EPCOS

MKV Power Electronic Capacitors

for Heavy Duty Applications

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MKV Power Electronic Capacitors for Heavy Duty Applications

Contents

Important Notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application.** These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as "hazardous")**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

   We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.
6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI)**.
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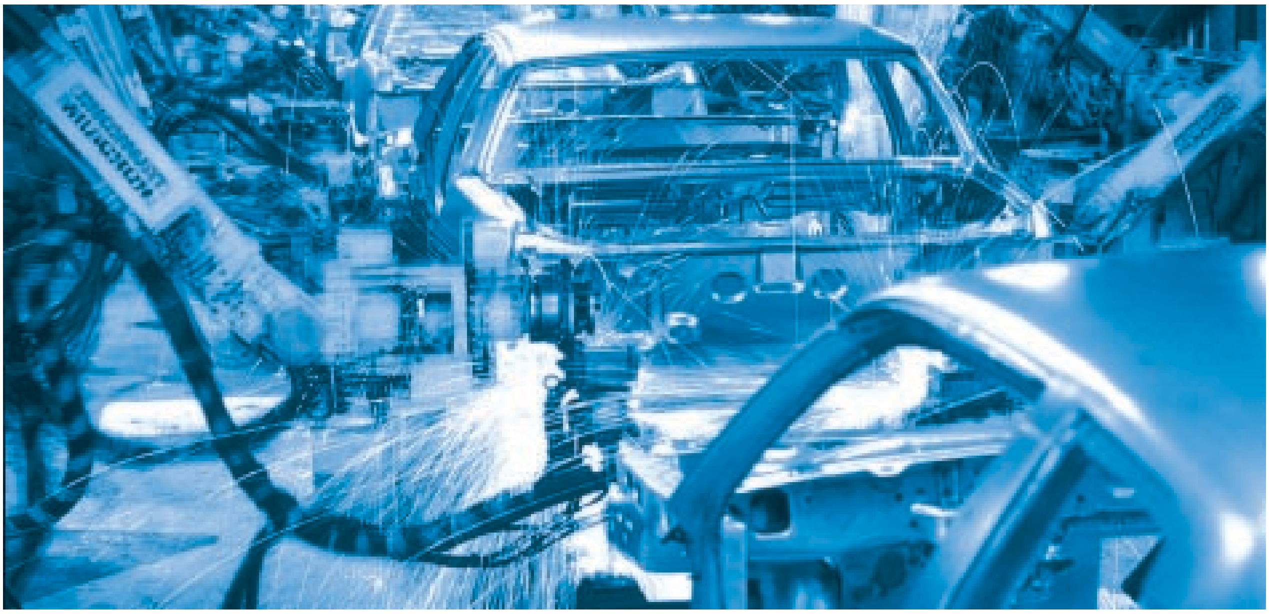
Preview



General technical information

MKV capacitors have been successfully used worldwide in high-end power electronic equipment for more than 30 years. This well-known self-healing capacitor technology offers significant benefits such as very low losses, high insulation resistance, high inrush current strength and high thermal stability.

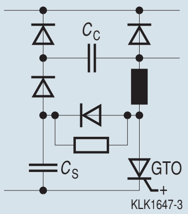
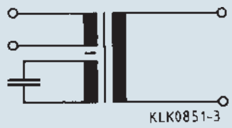
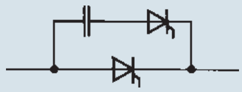
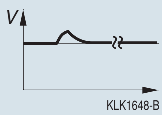
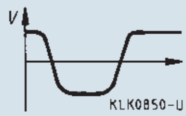
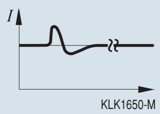
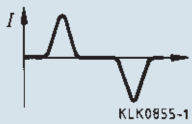
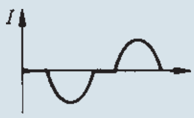
MKV capacitors are mainly designed for applications such as commutating with high reactive power, a non-sinusoidal voltage, high frequencies and a high peak current load. They are also used for damping, snubbering, clamping, smoothing, coupling and in general AC applications such as resonant circuits and filtering.

MKV capacitors are based on a polypropylene dielectric and a paper strip with metal vapor-deposited layers on both sides alternating with plastic film. The paper is not located in the electric field but supports the vapor-deposited, regenerating aluminum metallization, the contact area of the metal end spray, and reduces the electrical field strength at the edges of the electrodes. The typical polymer-paper arrangement is processed in tubular capacitor windings which are subsequently vacuum impregnated with oil – without environmental or toxicological problems – to ensure good heat dissipation from the winding to the surface of the case. This results in a long service life.
Most of these capacitors are equipped with an overpressure disconnector system.

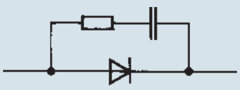
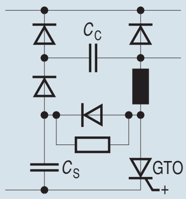
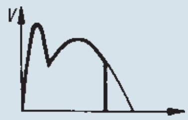
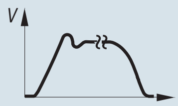
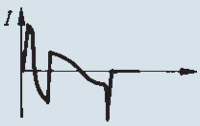
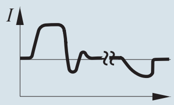
Overview of Types

Selector guide

Application	**Clamping**		**General AC applications**	**Commutating and general AC**	**Commutating**
					
Type	B25855	B25856	B25832	B25834	B25838
Page	30	35	15	19	27
Rated capacitance C_R	5 … 40 µF	5 … 20 µF	1.0 … 50 µF	0.10 … 220 µF	0.15 … 50 µF
Rated voltage V_R	DC 1300 … 4000 V	DC 1700 V … 3300 V	AC 640, 930 V	AC 500 … 2100 V	AC 600 … 1100 V

	Clamping	**General AC applications**	**Commutating**
Circuit			
Voltage characteristic			
Current characteristic			

Overview of Types

Selector guide					
Application	**Damping**			**Snubbering**	
					
Type	B25834	B25835	B25838	B25855	B25856
Page	19	24	27	30	35
Rated capacitance C_R	0.10 … 220 µF	0.10 … 4.7 µF	0.15 … 50 µF	0.5 … 10 µF	0.1 … 10 µF
Rated voltage V_R	AC 500 … 2100 V	AC 900 … 3400 V	AC 600 … 1100 V	DC 1300 … 4000 V AC 1100 … 3400 V	DC 1700 … 4000 V AC 1400 … 3400 V
	Damping			**Snubbering**	
Circuit					
Voltage characteristic					
Current characteristic					

General

Applications Guide

General

General AC applications

AC capacitors are suitable for general-purpose applications. They are also used with non-sinusoidal voltages and currents.

Fields of application:
- in resonant circuits,
- for filtering in magnetic voltage stabilizers at line frequency,
- commutating capacitors in power inverters with interphase commutation below 100 Hz.

Commutation

Commutating AC capacitors quench the conducting state in a semiconductor component. They are periodically and abruptly charged and discharged, the peak value of the current that occurs being substantially greater than the RMS figure.

Commutating capacitors are mainly subjected to high reactive power and peak current. A decisive factor is the ring-around time. At high ring-around frequencies (10 … 100 kHz) the capacitor must still exhibit a purely capacitive reactance, i.e. it must be low-inductance in design.

Damping

Damping AC capacitors are connected in parallel with semiconductor components to suppress or damp undesirable voltage spikes.

Damping capacitors are abruptly charged and/or discharged, the peak value of the current that occurs being substantially greater than the RMS figure.

In addition to sinusoidal halfwave voltage, damping capacitors carry
- periodic voltage peaks from the hole storage effect, and
- harmonic components from phase controls.

Special requirements are made of these capacitors for high dielectric strength and peak-current capability. They are also expected to be highly reliable because, if RC circuitry fails, a power semiconductor will be destroyed in most cases.

Clamping

Especially powerful inverters for high-speed railways as well as industrial inverters call for special circuit designs to minimize switching losses. Besides snubber capacitors for protecting semiconductor devices, clamping capacitors are used, which reduce switching losses to a minimum.

Snubbering

Low-inductance snubber capacitors are connected in parallel with semiconductor valves to limit the rate of rise of their repetitive reverse voltage.

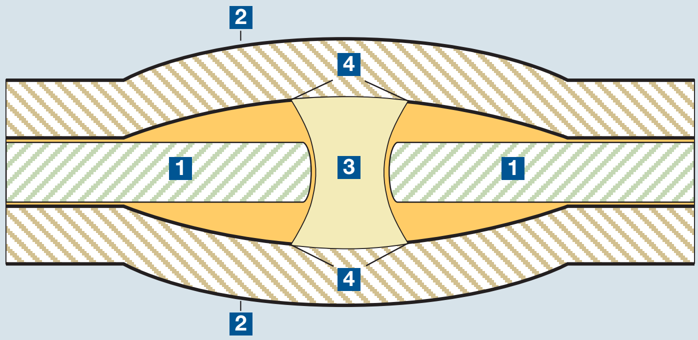
These capacitors are periodically and abruptly charged and discharged, whereby the peak value of the current reaches very high values. The RMS current is also significantly higher than the loads of conventional snubber capacitors, because this capacitor must briefly carry the entire load current. The wiring only allows very small circuit inductances. So especially low-inductance capacitor design is important.

Further applications

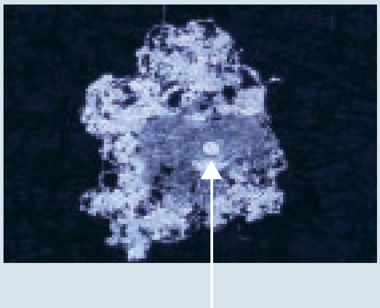
MKV capacitors are also suitable for applications like High Voltage Direct Current (HVDC), Power Factor Correction (PFC) and filtering.

EPCOS can offer the appropriate MKV capacitors on request. For more details on PFC capacitors, please refer to the current “Power Factor Correction, Product Profile”.

Self-healing



1 Dielectric (polypropylene film)
2 Double-sided metallized paper
3 Breakdown chanel, plasma zone
4 Zone of displaced metalization (isolating region)



Breakdown

Design

The winding element of the MKV capacitor consists of a dielectric of polypropylene film and an electrode of double-sided metallized paper. This winding construction achieves low losses and a high pulse-current withstand capability. Oil is used for impregnation of the capacitor.

Contacting

The end faces of the windings are contacted by metal spraying to ensure a reliable and low-inductance connection between the leads and layers. The leads are welded or soldered to these end faces, brought out through insulating elements (ceramic or plastic) and soldered to the terminals.

Impregnation

All hollows between the windings and between the windings and the case are filled with an impregnating agent. Besides increasing dielectric strength, this improves heat dissipation from inside a capacitor.

The impregnating agents that we use are free of PCB and halogens. They consist of mineral oil, or pure synthetic hydrocarbons that partly contain small quantities of conventional additives (stabilizers). For waste disposal, refer to “End of use and disposal”, page 14.

Self-healing

All MKV capacitors are self-healing, i. e. voltage breakdowns heal in a matter of microseconds and hence do not produce a short circuit.

Breakdowns can occur under heavy electrical load as a result of weaknesses or pores in the dielectric. The integrity of self-healing capacitors is not affected by such breakdowns.

When a breakdown occurs, the dielectric in a breakdown channel is broken down into its atomic components by the electric arc that forms between the electrodes. At the high temperatures of as much as 6000 K, a plasma is created that explodes out of the channel region and pushes the dielectric layers apart. The actual self-healing process starts with the continuation of the electric arc in the propagating plasma. Here the metal layers are removed from the metal edges by evaporation. Insulation areas are formed. The rapid expansion of the plasma beyond the areas of insulation and its cooling in the areas of less field strength allow the discharge to extinguish after a few microseconds.

The area of insulation that is created is highly resistive and voltage-proof for all operating requirements of the capacitor. The self-healing breakdown is limited in current and so it does not represent a short circuit. The self-healing process is so brief and low in energy that the capacitor also remains fully functional during the breakdown.

Characteristics

Capacitance

Rated capacitance C_R

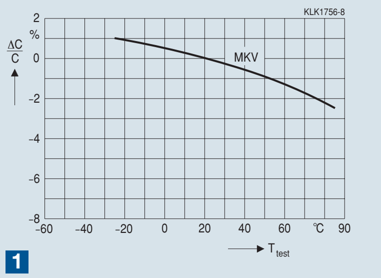
This is referred to a test temperature of 20 °C and a measuring frequency range of 50 to 120 Hz

Capacitance tolerance range

This is the range within which the actual capacitance may differ from rated capacitance. The actual capacitance is to be measured at a temperature of 20 °C.

Temperature dependence of capacitance

The capacitance variation in the permissible temperature range is not linear, but it is reversible. Figure 1 shows the characteristic change in capacitance ΔC/C as a function of test temperature.



1

Relative capacitance change ΔC/C versus test tmperature T_{test}

Capacitance drift

Capacitance is subject to irreversible in addition to reversible changes, i. e. capacitance drift, the sum of all time-dependent, irreversible changes of capacitance during service life. This variation is stated in percent of the value at delivery. The typical figure is +1/– 3%.

Voltages

Rated AC voltage V_R

The maximum operating recurrent peak voltage of either polarity of a reversing type waveform for which the capacitor has been designed.

Unlike what is common in other standards therefore, the rated voltage V_R is **not the RMS value** but the maximum or peak value of the capacitor voltage.

The voltage at which the capacitor may be operated is dependent on other factors (especially current and frequency) besides rated voltage.

Rated DC voltage V_{RDC}

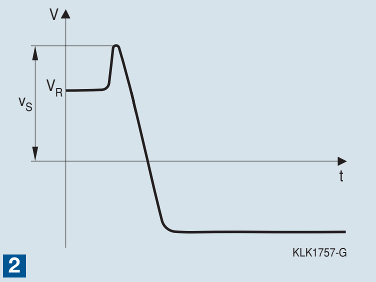
The maximum operating peak voltage of either polarity but of a non-reversing type waveform, for which the capacitor has been designed, for continuous operation.

Max. recurrent peak voltage $\hat{v}$

This is the permissible, max. recurrent peak voltage that may appear for max. 1% of the period.

Non-recurrent surge voltage v_S

A peak voltage induced by a switching or any other disturbance of the system which is allowed for a limited number of times and for durations shorter than the basic period.



2

Max. duration: 50 ms/pulse
Max. count: 1000 (during load)

Currents

Maximum current I_{max}

The maximum RMS current for continuous operation.

Maximum peak current $\hat{i}$

The maximum current amplitude which occurs instantaneously during continuous operation.

The maximum peak current and the maximum rate of voltage rise $(dv/dt)_{max}$ on a capacitor are related as follows:

$$\hat{i} = C \cdot (dv/dt)_{max}$$

Maximum surge current I_s

The admissible peak current induced by a switching or any other disturbance of the system which is allowed for a limited number of times.

$$I_s = C \cdot (dv/dt)_s$$

Max. duration: 50 ms/pulse
Max. count: 1000 (during load)

Self-inductance L_{self}

The self-inductance is produced by the inductance of the terminals and the windings. Because of the special kind of contacting in self-healing capacitors (large-area metal spraying covering all windings), the self-inductance is particularly low.

The resonance frequency is accordingly high for all capacitors.

General

Characteristics

Insulation resistance R_{ins} and self-discharge time constant τ

The insulation values for the individual components, according to the capacitance, are stated as an insulation resistance in MΩ or a self-discharge time constant τ in seconds. In this data book minimum figures at delivery are stated.

$$\tau = R_{ins} \cdot C$$

Capacitor losses

Series resistance R_S

Resistive losses occur in the electrodes, in the contacting and in the inner wiring. These are comprised in the series resistance R_S of a capacitor.

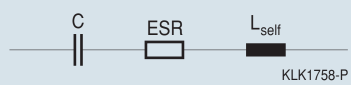
The series resistance R_S generates the ohmic losses ($I^2 \times R_S$) in a capacitor. It is largely independent of frequency. The figures stated in selection charts apply to 20 °C capacitor temperature.

Dielectric dissipation factor tan δ_0

The dissipation factor tan δ_0 of the dielectric is assumed to be constant for all capacitors in their frequency range of use. The figures stated in data sheets apply to rated operation.

Dissipation factor tan δ

The equivalent circuit diagram used for the losses in a capacitor can be shown as in Figure 3.



3

Simplified equivalent circuit diagram of a capacitor

L_{self}	self-inductance
ESR	equivalent series resistance, representing entire active power in capacitor.

The self-inductance and capacitance of a capacitor produce its resonance frequency (natural frequency).

$$\tan\delta(f) = \tan\delta_0 + R_S \cdot \omega \cdot C$$

From this the frequency dependence of the equivalent series resistance can be derived:

$$ESR = \frac{\tan\delta}{\omega \cdot C} = R_s + \frac{\tan\delta_0}{\omega \cdot C}$$

tan δ	dissipation factor of capacitor	
tan δ_0	dissipation factor of dielectric	
C	capacitance	F
R_S	series resistance	Ω
ESR	equivalent series resistance	Ω

Standards and specifications

Standards IEC 61071-1 and 2, which are identical to EN 61071-1 and 2 as well as to VDE 0560, parts 120 and 121, apply to capacitors for power electronics.

Other specifications

VDE 0100	Installation of electrical power installations with rated voltages up to 1000 V
DIN 40 011	Electrical engineering: ground, protective conductor, low-noise ground, frame, total insulation; identification on items of apparatus
EN ISO 2899-1 resp. DIN 40 080	Sampling procedures and tables for inspection by attributes
IEC 60068	Basic environmental testing procedures Part 1 General and guide Part 2-1 Test group A: cold Part 2-2 Test group B: dry heat Part 2-3 Test Ca: damp heat, steady state Part 2-6 Test Fc and guide: vibration, sinusoidal Part 2-13 Test group M: low air pressure Part 2-20 Test group T: soldering Part 2-21 Test group U: robustness of terminals Part 2-27 Test Ea and guide: shock

Literature

The following publications contain additional information:

- Thermal Design of Power Capacitors
- High-Performance Capacitors for Low-Inductance Circuits
- Power Factor Correction Product Profile (EPC:26013-7600), page 43–44

They can be obtained from
EPCOS AG
FK PC PM
Postfach 801709
D-81617 München
Fax: ++49(0)89-636-22748

Thermal Design

Criteria for use

In order to scale a capacitor correctly for a particular application, the permisible ambient temperature has to be determined. This can be taken from the diagram "Permissible ambient temperature T_A vs. total power dissipation P" after calculating the power dissipation (see individual data sheets). For a data sheet of a specific capacitor type, contact the nearest EPCOS office (see inside back cover) or visit www.epcos.com.

For a detailed description of thermal design including a calculation example, please see: www.epcos.com/thermal_design.

Calculation of power dissipation P

The total power dissipation P is composed of the dielectric losses (P_D) and the resistive losses (P_R):

Generally a secondary sinusoidal AC voltage can be used for calculating with sufficient accuracy.

$$P = P_D + P_R$$

$$P_D = \hat{v}_{ac}^2 \cdot \pi \cdot f_0 \cdot C \cdot \tan \delta_0$$

$\hat{v}_{ac}$	peak value of symmetrical AC voltage applied to capacitor	V
f_0	fundamental frequency	Hz
C	capacitance	F
$\tan \delta_0$	dissipation factor of dielectric	

$$P_R = I^2 \cdot R_S$$

I	RMS value of capacitor current	A
R_S	series resistance at maximum hot-spot temperature	Ω

The R_S figure at maximum hot-spot temperature is used to calculate the resistive losses. In selection charts and data sheets the figure is stated for 20 °C capacitor temperature. The conversion factor is as follows:

$$R_{S85} = 1.25 \cdot R_{S20}$$

Thermal resistance R_{th}

The thermal resistance is defined as the ratio of a temperature difference and the power dissipation produced in a capacitor. The decisive factor here is ΔT_{cap}: the temperature difference between an external reference point of the coolant (e. g. air) surrounding the capacitor and the hot spot (zone with the highest temperature occurring in the component). In a steady state:

$$R_{th} = \frac{\Delta T_{cap}}{P}$$

R_{th}	thermal resistance	K/W
ΔT_{cap}	temperature difference between hot-spot and ambient	K
P	power dissipation	W

The temperature difference depends on a large number of different factors. The thermal resistance is a function of several parameters such as the working temperature and the power dissipation of the capacitor.

Thermal time constant π_{th}

The thermal time constant π_{th} can be calculated with sufficient accuracy for our capacitors from the specific thermal capacitance (approx. 1.3 Ws/K x g), the capacitor mass stated in the selection charts and the thermal resistance at the operating point:

$$\pi_{th} = m \cdot c_{thcap} \cdot R_{th}$$

π_{th}	thermal time constant	s
R_{th}	thermal resistance	K/W
m	capacitor mass (weight)	g
c_{thcap}	specific thermal capacitance	Ws/K x g

Load duration t_{LD} as a function of temperature T

The load duration of capacitors with organic dielectrics depends among other things on the hot-spot temperature produced in operation. By derivation from the Arrhenius equation (this describes temperature-dependent aging processes) a relation can be produced for the load duration on the basis of the maximum hot-spot temperature in a not too considerable temperature interval ($T_{hs} = T_{HS} \dots T_{HS} - 7$ K).

$$t_{LDT_{hs}} = t_{LDT_{HS}} \cdot 2 \left(\frac{T_{HS} - T_{hs}}{c}\right)$$

$t_{LDT_{hs}}$	load duration at hot-spot temperature at operating point	h
$t_{LDT_{HS}}$	load duration at maximum hot-spot temperature	h
T_{HS}	maximum hot-spot temperature	°C
T_{hs}	hot-spot temperature at operating point	°C
c	Arrhenius coefficient	7 °C

Load duration t_{LD} as a function of voltage V

This produces, in analogous fashion to the temperature-dependent load-duration forecast, results that are only useful within relatively narrow limits ($V = 0.9 \dots 1.1 \times V_R$). The voltage-dependent load duration of the capacitors can be approximated by a law of exponents:

$$t_{LD_V} = t_{LD_{V_R}} \left(\frac{V_R}{V}\right)^n$$

t_{LD_V}	load duration at operating voltage	h
$t_{LD_{V_R}}$	load duration at rated voltage	h
V_R	rated voltage	V
V	operating voltage	V
n	exponent	8

Installation and Disposal

Delivery and packing

In the packing of products, EPCOS naturally supports the needs of protection of the environment. In other words:

- use of packaging made of environmentally compatible materials,
- reduction of packaging to the necessary minimum.

We have implemented the following measures to ensure compliance with regulations governing the handling and disposal of commercial waste:

- Use of Euro pallets.
- Securing of pallets by straps and edge guards of environment-friendly plastic (PE or PP).
- Stretch and shrink film (PE) are used.
- Shipping cartons are identified by the RESY symbol.
- Separating layers for pallets and cartons are primarily of paper or cardboard.
- Filler material consists of paper.
- Shipping cartons are sealed with recycled paper adhesive tape to ensure material of the same kind for disposal.
- We take our packaging back (especially product-specific packaging made of plastic). Nevertheless we request our customers to deliver cardboard products, corrugated board, paper, etc. to recycling or disposal operators in order to avoid unnecessary transport of empty packaging.

Mechanical stress

Mechanical robustness of terminals

The terminals satisfy the following test conditions to IEC 60068, part 2–21:

Tensile strength	test Ua (20 N)
Bending strength	test Ub two bends in opposite directions
Torsional strength of threaded bolts	test Ud

Vibration resistance

The resistance to vibration of capacitors with diameters of ≤60 mm and heights of ≤160 mm corresponds to IEC 60068, part 2–6.

The following conditions are satisfied (figures for larger capacitors upon enquiry):

Test duration	6 h*
Frequency range	10 … 55 Hz*
Displacement amplitude	0.75 mm*

*corresponding to max. 98.1 m/s^2 or 10 *g*

These figures apply to the capacitor alone.

Because the fixing and the terminals may influence the vibration properties, it is necessary to check stability when a capacitor is built in and exposed to vibration.

Irrespective of this, you are advised not to locate capacitors where vibration amplitude reaches its maximum in strongly vibrating appliances.

Shock testing

This is carried out in accordance with IEC 60068, part 2–27: test Ea. Figures on request.

The figures are dependent on the size and mass of a capacitor. The maximum figures for small capacitors, for instance, are about 30 g.

Mounting instructions

Overpressure disconnector

When mounting capacitors with overpressure disconnectors (all series except B25856), make sure that the elastic elements of the fuse are not impeded.

This means:

- The connecting leads must be sufficiently elastic.
- There must be enough space left for expansion above the terminals of aluminum-cased capacitors (extension up to 12 mm).
- The folded crimps must not be held by retaining clamps.

Mounting position

Capacitors will usually be mounted upright, i. e. terminals on top. But the following exceptions to the rule are possible:

- Capacitors in aluminum cases with voltage ratings up to 1400 V may also be positioned horizontally.
- At higher voltages horizontal positioning is also permissible. But consult the manufacturer first.
- Axial capacitors in fully insulated cases (type B25856) can be mounted in any position.

Mounting

The threaded bolt on the bottom of aluminum cases with a diameter of ≤60 mm and a height of ≤160 mm may be used for attachment if vibration stress does not exceed 5 *g*. For larger dimensions and vibration of >5 *g*, the capacitors should be mounted by clamps, rings, etc. For the EPCOS selection of mounting accessories, see www.epcos.com/mounting_parts.

Mounting with threaded bolt:

Threaded bolt	Mounting hole	Maximum torque
M8	10 mm	4 Nm
M12	14 mm	10 Nm

General

Installation and Disposal

General

Terminals

For terminal bolt and nut tightening torques, refer to pages 14–36.

The terminal torque must not act upon the ceramic. So the lead should be locked between two nuts.

Minimum terminal connection cross-sections in accordance with VDE / DIN 0100 part 523 and 430, group 2.

For the electrical terminals on ceramic lead-throughs only flexible leads should be used so that these lead-throughs are guarded against mechanical stress.

The outer leads to the capacitor must be dimensioned so that no heat is conducted into the component. You are advised to scale these leads so that heat is conducted away from capacitor terminals.

Multicore leads (copper)

Rated current (A)	Nom. cross-section (mm^2)
12	0.75
15	1
18	1.5
26	2.5
34	4
44	6
61	10
82	16
108	25
135	35

Grounding

Either a threaded bolt or a strap serves for grounding to VDE 0100. Grounding is omitted for single-pole and fully insulated capacitors. The layer of varnish beneath the clamp should be removed when grounding with a metal clamp.

Positioning

Within high-power inverter circuits the capacitors usually produce the smallest portion of the total losses, and the permissible operating temperatures are low compared to power semiconductors and resistors.

So, to make the best possible use of capacitors, technically and economically, it is advisable to supply cooling air to them first. This means that the capacitors can sustain a correspondingly higher load, and the following components will be located in an air flow that is only slightly warmed.

Soldering conditions

EPCOS capacitors satisfy the following test conditions to IEC 60068, part 2–20:

Solderability:	(275 ±10) °C, (2 ±0.5) s
Heat resistance:	(350 ±10) °C, 5 s

When soldering the terminals, make sure the capacitors are not damaged through excessive heat.

This means:

- Lead wires with a cross-section of >1.5 mm^2 should not be soldered but clamped (soldering would require too much heat).
- Do not solder at spots where heat concentrates, otherwise there is a risk that the solder joint of the tags melts.

End of use and disposal

The materials used in capacitors for power electronics from EPCOS do not exceed the limits for chemical substances specified in the following national regulations:

- chemicals prohibition regulation,
- CFC halogen prohibition regulation.

Our capacitors for power electronics contain no means of impregnation with PCB. For further details of the means of impregnation used, refer to “Impregnation”, page 9.

Capacitors without PCB for power electronics are not explicitly mentioned in the waste qualification regulations. From this it could be deduced that they do not have to be disposed of as “waste requiring special supervision”.

Because of our special commitment to and responsibility for the environment, we ask you to take every care when disposing of capacitors and to observe the relevant local regulations. We recommend that you drain the impregnation oil out of the capacitor and send it to an oil refuse depot. The emptied capacitor can then be disposed of as a grease and oil soiled item of apparatur. In any case it is advisable to consult a waste disposal facility and to find out about the applicable regulations in force.

General AC Applications – B25832

Features

- Compact design
- Long-term stability and reliability

Applications

- For commutation in the low-frequency range

Construction

- Self-healing
- Plastic dielectric
- Oil-impregnated tubular windings (no PCB)
- Metal-sprayed end faces ensure reliable contacting
- Cylindrical aluminum case
- Ceramic or plastic lead-throughs
- Mounting bolts M8 or M12

Terminals

- Tab connectors 6.3 mm
- Dual tab connectors 6.3 mm

Mounting

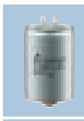
- If the vibration stress is ≤5 *g* and the capacitors are ≤60 mm in diameter, the bolt is used for mounting.

Grounding

- Mounting bolts for grounding in accordance with VDE 0100
- Grounding identification in accordance with DIN 40 011

Individual data sheets

- Data sheets are available for each capacitor type.



Technical data

Electrical		(Standards IEC 61071-1/2, EN 61071-1/2, VDE 0560 part 120 and 121)
Dielectric dissipation factor	$\tan \delta_0$	2×10^{-4}
Capacitance tolerance		± 10%
Max. repetitive rate of voltage rise	$(dv/dt)_{max}$	$\hat{i}$ / C
Max. non-repetitive rate of voltage rise	$(dv/dt)_s$	I_s / C
Climatic data		
Min. operating temperature	T_{min}	– 25 °C
Max. operating temperature	T_{max}	+ 85 °C
Average relative humidity		≤ 75%
Storage temperature limit	T_{stg}	– 55 / + 85 °C
IEC climatic category (IEC 68-1 and 2)		25/085/56
Failure quota	α_{FQ}	1000 failures per 10^9 component hours
Load duration	t_{LD}	Up to 30 000 h
Test data		
AC test voltage		
between terminals	V_{TT}	1.25 x V_R, 50 Hz, 10 s (or DC 1.75 x V_R, 10 s)
between terminals and case	V_{TC}	2 x V_i + 1 000 V, 50 Hz, 10 s Insulating voltage V_i = max. recurrent peak voltage $\hat{v}/\sqrt{2}$
Insulation resistance	R_{ins}	≤ 1 µF: ≥ 3 000 MΩ
Self-discharge time constant	τ (R_{ins} x C)	> 1 µF: ≥ 3 000 s
Dissipation factor (50 Hz)	$\tan \delta$	$\leq 3 \times 10^{-4}$

General AC Applications – B25832

Characteristics and ordering codes

Rated capacitance[1)] (C_R) μF	Max. RMS current (I_{max}) A	Max. peak current ($\hat{i}$) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_R = 640 V / $\hat{v}$ = 800 V / v_s = 1100 V / V_{TT} = AC 800 V / V_{TC} = AC 2200 V									
1.0	10	40	100	24.0	50	25 x 48	3	30	B25832F4105K001
1.5	10	25	60	54.0	90	25 x 80	3	50	B25832F4155K001
1.6	16	60	160	16.0	50	30 x 48	4	50	B25832F4165K001
2.0	16	80	200	13.0	50	30 x 48	4	50	B25832F4205K001
2.2	10	35	90	39.0	90	25 x 80	3	50	B25832F4225K001
2.5	16	100	250	12.0	50	35 x 48	5	60	B25832F4255K001
3.0	10	50	120	30.0	90	25 x 80	3	50	B25832F4305K001
3.0	16	120	300	11.0	50	35 x 48	5	60	B25832F4305K011
3.3	10	50	130	28.0	90	25 x 80	3	50	B25832F4335K001
4.0	16	60	160	24.0	90	30 x 80	4	70	B25832F4405K001
4.7	16	75	190	21.0	90	30 x 80	4	70	B25832F4475K001
5.0	16	80	200	20.0	90	30 x 80	4	70	B25832F4505K001
6.0	18	240	600	5.6	70	45 x 57	1	110	B25832C4605K009
6.8	16	110	270	17.0	90	35 x 80	5	100	B25832F4685K001
7.0	16	110	280	16.0	90	35 x 80	5	100	B25832F4705K001
8.0	18	130	320	12.0	90	40 x 86	1	130	B25832C4805K009
10	18	160	400	10.0	90	40 x 86	1	130	B25832C4106K009
12	18	190	480	9.4	90	45 x 86	1	160	B25832C4126K009
14	18	220	560	8.6	90	50 x 86	1	200	B25832C4146K009
15	18	240	600	8.1	90	50 x 86	1	200	B25832C4156K009
16	18	260	640	7.8	90	50 x 86	1	200	B25832C4166K009
20	18	320	800	7.0	90	55 x 86	1	250	B25832C4206K009
22	18	350	880	6.7	90	60 x 86	1	300	B25832C4226K009
25	18	400	1000	6.2	90	60 x 86	1	300	B25832C4256K009
30	18	480	1200	6.8	140	50 x 156	1	370	B25832C4306K009
33	18	530	1300	6.6	140	50 x 156	1	370	B25832C4336K009
40	18	640	1600	6.2	140	55 x 156	1	450	B25832C4406K009
47	18	750	1900	6.1	140	60 x 156	1	550	B25832C4476K009
50	18	800	2000	5.9	140	60 x 156	1	550	B25832C4506K009
V_R = 930 V / $\hat{v}$ = 1200 V / v_s = 1600 V / V_{TT} = AC 1200 V / V_{TC} = AC 2700 V									
1.5	10	45	110	33.0	90	30 x 80	4	70	B25832F6155K001
2.0	10	60	150	26.0	90	30 x 80	4	70	B25832F6205K001
2.5	16	75	190	22.0	90	35 x 80	5	100	B25832F6255K001
3.0	18	90	230	17.0	90	40 x 86	1	130	B25832C6305K009
4.0	18	120	300	14.0	90	40 x 86	1	130	B25832C6405K009
5.0	18	150	380	12.0	90	45 x 86	1	160	B25832C6505K009
5.5	18	170	410	11.0	90	45 x 86	1	160	B25832C6555K009
6.0	18	180	450	10.0	90	50 x 86	1	200	B25832C6605K009
7.0	18	210	530	9.2	90	50 x 86	1	200	B25832C6705K009
8.0	18	240	600	8.5	90	55 x 86	1	250	B25832C6805K009
10	18	300	750	7.5	90	60 x 86	1	300	B25832C6106K009
12	18	360	900	6.7	90	60 x 86	1	300	B25832C6126K009
15	18	450	1100	7.0	110	79.2 x 104	2	600	B25832C6156K009
18	18	540	1400	6.5	110	79.2 x 104	2	600	B25832C6186K009
20	18	600	1500	6.3	110	89.3 x 104	2	800	B25832C6206K009
22	18	660	1700	6.2	110	89.3 x 104	2	800	B25832C6226K009

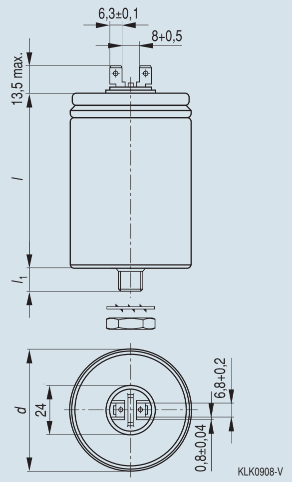
1) Other capacitance values upon request

General AC Applications – B25832

Dimensional drawings

Dual tab connectors 6.3 mm	Dual tab connectors 6.3 mm

1



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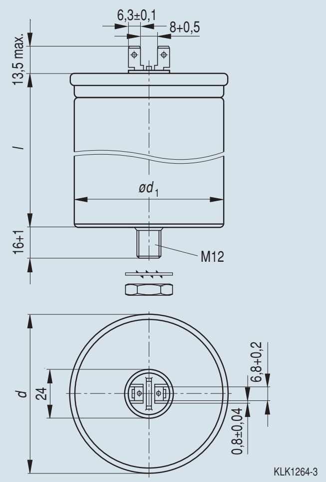


Characteristics

Dimensions in mm

d +0.5 / –0.2	l +1 / –2	l_1 +1*)	d –1.2	l –4	∅ d_1 –0.4
40	86	8	79.2	104	75.2
45	57	8	89.3	104	85.2
45	86	8			
50	86	12			
50	156	12			
55	86	12			
55	156	12			
60	86	12			
60	156	12			
Creepage distance:	7		Creepage distance:	7	
Clearance:	5		Clearance:	5	

*) 8 mm = threaded bolt M8, 12 mm = threaded bolt M12

Mounting parts (included in delivery)

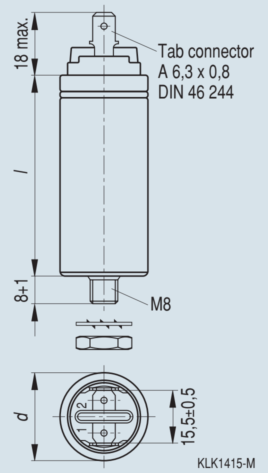
Threaded bolt	Max. torque	Toothed washer	Hex nut
M8	4 Nm	J 8.2 DIN 6797	M8 DIN 439
M12	10 Nm	J 12.5 DIN 6797	M12 DIN 439

General AC Applications – B25832

Dimensional drawings

Tab connectors 6.3 mm	Tab connectors 6.3 mm	Tab connectors 6.3 mm

3



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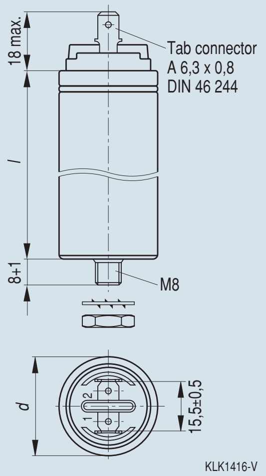

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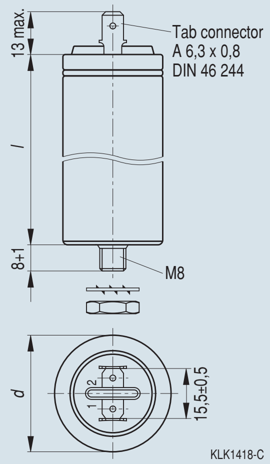


Characteristics

Dimensions in mm

d +0.5 / –0.2	l ±2	d +0.5 / –0.2	l ±2	d +0.5 / –0.2	l ±2
25	48	30	48	35	48
25	80	30	80	35	80
Creepage distance:	9	Creepage distance:	9	Creepage distance:	6
Clearance:	7	Clearance:	7	Clearance:	6

Mounting parts (included in delivery)

Threaded bolt	Max. torque	Toothed washer	Hex nut
M8	4 Nm	J 8.2 DIN 6797	M8 DIN 439

Damping, Commutating – B25834

Features

- High dielectric strength
- High peak-current capability

Applications

- For damping and commutating in the medium frequency range
- Also for general AC applications

Construction

- Self-healing
- Plastic dielectric
- Oil-impregnated tubular windings (no PCB)
- Metal-sprayed end faces ensure reliable contacting
- Cylindrical aluminum case
- Plastic or ceramic lead-throughs
- Mounting bolts M8 or M12

Terminals

- Screw terminals M10
- Tab connectors 6.3 mm
- Dual tab connectors 6.3 mm and 9.5 mm

Mounting

- If the vibration stress is ≤5 *g* and the capacitors are ≤60 mm in diameter and ≤160 mm in height, the bolt is used for mounting.

Grounding

- Mounting bolts for grounding in accordance with VDE 0100
- Grounding identification in accordance with DIN 40 011

Individual data sheets

- Data sheets are available for each capacitor type.

Technical data

Electrical		(Standards IEC 61071-1/2, EN 61071-1/2, VDE 0560 part 120 and 121)
Dielectric dissipation factor	$\tan \delta_0$	2×10^{-4}
Capacitance tolerance		For C_R < 1.0 µF ± 20%, for C_R ≥ 1.0 µF ±10%
Max. repetitive rate of voltage rise	$(dv/dt)_{max}$	$\hat{i}$ / C
Max. non-repetitive rate of voltage rise	$(dv/dt)_s$	I_s / C

Climatic data		
Min. operating temperature	T_{min}	– 25 °C
Max. operating temperature	T_{max}	+ 85 °C
Average relative humidity		≤ 95% (screw terminals / dual tab 9.5 mm) ≤ 75% (dual tab 6.3 mm / tab 6.3 mm)
Storage temperature limit	T_{stg}	– 55 / + 85 °C
IEC climatic category (IEC 68-1 and 2)		25/085/56
Failure quota	α_{FQ}	300 failures per 10^9 component hours
Load duration	t_{LD}	Up to 100 000 h

Test data					
AC test voltage					
between terminals	V_{TT}	1.25 x V_R, 50 Hz, 10 s (or DC 1.75 x V_R, 10 s)			
between terminals and case	V_{TC}	2 x V_i + 1 000 V, 50 Hz, 10 s Insulating voltage V_i = max. recurrent peak voltage $\hat{v}/\sqrt{2}$			
		C_R	Screw terminals, dual tab 9.5 mm	Dual tab 6.3 mm	Tab 6.3 mm
Insulation resistance	R_{ins}	≤ 1 µF	≥ 10 000 MΩ	≥ 3 000 MΩ	≥ 3 000 MΩ
Self-discharge time constant	τ (R_{ins} x C)	> 1 µF	≥ 10 000 s	≥ 3 000 s	≥ 3 000 s
Dissipation factor (50 Hz)	$\tan \delta$	≤ 3×10^{-4}			

Damping, Commutating – B25834

B25834

Characteristics and ordering codes

Rated capacitance[1] (C_R) µF	Max. RMS current (I_{max}) A	Max. peak current ($\hat{i}$) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_R = 500 V / $\hat{v}$ = 630 V / v_s = 860 V / V_{TT} = AC 620 V / V_{TC} = AC 2000 V									
33	18	1300	3300	4.9	90	60 x 86	3	290	B25834L3336K009
47	80	1900	4700	1.9	110	79.2 x 104	2	610	B25834D3476K004
68	80	2700	6800	1.5	110	99.3 x 104	2	970	B25834D3686K004
100	80	4000	10000	1.4	180	79.2 x 248	2	1500	B25834D3107K004
220	80	8800	22000	1.2	180	99.3 x 248	2	2300	B25834D3227K004
V_R = 600 V / $\hat{v}$ = 750 V / v_s = 1000 V / V_{TT} = AC 750 V / V_{TC} = AC 2100 V									
0.68	10	110	270	25.0	50	25 x 48	5	30	B25834F4684M001
1.0	10	160	400	18.0	50	25 x 48	5	30	B25834F4105K001
1.5	16	240	600	14.0	50	30 x 48	6	50	B25834F4155K001
2.2	16	350	880	10.0	50	30 x 48	6	50	B25834F4225K001
3.3	16	530	1300	8.7	50	35 x 48	7	60	B25834F4335K001
4.7	16	190	470	16.0	90	30 x 80	6	70	B25834F4475K001
6.8	16	270	680	13.0	90	35 x 80	7	100	B25834F4685K001
10	18	400	1000	8.0	90	40 x 86	3	130	B25834L4106K009
15	18	600	1500	6.5	90	50 x 86	3	200	B25834L4156K009
22	60	880	2200	3.1	110	64.2 x 104	2	400	B25834D4226K004
33	80	1300	3300	2.4	110	79.2 x 104	2	610	B25834D4336K004
33	64	1300	3300	2.4	110	79.2 x 104	4	610	B25834D4336K009
47	80	1900	4700	2.0	110	89.3 x 104	2	780	B25834D4476K004
47	64	1900	4700	2.0	110	89.3 x 104	4	780	B25834D4476K009
68	80	2700	6800	1.7	180	64.2 x 248	2	960	B25834D4686K004
100	80	4000	10000	1.5	180	79.2 x 248	2	1500	B25834D4107K004
150	80	6000	15000	1.3	180	89.3 x 248	2	1900	B25834D4157K004
V_R = 750 V / $\hat{v}$ = 940 V / v_s = 1300 V / V_{TT} = AC 930 V / V_{TC} = AC 2400 V									
4.7	16	240	590	13.0	90	35.0 x 80	7	100	B25834F5475K001
6.8	18	340	850	8.4	90	40.0 x 86	3	130	B25834L5685K009
10	18	500	1250	7.0	90	50.0 x 86	3	200	B25834L5106K009
15	18	750	1900	5.9	90	60.0 x 86	3	290	B25834L5156K009
22	80	1100	2800	2.6	110	79.2 x 104	2	610	B25834D5226K004
22	64	1100	2800	2.5	110	79.2 x 104	4	610	B25834D5226K009
33	80	1700	4100	2.0	110	89.3 x 104	2	780	B25834D5336K004
33	64	1700	4100	1.9	110	89.3 x 104	4	780	B25834D5336K009
47	80	2400	5900	1.7	180	64.2 x 248	2	960	B25834D5476K004
68	80	3400	8500	1.6	180	79.2 x 248	2	1500	B25834D5686K004
100	80	5000	12500	1.4	180	89.3 x 248	2	1900	B25834D5107K004

[1]) Other capacitance values upon request

Damping, Commutating – B25834

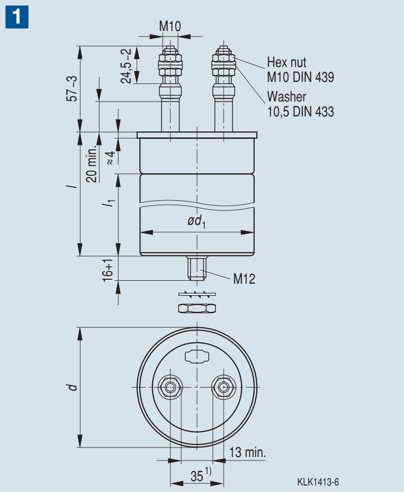
Characteristics and ordering codes

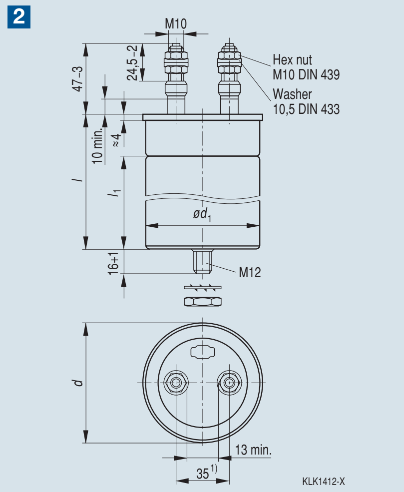
Rated capacitance[1) (C_R) µF	Max. RMS current (I_{max}) A	Max. peak current ($\hat{i}$) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_R = 900 V / $\hat{v}$ = 1100 V / v_S = 1500 V / V_{TT} = AC 1150 V / V_{TC} = AC 2600 V									
0.10	10	50	120	33.0	50	25.0 x 48	5	30	B25834F6104M001
0.15	10	70	180	24.0	50	25.0 x 48	5	30	B25834F6154M001
0.22	10	100	260	17.0	50	25.0 x 48	5	30	B25834F6224M001
0.33	10	90	220	29.0	50	25.0 x 48	5	30	B25834F6334M001
0.47	10	130	320	21.0	50	25.0 x 48	5	30	B25834F6474M001
0.68	10	180	460	16.0	50	25.0 x 48	5	30	B25834F6684M001
1.0	16	300	750	12.0	50	30.0 x 48	6	50	B25834F6105K001
1.5	16	450	1100	9.8	50	35.0 x 48	7	60	B25834F6155K001
2.2	16	150	390	18.0	90	30.0 x 80	6	70	B25834F6225K001
3.3	16	230	580	14.0	90	35.0 x 80	7	100	B25834F6335K001
4.7	18	330	820	9.0	90	40.0 x 86	3	130	B25834L6475K009
6.8	18	480	1200	7.3	90	50.0 x 86	3	200	B25834L6685K009
10	18	700	1750	6.1	90	60.0 x 86	3	290	B25834L6106K009
15	60	1100	2600	2.8	100	79.2 x 104	2	610	B25834D6156K004
15	60	1100	2600	2.7	100	79.2 x 104	4	610	B25834D6156K009
22	80	1500	3900	2.2	110	89.3 x 104	2	780	B25834D6226K004
22	64	1500	3900	2.1	110	89.3 x 104	4	780	B25834D6226K009
33	80	2300	5800	1.8	180	64.2 x 248	2	960	B25834D6336K004
47	80	3300	8200	1.6	180	79.2 x 248	2	1500	B25834D6476K004
68	80	4800	12000	1.4	180	89.3 x 248	2	1900	B25834D6686K004
V_R = 1100 V / $\hat{v}$ = 1400 V / v_S = 1900 V / V_{TT} = AC 1400 V / V_{TC} = AC 3000 V									
4.7	18	380	940	17.0	140	40.0 x 156	3	240	B25834L7475K009
6.8	18	540	1400	13.0	140	50.0 x 156	3	370	B25834L7685K009
10	60	800	2000	6.3	150	64.2 x 176	1	680	B25834D7106K004
15	80	1200	3000	4.9	150	79.2 x 176	1	1000	B25834D7156K004
22	80	1800	4400	3.7	150	89.3 x 176	1	1300	B25834D7226K004
33	80	2600	6600	2.8	150	99.3 x 176	1	1600	B25834D7336K004
V_R = 1400 V / $\hat{v}$ = 1800 V / v_S = 2400 V / V_{TT} = AC 1800 V / V_{TC} = AC 3600 V									
4.7	60	470	1200	9.3	150	64.2 x 176	1	680	B25834D0475K004
6.8	60	680	1700	6.6	150	64.2 x 176	1	680	B25834D0685K004
10	80	1000	2500	5.2	150	79.2 x 176	1	1000	B25834D0106K004
15	80	1500	3800	3.8	150	89.3 x 176	1	1300	B25834D0156K004
22	80	2200	5500	2.9	150	99.3 x 176	1	1600	B25834D0226K004
V_R = 1700 V / $\hat{v}$ = 2100 V / v_S = 2900 V / V_{TT} = AC 2100 V / V_{TC} = AC 4000 V									
4.7	60	560	1400	13.0	220	64.2 x 248	1	960	B25834D1475K004
6.8	60	820	2000	9.0	220	64.2 x 248	1	960	B25834D1685K004
10	80	1200	3000	7.0	220	79.2 x 248	1	1500	B25834D1106K004
15	80	1800	4500	5.3	220	89.3 x 248	1	1900	B25834D1156K004
22	80	2600	6600	3.9	220	99.3 x 248	1	2300	B25834D1226K004
V_R = 2100 V / $\hat{v}$ = 2600 V / v_S = 3600 V / V_{TT} = AC 2600 V / V_{TC} = AC 4800 V									
3.3	60	530	1300	13.0	220	64,2 x 248	1	960	B25834D2335K004
4.7	60	750	1900	9.4	220	64.2 x 248	1	960	B25834D2475K004
6.8	80	1100	2700	7.4	220	79.2 x 248	1	1500	B25834D2685K004
10	80	1600	4000	5.4	220	89.3 x 248	1	1900	B25834D2106K004
15	80	2400	6000	4.1	220	99.3 x 248	1	2300	B25834D2156K004

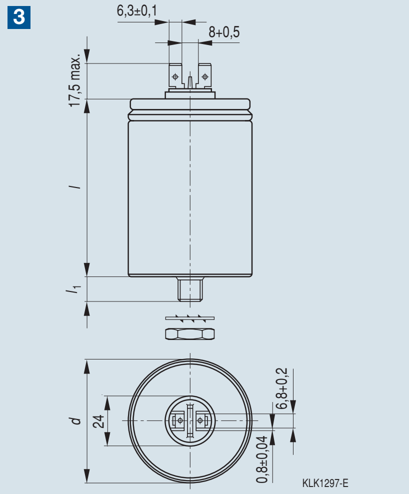
1) Other capacitance values upon request

Dimensional drawings

Screw terminals M10	Screw terminals M10	Dual tab connectors 6.3 mm







1) Dimensions for guidance only, subject to modification

Characteristics

Dimensions in mm

d –1.2	l –4	∅ d1 –0.4	l1 min	d –1.2	l –4	∅ d1 –0.4	l1 min	d + 0.5 /–0.2	l + 1 /–2	l1 +1**)
64.2	176	60.2	135	64.2	104	60.2	135	40	86	8
64.2	248	60.2	204	64.2	248	60.2	204	40	156	8
79.2	176	75.2	135	79.2	104	75.2	75	50	86	12
79.2	248	75.2	204	79.2	248	75.2	204	50	156	12
89.3	176	85.2	135	89.3	104	85.2	75	60	86	12
89.3	248	85.2	204	89.3	248	85.2	204	-	-	-
99.3	176	95.2	135	99.3	104	95.2	75	-	-	-
99.3	248	95.2	204	99.3	248	95.2	204	-	-	-
Max. torque terminals*): 7 Nm				Max. torque terminals*): 7 Nm						
Creepage distance: 20				Creepage distance: 10				Creepage distance: 10		
Clearance: 13				Clearance: 10				Clearance: 6		

*) The terminal torque must not act upon the ceramic. So the lead should be locked between two nuts.
**) 8 mm = threaded bolt M8, 12 mm = threaded bolt M12

Mounting parts (included in delivery)

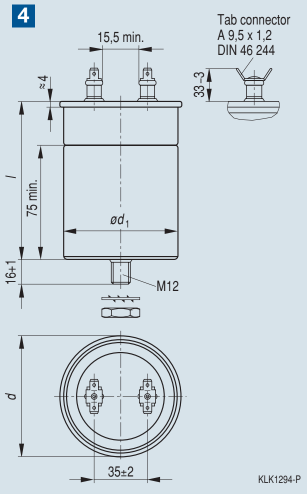
Threaded bolt	Max. torque	Toothed washer	Hex nut
M8	4 Nm	J 8.2 DIN 6797	M8 DIN 439
M12	10 Nm	J 12.5 DIN 6797	M12 DIN 439

Damping, Commutating – B25834

Dimensional drawings

Dual tab connectors 9.5 mm	Tab connectors 6.3 mm	Tab connectors 6.3 mm	Tab connectors 6.3 mm

4



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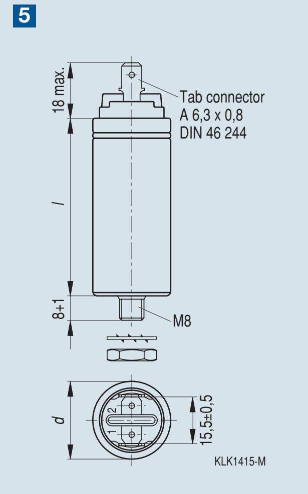

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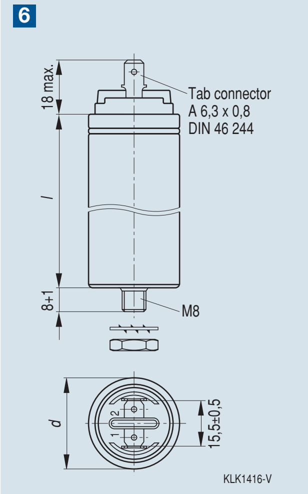

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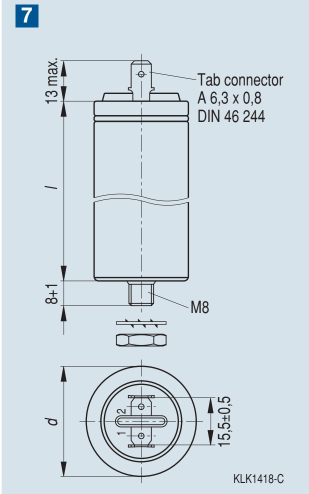


Characteristics

Dimensions in mm

d –1.2	l –4	∅ d1 –0.4	d +0.5/–0.2	l ±2	d +0.5/–0.2	l ±2	d +0.5/–0.2	l ±2
79.2	104	75.2	25	48	30	48	35	48
89.3	104	85.2	-	-	30	80	35	80
Creepage distance: 10			Creepage distance: 9		Creepage distance: 9		Creepage distance: 6	
Clearance: 10			Clearance: 7		Clearance: 7		Clearance: 6	

Mounting parts (included in delivery)

Threaded bolt	Max. torque	Toothed washer	Hex nut
M8	4 Nm	J 8.2 DIN 6797	M8 ISO 4035
M12	10 Nm	J 12.5 DIN 6797	M12 ISO 4035

Damping – B25835

Features

- High dielectric strength
- High peak-current capability

Applications

- Especially suitable for snubber circuits

Construction

- Self-healing
- Plastic dielectric
- Oil-impregnated tubular windings (no PCB)
- Metal-sprayed end faces ensure reliable contacting
- Cylindrical aluminum case
- 1-pole version, ceramic lead-through
- Mounting bolts M8 or M12

Terminals

- Tab connector 6.3 mm

Mounting

- If the vibration stress is ≤5 *g* the bolt is used for mounting.

Grounding

- 1-pole capacitors need not be grounded.

Individual data sheets

- Data sheets are available for each capacitor type.

Technical data

Electrical		**(Standards IEC 61071-1/2, EN 61071-1/2, VDE 0560 part 120 and 121)**
Dielectric dissipation factor	$\tan \delta_0$	2×10^{-4}
Capacitance tolerance		± 10%
Max. repetitive rate of voltage rise	$(dv/dt)_{max}$	î / C
Max. non-repetitive rate of voltage rise	$(dv/dt)_s$	I_s / C
Climatic data		
Min. operating temperature	T_{min}	– 25 °C
Max. operating temperature	T_{max}	+ 85 °C
Average relative humidity		≤ 95%
Storage temperature limit	T_{stg}	– 55 / + 85 °C
IEC climatic category (IEC 68-1 and 2)		25/085/56
Failure quota	α_{FQ}	300 failures per 10^9 component hours
Load duration	t_{LD}	Up to 100 000 h
Test data		
AC test voltage		
between terminals	V_{TT}	1.25 x V_R, 50 Hz, 10 s (or DC 1.75 x V_R, 10 s)
Insulation resistance	R_{ins}	≤ 1 µF: ≥ 10 000 MΩ
Self-discharge time constant	τ (R_{ins} x C)	> 1 µF: ≥ 10 000 s
Dissipation factor (50 Hz)	$\tan \delta$	$\leq 3 \times 10^{-4}$

Damping – B25835

Characteristics and ordering codes

Rated capacitance[1] (C_R) µF	Max. RMS current (I_{max}) A	Max. peak current ($\hat{i}$) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_R = 900 V / $\hat{v}$ = 1100 V / v_s = 1500 V / V_{TT} = AC 1150 V									
0.22	10	90	220	15.0	110	25 x 57	1	40	B25835M6224K007
0.33	10	130	330	11.0	110	25 x 57	1	40	B25835M6334K007
0.47	10	100	250	19.0	110	25 x 57	1	40	B25835M6474K007
0.68	18	150	370	14.0	110	30 x 57	1	50	B25835M6684K007
1.00	18	220	550	10.0	110	30 x 57	1	50	B25835M6105K007
2.20	18	480	1200	6.6	110	45 x 57	1	110	B25835M6225K007
4.70	18	1000	2500	4.6	110	60 x 57	1	190	B25835M6475K007
V_R = 1400 V / $\hat{v}$ = 1800 V / v_s = 2400 V / V_{TT} = AC 1800 V									
0.10	10	150	380	20.0	110	25 x 57	2	40	B25835M0104K007
0.22	10	220	550	18.0	140	25 x 70	1	50	B25835M0224K007
0.33	10	200	500	27.0	190	25 x 95	1	60	B25835M0334K007
0.47	18	280	700	20.0	190	30 x 95	1	90	B25835M0474K007
0.68	18	400	1000	15.0	190	30 x 95	1	90	B25835M0684K007
1.00	18	600	1500	12.0	190	35 x 95	1	110	B25835M0105K007
2.20	18	1300	3300	7.6	190	50 x 95	1	220	B25835M0225K007
V_R = 1700 V / $\hat{v}$ = 2100 V / v_s = 2900 V / V_{TT} = AC 2100 V									
0.10	10	200	500	16.0	110	25 x 57	2	40	B25835M7104K007
0.22	10	300	750	15.0	140	25 x 70	1	50	B25835M7224K007
0.47	18	660	1600	8.4	140	35 x 70	1	90	B25835M7474K007
V_R = 2100 V / $\hat{v}$ = 2600 V / v_s = 3600 V / V_{TT} = AC 2600 V									
0.47	18	750	1900	11.0	190	35 x 95	2	110	B25835M1474K007
0.68	18	1100	2700	8.7	190	40 x 95	1	140	B25835M1684K007
1.00	18	1600	4000	7.1	190	45 x 95	1	180	B25835M1105K007
2.20	18	1100	2800	13.0	250	60 x 131	1	440	B25835M1225K007
V_R = 3400 V / $\hat{v}$ = 4300 V / v_s = 5800 V / V_{TT} = AC 4300 V									
0.10	18	280	700	33.0	250	35 x 131	1	150	B25835M2104K007
0.15	18	400	1000	24.0	250	35 x 131	1	150	B25835M2154K007
0.22	18	600	1500	18.0	250	35 x 131	1	150	B25835M2224K007
0.33	18	900	2300	15.0	250	50 x 131	1	300	B25835M2334K007
0.47	18	1300	3300	12.0	250	50 x 131	1	300	B25835M2474K007
0.68	18	1900	4800	11.0	250	60 x 131	1	440	B25835M2684K007

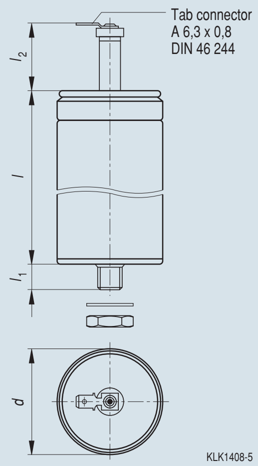
[1]) Other capacitance values upon request

Damping – B25835

Dimensional drawings

Tab connector 6.3 mm	Tab connector 6.3 mm

1



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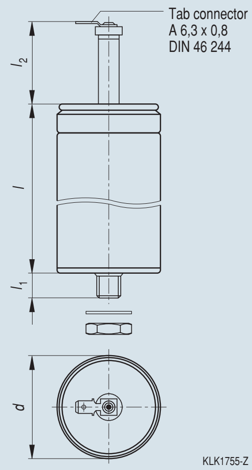


Characteristics

Dimensions in mm

d +0.5 /–0.2	l +1 /–2	l_1 +1*)	$l_{2\,max}$	Creepage distance	Clearance
Figure 1					
25	57	8	15	6	6
25	70	8	23	14	14
25	95	8	23	14	14
30	57	8	15	6	6
30	95	8	23	14	14
35	70	8	26	14	14
35	95	8	26	14	14
35	131	8	32	20	20
40	95	8	32	20	20
45	57	8	22	10	10
45	95	8	32	20	20
50	95	12	26	14	14
50	131	12	32	20	20
60	57	12	22	10	10
60	131	12	32	20	20
Figure 2					
25	57	8	23	14	14
35	95	8	32	20	20

*) 8 mm = threaded bolt M8, 12 mm = threaded bolt M12

Mounting parts (included in delivery)

Threaded bolt	Max. torque	Toothed washer	Hex nut
M8	4 Nm	A 8.4 DIN 125-Ms	M8 DIN 439
M12	10 Nm	A 13 DIN 125-Ms	M12 DIN 439

Damping, Commutating – B25838

B25838

Features

- High dielectric strength
- High peak-current capability

Applications

- For damping and commutating in the upper frequency range

Construction

- Self-healing
- Plastic dielectric
- Oil-impregnated tubular windings (no PCB)
- Metal-sprayed end faces ensure reliable contacting
- Cylindrical aluminum case
- Ceramic lead-throughs
- Mounting bolts M8 or M12

Terminals

- Screw terminals M10
- Tab connectors 6.3 mm
- Dual tab connectors 6.3 mm

Mounting

- If the vibration stress is ≤5 *g* and the capacitors are ≤60 mm in diameter and ≤160 mm in height the bolt is used for mounting.

Grounding

- Mounting bolt for grounding in accordance with VDE 0100
- Grounding identification in accordance with DIN 40 011

Individual data sheets

- Data sheets are available for each capacitor type.

Technical data

Electrical		**(Standards IEC 61071-1/2, EN 61071-1/2, VDE 0560 part 120 and 121)**
Dielectric dissipation factor	$\tan \delta_0$	2×10^{-4}
Capacitance tolerance		± 10%
Max. repetitive rate of voltage rise	$(dv/dt)_{max}$	$\hat{i}$ / C
Max. non-repetitive rate of voltage rise	$(dv/dt)_s$	I_s / C
Climatic data		
Min. operating temperature	T_{min}	– 25 °C
Max. operating temperature	T_{max}	+ 85 °C
Average relative humidity		≤ 95%
Storage temperature limit	T_{stg}	– 55 / + 85 °C
IEC climatic category (IEC 68-1 and 2)		25/085/56
Failure quota	α_{FQ}	300 failures per 10^9 component hours
Load duration	t_{LD}	Up to 100 000 h
Test data		
AC test voltage		
between terminals	V_{TT}	1.25 x V_R, 50 Hz, 10 s (or DC 1.75 x V_R, 10 s)
between terminals and case	V_{TC}	2 x V_i + 1 000 V, 50 Hz, 10 s Insulating voltage V_i = max. recurrent peak voltage $\hat{v}/\sqrt{2}$
Insulation resistance	R_{ins}	≤ 1 µF: ≥ 10 000 MΩ
Self-discharge time constant	τ (R_{ins} x C)	> 1 µF: ≥ 10 000 s
Dissipation factor (50 Hz)	$\tan \delta$	$\leq 3 \times 10^{-4}$

Damping, Commutating – B25838

Characteristics and ordering codes

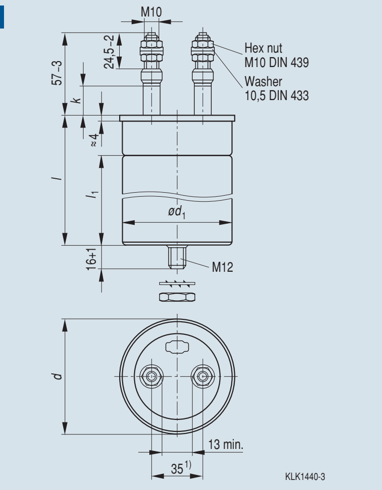
Rated capacitance[1)] (C_R) µF	Max. RMS current (I_{max}) A	Max. peak current ($\hat{i}$) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_R = 600 V / $\hat{v}$ = 750 V / v_s = 1000 V / V_{TT} = AC 750 V / V_{TC} = AC 2100 V									
2.2	20	350	880	8.0	60	40.0 x 57	3	90	B25838K4225K001
4.7	40	750	1900	4.5	70	40.0 x 95	2	140	B25838K4475K009
10	80	1600	4000	2.4	90	64.2 x 115	1	450	B25838L4106K004
15	80	2400	6000	2.2	140	79.2 x 194	1	1100	B25838L4156K004
22	80	3500	8800	1.7	140	79.2 x 194	1	1100	B25838L4226K004
33	80	5300	13000	1.4	140	79.2 x 194	1	1100	B25838L4336K004
47	80	7500	19000	1.1	140	79.2 x 194	1	1100	B25838L4476K004
V_R = 900 V / $\hat{v}$ = 1100 V / v_s = 1500 V / V_{TT} = AC 1150 V / V_{TC} = AC 2600 V									
1.0	20	280	700	9.6	60	40.0 x 57	3	90	B25838K6105K001
2.2	20	620	1500	4.9	60	50.0 x 57	3	130	B25838K6225K001
4.7	40	1300	3300	3.1	70	50.0 x 95	2	220	B25838K6475K009
6.8	80	1900	4800	2.0	90	64.2 x 115	1	450	B25838L6685K004
10	80	2800	7000	1.9	140	79.2 x 194	1	1100	B25838L6106K004
12	80	3400	8400	1.7	140	79.2 x 194	1	1100	B25838L6126K004
15	80	4200	10500	1.5	140	79.2 x 194	1	1100	B25838L6156K004
22	80	6200	15000	1.2	140	79.2 x 194	1	1100	B25838L6226K004
33	80	9200	23000	1.1	140	89.3 x 194	1	1500	B25838L6336K004
V_R = 1100 V / $\hat{v}$ = 1400 V / v_s = 1900 V / V_{TT} = AC 1400 V / V_{TC} = AC 3000 V									
1.0	20	600	1500	13.0	90	40.0 x 95	3	140	B25838K8105K001
2.2	20	1300	3300	6.5	70	50.0 x 95	3	220	B25838K8225K001
4.7	80	2800	7000	3.5	170	64.2 x 194	1	750	B25838L8475K004
10	80	6000	15000	2.1	170	79.2 x 194	1	1100	B25838L8106K004
12	80	7200	18000	2.0	170	89.3 x 194	1	1500	B25838L8126K004
15	80	9000	23000	1.7	170	89.3 x 194	1	1500	B25838L8156K004
18	80	11000	27000	1.5	170	89.3 x 194	1	1500	B25838L8186K004
22	80	13000	33000	1.4	170	89.3 x 194	1	1500	B25838L8226K004

1) Other capacitance values upon request

Damping, Commutating – B25838

Dimensional drawings

Screw terminals M10	Dual tab connectors 6.3 mm	Tab connectors 6.3 mm

1


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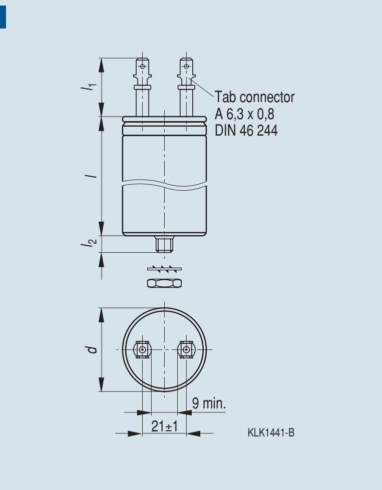

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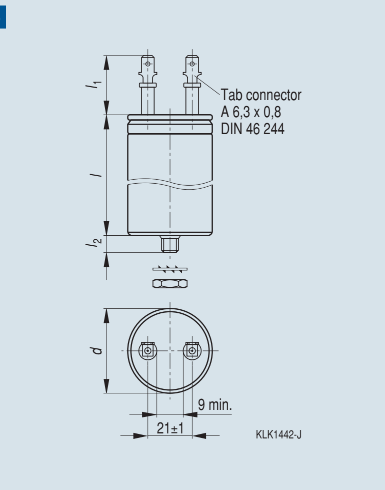


1) Dimensions only for orientation, subject for modifications

Characteristics

Dimensions in mm

d –1.2	l –4	∅ d_1 –0.4	$l_{1\,min}$	d +0.5 / –0.2	l +1 / –2	$l_{1\,max}$	l_2 +1 2)	d +0.5 / –0.2	l +1 / –2	$l_{1\,max}$	l_2 +1 2)
64.2	115	60.2	78	40	95	28	8	40	57	28 3)	8
64.2	194	60.2	150	50	95	32	12	40	57	32	8
79.2	194	75.2	150	-	-	-	-	40	95	32	8
89.3	194	85.2	150	-	-	-	-	50	57	32	12
-	-	-	-	-	-	-	-	50	95	32	12
Max. torque terminals 1): 7 Nm											
Creepage distance: 20				Creepage distance: 10 (for l_1 = 28) 14 (for l_1 = 32)				Creepage distance: 10 (for l_1 = 28) 14 (for l_1 = 32)			
Clearance: 13				Clearance: 9				Clearance: 9			

1) The terminal torque must not act upon the ceramic. So the lead should be locked between two nuts.
2) 8 mm = threaded bolt M8, 12 mm = threaded bolt M12
3) Type B25838K4225K001

Mounting parts (included in delivery)

Threaded bolt	Max. torque	Toothed washer	Hex nut
M8	4 Nm	J 8.2 DIN 6797	M8 DIN 439
M12	10 Nm	J 12.5 DIN 6797	M12 DIN 439

B25838

LSI Snubbering and Clamping – B25855

Features

- High rate of voltage rise
- High peak-current capability
- Extremely low inductance

Construction

- Self-healing
- Plastic dielectric
- Oil-impregnated tubular windings (no PCB)
- Metal-sprayed end faces ensure reliable contacting
- Cylindrical aluminum case
- Also available in high-grade, freon-resistant steel case upon request
- Coaxial winding design with internal low-inductance circuitry
- Mounting bolt M12

Terminals

- Screw terminals M6 … M12

Mounting

- If the vibration stress is ≤5 *g* and the capacitors are ≤60 mm in diameter and ≤160 mm in height, the bolt is used for mounting.

Grounding

- Mounting bolt for grounding in accordance with VDE 0100
- Grounding identification in accordance with DIN 40 011

Individual data sheets

- Data sheets are available for each capacitor type.

Technical data

Electrical		(Standards IEC 61071-1/2, EN 61071-1/2, VDE 0560 part 120 and 121)
Dielectric dissipation factor	tan δ_0	2 x 10^{-4}
Capacitance tolerance		± 10%
Max. repetitive rate of voltage rise	$(dv/dt)_{max}$	î / C
Max. non-repetitive rate of voltage rise	$(dv/dt)_s$	I_s / C
Climatic data		
Min. operating temperature	T_{min}	– 25 °C (– 40 °C upon request)
Max. operating temperature	T_{max}	+ 85 °C
Average relative humidity		≤ 95%
Storage temperature limit	T_{stg}	– 55 / + 85 °C
IEC climatic category (IEC 68-1 and 2)		25/085/56 (40/085/56 upon request)
Failure quota	α_{FQ}	300 failures per 10^9 component hours
Load duration	t_{LD}	Up to 100 000 h
Test data		
Voltage test		
between terminals DC test voltage AC test voltage (rms value)	V_{TT}	 1.75 x V_R, 10 s or 1.5 x V_{RDC}, 10 s 1.25 x V_R, 50 Hz, 10 s
between terminals and case AC test voltage (rms value)	V_{TC}	2 x V_i + 1 000 V, 50 Hz, 10 s Insulating voltage V_i = max. recurrent peak voltage $\hat{v}/\sqrt{2}$
Insulation resistance	R_{ins}	≤ 1 µF: ≥ 10 000 MΩ
Self-discharge time constant	τ (R_{ins} x C)	> 1 µF: ≥ 10 000 s
Dissipation factor (50 Hz)	tan δ	≤ 3 x 10^{-4}

LSI Snubbering and Clamping – B25855

Characteristics and ordering codes

Rated capacitance[1] (C_R) µF	Max. RMS current (I_{max}) A	Max. peak current ($\hat{i}$) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_{RDC} = 1300 V / V_R = 1100 V / $\hat{v}$ = 1600 V / v_s = 2300 V / V_{TT} = AC 1400 V / V_{TC} = AC 3300 V									
1	40	1000	2500	2.5	30	64.2 x 64	1	250	B25855C8105K004
1.5	40	1500	3800	1.8	30	64.2 x 64	1	250	B25855C8155K004
2	40	1400	3500	2.4	30	64.2 x 76	1	300	B25855C8205K004
2.5	40	1000	2500	4.1	30	64.2 x 97	1	400	B25855C8255K004
3	40	1200	3000	3.5	30	64.2 x 97	1	400	B25855C8305K004
4	40	1600	4000	2.8	30	64.2 x 97	1	400	B25855C8405K004
5	80	2000	5000	2.3	30	79.2 x 97	2	600	B25855C8505K004
7.5	80	3000	7500	1.7	30	79.2 x 97	2	600	B25855C8755K004
10	80	4000	10000	1.4	30	89.3 x 97	2	750	B25855C8106K004
20	120	8000	20000	0.9	30	121.6 x 97	3	1400	B25855C8206K004
40	120	8000	20000	1.5	50	121.6 x 163	3	2300	B25855C8406K004
V_{RDC} = 1700 V / V_R = 1400 V / $\hat{v}$ = 2000 V / v_s = 2900 V / V_{TT} = AC 1800 V / V_{TC} = AC 3900 V									
0.5	40	700	1800	3.5	30	64.2 x 64	1	250	B25855C0504K004
0.75	40	1100	2600	2.5	30	64.2 x 64	1	250	B25855C0754K004
1	40	1400	3500	2.0	30	64.2 x 64	1	250	B25855C0105K004
1.5	40	1500	3800	2.4	30	64.2 x 76	1	300	B25855C0155K004
2	80	2000	5000	1.9	30	79.2 x 76	2	450	B25855C0205K004
2.5	80	2500	6300	1.6	30	79.2 x 76	2	450	B25855C0255K004
3	80	3000	7500	1.4	30	79.2 x 76	2	450	B25855C0305K004
4	80	4000	10000	1.2	30	89.3 x 76	2	600	B25855C0405K004
5	80	3000	7500	1.8	30	79.2 x 97	2	600	B25855C0505K004
7.5	80	4500	11000	1.4	30	99.3 x 97	2	900	B25855C0755K004
10	120	6000	15000	1.1	30	121.6 x 97	3	1400	B25855C0106K004
20	120	6000	15000	2.0	50	121.6 x 163	3	2300	B25855C0206K004
V_{RDC} = 2000 V / V_R = 1700 V / $\hat{v}$ = 2400 V / v_s = 3500 V / V_{TT} = AC 2200 V / V_{TC} = AC 4400 V									
0.5	40	900	2300	2.9	30	64.2 x 64	1	250	B25855C4504K004
0.75	40	1400	3400	2.1	30	64.2 x 64	1	250	B25855C4754K004
1	40	1200	3000	2.8	30	64.2 x 76	1	300	B25855C4105K004
1.5	80	1800	4500	2.0	30	79.2 x 76	2	450	B25855C4155K004
2	80	2400	6000	1.6	30	79.2 x 76	2	450	B25855C4205K004
2.5	80	3000	7500	1.4	30	89.3 x 76	2	600	B25855C4255K004
3	80	2400	6000	2.3	30	79.2 x 97	2	600	B25855C4305K004
4	80	3200	8000	1.8	30	89.3 x 97	2	750	B25855C4405K004
5	80	4000	10000	1.6	30	99.3 x 97	2	900	B25855C4505K004
7.5	120	6000	15000	1.0	30	121.6 x 97	3	1400	B25855C4755K004
10	120	8000	20000	1.6	30	121.6 x 97	3	1400	B25855C4106K004
20	120	7200	18000	1.7	50	121.6 x 163	3	2300	B25855C4206K004

[1]) Other capacitance values upon request

Characteristics and ordering codes

Rated capacitance[1] (C_R) µF	Max. RMS current (I_{max}) A	Max. peak current (î) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_{RDC} = 2500 V / V_R = 2100 V / $\hat{v}$ = 3000 V / v_s = 4300 V / V_{TT} = AC 2700 V / V_{TC} = AC 5400 V									
0.5	40	1200	3000	2.9	30	64.2 x 76	1	300	B25855C1504K004
0.75	80	1800	4500	2.1	30	79.2 x 76	2	450	B25855C1754K004
1	80	2400	6000	1.7	30	79.2 x 76	2	450	B25855C1105K004
1.5	80	3600	9000	1.3	30	89.3 x 76	2	600	B25855C1155K004
2	80	2800	7000	1.9	30	89.3 x 97	2	750	B25855C1205K004
2.5	80	3500	8800	1.6	30	89.3 x 97	2	750	B25855C1255K004
3	80	4200	11000	1.4	30	99.3 x 97	2	900	B25855C1305K004
4	120	5600	14000	1.2	30	121.6 x 97	3	1400	B25855C1405K004
5	120	7000	18000	1.0	30	121.6 x 97	3	1400	B25855C1505K004
7.5	120	6800	17000	1.8	50	121.6 x 163	3	2300	B25855C1755K004
10	120	9000	23000	1.5	50	121.6 x 163	3	2300	B25855C1106K004
20	120	8000	20000	2.2	70	121.6 x 231	3	3200	B25855C1206K004
V_{RDC} = 3000 V / V_R = 2500 V / $\hat{v}$ = 3600 V / v_s = 5200 V / V_{TT} = AC 3200 V / V_{TC} = AC 6200 V									
0.5	80	1500	3800	2.1	30	79.2 x 76	2	450	B25855C7504K004
0.75	80	2300	5600	1.7	30	79.2 x 76	2	450	B25855C7754K004
1	80	3000	7500	1.4	30	89.3 x 76	2	600	B25855C7105K004
1.5	80	2700	6800	2.0	30	89.3 x 97	2	750	B25855C7155K004
2	80	3600	9000	1.6	30	89.3 x 97	2	750	B25855C7205K004
2.5	80	4500	11000	1.4	30	99.3 x 97	2	900	B25855C7255K004
3	120	5400	14000	1.2	30	121.6 x 97	3	1400	B25855C7305K004
4	120	7200	18000	1.0	30	121.6 x 97	3	1400	B25855C7405K004
5	120	8500	21000	1.3	35	121.6 x 123	3	1700	B25855C7505K004
7.5	120	7500	19000	1.6	50	121.6 x 163	3	2300	B25855C7755K004
10	120	5000	13000	3.0	70	121.6 x 231	3	3200	B25855C7106K004
15	120	7500	19000	2.2	70	121.6 x 231	3	3200	B25855C7156K004
V_{RDC} = 3300 V / V_R = 2800 V / $\hat{v}$ = 4000 V / v_s = 5800 V / V_{TT} = AC 3500 V / V_{TC} = AC 6800 V									
0.5	80	1800	4400	2.1	35	79.2 x 76	2	450	B25855C3504K004
0.75	80	2600	6600	1.6	35	89.3 x 76	2	600	B25855C3754K004
1	80	2100	5300	2.5	35	79.2 x 97	2	600	B25855C3105K004
1.5	80	3200	7900	1.8	35	89.3 x 97	2	750	B25855C3155K004
2	120	4200	11000	1.5	35	121.6 x 97	3	1400	B25855C3205K004
2.5	120	5300	13000	1.3	35	121.6 x 97	3	1400	B25855C3255K004
3	120	6300	16000	1.1	35	121.6 x 97	3	1400	B25855C3305K004
4	120	8000	20000	1.3	40	121.6 x 123	3	1700	B25855C3405K004
5	120	6000	15000	2.0	60	121.6 x 163	3	2300	B25855C3505K004
7.5	120	4500	11000	3.3	80	121.6 x 231	3	3200	B25855C3755K004
10	120	6000	15000	2.7	80	121.6 x 231	3	3200	B25855C3106K004
V_{RDC} = 4000 V / V_R = 3400 V / $\hat{v}$ = 4800 V / v_s = 7000 V / V_{TT} = AC 4300 V / V_{TC} = AC 7800 V									
0.5	80	1800	4400	3.1	35	79.2 x 99	2	600	B25855C2504K004
0.75	80	2600	6600	2.2	35	89.3 x 99	2	750	B25855C2754K004
1	80	2500	6300	2.9	40	89.3 x 123	2	1000	B25855C2105K004
1.5	80	3800	9400	2.2	40	99.3 x 123	2	1200	B25855C2155K004
2	80	3000	7500	3.4	60	89.3 x 163	2	1200	B25855C2205K004
2.5	80	3800	9400	2.8	60	99.3 x 163	2	1500	B25855C2255K004
3	80	4500	11000	2.4	60	99.3 x 163	2	1500	B25855C2305K004
4	120	6000	15000	2.0	60	121.6 x 231	3	2300	B25855C2405K004
5	120	7000	18000	2.6	80	121.6 x 231	3	3200	B25855C2505K004

[1]) Other capacitance values upon request

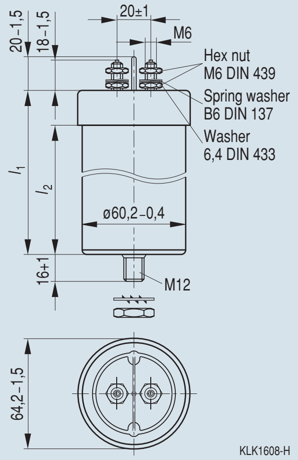
LSI Snubbering and Clamping – B25855

B25855

Dimensional drawings

Screw terminals M6	Screw terminals M10

1



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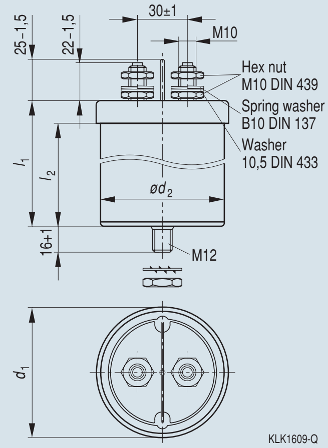


Characteristics

Dimensions in mm

l_1 −4	$l_{2\,min}$	Creepage distance	Clearance	∅ d_1 −1.5	l_1 −4	$l_{2\,min}$	∅ d_2 −0.4	Creepage distance	Clearance
64	44	35	14	79.2	76	54	75.2	42	20
76	56	35	14	79.2	97	71	75.2	42	20
97	77	35	14	79.2	99	73	75.2	42	20
-	-	-	-	89.3	76	54	85.2	50	20
-	-	-	-	89.3	97	71	85.2	50	20
-	-	-	-	89.3	99	73	85.2	50	20
-	-	-	-	89.3	123	97	85.2	50	20
-	-	-	-	89.3	163	137	85.2	50	20
-	-	-	-	99.3	97	71	95.2	55	20
-	-	-	-	99.3	123	97	95.2	55	20
-	-	-	-	99.3	163	137	95.2	55	20
Max. torque terminals[1]: 2 Nm				Max. torque terminals[1]: 7 Nm					

[1]) The terminal torque must not act upon the cover. So the lead should be locked between two nuts.

Mounting parts (included in delivery)

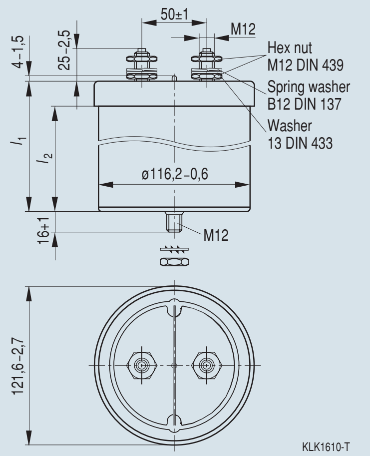
Threaded bolt	Max. torque	Toothed washer	Hex nut
M12	10 Nm	J 12.5 DIN 6797	M12 DIN 439

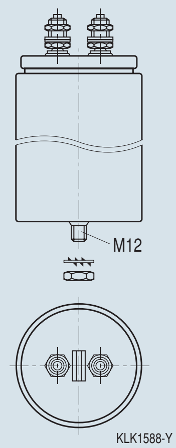
LSI Snubbering and Clamping – B25855

Dimensional drawings

Screw terminals M12	Version in high-grade, freon-resistant steel case

3





Characteristics

Dimensions in mm

l_1 –4	$l_{2\,min}$	Creepage distance	Clearance	Diameter* (mm)	Length* (mm)
97	71	42	28	85	137
123	97	42	28	85	161
163	137	42	28	116	234
231	205	42	28	-	-
Max. torque terminals[1]): 10 Nm				-	

[1]) The terminal torque must not act upon the cover. So the lead should be locked between two nuts.
*) Other case dimensions upon request.

Mounting parts (included in delivery)

Threaded bolt	Max. torque	Toothed washer	Hex nut
M12	10 Nm	J 12.5 DIN 6797	M12 DIN 439

LSI Snubbering and Clamping – B25856

Features

- High dielectric strength
- High peak-current capability
- Extremely low inductance

Construction

- Self-healing
- Plastic dielectric
- Oil-impregnated tubular windings (no PCB)
- Metal-sprayed end faces ensure reliable contacting
- Fully insulated case
- Axial version

Terminals

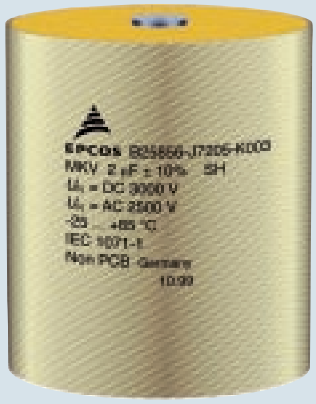
- Internal thread M6 x 8 and M8 x 10
- Axial

Mounting

- On the terminals

Individual data sheets

- Data sheets are available for each capacitor type.



Technical data

Electrical		(Standards IEC 61071-1/2, EN 61071-1/2, VDE 0560 part 120 and 121)
Dielectric dissipation factor	tan δ_0	2×10^{-4}
Capacitance tolerance		± 10%
Max. repetitive rate of voltage rise	$(dv/dt)_{max}$	$\hat{i}$ / C
Max. non-repetitive rate of voltage rise	$(dv/dt)_s$	I_s / C
Climatic data		
Min. operating temperature	T_{min}	– 25 °C
Max. operating temperature	T_{max}	+ 85 °C
Average relative humidity		≤ 95%
Storage temperature limit	T_{stg}	≤ 98 mm diameter: – 55 / + 85 °C ≥ 103 mm diameter: – 30 / + 85 °C
IEC climatic category (IEC 68-1 and 2)		25/085/56
Failure quota	α_{FQ}	300 failures per 10^9 component hours
Load duration	t_{LD}	Up to 100 000 h
Test data		
Voltage test		
between terminals **DC test voltage** **AC test voltage (rms value)**	V_{TT}	 $1.75 \times V_R$, 10 s or $1.5 \times V_{RDC}$, 10 s $1.25 \times V_R$, 50 Hz, 10 s
Insulation resistance	R_{ins}	≤ 1 µF: ≥ 10 000 MΩ
Self-discharge time constant	τ (R_{ins} x C)	> 1 µF: ≥ 10 000 s
Dissipation factor (50 Hz)	tan δ	$\leq 3 \times 10^{-4}$

LSI Snubbering and Clamping – B25856

B25856

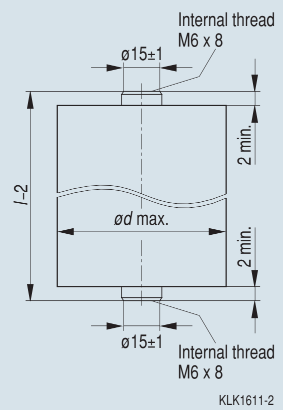
Characteristics and ordering codes

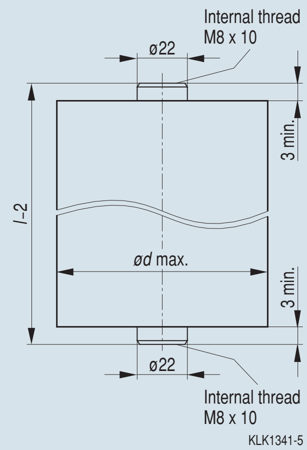
Rated capacitance[1)] (C_R) µF	Max. RMS current (I_{max}) A	Max. peak current ($\hat{i}$) A	Max. surge current (I_S) A	Series resistance (R_S, 20 °C) mΩ	Self inductance (L_{self}) nH	Dimensions (d x l) mm	Fig.	Approx. weight g	Ordering code
V_{RDC} = 1700 V / V_R = 1400 V / $\hat{v}$ = 2000 V / v_s = 2900 V / V_{TT} = AC 1800 V									
0.2	30	200	500	3.1	< 20	40 x 49	1	130	B25856K0204K003
0.47	80	470	1200	1.0	< 20	68 x 49	1	300	B25856J0474K003
1	60	1400	3500	1.6	< 20	53 x 59	1	200	B25856K0105K003
1.5	80	1400	3500	1.1	< 20	68 x 68	2	500	B25856K0155K003
2	70	2000	5000	1.5	< 20	68 x 79	2	550	B25856K0205K003
4	70	2400	6000	1.8	< 20	73 x 100	2	700	B25856K0405K003
7.5	80	3000	7500	1.0	< 20	93 x 100	2	1000	B25856K0755K003
15	80	3000	7500	2.0	< 20	93 x 168	2	1600	B25856K0156K003
V_{RDC} = 2000 V / V_R = 1700 V / $\hat{v}$ = 2400 V / v_s = 3500 V / V_{TT} = AC 2200 V									
0.2	30	350	900	6.0	< 20	40 x 59	1	150	B25856K4204K003
0.5	50	600	1500	1.1	< 20	68 x 49	1	300	B25856K4504K013
1	50	1200	3000	2.4	< 20	53 x 70	1	250	B25856K4105K003
2.5	80	3000	7500	1.0	< 20	83 x 79	2	700	B25856K4255K003
7.5	80	4200	10500	1.4	< 20	93 x 126	2	1250	B25856K4755K003
V_{RDC} = 2500 V / V_R = 2100 V / $\hat{v}$ = 3000 V / v_s = 4300 V / V_{TT} = AC 2700 V									
0.2	30	500	1200	6.1	< 20	40 x 70	1	160	B25856K1204K003
1.5	80	3600	9000	0.9	< 20	83 x 79	2	700	B25856K1155K003
2.5	80	3500	8800	1.3	< 20	83 x 100	2	850	B25856K1255K003
5	80	5000	12500	1.5	< 20	93 x 142	2	1400	B25856K1505K003
7.5	80	5000	13000	1.8	< 20	98 x 173	2	1800	B25856K1755K003
10	80	6800	17000	1.4	< 20	108 x 173	2	2200	B25856K1106K003
V_{RDC} = 3000 V / V_R = 2500 V / $\hat{v}$ = 3600 V / v_s = 5200 V / V_{TT} = AC 3200 V									
0.5	70	2200	5500	1.9	< 20	68 x 79	2	550	B25856K7504K013
1	80	3000	7500	1.1	< 20	83 x 79	2	700	B25856K7105K003
1.5	80	4800	12000	0.7	< 20	93 x 79	2	800	B25856K7155K013
2	80	3600	9000	1.3	< 20	88 x 100	2	900	B25856K7205K003
2.5	80	4500	11000	1.0	< 20	98 x 100	2	1100	B25856K7255K003
3	80	3600	9000	1.9	< 10	88 x 142	2	1100	B25856J7305J003
3.5	80	4200	10500	1.7	< 20	93 x 142	2	1400	B25856K7355K003
4	80	4800	12000	1.5	< 20	98 x 142	2	1500	B25856K7405K003
5	80	6000	15000	1.2	< 20	108 x 142	2	1800	B25856K7505K003
V_{RDC} = 3300 V / V_R = 2800 V / $\hat{v}$ = 4000 V / v_s = 5800 V / V_{TT} = AC 3500 V									
0.1	20	350	900	8.0	< 20	40 x 70	1	160	B25856K3104K003
0.5	70	1800	4500	1.7	< 20	73 x 79	2	600	B25856K3504K003
2.5	80	3500	8800	2.0	< 20	88 x 142	2	1300	B25856K3255K003
V_{RDC} = 4000 V / V_R = 3400 V / $\hat{v}$ = 4800 V / v_s = 7000 V / V_{TT} = AC 4300 V									
0.2	50	1200	3000	2.6	< 20	53 x 70	1	250	B25856K2204K003
0.5	80	3000	7500	1.1	< 20	83 x 79	2	700	B25856K2504K003
1	80	3500	8800	1.3	< 20	88 x 105	2	1000	B25856K2105K003
2	80	5000	12500	1.3	< 20	98 x 126	2	1350	B25856K2205K003
2.5	80	3800	9400	2.3	< 20	88 x 168	2	1500	B25856K2255K003
3	80	4500	11000	2.0	< 20	98 x 168	2	1700	B25856K2305K003
4	80	6000	15000	1.5	< 20	108 x 168	2	2100	B25856K2405K003

[1)] Other capacitance values upon request

Dimensional drawings

Internal thread M6	Internal thread M8
1	2





Characteristics

$\varnothing$ d_{max} = 40 ... 68 mm		$\varnothing$ d_{max} = 68 ... 108 mm	
Internal thread	M6 x 8	Internal thread	M8 x 10
Max. torque	7 Nm	Max. torque	7 Nm

B25856

Cautions and Warnings

- In case of dents of more than 1 mm depth or any other mechanical damage, capacitors must not be used at all. This applies also in cases of oil leakage.
- To ensure the full functionality of the overpressure disconnector, elastic elements must not be hindered and a minimum space of 12 mm has to be kept above each capacitor.
- Check tightness of the connections/terminals periodically.
- The energy stored in capacitors may be lethal. to prevent any chance of shock, discharge and short-circuit the capacitor before handling.
- Failure to follow cautions may result, worst case, in premature failures, bursting and fire.
- EPCOS AG is not responsible for any kind of possible damages to persons or things due to improper installation and application of capacitors for power electronics.

Safety

- Electrical or mechanical misapplication of capacitors may be hazardous. Personal injury or property damage may result from bursting of the capacitor or from expulsion of oil or melted material due to mechanical disruption of the capacitor.
- Ensure good, effective grounding for capacitor enclosures.
- Observe appropriate safety precautions during operation (self-recharging phenomena and the high energy contained in capacitors).
- Handle capacitors carefully, because they may still be charged even after disconnection
- The terminals of capacitors, connected bus bars and cables as well as other devices may also be energized.
- Follow good engineering practice.

Thermal load

After installation of the capacitor it is necessary to verify that maximum hot-spot temperature is not exceeded at extreme service conditions (see page 12, thermal design).

Mechanical protection

The capacitor has to be installed in a way that mechanical damages and dents in the aluminum can are avoided.

Storage and operating conditions

Do not use or store capacitors in corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. In dusty environments regular maintenance and cleaning especially of the terminals is required to avoid conductive path between phases and/or phases and ground.

Overpressure disconnector

To ensure full functionality of an overpressure disconnector, the following must be observed:

1. The elastic elements must not be hindered, i.e.
   - connecting lines must be flexible leads (cables),
   - there must be sufficient space for expansion above the connections (see page 13).
   - folding crimps must not be retained by clamps.
2. Stress parameters of the capacitor must be within the IEC61071 specification.

Service life expectancy

Electrical components do not have an unlimited service life expectancy; this applies to self-healing capacitors too. The maximum service life expectancy may vary depending on the application the capacitor is used in (see page 12).

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Herausgegeben von EPCOS AG, Corporate Communications
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Published by EPCOS AG, Corporate Communications
P.O.B. 80 17 09, 81617 Munich, GERMANY
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07/05

Published by EPCOS AG · Corporate Communications
Edition 08/2005 · Ordering No. EPC:26016-7600 · Printed in Germany · PS 08054.