

Aluminum electrolytic capacitors

Single-ended capacitors

Series/Type: B42824, B42851

Date: December 2014

General-purpose grade capacitors

Applications

- Audio frequency dividers
- For filtering, coupling and pulse circuits

Features

- Bipolar
- Low dissipation factor $\tan \delta$
- RoHS-compatible

Construction

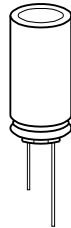
- Radial leads
- Charge-discharge proof, non polarized
- Aluminum case with insulating sleeve
- Case with safety vent from diameter 6.3 mm

Delivery mode

Terminal configurations and packing:

- Bulk
- Taped, Ammo pack
- Cut
- Kinked

Refer to chapter "Single-ended capacitors – Taping, packing and lead configurations" for further details.




Specifications and characteristics in brief

Series	B42824	B42851
Rated voltage V_R	10 ... 100 V DC	10 ... 50 V DC
Surge voltage V_S	$1.15 \cdot V_R$	$1.15 \cdot V_R$
Rated capacitance C_R	2.2 ... 1000 μ F	2.2 ... 1000 μ F
Capacitance tolerance	$\pm 20\% \triangleq M$	$\pm 20\% \triangleq M$
Voltage endurance test	85 °C; V_R ; $I_{AC,R}$ 1000 h with polarity inverted every 250 h	105 °C; V_R ; $I_{AC,R}$ 1000 h with polarity inverted every 250 h
Post test requirements	$ \Delta C/C \leq 30\%$ of initial value $\tan \delta \leq 2$ times initial specified limit $I_{leak} \leq$ initial specified limit	
Vibration resistance test	To IEC 60068-2-6, test Fc: Frequency range 10 Hz ... 2 kHz, displacement amplitude max. 0.75 mm, acceleration max. 10 g, duration 3×2 h. Capacitor rigidly clamped by the aluminum case.	
IEC climatic category	To IEC 60068-1: B42824: 40/085/56 (–40 °C/+85 °C/56 days damp heat test)	To IEC 60068-1: B42851: 40/105/56 (–40 °C/+105 °C/56 days damp heat test)
Sectional specification	IEC 60384-4	

Further information, specific technical data and ordering codes are available upon request.



B42824, B42851

Bipolar series – 85 °C and 105°C

Taping, packing and lead configurations

Taping

Single-ended capacitors are available taped in Ammo pack from diameter 8 to 18 mm as follows:

Lead spacing $F = 3.5$ mm ($\varnothing d = 8$ mm)

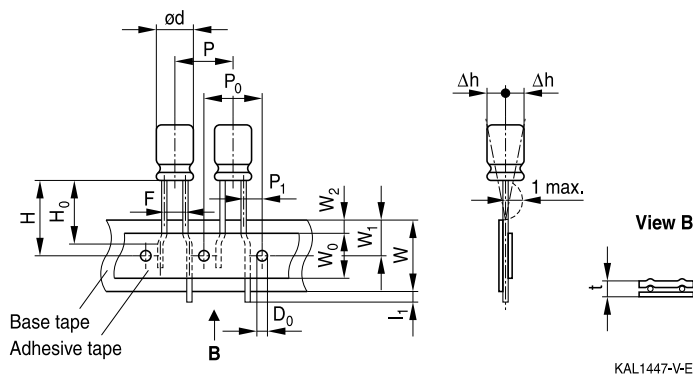
Lead spacing $F = 5.0$ mm ($\varnothing d = 8 \dots 12.5$ mm)

Lead spacing $F = 7.5$ mm ($\varnothing d = 16 \dots 18$ mm).

The dimensions for F , P_1 and 1 max. are specified with reference to the center of the terminal wires.

Lead spacing 3.5 mm ($\varnothing d = 8$ mm)

Last 3 digits of ordering code: 006



Dimensions in mm

$\varnothing d$	F	H	W	W_0	W_1	W_2	P	P_0	P_1	l_1	t	Δh	D_0
8	3.5	18.5	18.0	9.5	9.0	3.0	12.7	12.7	4.6	1.0	0.7	1.0	4.0
Tolerance	+0.8 -0.2	± 1.0	± 0.5	min.	± 0.5	max.	± 1.0	± 0.3	± 0.6	max.	± 0.2	max.	± 0.2

Leads can also run straight through the taping area.

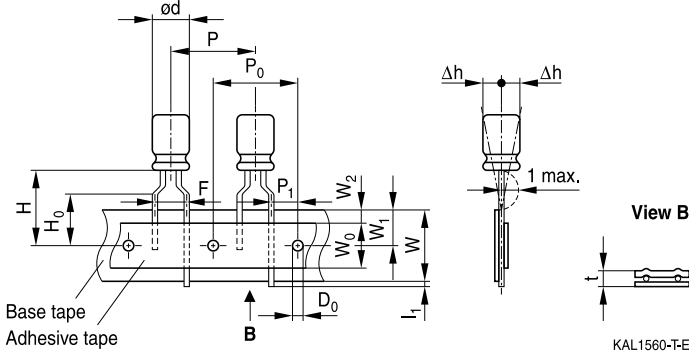


B42824, B42851

Bipolar series – 85 °C and 105°C

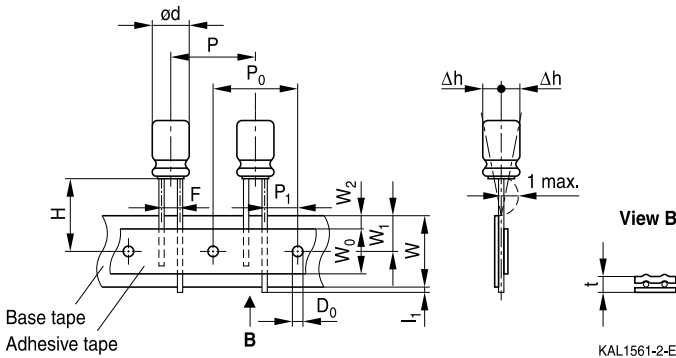
Lead spacing 5.0 mm (∅ d = 8 mm)

Last 3 digits of ordering code: 008



Lead spacing 5.0 mm (∅ d = 10 ... 12.5 mm)

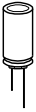
Last 3 digits of ordering code: 008



Dimensions in mm

∅ d	F	H	W	W ₀	W ₁	W ₂	H ₀	P	P ₀	P ₁	l ₁	t	Δh	D ₀
8		20.0		9.5			16.0	12.7	12.7	3.85				
10	5.0	19.0	18.0	9.5	9.0	1.5	–	12.7	12.7	3.85	1.0	0.6	1.0	4.0
12.5		19.0		11.5			–	15.0	15.0	5.0				
Tolerance	+0.8 –0.2	±0.75	±0.5	min.	±0.5	max.	±0.5	±1.0	±0.2	±0.5	max.	+0.3 –0.2	max.	±0.2

Taping is available up to dimensions d × l = 12.5 × 25 mm.

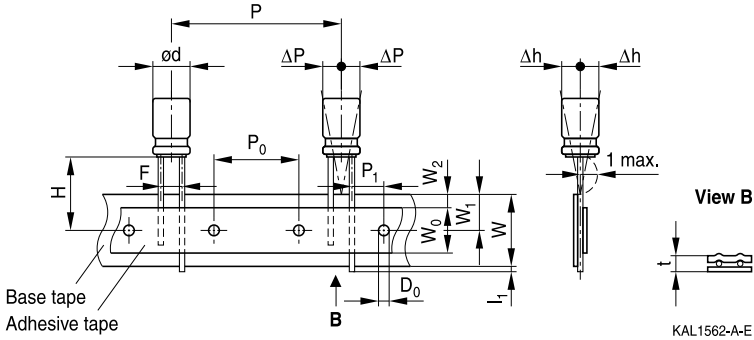


B42824, B42851

Bipolar series – 85 °C and 105°C

Lead spacing 7.5 mm (∅ d = 16 ...18 mm)

Last 3 digits of ordering code: 009



Dimensions in mm

∅ d	F	H	W	W ₀	W ₁	W ₂	P	P ₀	P ₁	l ₁	t	ΔP	Δh	D ₀
16	7.5	18.5	18.0	12.5	9.0	1.5	30.0	15.0	3.75	1.0	0.7	0	0	4.0
18														
Tolerance	±0.8	-0.5 +0.75	±0.5	min.	±0.5	max.	±1.0	±0.2	±0.5	max.	±0.2	±1.0	±1.0	±0.2

Taping is available up to dimensions d × l = 16 × 31.5 mm and 18 × 31.5 mm.



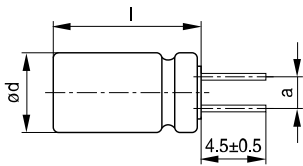
Cut or kinked leads

Single-ended capacitors are available with cut or kinked leads. Other lead configurations also available upon request.

Cut leads

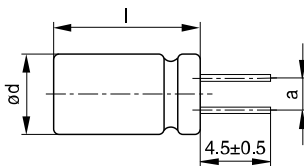
Last 3 digits of ordering code: 002

With stand-off rubber seal



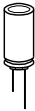
KAL1085-I

With flat rubber seal



KAL1086-R

Case size d × l (mm)	Dimensions (mm) a ±0.5
10 × 12.5	5.0
10 × 16	5.0
10 × 20	5.0
12.5 × 20	5.0
12.5 × 25	5.0
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
16 × 35.5	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35	7.5
18 × 40	7.5



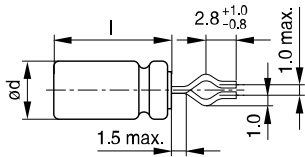
B42824, B42851

Bipolar series – 85 °C and 105°C

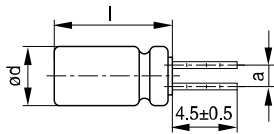
Kinked leads

Last 3 digits of ordering code: 001

With stand-off rubber seal

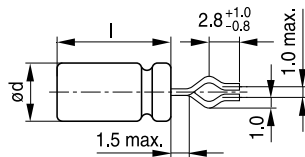


KAL1081-K

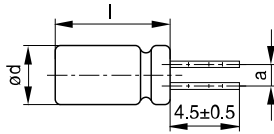


KAL1083-2

With flat rubber seal



KAL1082-T



KAL1084-A

Case size d × l (mm)	Dimensions (mm) a ±0.5
10 × 20	5.0
12.5 × 20	5.0
12.5 × 25	5.0
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
16 × 35.5	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35	7.5
18 × 40	7.5



PAPR leads (Protection Against Polarity Reversal)

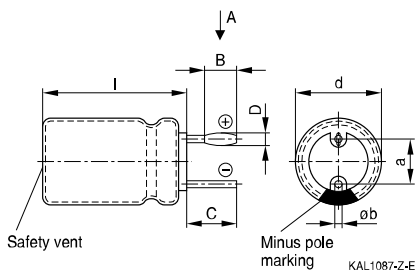
These lead configurations ensure correct placement of the capacitor on the PCB with regard to polarity. PAPR leads are available for diameters from 10 mm up to 18 mm (excluding $d \times l = 12.5 \times 30/35/40$ mm).

There are three configurations available: Crimped leads, J leads, bent 90° leads.

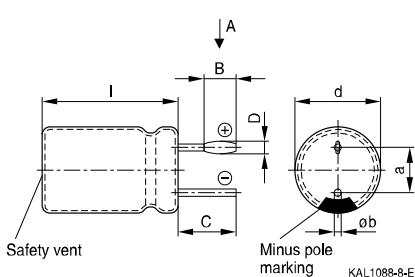
Crimped leads

Last 3 digits of ordering code: 003

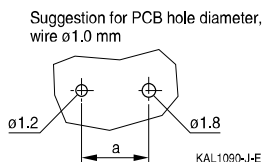
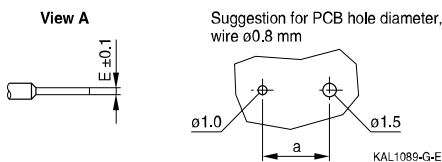
With stand-off rubber seal



With flat rubber seal



Suggestion for PCB hole diameter



Case size $d \times l$ (mm)	Dimensions (mm)					
	B ± 0.2	C ± 0.5	D ± 0.1	E ± 0.1	a ± 0.5	$\varnothing b$
16 × 20	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.05
16 × 25	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.05
16 × 31.5	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.05
16 × 35.5	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.05
18 × 20	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.1
18 × 25	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.1
18 × 31.5	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.1
18 × 35	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.1
18 × 40	1.5	3.0	1.3	0.3	7.5	0.8 ± 0.1

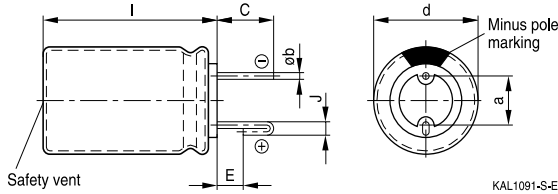


B42824, B42851

Bipolar series – 85 °C and 105°C

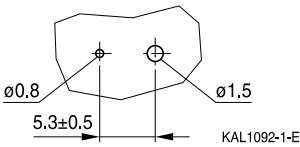
J leads

Last 3 digits of ordering code: 004

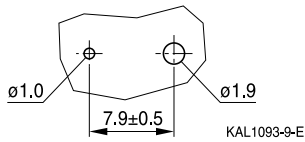


Suggestion for PCB hole diameter

Suggestion for PCB hole diameter,
wire $\varnothing 0.6$ mm



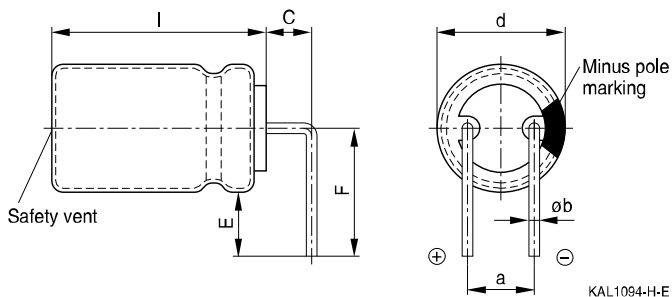
Suggestion for PCB hole diameter,
wire $\varnothing 0.8$ mm



Case size d × l (mm)	Dimensions (mm)				
	C ±0.5	E ±0.5	J ±0.2	a ±0.5	∅b
10 × 12.5	3.2	0.7	1.2	5.0	0.6 ±0.05
10 × 16	3.2	0.7	1.2	5.0	0.6 ±0.05
10 × 20	3.2	0.7	1.2	5.0	0.6 ±0.05
12.5 × 20	3.2	0.7	1.2	5.0	0.6 ±0.05
12.5 × 25	3.2	0.7	1.2	5.0	0.6 ±0.05
16 × 20	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 25	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 31.5	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 35.5	3.5	0.7	1.6	7.5	0.8 ±0.05
18 × 20	3.5	0.7	1.6	7.5	0.8 ±0.1
18 × 25	3.5	0.7	1.6	7.5	0.8 ±0.1
18 × 31.5	3.5	0.7	1.6	7.5	0.8 ±0.1
18 × 35	3.5	0.7	1.6	7.5	0.8 ±0.1


Bent 90° leads for horizontal mounting pinning

Last 3 digits of ordering code: 012



Case size d × l (mm)	Dimensions (mm)				
	C ±0.5	E ±0.5	F ±0.5	a ±0.5	Øb
16 × 20	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 25	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 31.5	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 35.5	4.0	4.0	12.0	7.5	0.8 ±0.05
18 × 20	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 25	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 31.5	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 35	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 40	4.0	4.0	13.0	7.5	0.8 ±0.1

Bent leads for diameter 12.5 mm available upon request.

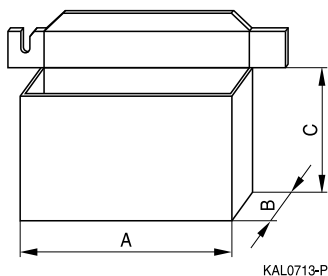


B42824, B42851

Bipolar series – 85 °C and 105°C

Packing units and box dimensions

Ammo pack



Case size d × l mm	Dimensions (mm)			Packing units pcs.
	A _{max}	B _{max}	C _{max}	
8 × 11.5	345	60	240	1000
10 × 12.5	345	60	280	750
10 × 16	345	65	200	500
10 × 20	345	65	200	500
12.5 × 20	345	65	260	500
12.5 × 25	345	65	260	500
16 × 20	320	65	285	300
16 × 25	320	65	285	300
16 × 31.5	320	75	275	300
18 × 20	320	65	285	250
18 × 25	320	65	285	250
18 × 31.5	320	75	275	250


Overview of packing units and code numbers for case sizes 8 × 11.5 ... 16 × 35.5

					PAPR				
Case size d × l	Stan- dard, bulk	Taped, Ammo pack		Kinked leads, bulk	Cut leads, bulk	Crimped leads, blister	J leads, blister	Bent 90° leads, blister	
mm	pcs.	pcs.		pcs.	pcs.	pcs.	pcs.	pcs.	
8 × 11.5	1000	1000		–	–	–	–		
10 × 12.5	1000	750		–	1000	–	675		
10 × 16	1000	500		–	1000	–	675		
10 × 20	500	500		500	500	–	500		
12.5 × 20	350	500		350	350	–	300	1)	
12.5 × 25	250	500		500	500	–	225	1)	
12.5 × 30	200	–		–	–	–	–		
12.5 × 35	175	–		–	–	–	–		
12.5 × 40	175	–		–	–	–	–		
16 × 20	250	300		200	200	200	200	120	
16 × 25	250	300		200	200	200	200	216	
16 × 31.5	200	300		250	250	344	344	180	
16 × 35.5	100	–		100	100	150	150	150	
The last three digits of the complete ordering code state the lead configuration	000	Code	F (mm)	d (mm)	001	002	003	004	012
		006	3.5	8					
		008	5	8...12.5					
		009	7.5	16...18					

1) Available upon request



B42824, B42851

Bipolar series – 85 °C and 105°C

Overview of packing units and code numbers for case sizes 18 × 20 ... 18 × 40

					PAPR				
Case size d × l mm	Standard, bulk pcs.	Taped, Ammo pack pcs.			Kinked leads, bulk pcs.	Cut leads, bulk pcs.	Crimped leads, blister pcs.	J leads, blister pcs.	Bent 90° leads, blister pcs.
18 × 20	175	250			175	175	200	200	120
18 × 25	150	250			150	150	200	200	120
18 × 31.5	100	250			100	100	150	150	120
18 × 35	100	–			100	100	150	150	150
18 × 40	125	–			100	100	120	–	72
The last three digits of the complete ordering code state the lead configuration	000	Code	F (mm)	d (mm)	001	002	003	004	012
		009	7.5	16...18					



Cautions and warnings

Personal safety

The electrolytes used by EPCOS 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 by EPCOS are self-extinguishing.

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

Materials and chemicals used in EPCOS aluminum electrolytic capacitors are continuously adapted in compliance with the EPCOS 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 the EPCOS 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 all of 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.



B42824, B42851

Bipolar series – 85 °C and 105°C

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 "Basic construction of aluminum electrolytic capacitors"
Reverse voltage	Voltages of opposite polarity should be prevented by connecting a diode.	3.1.6 "Reverse voltage"
Mounting position of screw-terminal capacitors	Screw terminal capacitors must not be mounted with terminals facing down unless otherwise specified.	11.1. "Mounting positions of capacitors with screw terminals"
Robustness of terminals	The following maximum tightening torques must not be exceeded when connecting screw terminals: M5: 2.5 Nm M6: 4.0 Nm	11.3 "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. Avoid any compressive, tensile or flexural stress. Do not move the capacitor after soldering to PC board. Do not pick up the PC board by the soldered capacitor. Do not insert the capacitor on the PC board with a hole space different to the lead space specified.	11.4 "Mounting considerations for single-ended capacitors"
Soldering	Do not exceed the specified time or temperature limits during soldering.	11.5 "Soldering"
Soldering, cleaning agents	Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors.	11.6 "Cleaning agents"
Upper category temperature	Do not exceed the upper category temperature.	7.2 "Maximum permissible operating temperature"
Passive flammability	Avoid external energy, e.g. fire.	8.1 "Passive flammability"



Topic	Safety information	Reference chapter "General technical information"
Active flammability	Avoid overload of the capacitors.	8.2 "Active flammability"
Maintenance	Make periodic inspections of the capacitors. Before the inspection, make sure that the power supply is turned off and carefully discharge the electricity of the capacitors. Do not apply excessive mechanical stress to the capacitor terminals when mounting.	10 "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 "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"

Display of ordering codes for EPCOS products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of EPCOS, 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.epcos.com/orderingcodes



B42824, B42851

Bipolar series – 85 °C and 105°C

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
ΔT	Temperature difference	Temperaturdifferenz
T_A	Ambient temperature	Umgebungstemperatur
T_C	Case temperature	Gehäusetemperatur
T_B	Capacitor base temperature	Temperatur des Gehäusebodens
t	Time	Zeit
Δt	Period	Zeitraum
t_b	Service life (operating hours)	Brauchbarkeitsdauer (Betriebszeit)



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 δ	Dissipation factor	Verlustfaktor
λ	Failure rate	Ausfallrate
ε ₀	Absolute permittivity	Elektrische Feldkonstante
ε _r	Relative permittivity	Dielektrizitätszahl
ω	Angular velocity; 2 · π · f	Kreisfrequenz; 2 · π · f

Note

All dimensions are given in mm.

Important notes

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Important notes

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