Aluminum Electrolytic Capacitors

Snap-in Capacitors

Series/Type: **B43659**

Date: August 2025

General-purpose grade capacitors

Applications

- Power supplies
- Frequency converters
- Uninterruptible power supplies
- Solar inverters
- Not for automotive applications unless otherwise specified

Features

- Ultra-compact
- High reliability
- High ripple current capability
- RoHS-compatible

Construction

- Minus pole marking on shrinking sleeve
- Minus pole not insulated from case
- Overload protection by pressure relief device on the base
- Length up to 100 mm on request

Terminals

- Snap-in terminals (2 pins, 4.5 mm)
- Snap-in terminals (2 pins, 6.3 mm)
- Snap-in terminals (3 pins, 4.5 mm)

Specifications and characteristics in brief

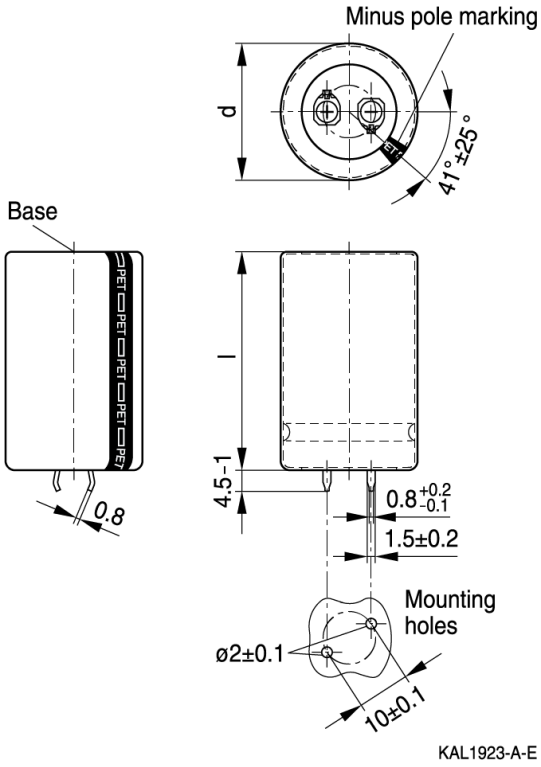
Rated voltage V_R Surge voltage V_S	420 ... 475 V DC 1.10 · V_R (15 ... 35 °C)	
Rated capacitance C_R Capacitance tolerance	140 ... 1440 µF ±20% ≙ M	
Dissipation factor tan δ (T_A =20 °C, 120 Hz)	≤ 0.20	
Leakage current I_{leak} (5 min, T_A =20 °C)	$I_{leak} \leq 0.3\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)^{0.7} + 4\ \mu A$	
Self-inductance ESL	Approx. 20 nH	
Useful life[1] T_A =105 °C; V_R; $I_{AC,R}$	> 2000 h	Requirements: |ΔC/C| ≤ 20% of initial value tan δ ≤ 2 times initial specified limit I_{leak} ≤ initial specified limit
Vibration resistance test	To IEC 60068-2-6:2007, test Fc: Frequency range 10 ... 55 Hz, displacement amplitude 0.35 mm, acceleration max. 5 *g*, duration 3 x 2 h. Capacitor mounted by its body which is rigidly clamped to the work surface.	
Characteristics at low temperature	Max. impedance ratio at 100 Hz	V_R | 420 ... 475 V DC $Z_{T_A=-25\ °C}$ / $Z_{T_A=20\ °C}$ | 10 $Z_{T_A=-40\ °C}$ / $Z_{T_A=20\ °C}$ | 20
IEC climatic category	To IEC 60068-1:2013: 25/105/56 (-25 °C/+105 °C/56 days damp heat test) The capacitors can be operated in the temperature range of T_A =–40 °C to T_A =+105 °C but the impedance at –40 °C must be taken into consideration.	
Sectional specification[2]	IEC 60384-4:2016	

1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life.
2) Refer to chapter “General technical information, 2 Standards and specifications” for further details.

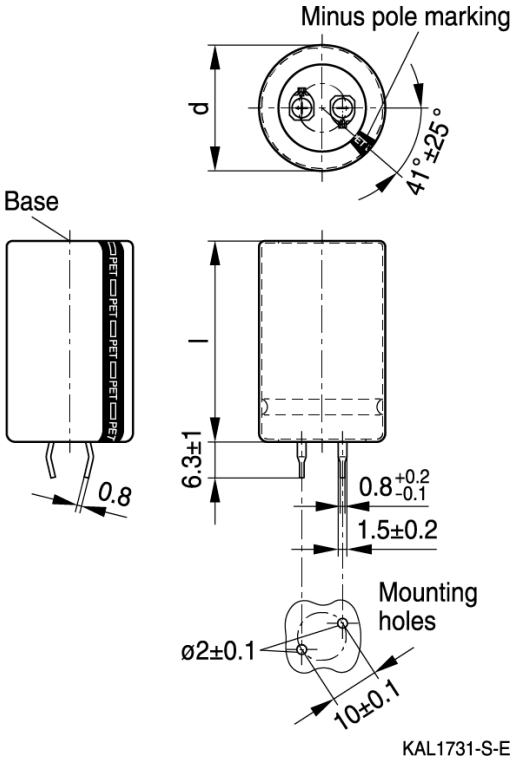
Dimensional drawings

Snap-in capacitors with PET sleeve, without base disk

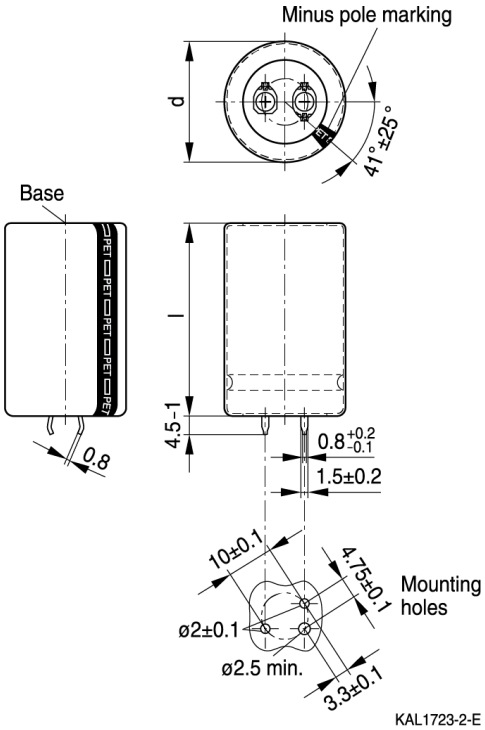
"PET" marking on the sleeve. Pressure relief device on the base.



Snap-in terminals (2 pins, 4.5 mm)



Snap-in terminals (2 pins, 6.3 mm)



Snap-in terminals (3 pins, 4.5 mm)

Dimensions and packing units

Dimensions (mm)		Approx. weight	Packing units
d +1	l + 2.5/–2	(g)	(pcs.)
22	25	9	160
22	30	12	160
22	35	15	160
22	40	18	160
22	45	20	160
22	50	24	160

Dimensions (mm)		Approx. weight	Packing units
d +1	l + 2.5/–2	(g)	(pcs.)
25.4	25	13	130
25.4	30	17	130
25.4	35	19	130
25.4	40	22	130
25.4	45	25	130
25.4	50	29	130
25.4	55	32	130
25.4	60	36	45
25.4	65	39	45
25.4	70	42	45

Dimensions (mm)		Approx. weight	Packing units
d +1	l + 2.5/–2	(g)	(pcs.)
30	25	17	80
30	30	23	80
30	35	29	80
30	40	36	80
30	45	41	80
30	50	46	80
30	55	53	80
30	60	58	60
30	65	64	60
30	70	69	60

Dimensions (mm)		Approx. weight	Packing units
d +1	l + 2.5/–2	(g)	(pcs.)
35	25	22	60
35	30	29	60
35	35	36	60
35	40	41	60
35	45	56	60
35	50	70	60
35	55	81	60
35	60	90	36

Packaging of snap-in capacitors

For ecological reasons cardboard is used for packaging.

Ordering codes

Identification in 3rd block of ordering code	
	PET sleeve, without base disk
Snap-in terminals (2 pins, 4.5 mm)	M*57
Snap-in terminals (3 pins, 4.5 mm)	M*52
Snap-in terminals (2 pins, 6.3 mm)	M*50

* Digit used for nominal capacitance indication.

Ordering examples:

B43659A5108M057 } capacitor with snap-in terminals (2 pins, 4.5 mm), PET sleeve, without base disk

B43659A5108M052 } capacitor with snap-in terminals (3 pins, 4.5 mm), PET sleeve, without base disk

Overview of available types

The capacitance and voltage ratings listed below are available in different case sizes upon request. Other voltage and capacitance ratings are also available upon request.

V_R (V DC)	420	450	475
	Case dimensions d x l (mm)		
C_R (µF)			
140		22 x 25	
160	22 x 25		
180			25.4 x 25
190		22 x 30	
210	22 x 30	25.4 x 25	
230	25.4 x 25	22 x 35	
240			25.4 x 30
260	22 x 35		
270		25.4 x 30	
280		22 x 40	30 x 25
290			25.4 x 35
300	22 x 40 25.4 x 30		
320		22 x 45 30 x 25	
330		25.4 x 35	
340			25.4 x 40
350	22 x 45 30 x 25		
360	25.4 x 35	22 x 50	30 x 30
380			35 x 25
400	22 x 50	25.4 x 40	25.4 x 45
410		30 x 30 35 x 25	
430	25.4 x 40		
450	30 x 30		25.4 x 50 30 x 35
460		25.4 x 45	
470	35 x 25		
490			35 x 30
500	25.4 x 45		25.4 x 55
510		30 x 35	
520		25.4 x 50	

Overview of available types

The capacitance and voltage ratings listed below are available in different case sizes upon request. Other voltage and capacitance ratings are also available upon request.

V_R (V DC)	420	450	475
	Case dimensions d x l (mm)		
C_R (µF)			
530			30 x 40
540		35 x 30	
560	25.4 x 50 30 x 35		25.4 x 60
580		25.4 x 55	
600		30 x 40	35 x 35
610	35 x 30		25.4 x 65 30 x 45
630	25.4 x 55		
640		25.4 x 60	
660	30 x 40	35 x 35	25.4 x 70
680		25.4 x 65	
690			30 x 50
700	25.4 x 60	30 x 45	
710			35 x 40
740		25.4 x 70	
750	35 x 35		
760	30 x 45		
770			30 x 55
780		35 x 40	
790		30 x 50	
820			35 x 45
860	30 x 50		30 x 60
890	35 x 40	30 x 55	
910		35 x 45	
930			35 x 50
940			30 x 65
970	30 x 55		
1000		30 x 60	
1020	35 x 45		30 x 70
1030		35 x 50 30 x 65	

Overview of available types

The capacitance and voltage ratings listed below are available in different case sizes upon request. Other voltage and capacitance ratings are also available upon request.

V_R (V DC)	420	450	475
	Case dimensions d x l (mm)		
C_R (µF)			
1070	30 x 60		
1120		30 x 70	
1150		35 x 55	
1160	35 x 50		
1280		35 x 60	
1300	35 x 55		
1440	35 x 60		

Technical data and ordering codes

C_R 100 Hz 20 ºC[1] µF	Case dimensions d x l mm	ESR_{typ} 120 Hz 20 °C[1] mΩ	ESR_{typ} 360 Hz 60 °C[1] mΩ	$I_{AC,max}$ 120 Hz 60 °C[1] A	$I_{AC,max}$ 120 Hz 85 °C[1] A	$I_{AC,R}$ 120 Hz 105 °C[1] A	Ordering code (composition see page 12)
V_R = 420 V DC							
160	22 x 25	820	200	2.06	1.55	0.89	B43659G0167M05#
210	22 x 30	630	160	2.56	1.93	1.10	B43659G0217M05#
230	25.4 x 25	590	160	2.54	1.91	1.09	B43659G0237M05#
260	22 x 35	510	130	3.06	2.30	1.31	B43659G0267M05#
300	22 x 40	440	110	3.45	2.60	1.48	B43659G0307M05#
300	25.4 x 30	450	120	3.13	2.36	1.35	B43659H0307M05#
350	22 x 45	380	95	3.94	2.97	1.69	B43659G0357M05#
350	30 x 25	410	130	3.09	2.32	1.33	B43659H0357M05#
360	25.4 x 35	380	100	3.64	2.74	1.57	B43659G0367M05#
400	22 x 50	330	85	4.42	3.33	1.90	B43659G0407M05#
430	25.4 x 40	310	85	4.21	3.17	1.81	B43659G0437M05#
450	30 x 30	320	100	3.76	2.83	1.62	B43659G0457M05#
470	35 x 25	340	130	3.39	2.55	1.46	B43659G0477M05#
500	25.4 x 45	270	75	4.80	3.61	2.06	B43659G0507M05#
560	25.4 x 50	240	65	5.29	3.98	2.28	B43659G0567M05#
560	30 x 35	260	85	4.47	3.36	1.92	B43659H0567M05#
610	35 x 30	260	100	4.13	3.10	1.66	B43659G0617M05#
630	25.4 x 55	210	60	5.86	4.41	2.52	B43659G0637M05#
660	30 x 40	220	70	5.12	3.85	2.06	B43659G0667M05#
700	25.4 x 60	190	55	6.43	4.84	2.59	B43659G0707M05#
750	35 x 35	210	85	4.86	3.65	1.95	B43659G0757M05#
760	30 x 45	190	60	5.77	4.34	2.32	B43659G0767M05#
860	30 x 50	170	55	6.40	4.82	2.57	B43659G0867M05#
890	35 x 40	180	70	5.58	4.19	2.24	B43659G0897M05#
970	30 x 55	150	50	7.09	5.33	2.85	B43659G0977M05#
1020	35 x 45	150	60	6.26	4.71	2.52	B43659G0108M25#
1070	30 x 60	140	45	7.73	5.81	3.11	B43659G0108M75#
1160	35 x 50	140	55	6.98	5.24	2.80	B43659G0118M65#
1300	35 x 55	120	50	7.68	5.78	3.09	B43659G0138M05#
1440	35 x 60	110	45	8.38	6.30	3.37	B43659G0148M45#

1) Ambient temperature T_A

Technical data and ordering codes

C_R 100 Hz 20 ºC[1] µF	Case dimensions d x l mm	ESR_{typ} 120 Hz 20 °C[1] mΩ	ESR_{typ} 360 Hz 60 °C[1] mΩ	$I_{AC,max}$ 120 Hz 60 °C[1] A	$I_{AC,max}$ 120 Hz 85 °C[1] A	$I_{AC,R}$ 120 Hz 105 °C[1] A	Ordering code (composition see page 12)
V_R = 450 V DC							
140	22 x 25	880	220	1.92	1.45	0.83	B43659A5147M05#
190	22 x 30	650	160	2.46	1.85	1.06	B43659A5197M05#
210	25.4 x 25	600	160	2.47	1.86	1.06	B43659A5217M05#
230	22 x 35	530	130	2.88	2.17	1.24	B43659A5237M05#
270	25.4 x 30	470	130	3.02	2.27	1.30	B43659A5277M05#
280	22 x 40	440	110	3.40	2.56	1.46	B43659A5287M05#
320	22 x 45	380	100	3.82	2.87	1.64	B43659A5327M05#
320	30 x 25	420	130	3.04	2.29	1.31	B43659B5327M05#
330	25.4 x 35	380	100	3.55	2.67	1.53	B43659A5337M05#
360	22 x 50	340	85	4.22	3.18	1.82	B43659A5367M05#
400	25.4 x 40	320	85	4.17	3.13	1.79	B43659A5407M05#
410	30 x 30	330	100	3.68	2.77	1.58	B43659A5417M05#
410	35 x 25	340	130	3.33	2.51	1.43	B43659B5417M05#
460	25.4 x 45	270	75	4.70	3.53	2.02	B43659A5467M05#
510	30 x 35	260	85	4.38	3.29	1.88	B43659A5517M05#
520	25.4 x 50	240	65	5.22	3.93	2.24	B43659A5527M05#
540	35 x 30	260	100	4.09	3.08	1.64	B43659A5547M05#
580	25.4 x 55	220	60	5.74	4.32	2.47	B43659A5587M05#
600	30 x 40	220	70	5.02	3.78	2.02	B43659A5607M05#
640	25.4 x 60	200	55	6.27	4.71	2.52	B43659A5647M05#
660	35 x 35	210	80	4.80	3.61	1.93	B43659A5667M05#
680	25.4 x 65	220	55	6.46	4.87	2.60	B43659A5687M05#
700	30 x 45	190	60	5.71	4.29	2.29	B43659A5707M05#
740	25.4 x 70	210	55	6.96	5.24	2.80	B43659A5747M05#
780	35 x 40	180	70	5.50	4.14	2.21	B43659A5787M05#
790	30 x 50	170	55	6.33	4.76	2.54	B43659A5797M05#
890	30 x 55	150	50	7.01	5.27	2.81	B43659A5897M05#
910	35 x 45	150	60	6.24	4.69	2.51	B43659A5917M05#
1000	30 x 60	130	45	7.74	5.82	3.11	B43659A5108M05#
1030	30 x 65	150	45	7.97	6.00	3.21	B43659B5108M35#
1030	35 x 50	140	50	6.93	5.21	2.78	B43659A5108M35#
1120	30 x 70	140	40	8.58	6.46	3.45	B43659A5118M25#
1150	35 x 55	120	50	7.50	5.64	3.01	B43659A5118M55#
1280	35 x 60	110	45	8.21	6.17	3.30	B43659A5128M85#

1) Ambient temperature T_A

Technical data and ordering codes

C_R 100 Hz 20 ºC[1] µF	Case dimensions d x l mm	ESR_{typ} 120 Hz 20 °C[1] mΩ	ESR_{typ} 360 Hz 60 °C[1] mΩ	$I_{AC,max}$ 120 Hz 60 °C[1] A	$I_{AC,max}$ 120 Hz 85 °C[1] A	$I_{AC,R}$ 120 Hz 105 °C[1] A	Ordering code (composition see below)
V_R = 475 V DC							
180	25.4 x 25	880	180	2.28	1.72	0.98	B43659A0187M05#
240	25.4 x 30	660	140	2.87	2.16	1.23	B43659A0247M05#
280	30 x 25	590	150	2.85	2.15	1.23	B43659A0287M05#
290	25.4 x 35	550	110	3.35	2.52	1.44	B43659A0297M05#
340	25.4 x 40	470	100	3.83	2.88	1.65	B43659A0347M05#
360	30 x 30	460	110	3.47	2.61	1.49	B43659A0367M05#
380	35 x 25	470	140	3.17	2.39	1.36	B43659A0387M05#
400	25.4 x 45	400	85	4.39	3.31	1.89	B43659A0407M05#
450	25.4 x 50	350	75	4.86	3.66	2.09	B43659A0457M05#
450	30 x 35	370	95	4.13	3.11	1.78	B43659B0457M05#
490	35 x 30	370	110	3.85	2.90	1.55	B43659A0497M05#
500	25.4 x 55	320	65	5.33	4.01	2.29	B43659A0507M05#
530	30 x 40	320	80	4.74	3.57	1.91	B43659A0537M05#
560	25.4 x 60	280	60	5.89	4.43	2.37	B43659A0567M05#
600	35 x 35	300	90	4.53	3.41	1.82	B43659A0607M05#
610	25.4 x 65	260	55	6.36	4.78	2.56	B43659A0617M05#
610	30 x 45	270	70	5.34	4.01	2.14	B43659B0617M05#
660	25.4 x 70	240	50	6.82	5.13	2.74	B43659A0667M05#
690	30 x 50	240	60	5.93	4.46	2.38	B43659A0697M05#
710	35 x 40	250	75	5.19	3.90	2.09	B43659A0717M05#
770	30 x 55	220	55	6.52	4.90	2.62	B43659A0777M05#
820	35 x 45	220	65	5.85	4.40	2.35	B43659A0827M05#
860	30 x 60	190	50	7.17	5.39	2.88	B43659A0867M05#
930	35 x 50	190	60	6.51	4.89	2.61	B43659A0937M05#
940	30 x 65	180	45	7.75	5.83	3.11	B43659A0947M05#
1020	30 x 70	160	40	8.34	6.27	3.35	B43659A0108M25#

1) Ambient temperature T_A

Composition of ordering code

# = Terminal style
7 = Snap-in terminals (2 pins, 4.5 mm)
2 = Snap-in terminals (3 pins, 4.5 mm)
0 = Snap-in terminals (2 pins, 6.3 mm)

Useful life[1)]

For useful life calculations, please use our web-based "AlCap Useful Life Calculation Tool", which can be found on the Internet under the following link:
www.tdk-electronics.tdk.com/alcap
The AlCap Useful Life Calculation Tool provides calculations of useful life as well as additional data for selected capacitor types under operating conditions defined by the user.

In addition, it is possible to calculate useful life expectancies based on temperatures measured by the user in the application.

1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life."

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.

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 seperate file 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 capacitors with screw or multi-pin terminals	Multi-pin capacitors with pressure relief vent on the can base must not be mounted with terminals facing up unless otherwise specified.	11.1 "Mounting positions of capacitors with screw or multi-pin 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	11.2 "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.	11.3 "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 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 sleeve, especially when ring clips are used for mounting.	"Screw terminals – accessories"

Display of ordering codes for TDK Electronics products

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.

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_B	Capacitor base temperature	Temperatur des Gehäusebodens
T_C	Case temperature	Gehäusetemperatur
t	Time	Zeit
Δt	Period	Zeitraum
t_b	Service life (operating hours)	Brauchbarkeitsdauer (Betriebszeit)
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

Symbol	English	German
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 frequency; $2 \cdot \pi \cdot f$	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.

2. We also point out that **in individual cases, a malfunction of 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 an 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 an 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.tdk-electronics.tdk.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. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.

Important notes

7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard**. The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements (“CSR”) TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System**. For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.
8. The trade names EPCOS, CarXield, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, FilterCap, FormFit, InsuGate, LeaXield, MediPlas, MiniBlue, MiniCell, MKD, MKK, ModCap, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PiezoBrush, PlasmaBrush, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, SurfIND, ThermoFuse, WindCap, XieldCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.tdk-electronics.tdk.com/trademarks.

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