



# Aluminum electrolytic capacitors

Capacitors with screw terminals – accessories

**Series/Type:** B44020, B44030

**Date:** December 2019




**Capacitors with screw terminals – accessories**
**Basic accessories**

One packing unit contains accessories for 16 capacitors.

|                      |  |  |       |                  |
|----------------------|--|--|-------|------------------|
| <b>For terminals</b> |  |  | Screw | Washer for screw |
|                      |  |  |       |                  |
|                      |  |  |       | KAL1712-L-E      |

| Thread d1 | d2 mm | Toothed washers | Screws  | Maximum torque                       | Ordering code   |
|-----------|-------|-----------------|---|--------------------------------------|-----------------|
| M5        | 5.3   | A 5.1 DIN 6797  | DIN 7985 /<br>ISO 7045-M5 x 10-5.6-Z<br>l = 10 mm | 2.5 Nm<br>thread depth<br>t ≥ 8 mm   | B44020J0500B000 |
| M6        | 6.4   | A 6.4 DIN 6797  | DIN 7985 /<br>ISO 7045-M6 x 12-5.6-Z<br>l = 12 mm | 4.0 Nm<br>thread depth<br>t ≥ 9.5 mm | B44020J0600B000 |

|                          |  |  |     |                |
|--------------------------|--|--|-----|----------------|
| <b>For threaded stud</b> |  |  | Nut | Washer for nut |
|                          |  |  |     |                |
|                          |  |  |     | KAL1713-U-E    |

| Thread | For terminal | Toothed washers | Nuts                  | Maximum torque | Ordering code   |
|--------|--------------|-----------------|-----------------------|----------------|-----------------|
| M12    | M5           | J 12.5 DIN 6797 | Hex nut BM 12 DIN 439 | 10 Nm          | B44020J0500B012 |
| M12    | M6           | J 12.5 DIN 6797 | Hex nut BM 12 DIN 439 | 10 Nm          | B44020J0600B012 |



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Additional accessories for capacitors with mounting stud on capacitor base

Insulating washer made of hostalen

| Capacitor diameter | Thread size | Dimensional drawing | Diameter d mm  | Ordering code   |
|--------------------|-------------|---------------------|--|-----------------|
| 51.6 mm            | M12         | <p>KAL1549-1</p>    | $d_1 - 0.5 = 51$<br>$d_2 - 0.5 = 31$<br>$d_3 \pm 0.3 = 21.5$<br>$d_4 \pm 0.2 = 13$     | B44020B0006B051 |
| 64.2 mm            | M12         |                     | $d_1 - 0.5 = 63.5$<br>$d_2 - 0.5 = 43.5$<br>$d_3 \pm 0.3 = 21.5$<br>$d_4 \pm 0.2 = 13$ | B44020B0006B064 |
| 76.9 mm            | M12         |                     | $d_1 - 0.5 = 76$<br>$d_2 - 0.5 = 56$<br>$d_3 \pm 0.3 = 21.5$<br>$d_4 \pm 0.2 = 13$     | B44020B0006B076 |
| 90.0 mm            | M12         |                     | $d_1 - 0.5 = 89$<br>$d_2 - 0.5 = 69$<br>$d_3 \pm 0.3 = 21.5$<br>$d_4 \pm 0.2 = 13$     | B44020B0006B090 |

Only for capacitors with threaded stud and without insulated base

Reinforced nylon cap nut

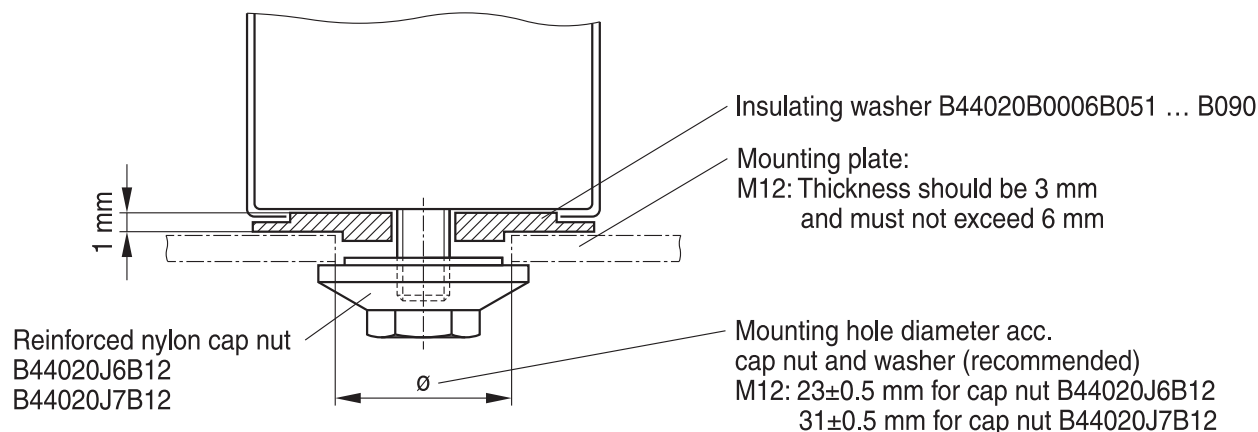
| Capacitor diameter | Thread size                                   | Dimensional drawing | Ordering code   |
|--------------------|---|---------------------|-----------------|
| > 40 mm            | M12 <sup>1)</sup><br>width across flats 19 mm | <p>KAL0349-1</p>    | B44020J0006B012 |
|                    |   | <p>KAL1759-3</p>    | B44020J0007B012 |

1) Maximum torque M12: 7.0 Nm for mounting thread length  $\geq 13$  mm; 5.0 Nm for mounting thread length  $\geq 10$  mm



### Mounting instructions

Insulated mounting with washer and cap nut (for capacitors with threaded stud and without insulated base):

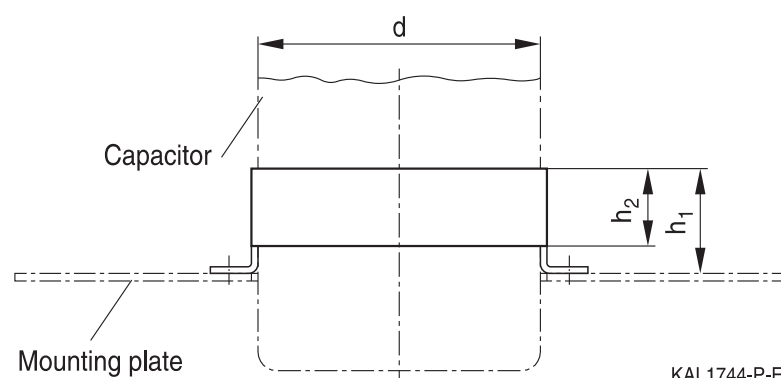


KAL1752-F-E

Mounting stud has the same potential as the negative terminal.  
Attention must be paid on any relevant regulations (e.g. VDE, BSA or UL).

### Ring clip mounting

Ring clips are primarily used for upright mounting of screw terminal and photoflash capacitors.  
The ring clips are corrosion protected and are RoHS-compatible.



KAL1744-P-E

It is recommended to insert an additional insulating strip between capacitor and ring clip to avoid any risk of damage due to edges from the clip. The strip is included in delivery. For ordering code, see the following table. Attention must be paid to any relevant regulations (e.g. VDE, BSA or UL).



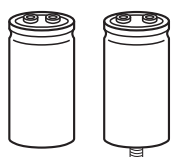
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| d    | h <sub>1</sub><br>mm | h <sub>2</sub> | Ring clip version | Ordering code<br>with insulating strip                  |
|------|----------------------|----------------|-------------------|---|
| 51.6 | 22                   | 15             |                   | B44030J0051B000<br>(insulating strip<br>length: 325 mm) |
| 64.3 | 29                   | 19             |                   | B44030J0064B000<br>(insulating strip<br>length: 420 mm) |
| 76.9 | 29                   | 19             |                   | B44030J0075B000<br>(insulating strip<br>length: 495 mm) |



| d    | h <sub>1</sub><br>mm | h <sub>2</sub> | Ring clip version | Ordering code<br>with insulating strip                           |
|------|----------------------|----------------|-------------------|--|
| 90.0 | 29                   | 19             |                   | <p>B44030J0090B000<br/>(insulating strip<br/>length: 585 mm)</p> |



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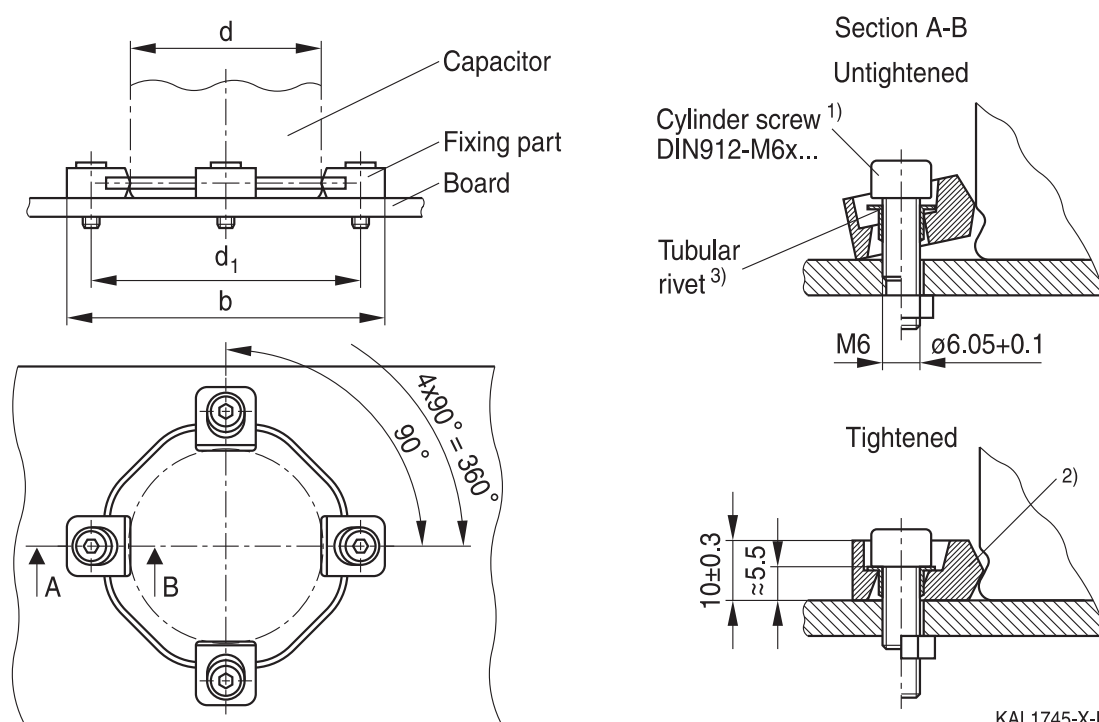
**Capacitors with screw terminals – accessories**

**Clamp mounting**

Screw terminal capacitors without threaded stud and with a diameter  $\geq 64.3$  mm can also be mounted with ring clamps. Clamp mounting offers the following advantages:

- Optimum heat transfer between capacitor base and board due to pressure contact
- High vibration resistance
- Electrically insulated material

**Dimensional drawing**



- 1) Length of screw depends on application.
- 2) The screws have to be tightened uniformly and crosswise until the fixing part rests flatly on the board.
- 3) Tubular rivets included in delivery package.

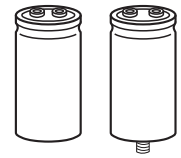
General hints for mounting: If required, the four fixation parts can be cut out from the common carrier ring and mounted separately.

**Dimensions and ordering codes**

| Capacitor diameter d | $d_1 \pm 0.2$ mm | b mm | Ordering code   |
|----------------------|------------------|------|-----------------|
| 64.3 mm              | 87               | 104  | B44030A0165B000 |
| 76.9 mm              | 99               | 116  | B44030A0175B000 |
| 90.0 mm              | 112              | 130  | B44030A0190B000 |

Screws are not included in the delivery package.

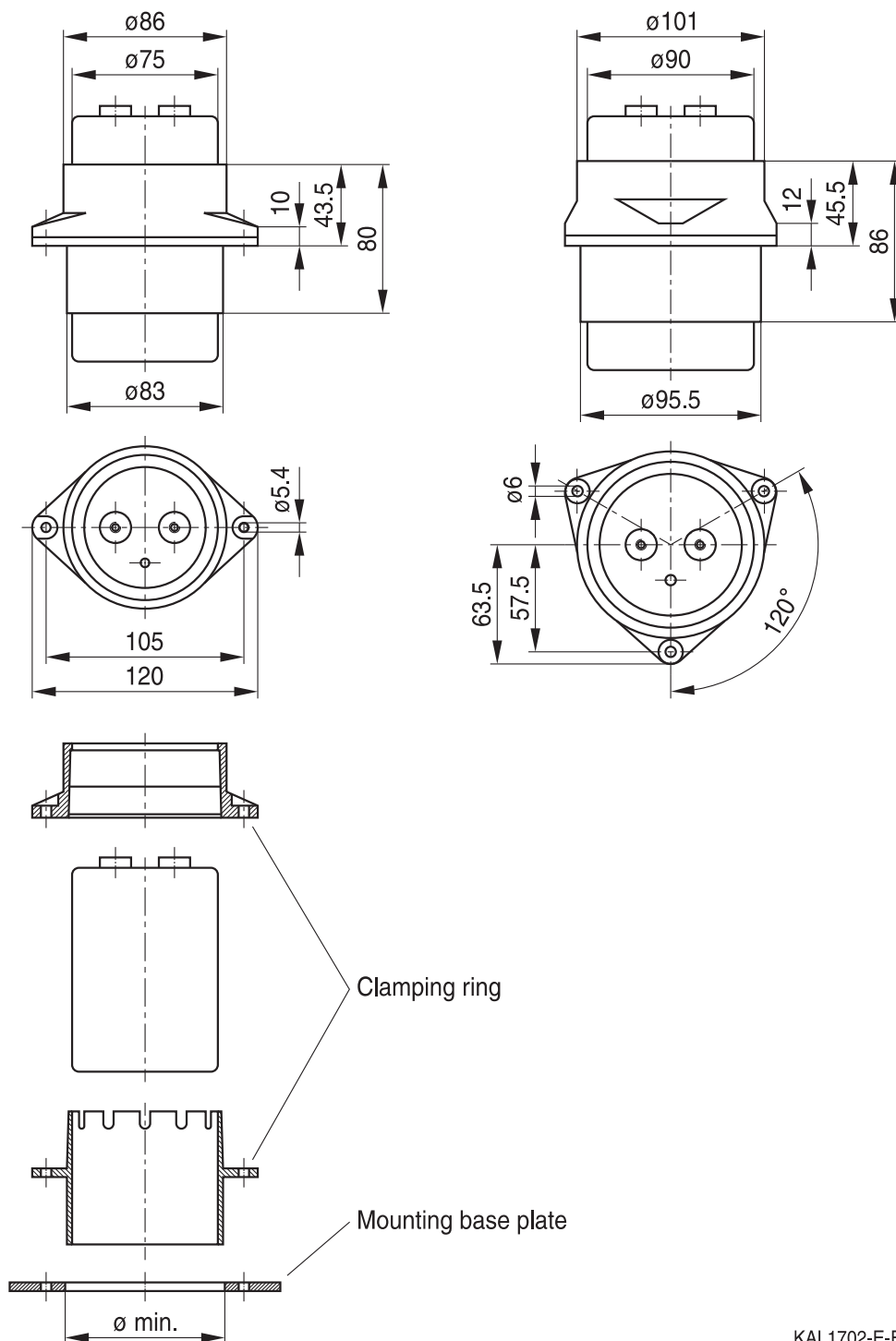



**Mounting set (ring clamps)**

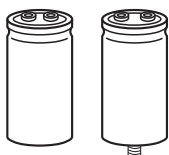
- Protects the capacitor against tilt and the terminals from mechanical stress
- Fits for different capacitor length
- Electrically insulated clamping material

**Dimensions and ordering codes**

| Capacitor diameter d | $\varnothing_{\min}$ | Ordering code   |
|----------------------|----------------------|-----------------|
| 76.9 mm              | 84 mm                | B44030A0375B000 |
| 90.0 mm              | 96.5 mm              | B44030A0390B000 |

**Dimensional drawing**


KAL1702-E-E



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Capacitors with screw terminals – accessories

## Cautions and warnings

### Personal safety

The electrolytes used have been optimized both with a view to the intended application and with regard to health and environmental compatibility. They do not contain any solvents that are detrimental to health, e.g. dimethyl formamide (DMF) or dimethyl acetamide (DMAC). Furthermore, some of the high-voltage electrolytes used are self-extinguishing.

As far as possible, we do not use any dangerous chemicals or compounds to produce operating electrolytes, although in exceptional cases, such materials must be used in order to achieve specific physical and electrical properties because no alternative materials are currently known. We do, however, restrict the amount of dangerous materials used in our products to an absolute minimum.

Materials and chemicals used in our aluminum electrolytic capacitors are continuously adapted in compliance with the TDK Electronics Corporate Environmental Policy and the latest EU regulations and guidelines such as RoHS, REACH/SVHC, GADSL, and ELV.

MDS (Material Data Sheets) are available on our website for all types listed in the data book.

MDS for customer specific capacitors are available upon request.

MSDS (Material Safety Data Sheets) are available for our electrolytes upon request.

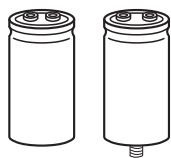
Nevertheless, the following rules should be observed when handling aluminum electrolytic capacitors: No electrolyte should come into contact with eyes or skin. If electrolyte does come into contact with the skin, wash the affected areas immediately with running water. If the eyes are affected, rinse them for 10 minutes with plenty of water. If symptoms persist, seek medical treatment. Avoid inhaling electrolyte vapor or mists. Workplaces and other affected areas should be well ventilated. Clothing that has been contaminated by electrolyte must be changed and rinsed in water.



## Product safety

The table below summarizes the safety instructions that must be observed without fail. A detailed description can be found in the relevant sections of chapter "General technical information".

| Topic  | Safety information  | Reference chapter "General technical information"                |
|--|---|--|
| Polarity                                       | Make sure that polar capacitors are connected with the right polarity.  | 1<br>"Basic construction of aluminum electrolytic capacitors"    |
| Reverse voltage                                | Voltages of opposite polarity should be prevented by connecting a diode.  | 3.1.6<br>"Reverse voltage"                                       |
| Mounting position of screw-terminal capacitors | Screw terminal capacitors must not be mounted with terminals facing down unless otherwise specified.  | 11.1.<br>"Mounting positions of capacitors with screw terminals" |
| Robustness of terminals                        | The following maximum tightening torques must not be exceeded when connecting screw terminals:<br>M5: 2.5 Nm<br>M6: 4.0 Nm  | 11.3<br>"Mounting torques"                                       |
| Mounting of single-ended capacitors            | The internal structure of single-ended capacitors might be damaged if excessive force is applied to the lead wires.<br>Avoid any compressive, tensile or flexural stress.<br>Do not move the capacitor after soldering to PC board.<br>Do not pick up the PC board by the soldered capacitor.<br>Do not insert the capacitor on the PC board with a hole space different to the lead space specified. | 11.4<br>"Mounting considerations for single-ended capacitors"    |
| Soldering                                      | Do not exceed the specified time or temperature limits during soldering.  | 11.5<br>"Soldering"  |
| Soldering, cleaning agents                     | Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors.   | 11.6<br>"Cleaning agents"  |
| Upper category temperature                     | Do not exceed the upper category temperature.   | 7.2<br>"Maximum permissible operating temperature"               |
| Passive flammability                           | Avoid external energy, e.g. fire.   | 8.1<br>"Passive flammability"                                    |



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**Capacitors with screw terminals – accessories**

| Topic                                    | Safety information   | Reference chapter "General technical information"   |
|--|--|---|
| Active flammability                      | Avoid overload of the capacitors.  | 8.2<br>"Active flammability"                        |
| Maintenance                              | Make periodic inspections of the capacitors.<br>Before the inspection, make sure that the power supply is turned off and carefully discharge the capacitors.<br>Do not apply excessive mechanical stress to the capacitor terminals when mounting. | 10<br>"Maintenance"                                 |
| Storage                                  | Do not store capacitors at high temperatures or high humidity. Capacitors should be stored at +5 to +35 °C and a relative humidity of ≤ 75%.   | 7.3<br>"Shelf life and storage conditions"          |
|  |  | Reference chapter "Capacitors with screw terminals" |
| Breakdown strength of insulating sleeves | Do not damage the insulating sleeve, especially when ring clips are used for mounting.   | "Screw terminals – accessories"                     |

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The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.

Detailed information can be found on the Internet under [www.tdk-electronics.tdk.com/orderingcodes](http://www.tdk-electronics.tdk.com/orderingcodes).


**Symbols and terms**

| Symbol        | English   | German  |
|---------------|---|---|
| C             | Capacitance   | Kapazität   |
| $C_R$         | Rated capacitance   | Nennkapazität   |
| $C_S$         | Series capacitance  | Serienkapazität   |
| $C_{S,T}$     | Series capacitance at temperature T                       | Serienkapazität bei Temperatur T                          |
| $C_f$         | Capacitance at frequency f                                | Kapazität bei Frequenz f                                  |
| d             | Case diameter, nominal dimension                          | Gehäusedurchmesser, Nennmaß                               |
| $d_{max}$     | Maximum case diameter                                     | Maximaler Gehäusedurchmesser                              |
| ESL           | Self-inductance   | Eigeninduktivität   |
| ESR           | Equivalent series resistance                              | Ersatzserienwiderstand                                    |
| $ESR_f$       | Equivalent series resistance at frequency f               | Ersatzserienwiderstand bei Frequenz f                     |
| $ESR_T$       | Equivalent series resistance at temperature T             | Ersatzserienwiderstand bei Temperatur T                   |
| f             | Frequency   | Frequenz  |
| I             | Current   | Strom   |
| $I_{AC}$      | Alternating current (ripple current)                      | Wechselstrom  |
| $I_{AC,RMS}$  | Root-mean-square value of alternating current             | Wechselstrom, Effektivwert                                |
| $I_{AC,f}$    | Ripple current at frequency f                             | Wechselstrom bei Frequenz f                               |
| $I_{AC,max}$  | Maximum permissible ripple current                        | Maximal zulässiger Wechselstrom                           |
| $I_{AC,R}$    | Rated ripple current                                      | Nennwechselstrom  |
| $I_{leak}$    | Leakage current   | Reststrom   |
| $I_{leak,op}$ | Operating leakage current                                 | Betriebsreststrom   |
| l             | Case length, nominal dimension                            | Gehäuselänge, Nennmaß                                     |
| $l_{max}$     | Maximum case length (without terminals and mounting stud) | Maximale Gehäuselänge (ohne Anschlüsse und Gewindebolzen) |
| R             | Resistance  | Widerstand  |
| $R_{ins}$     | Insulation resistance                                     | Isolationswiderstand                                      |
| $R_{symm}$    | Balancing resistance                                      | Symmetrierwiderstand                                      |
| T             | Temperature   | Temperatur  |
| $\Delta T$    | Temperature difference                                    | Temperaturdifferenz                                       |
| $T_A$         | Ambient temperature                                       | Umgebungstemperatur                                       |
| $T_C$         | Case temperature  | Gehäusetemperatur   |
| $T_B$         | Capacitor base temperature                                | Temperatur des Gehäusebodens                              |
| t             | Time  | Zeit  |
| $\Delta t$    | Period  | Zeitraum  |
| $t_b$         | Service life (operating hours)                            | Brauchbarkeitsdauer (Betriebszeit)                        |



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| Symbol        | English                                 | German                               |
|---------------|---|--------------------------------------|
| V             | Voltage                                 | Spannung                             |
| $V_F$         | Forming voltage                         | Formierspannung                      |
| $V_{op}$      | Operating voltage                       | Betriebsspannung                     |
| $V_R$         | Rated voltage, DC voltage               | Nennspannung, Gleichspannung         |
| $V_S$         | Surge voltage                           | Spitzenspannung                      |
| $X_C$         | Capacitive reactance                    | Kapazitiver Blindwiderstand          |
| $X_L$         | Inductive reactance                     | Induktiver Blindwiderstand           |
| Z             | Impedance                               | Scheinwiderstand                     |
| $Z_T$         | Impedance at temperature T              | Scheinwiderstand bei Temperatur T    |
| $\tan \delta$ | Dissipation factor                      | Verlustfaktor                        |
| $\lambda$     | Failure rate                            | Ausfallrate                          |
| $\epsilon_0$  | Absolute permittivity                   | Elektrische Feldkonstante            |
| $\epsilon_r$  | Relative permittivity                   | Dielektrizitätszahl                  |
| $\omega$      | Angular velocity; $2 \cdot \pi \cdot f$ | Kreisfrequenz; $2 \cdot \pi \cdot f$ |

**Note**

All dimensions are given in mm.

## 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, we are 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 a product with the properties described in the product specification is suitable for use in a particular customer application.
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