



# Aluminum electrolytic capacitors

## Snap-in capacitors

**Series/Type:**            **B43657**

**Date:**                    April 2024

## General-purpose grade capacitors

### Applications

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



### Features

- Extremely high CV product, ultra compact
- High reliability
- High ripple current capability
- RoHS-compatible

### Construction

- Aluminum case, insulated with PET sleeve without insulation sheet at the can bottom
- Snap-in solder pins to hold component in place on PC-board
- Minus pole marking on shrinking sleeve
- Minus pole not insulated from case
- Overload protection by pressure relief device on the base

### Terminals

- Standard version with 2 terminals,  
2 lengths available: 6.3 and 4.5 mm
- 3 terminals to ensure correct insertion: length 4.5 mm

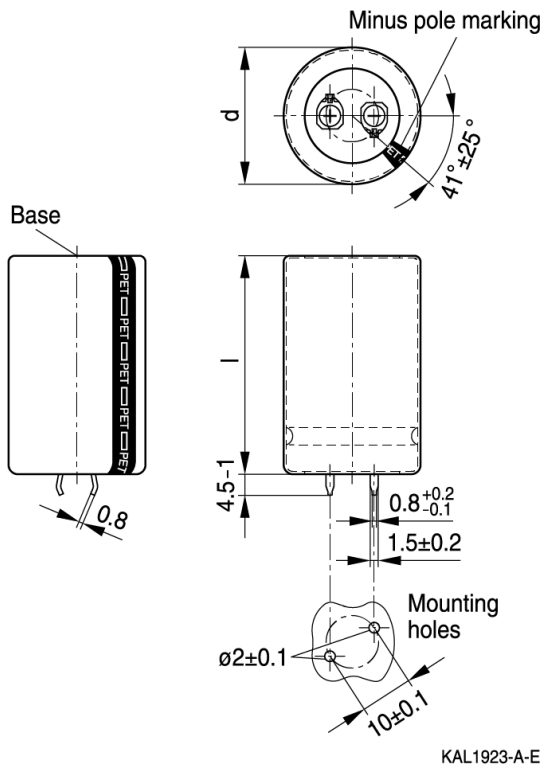
**Specifications and characteristics in brief**

Rated voltage $V_R$ Surge voltage $V_S$	450 ... 475 V DC $1.10 \cdot V_R$ (15 ... 35 °C)		
Rated capacitance $C_R$ Capacitance tolerance	120 ... 2060 $\mu$ F $\pm 20\% \triangleq M$		
Dissipation factor $\tan \delta$ (20 °C, 120 Hz)	$\leq 0.20$		
Leakage current $I_{leak}$ (5 min, 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 <sup>1)</sup> 105 °C; $V_R$ ; $I_{AC,R}$	> 2000 h	Requirements: $ \Delta C/C  \leq 20\%$ of initial value $\tan \delta \leq 2$ times initial specified limit $I_{leak} \leq$ initial specified limit	
Vibration resistance test	To IEC 60068-2-6:2007, 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	$V_R$	
		450 V	475 V
		$Z_{-25\text{ °C}} / Z_{20\text{ °C}}$	10
		$Z_{-40\text{ °C}} / Z_{20\text{ °C}}$	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 -40 °C to +105 °C but the impedance at -40 °C must be taken into consideration.		
Sectional specification	IEC 60384-4:2016		

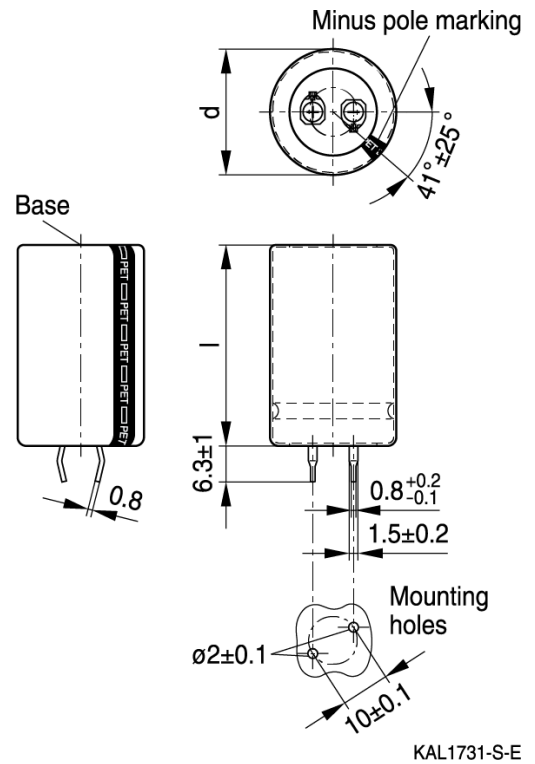
1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life.

**Dimensional drawings**
**Snap-in capacitors with PET shrinking sleeve**

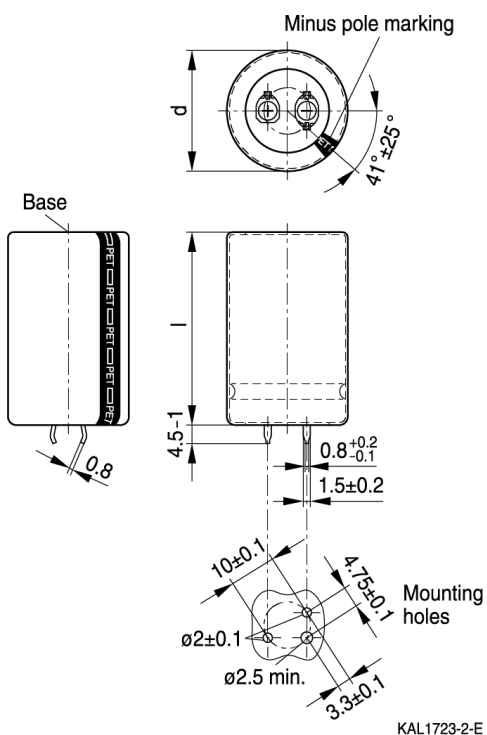
Insulation is marked with “PET” on the sleeve. Pressure relief device on the base.



Snap-in terminals (2 terminals, 4.5 mm)



Snap-in terminals (2 terminals, 6.3 mm)



Snap-in terminals (3 terminals, 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.)
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
30	75	74	60
30	80	80	60
30	85	86	60
30	90	92	60
30	95	98	60
30	100	103	60

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
25.4	75	45	45
25.4	80	48	45

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
35	65	102	36
35	70	115	36
35	75	128	36
35	80	142	36
35	85	148	36
35	90	159	36
35	95	171	36
35	100	182	36

**Packaging of snap-in capacitors**


For ecological reasons the packing is pure cardboard.

**Ordering codes for terminal styles and insulation features**

Identification in 3<sup>rd</sup> block of ordering code

Snap-in capacitors	
Terminal version	Insulation
	PET sleeve
Snap-in terminals (2 terminals, 4.5 mm)	M*57
Snap-in terminals (3 terminals, 4.5 mm)	M*52
Snap-in terminals (2 terminals, 6.3 mm)	M*50

\* Digit used for nominal capacitance indication.

Ordering example:

B43657C5917M057 } snap-in capacitor with 2 pin terminals (4.5 mm) and PET sleeve

B43657C5917M052 } snap-in capacitor with 3 pin terminals and PET sleeve

**Overview of available types 1/3**

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)	450	475
	Case dimensions d x l (mm)	
$C_R$ (μF)		
120		22 x 25
140	22 x 25	
160		22 x 30
170		25.4 x 25
180	22 x 30	
190	25.4 x 25	22 x 35
220	22 x 35	25.4 x 30
230		22 x 40
250	25.4 x 30	
260	22 x 40	30 x 25
270		22 x 45 25.4 x 35
290	30 x 25	
300	25.4 x 35	
310	22 x 45	22 x 50
320		25.4 x 40
330		30 x 30
350	22 x 50	35 x 25
360	25.4 x 40	
370		25.4 x 45
380	30 x 30	
400	35 x 25	
410		30 x 35
420	25.4 x 45	25.4 x 50
460		35 x 30
470	30 x 35	25.4 x 55
480	25.4 x 50	
490		30 x 40

**Overview of available types 2/3**

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)	450	475
	Case dimensions d x l (mm)	
$C_R$ (μF)		
520	35 x 30	25.4 x 60
530	25.4 x 55	
560	30 x 40	25.4 x 65 30 x 45
570		35 x 35
590	25.4 x 60	
610		25.4 x 70
620	25.4 x 65	
640	30 x 45 35 x 35	30 x 50
650		25.4 x 75
670	25.4 x 70	35 x 40
700		25.4 x 80
720	25.4 x 75	30 x 55
730	30 x 50	
760	35 x 40	
780	25.4 x 80	35 x 45
800		30 x 60
810		30 x 65
820	30 x 55	
880	35 x 45	30 x 70 35 x 50
910	30 x 60	
920	30 x 65	
960		30 x 75
990		35 x 55



**Overview of available types 3/3**

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)	450	475
	Case dimensions d x l (mm)	
$C_R$ (μF)		
1000	35 x 50	
1010	30 x 70	
1030		30 x 80
1090	30 x 75	35 x 60
1100		30 x 85
1110		35 x 65
1120	35 x 55	
1170	30 x 80	
1180		30 x 90
1210		35 x 70
1250	35 x 60	30 x 95
1260	30 x 85 35 x 65	
1310		35 x 75
1320		30 x 100
1340	30 x 90	
1380	35 x 70	
1410		35 x 80
1420	30 x 95	
1490	35 x 75	
1500	30 x 100	
1510		35 x 85
1600	35 x 80	
1610		35 x 90
1710		35 x 95
1720	35 x 85	
1810		35 x 100
1830	35 x 90	
1940	35 x 95	
2060	35 x 100	

**Technical data and ordering codes**

$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions d x l mm	$\text{ESR}_{\text{typ}}$ 120 Hz 20 °C m $\Omega$	$\text{ESR}_{\text{typ}}$ 360 Hz 60 °C m $\Omega$	$I_{\text{AC,max}}$ 120 Hz 60 °C A	$I_{\text{AC,max}}$ 120 Hz 85 °C A	$I_{\text{AC,R}}$ 120 Hz 105 °C A	Ordering code (composition see below)
<b><math>V_R = 450 \text{ V DC}</math></b>							
140	22 x 25	830	220	2.01	1.52	0.90	B43657C5147M05#
180	22 x 30	650	170	2.46	1.86	1.10	B43657C5187M05#
190	25.4 x 25	630	170	2.41	1.82	1.07	B43657C5197M05#
220	22 x 35	530	140	2.91	2.20	1.30	B43657C5227M05#
250	25.4 x 30	480	130	3.00	2.26	1.34	B43657C5257M05#
260	22 x 40	450	120	3.35	2.53	1.49	B43657C5267M05#
290	30 x 25	430	130	3.00	2.27	1.34	B43657C5297M05#
300	25.4 x 35	400	110	3.48	2.63	1.55	B43657C5307M05#
310	22 x 45	380	100	3.89	2.94	1.73	B43657C5317M05#
350	22 x 50	330	85	4.32	3.26	1.92	B43657C5357M05#
360	25.4 x 40	330	90	4.05	3.06	1.81	B43657C5367M05#
380	30 x 30	330	100	3.71	2.79	1.65	B43657C5387M05#
400	35 x 25	330	120	3.42	2.58	1.52	B43657C5407M05#
420	25.4 x 45	280	80	4.62	3.48	2.06	B43657C5427M05#
470	30 x 35	270	85	4.40	3.31	1.96	B43657C5477M05#
480	25.4 x 50	250	70	5.19	3.91	2.31	B43657C5487M05#
520	35 x 30	260	100	4.17	3.14	1.70	B43657C5527M05#
530	25.4 x 55	220	60	5.66	4.27	2.52	B43657C5537M05#
560	30 x 40	220	70	5.07	3.82	2.07	B43657C5567M05#
590	25.4 x 60	200	55	6.21	4.68	2.54	B43657C5597M05#
620	25.4 x 65	210	55	6.47	4.87	2.60	B43657C5627M05#
640	30 x 45	200	60	5.68	4.28	2.33	B43657C5647M05#
640	35 x 35	210	80	4.91	3.70	2.01	B43657D5647M05#
670	25.4 x 70	190	50	6.94	5.23	2.79	B43657C5677M05#
720	25.4 x 75	180	45	7.41	5.58	2.98	B43657C5727M05#
730	30 x 50	170	55	6.35	4.79	2.60	B43657C5737M05#
760	35 x 40	170	65	5.64	4.25	2.31	B43657C5767M05#
780	25.4 x 80	170	45	7.95	5.99	3.20	B43657C5787M05#
820	30 x 55	150	50	7.02	5.29	2.87	B43657C5827M05#
880	35 x 45	150	55	6.36	4.79	2.60	B43657C5887M05#
910	30 x 60	140	45	7.68	5.78	3.14	B43657C5917M05#
920	30 x 65	150	45	8.15	6.12	3.26	B43657C5927M05#
1000	35 x 50	130	50	7.08	5.33	2.89	B43657C5108M05#
1010	30 x 70	130	40	8.81	6.61	3.53	B43657C5108M15#
1090	30 x 75	130	36	9.40	7.06	3.76	B43657C5108M95#
1120	35 x 55	120	45	7.79	5.87	3.18	B43657C5118M25#

**Snap-in capacitors**
**B43657**
**Ultra compact – 105 °C**

$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions d x l mm	$\text{ESR}_{\text{typ}}$ 120 Hz 20 °C m $\Omega$	$\text{ESR}_{\text{typ}}$ 360 Hz 60 °C m $\Omega$	$I_{\text{AC,max}}$ 120 Hz 60 °C A	$I_{\text{AC,max}}$ 120 Hz 85 °C A	$I_{\text{AC,R}}$ 120 Hz 105 °C A	Ordering code (composition see below)
$V_R = 450 \text{ V DC}$							
1170	30 x 80	120	34	9.99	7.50	4.00	B43657C5118M75#
1250	35 x 60	110	40	8.54	6.43	3.49	B43657C5128M55#
1260	30 x 85	110	32	10.60	7.99	4.26	B43657C5128M65#
1260	35 x 65	110	40	9.26	6.95	3.71	B43657D5128M65#
1340	30 x 90	100	30	11.20	8.43	4.50	B43657C5138M45#
1380	35 x 70	100	36	9.97	7.48	3.99	B43657C5138M85#
1420	30 x 95	100	28	11.80	8.87	4.73	B43657C5148M25#
1490	35 x 75	100	34	10.60	7.98	4.26	B43657C5148M95#
1500	30 x 100	90	26	12.40	9.31	4.97	B43657C5158M05#
1600	35 x 80	90	30	11.30	8.49	4.53	B43657C5168M05#
1720	35 x 85	85	30	12.00	9.01	4.81	B43657C5178M25#
1830	35 x 90	80	28	12.60	9.51	5.07	B43657C5188M35#
1940	35 x 95	75	26	13.30	10.00	5.34	B43657C5198M45#
2060	35 x 100	70	24	14.00	10.50	5.62	B43657C5208M65#

**Composition of ordering code**

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

**Technical data and ordering codes**

$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions d x l mm	$\text{ESR}_{\text{typ}}$ 120 Hz 20 °C m $\Omega$	$\text{ESR}_{\text{typ}}$ 360 Hz 60 °C m $\Omega$	$I_{\text{AC,max}}$ 120 Hz 60 °C A	$I_{\text{AC,max}}$ 120 Hz 85 °C A	$I_{\text{AC,R}}$ 120 Hz 105 °C A	Ordering code (composition see below)
$V_R = 475 \text{ V DC}$							
120	22 x 25	1330	250	1.77	1.33	0.78	B43657C0127M05#
160	22 x 30	1000	190	2.23	1.68	0.99	B43657C0167M05#
170	25.4 x 25	960	190	2.20	1.66	0.98	B43657C0177M05#
190	22 x 35	840	160	2.57	1.94	1.14	B43657C0197M05#
220	25.4 x 30	740	150	2.71	2.04	1.20	B43657C0227M05#
230	22 x 40	700	130	3.02	2.27	1.34	B43657C0237M05#
260	30 x 25	650	140	2.79	2.10	1.24	B43657C0267M05#
270	22 x 45	590	110	3.46	2.61	1.54	B43657C0277M05#
270	25.4 x 35	600	120	3.20	2.41	1.42	B43657D0277M05#
310	22 x 50	520	100	3.91	2.94	1.73	B43657C0317M05#
320	25.4 x 40	510	100	3.68	2.77	1.63	B43657C0327M05#
330	30 x 30	510	110	3.36	2.53	1.49	B43657C0337M05#
350	35 x 25	490	130	3.20	2.41	1.42	B43657C0357M05#
370	25.4 x 45	440	85	4.17	3.14	1.85	B43657C0377M05#
410	30 x 35	410	90	4.00	3.01	1.78	B43657C0417M05#
420	25.4 x 50	390	75	4.65	3.50	2.06	B43657C0427M05#
460	35 x 30	380	100	3.92	2.95	1.60	B43657C0467M05#
470	25.4 x 55	350	70	5.14	3.86	2.28	B43657C0477M05#
490	30 x 40	340	75	4.62	3.48	1.89	B43657C0497M05#
520	25.4 x 60	310	60	5.61	4.22	2.29	B43657C0527M05#
560	25.4 x 65	310	60	6.12	4.60	2.46	B43657C0567M05#
560	30 x 45	300	65	5.18	3.90	2.12	B43657D0567M05#
570	35 x 35	300	80	4.64	3.49	1.89	B43657C0577M05#
610	25.4 x 70	280	55	6.60	4.96	2.65	B43657C0617M05#
640	30 x 50	260	60	5.80	4.36	2.37	B43657C0647M05#
650	25.4 x 75	260	50	7.00	5.26	2.81	B43657C0657M05#
670	35 x 40	260	70	5.29	3.98	2.16	B43657C0677M05#
700	25.4 x 80	250	50	7.48	5.63	3.01	B43657C0707M05#
720	30 x 55	230	55	6.41	4.82	2.62	B43657C0727M05#
780	35 x 45	220	60	5.98	4.50	2.44	B43657C0787M05#
800	30 x 60	210	50	7.03	5.29	2.87	B43657C0807M05#
810	30 x 65	210	45	7.73	5.8	3.10	B43657C0817M05#
880	30 x 70	200	45	8.29	6.22	3.32	B43657C0887M05#
880	35 x 50	200	55	6.63	4.99	2.71	B43657D0887M05#
960	30 x 75	180	40	8.91	6.69	3.57	B43657C0967M05#
990	35 x 55	180	50	7.32	5.50	2.99	B43657C0997M05#

$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions d x l mm	$\text{ESR}_{\text{typ}}$ 120 Hz 20 °C m $\Omega$	$\text{ESR}_{\text{typ}}$ 360 Hz 60 °C m $\Omega$	$I_{\text{AC,max}}$ 120 Hz 60 °C A	$I_{\text{AC,max}}$ 120 Hz 85 °C A	$I_{\text{AC,R}}$ 120 Hz 105 °C A	Ordering code (composition see below)
$V_R = 475 \text{ V DC}$							
1030	30 x 80	170	38	9.47	7.11	3.79	B43657C0108M35#
1090	35 x 60	160	45	7.95	5.98	3.25	B43657C0108M95#
1100	30 x 85	160	34	10.00	7.53	4.02	B43657C0118M05#
1110	35 x 65	160	40	8.87	6.65	3.55	B43657C0118M15#
1180	30 x 90	150	32	10.60	7.99	4.26	B43657C0118M85#
1210	35 x 70	150	40	9.52	7.15	3.81	B43657C0128M15#
1250	30 x 95	140	30	11.20	8.40	4.48	B43657C0128M55#
1310	35 x 75	140	36	10.10	7.63	4.07	B43657C0138M15#
1320	30 x 100	130	30	11.70	8.82	4.71	B43657C0138M25#
1410	35 x 80	130	32	10.80	8.12	4.33	B43657C0148M15#
1510	35 x 85	120	30	11.40	8.61	4.59	B43657C0158M15#
1610	35 x 90	110	30	12.10	9.09	4.85	B43657C0168M15#
1710	35 x 95	110	28	12.70	9.57	5.11	B43657C0178M15#
1810	35 x 100	100	26	13.40	10.00	5.36	B43657C0188M15#

### Composition of ordering code

# = Terminal style

7 = Snap-in terminals (2 terminals, 4.5 mm)

2 = Snap-in terminals (3 terminals, 4.5 mm)

0 = Snap-in terminals (2 terminals, 6.3 mm)

### Useful life<sup>1)</sup>

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](http://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.

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 separate 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 $\leq 75\%$ .	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 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](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
$T_B$	Capacitor base temperature	Temperatur des Gehäusebodens
$T_C$	Case temperature	Gehäusetemperatur
t	Time	Zeit
$\Delta t$	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
$\tan \delta$	Dissipation factor	Verlustfaktor
$\lambda$	Failure rate	Ausfallrate
$\varepsilon_0$	Absolute permittivity	Elektrische Feldkonstante
$\varepsilon_r$	Relative permittivity	Dielektrizitätszahl
$\omega$	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](http://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](http://www.tdk-electronics.tdk.com/trademarks).

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