	40x60	0.15	125	105	3.84	K76500102_PM0F060	
1200	40x77	0.15	107	90	4.90	K76500122_PM0F077	
1500	40x97	0.15	94	85	6.10	K76500152_PM0F097	
1800	45x97	0.15	80	72	7.20	K76500182_PM0N097	
2200	45x105	0.15	69	65	7.60	K76500222_PM0N105	

*** 5% more is the ripple current value at 120Hz**

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION OR SPEC-IN ANALYSIS.

K85 TYPE -40˚C +105˚C 8000H

RoHS Compliant

- **Design optimized for high ripple current and very long life application.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Snap in terminals for PCB mounting.**

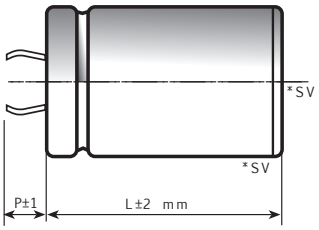
APPLICATIONS

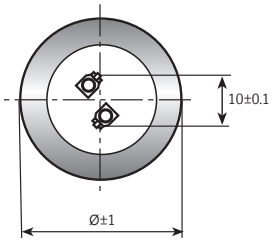
Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

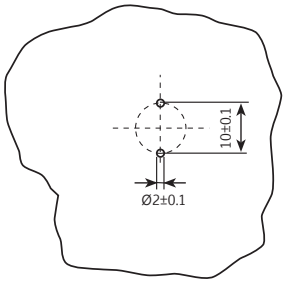
Dimensions in mm.

Circuit board hole dimensions

2 PIN CAPACITOR

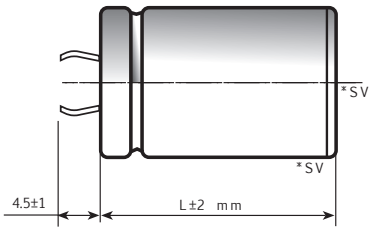


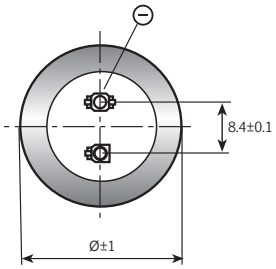


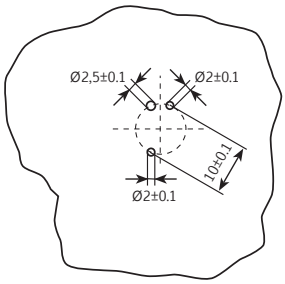


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

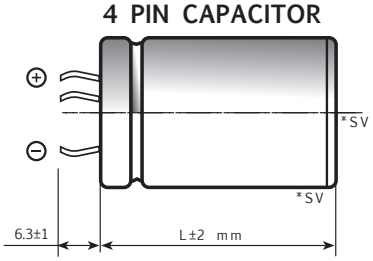
3 PIN CAPACITOR

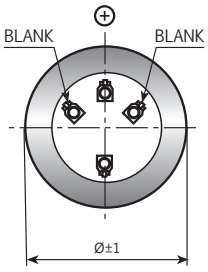


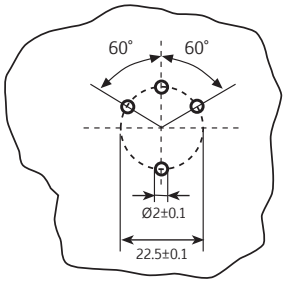




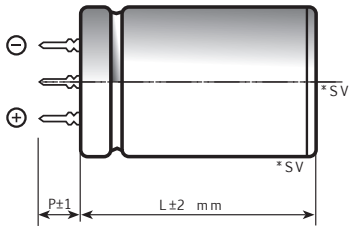
4 PIN CAPACITOR

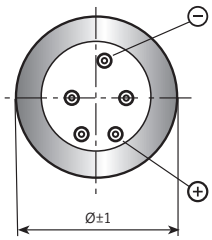


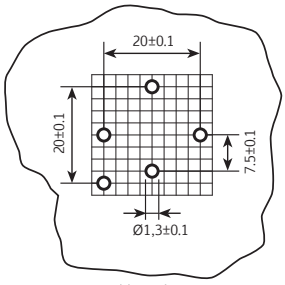




5 PIN CAPACITOR







*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K85 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +105°C Storage : Preferably below +25°C, not exceeding +40°C	
Rated Voltage Range (V_r)	from 350V to 450V DC	
Surge Voltage (V_p)	V_p = 1.10 V_r	
Rated Capacitance Range	from 100 µF to 1000 µF	
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]	
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA	
Ripple current (I_r)	Refer to table at 105°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.88 1.0 1.45 1.5 1.55 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1	
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.	
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h	
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min	
Life test	After 3,000 hours application of rated voltage at 105°C capacitors meet characteristics aside	Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside	Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (105°C, Vn, Ir applied)	≥ 8.000 h at 105°C	Cap change ≤ 20% tan δ ≤ 200% Leakage current (I_L) < initial limit Impedance (Z) ≤ 200%
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)	
Self inductance	Approx. 15 nH	
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C	
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10	
Marking information	minus pole band aside within an angle of 41° ± 25°	
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE	

K85 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
180	25x30	0.06	240	136	1.35	K85350181_PM0C030	350V
220	25x35	0.06	199	121	1.57	K85350221_PM0C035	
220	30x30	0.06	209	128	1.64	K85350221_PM0D030	
330	25x45	0.06	136	83	2.10	K85350331_PM0C045	
330	30x35	0.06	144	86	2.07	K85350331_PM0D035	
390	25x50	0.06	134	83	2.29	K85350391_PM0C050	
390	30x35	0.06	140	86	2.11	K85350391_PM0D035	
390	30x40	0.06	140	86	2.46	K85350391_PM0D040	
390	35x30	0.06	138	85	2.33	K85350391_PM0E030	
470	25x55	0.07	96	77	2.59	K85350471_PM0C055	
470	35x35	0.07	96	78	2.51	K85350471_PM0E035	
560	30x55	0.07	78	48	3.10	K85350561_PM0D055	
560	35x40	0.07	88	54	2.98	K85350561_PM0E040	
680	35x45	0.07	75	45	3.20	K85350681_PM0E045	
680	35x50	0.07	74	44	3.32	K85350681_PM0E050	
720	35x50	0.07	67	42	3.45	K85350721_PM0E050	
820	35x55	0.07	63	39	3.78	K85350821_PM0E055	
1000	35x60	0.08	60	39	4.00	K85350102_PM0E060	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
150	25x30	0.06	291	160	1.23	K85400151_PM0C030	400V
180	25x35	0.06	240	136	1.44	K85400181_PM0C035	
180	30x30	0.06	240	136	1.53	K85400181_PM0D030	
220	25x45	0.06	184	102	1.81	K85400221_PM0C045	
220	30x35	0.06	196	110	1.79	K85400221_PM0D035	
270	25x50	0.06	185	95	1.88	K85400271_PM0C050	
270	30x35	0.06	170	98	1.91	K85400271_PM0D035	
270	35x30	0.06	162	92	2.07	K85400271_PM0E030	
330	25x55	0.06	121	67	2.41	K85400331_PM0C055	
330	30x40	0.06	152	84	2.12	K85400331_PM0D040	
330	35x35	0.06	153	89	2.24	K85400331_PM0E035	
390	30x50	0.06	103	55	2.71	K85400391_PM0D050	
390	35x40	0.06	114	63	2.73	K85400391_PM0E040	
470	30x55	0.07	97	52	3.01	K85400471_PM0D055	
470	35x45	0.07	95	52	3.07	K85400471_PM0E045	
560	35x50	0.07	85	45	3.20	K85400561_PM0E050	
680	35x55	0.07	75	45	3.51	K85400681_PM0E055	

K85 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
120	25x30	0.06	312	181	1.19	K85420121_PM0C030	420V
150	25x35	0.06	253	146	1.40	K85420151_PM0C035	
180	30x30	0.06	240	136	1.53	K85420181_PM0D030	
220	25x45	0.06	184	102	1.81	K85420221_PM0C045	
220	30x35	0.06	196	110	1.79	K85420221_PM0D035	
250	25x50	0.06	170	92	1.96	K85420251_PM0C050	
250	30x35	0.06	185	103	1.83	K85420251_PM0D035	
250	35x30	0.06	172	96	2.00	K85420251_PM0E030	
270	30x40	0.06	152	84	2.12	K85420271_PM0D040	
330	25x55	0.06	121	67	2.41	K85420331_PM0C055	
330	35x35	0.06	153	89	2.24	K85420331_PM0E035	
390	30x55	0.06	103	55	2.91	K85420391_PM0D055	
390	35x40	0.06	114	63	2.71	K85420391_PM0E040	
470	35x50	0.07	97	45	3.15	K85420471_PM0E050	
560	35x55	0.07	85	45	3.30	K85420561_PM0E055	
680	35x60	0.07	75	45	3.54	K85420681_PM0E060	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
100	25x30	0.06	388	214	1.07	K85450101_PM0C030	450V
120	25x35	0.06	324	178	1.24	K85450121_PM0C035	
150	25x40	0.06	250	142	1.48	K85450151_PM0C040	
150	30x30	0.06	260	144	1.45	K85450151_PM0D030	
150	30x40	0.06	250	142	1.66	K85450151_PM0D040	
180	25x45	0.06	212	119	1.68	K85450181_PM0C045	
180	30x35	0.06	223	126	1.67	K85450181_PM0D035	
220	25x50	0.06	183	101	1.89	K85450221_PM0C050	
220	30x40	0.06	197	110	1.97	K85450221_PM0D040	
220	35x30	0.06	185	104	1.92	K85450221_PM0E030	
270	30x45	0.06	159	86	2.21	K85450271_PM0D045	
270	35x35	0.06	166	95	2.12	K85450271_PM0E035	
330	30x50	0.06	127	68	2.53	K85450331_PM0D050	
330	35x40	0.06	127	68	2.57	K85450331_PM0E040	
390	30x55	0.06	110	59	2.82	K85450391_PM0D055	
390	35x45	0.06	119	63	2.77	K85450391_PM0E045	
470	35x50	0.06	106	58	3.06	K85450471_PM0E050	
560	35x55	0.07	91	54	3.30	K85450561_PM0E055	
560	35x60	0.07	91	54	3.42	K85450561_PM0E060	
680	35x77	0.07	81	41	4.07	K85450681_PM0E077	

PLEASE TO CONTACT OUR TECHNICAL SERVICE FOR MORE INFORMATION.

K95 TYPE -40˚C +105˚C 5000H

RoHS Compliant

- **Design optimized for high ripple current and long life application.**
- **Miniaturized design.**
- **Surge-proof capacitor in aluminium can with insulation sleeve.**
- **Snap in terminals for PCB mounting.**

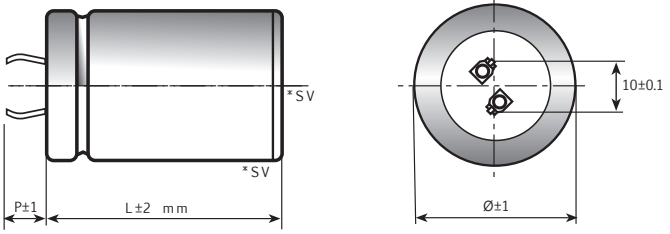
APPLICATIONS

Designed for professional application.
Ultra compact UPS, Solar inverters, High ripple current converters, Motor drives.

Dimensions in mm.

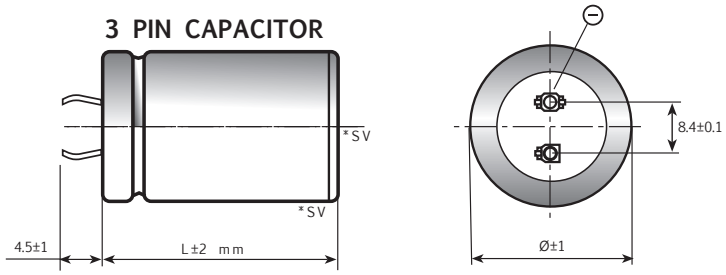
Circuit board hole dimensions

2 PIN CAPACITOR

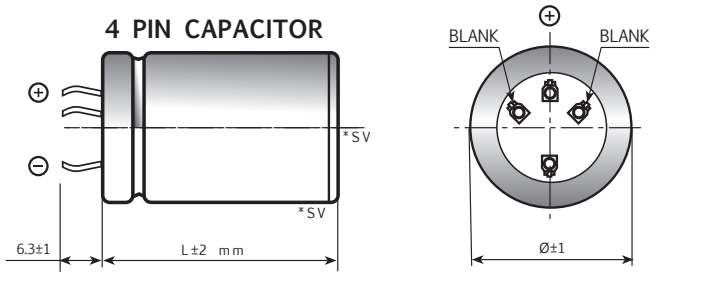


PIN LENGTH
P 4.5 short pin - P 6.3 long pin (standard)

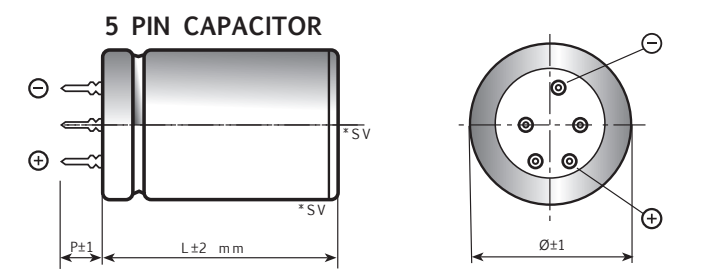
3 PIN CAPACITOR



4 PIN CAPACITOR



5 PIN CAPACITOR



*SV = aluminium can with bottom or side Safety Vent

solder side view

Ø	22	25	30	35	40	45	50
2 PIN	●	●	●	●	●		
3 PIN		●	●	●			
4 PIN				●	●	●	●
5 PIN					●		

On demand, only for capacitors with diam ≥ 35mm: octagonal can shape for long stress vibration applications.

K95 TYPE SPECIFICATIONS

Temperature Range	Operating : -40°C +105°C Storage : Preferably below +25°C, not exceeding +40°C	
Rated Voltage Range (V_r)	from 350V to 450V DC	
Surge Voltage (V_p)	V_p = 1.10 V_r	
Rated Capacitance Range	from 150 µF to 1000 µF	
Capacitance Tolerance	±20% at 100 Hz, 20°C [M class IEC-62]	
Leakage Current (I_L) (mA, 5 min, 20°C)	max I_L= 0.006 C_r V_r + 4 µA	
Ripple current (I_r)	Refer to table at 105°C and 100Hz : FREQUENCY 50Hz 100Hz 500Hz 1000Hz >10kHz MULTIPLIER 0.88 1.0 1.45 1.5 1.55 AMBIENT TEMP 35°C 45°C 55°C 65°C 75°C 85°C 95°C 105°C MULTIPLIER 3.0 2.8 2.6 2.4 2.2 1.8 1.5 1	
Insulation Resistance	At 100V DC for 1 min is >100 MΩ across insulating sleeve and terminals.	
Vibration Resistance	Frequency range: 10 Hz to 500 Hz - Max acceleration 0.75mm or 10g for 3x2 h	
Withstand voltage (between terminals bundled and plate)	2500 VAC for 1 min	
Life test	After 2,000 hours application of rated voltage at 105°C capacitors meet characteristics aside	Cap change ≤ 10% tan δ ≤ 130% Leakage current (I_L) < initial limit Impedance (Z) ≤ 130%
Shelf life	After leaving capacitors under no load for 500 hours at 105°C, when restored at 20°C meet specifications aside	Cap change ≤ ±15% tan δ ≤ 150% Leakage current (I_L) < initial limit
Useful life (105°C, Vn, Ir applied)	≥ 5.000 h at 105°C	Cap change ≤ 20% tan δ ≤ 200% Leakage current (I_L) < initial limit Impedance (Z) ≤ 200%
Failure percentage Failure rate	≤ 1% (during useful life) ≤ 40 fit (40 10^{-9}/h)	
Self inductance	Approx. 15 nH	
Damp heat test (Vn applied, 2000 hours, 85% RH)	Stable electrical parameters in humidity ambient condition 85°C	
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10	
Marking information	minus pole band aside within an angle of 41° ± 25°	
Reference standards	CECC 30.300 IEC 60384-4 LONG LIFE GRADE	

K95 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
220	25x30	0.10	247	136	1.20	K95350221_PM0C030	350V
270	25x35	0.10	223	111	1.39	K95350271_PM0C035	
330	25x35	0.10	165	91	1.50	K95350331_PM0C035	
330	30x30	0.10	165	91	1.53	K95350331_PM0D030	
390	25x40	0.10	135	75	1.75	K95350391_PM0C040	
390	30x35	0.10	135	75	1.80	K95350391_PM0D035	
470	25x50	0.10	131	70	2.11	K95350471_PM0C050	
470	35x30	0.10	131	70	2.11	K95350471_PM0E030	
560	25x55	0.11	115	60	2.45	K95350561_PM0C055	
560	30x40	0.11	120	60	2.23	K95350561_PM0D040	
560	35x35	0.11	120	70	2.26	K95350561_PM0E035	
680	30x55	0.11	108	65	2.85	K95350681_PM0D055	
680	35x40	0.11	108	68	2.59	K95350681_PM0E040	
820	35x50	0.11	85	46	3.15	K95350821_PM0E050	
1000	35x60	0.11	63	40	3.82	K95350102_PM0E060	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
150	25x30	0.10	351	186	1.05	K95400151_PM0C030	400V
180	25x30	0.10	297	159	1.14	K95400181_PM0C030	
220	25x35	0.10	240	130	1.34	K95400221_PM0C035	
220	30x30	0.10	247	136	1.41	K95400221_PM0D030	
270	25x40	0.10	199	107	1.55	K95400271_PM0C040	
270	30x35	0.10	201	111	1.60	K95400271_PM0D035	
330	25x50	0.10	165	90	1.86	K95400331_PM0C050	
330	30x35	0.10	167	91	1.80	K95400331_PM0D035	
330	35x30	0.10	167	91	1.90	K95400331_PM0E030	
390	25x55	0.10	141	68	2.20	K95400391_PM0C055	
390	30x40	0.10	145	70	2.10	K95400391_PM0D040	
390	35x35	0.10	148	75	2.10	K95400391_PM0E035	
470	30x50	0.10	138	69	2.51	K95400471_PM0D050	
470	35x40	0.10	138	69	2.53	K95400471_PM0E040	
560	30x55	0.11	115	60	2.79	K95400561_PM0D055	
560	35x40	0.11	115	60	2.65	K95400561_PM0E040	
680	35x50	0.11	108	59	3.18	K95400681_PM0E050	
820	35x55	0.11	85	46	3.65	K95400821_PM0E055	
920	35x60	0.11	63	40	3.95	K95400921_PM0E060	

K95 TYPE STANDARD RATINGS

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
150	25x30	0.10	351	186	1.05	K95420151_PM0C030	420V
180	25x30	0.10	297	159	1.14	K95420181_PM0C030	
220	25x35	0.10	240	133	1.34	K95420221_PM0C035	
220	30x30	0.10	247	136	1.41	K95420221_PM0D030	
270	25x40	0.10	199	107	1.55	K95420271_PM0C040	
270	30x35	0.10	201	111	1.64	K95420271_PM0D035	
330	25x50	0.10	165	90	1.86	K95420331_PM0C050	
330	30x35	0.10	167	91	1.80	K95420331_PM0D035	
330	35x30	0.10	167	91	1.90	K95420331_PM0E030	
390	25x55	0.10	141	68	2.20	K95420391_PM0C055	
390	30x40	0.10	145	70	2.10	K95420391_PM0D040	
390	35x35	0.10	148	75	2.10	K95420391_PM0E035	
470	30x50	0.10	138	69	2.51	K95420471_PM0D050	
470	35x40	0.10	138	69	2.53	K95420471_PM0E040	
560	30x55	0.11	115	60	2.79	K95420561_PM0D055	
560	35x45	0.11	115	60	2.85	K95420561_PM0E045	
680	35x50	0.11	108	59	3.18	K95420681_PM0E050	
820	35x60	0.11	85	46	3.85	K95420821_PM0E060	

Cap µF	Ø x L mm	Tan δ MAX 100 Hz 20°C	ESR TYP mΩ 100 Hz 20°C	Z TYP mΩ 10 kHz 20°C	Ir a.c. A max 100 Hz 105°C	PART NUMBER termination digit excluded	RATED VOLTAGE VDC
150	25x30	0.10	367	186	1.02	K95450151_PM0C030	450V
150	30x30	0.10	367	186	1.15	K95450151_PM0D030	
180	25x40	0.10	287	146	1.30	K95450181_PM0C040	
180	30x30	0.10	293	152	1.28	K95450181_PM0D030	
220	25x40	0.10	255	136	1.38	K95450221_PM0C040	
220	30x30	0.10	255	136	1.36	K95450221_PM0D030	
220	35x30	0.10	255	136	1.57	K95450221_PM0E030	
270	30x40	0.10	204	106	1.71	K95450271_PM0D040	
270	35x30	0.10	204	106	1.71	K95450271_PM0E030	
330	30x50	0.10	173	90	2.11	K95450331_PM0D050	
330	35x40	0.10	173	90	2.12	K95450331_PM0E040	
390	30x50	0.10	155	75	2.26	K95450391_PM0D050	
390	35x40	0.10	155	75	2.26	K95450391_PM0E040	
470	35x50	0.10	142	71	2.73	K95450471_PM0E050	
560	35x55	0.11	120	60	3.10	K95450561_PM0E055	
680	35x60	0.11	110	59	3.40	K95450681_PM0E060	

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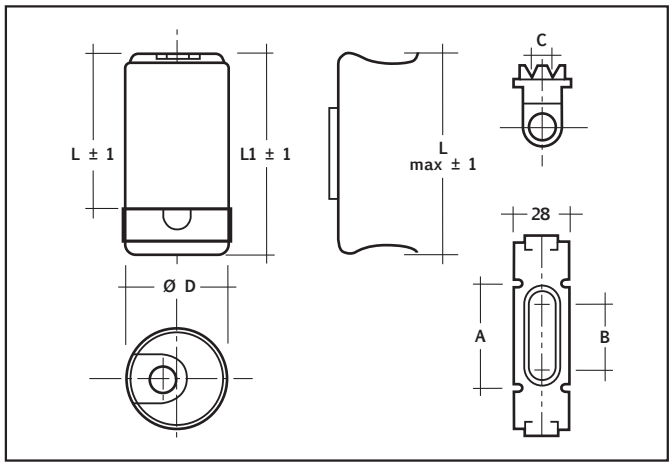
K13 TYPE MOTOR START

RoHS Compliant

- **Surge-proof electrolytic capacitor in plastic case.**
- **Poles brought out to single or double fast-on terminals**
- **Normally supplied with end cup.**
- **On request: bipolar cable, discharge resistance, metal mounting bracket, with or without cover.**

APPLICATIONS

Non polarized capacitor especially designed for intermittent A.C. voltage applications at 50-60 Hz for single phase motor starting.



	Case			Bracket		
	Ø est. mm.	L mm.	L1 mm.	Lmax mm.	A mm.	B x C mm.
A2	38	85.7	98.4	104	53	37 x 6.1
B2	46	85.7	98.4	104	53	37 x 6.1

K13 TYPE SPECIFICATIONS

Operating Temperature Range	(Operating) -25°C +75°C (Storage) -40°C +85°C
Working Voltage Range	from 125V AC to 320V AC
Capacitance Range	from 25 µF to 800 µF
Capacitance Tolerance	-0% +25% or ±10%
Tan δ (Dissipation loss angle)	Measurement frequency: 100 Hz, temperature 20°C Value shall not exceed 0.10 and shall be calculated as follows: tan d = W / (V x I) = (true watts / apparent watts)
Capacitance Measurement	Capacitance shall be determined by measuring the current (after 2÷3 seconds of energising) through the capacitors at rated voltage and frequency. The capacitance is defined from the following formula: $C = (I \times 10^6) / 2\ p\ p \times f\ V$ C = capacitance in µF I = current in Amperes π = 3.14 constant f = frequency in Hz V = applied AC voltage in Volt
Working condition	The standard time rating defined of the IEC 252 is 1.67% or 1/60th full time and corresponds to a duty cycle of 3 seconds on and 177 seconds off. Alternative customer duty is available on request.
Endurance test	500 hours
Electrolyte	All the capacitors of this series have self-extinguishing electrolyte in accordance with IEC EN 60695-11-10
Reference standards	IEC EN 60252-2

K13 TYPE STANDARD RATINGS

RoHS Compliant

VOLTAGE

125VAC

Cap μF	PART NUMBER digit_15=0 no cover	PART NUMBER digit_15=1 with cover	PART NUMBER digit_15=2 with cover + bracket	PART NUMBER digit_15=3 with bipolar cable no cover
100-125	K131251000000000B2	K13125100000001B2	K13125100000002B2	K13125100000003B2
125-160	K131251250000000B2	K13125125000001B2	K13125125000002B2	K13125125000003B2
160-200	K131251600000000B2	K13125160000001B2	K13125160000002B2	K13125160000003B2
200-250	K131252000000000B2	K13125200000001B2	K13125200000002B2	K13125200000003B2
250-315	K131252500000000B2	K13125250000001B2	K13125250000002B2	K13125250000003B2
315-400	K131253150000000B2	K13125315000001B2	K13125315000002B2	K13125315000003B2
600	K131256000000000B2	K13125600000001B2	K13125600000002B2	K13125600000003B2
800	K131258000000000B2	K13125800000001B2	K13125800000002B2	K13125800000003B2

VOLTAGE

250VAC

Cap μF	PART NUMBER digit_15=0 no cover	PART NUMBER digit_15=1 with cover	PART NUMBER digit_15=2 with cover + bracket	PART NUMBER digit_15=3 with bipolar cable no cover
25-31	K132500250000000B2	K13250025000001B2	K13250025000002B2	K13250025000003B2
31-40	K132500310000000B2	K13250031000001B2	K13250031000002B2	K13250031000003B2
40-50	K132500400000000B2	K13250040000001B2	K13250040000002B2	K13250040000003B2
50-63	K132500500000000B2	K13250050000001B2	K13250050000002B2	K13250050000003B2
63-80	K132500630000000B2	K13250063000001B2	K13250063000002B2	K13250063000003B2
80-100	K132500800000000B2	K13250080000001B2	K13250080000002B2	K13250080000003B2
100-125	K132501000000000B2	K13250100000001B2	K13250100000002B2	K13250100000003B2
125-160	K132501250000000B2	K13250125000001B2	K13250125000002B2	K13250125000003B2
160-200	K132501600000000B2	K13250160000001B2	K13250160000002B2	K13250160000003B2
200-250	K132502000000000B2	K13250200000001B2	K13250200000002B2	K13250200000003B2
250-315	K132502500000000B2	K13250250000001B2	K13250250000002B2	K13250250000003B2
315-400	K132503150000000B2	K13250315000001B2	K13250315000002B2	K13250315000003B2
400	K132504000000000B2	K13250400000001B2	K13250400000002B2	K13250400000003B2
500	K132505000000000B2	K13250500000001B2	K13250500000002B2	K13250500000003B2

VOLTAGE

320VAC

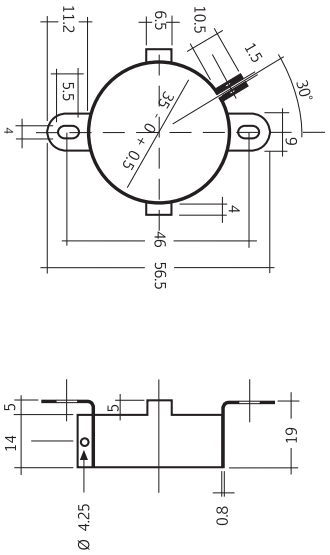
Cap μF	PART NUMBER digit_15=0 no cover	PART NUMBER digit_15=1 with cover	PART NUMBER digit_15=2 with cover + bracket	PART NUMBER digit_15=3 with bipolar cable no cover
25-31	K133200250000000B2	K13320025000001B2	K13320025000002B2	K13320025000003B2
31-40	K133200310000000B2	K13320031000001B2	K13320031000002B2	K13320031000003B2
40-50	K133200400000000B2	K13320040000001B2	K13320040000002B2	K13320040000003B2
50-63	K133200500000000B2	K13320050000001B2	K13320050000002B2	K13320050000003B2
63-80	K133200630000000B2	K13320063000001B2	K13320063000002B2	K13320063000003B2
80-100	K133200800000000B2	K13320080000001B2	K13320080000002B2	K13320080000003B2
100-125	K133201000000000B2	K13320100000001B2	K13320100000002B2	K13320100000003B2
125-160	K133201250000000B2	K13320125000001B2	K13320125000002B2	K13320125000003B2
160-200	K133201600000000B2	K13320160000001B2	K13320160000002B2	K13320160000003B2
200-250	K133202000000000B2	K13320200000001B2	K13320200000002B2	K13320200000003B2
250-315	K133202500000000B2	K13320250000001B2	K13320250000002B2	K13320250000003B2

Note: P/N code B2 as example

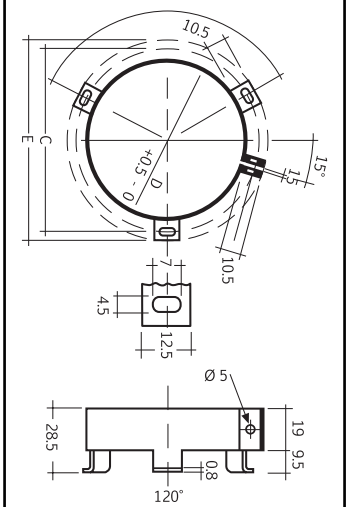
MOUNTING ACCESSORIES FOR THE SCREW TYPE CAPACITORS
dimensions in mm

CAP diameter ø mm	C (±0.5) mm hole distance	E (±0.5) mm max width	ORDERING CODE	unit WEIGTH grams (±0.5)
35	46.0	56.5	16035000000000000	11.0
51	63.5	73.4	16050000000000000	22.0
63	76.0	86.1	16064000000000000	26.0
76	89.0	98.6	16076000000000000	27.0
90	101.6	111.1	16090000000000000	62.0

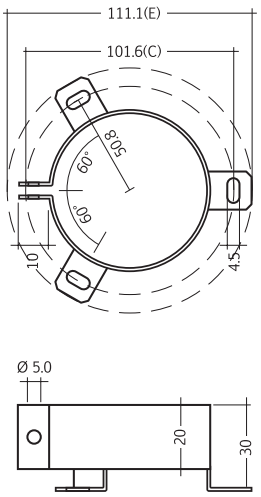
RING CLIPS Ø 35 mm



RING CLIPS Ø 51-63-76 mm



RING CLIPS Ø 90 mm



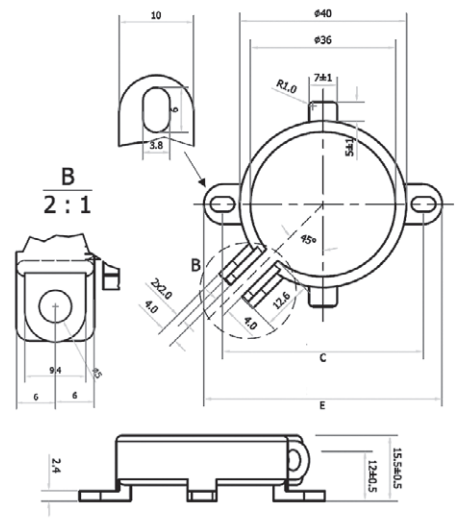
FEATURES
The mounting clips are mainly used for upright mountings of screw terminal capacitors.
The ring clips are RoHS-compatible.

MOUNTING GUIDE
It is strongly recommended to insert an additional insulating layer between capacitor and mounting clip in order to avoid any potential risk of damage due to edges from the counting clips.
Pay attention to any relevant regulations (e.g. VDE, BSA or UL).

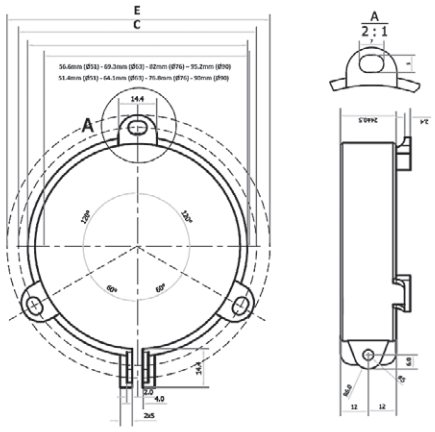
PET MOUNTING ACCESSORIES FOR THE SCREW TYPE CAPACITORS
dimensions in mm

CAP diameter ø mm	C (±0.5) mm hole distance	E (±0.5) mm max width	ORDERING CODE	unit WEIGTH grams (±0.5)
35	48.0	59.2	16035010000000000	5.0
51	65.4	77.0	16050020000000000	15.0
63	78.1	89.8	16064020000000000	19.0
76	92.0	102.5	16076020000000000	21.0
90	104.0	116.0	16090020000000000	23.0

PET RING CLIPS
Ø 35 mm



PET RING CLIPS
Ø 51-63-76-90 mm



FEATURES
The PET mounting clips are mainly used for upright mountings of screw terminal capacitors. The ring clips are RoHS-compatible.

TO BE USED WITH SCREW TYPE CAPACITORS
DIMENSIONS mm

THREAD	DESCRIPTION	Ø	h	H	D	ORDERING CODE
M12	NUT S17 STANDARD	17	1.3	18	28	24000000000000001
M12	NUT S22	22	1.3	18	28	24000000000000003
M8	NUT M8	18	1.3	18	28	24000000000000004
M8	FLAT WASHER					24000000000000005
M12	FLAT WASHER					24000000000000006

INSULATED MOUNTING WITH HEX NUT

Hex nuts and spring washers are delivered loosely with the capacitor.
Insulation washers shall be ordered separately.

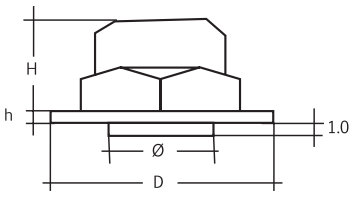
FEATURES

Insulated nylon hex nut and nylon washer and cap nut to be mounted on capacitor with M8 and M12 mounting stud.

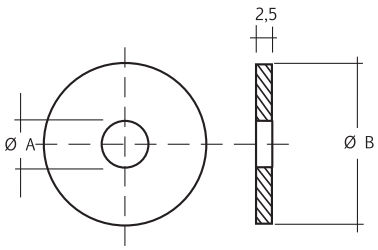
MOUNTING GUIDE

Mounting stud has the same potential as the negative terminal.
Pay attention to any relevant regulations (e.g. VDE, BSA or UL).

M	A	B
M8	8.4	24
M12	12.5	34



HEX NUT



FLAT WASHER

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