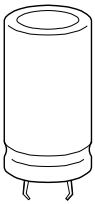
Aluminum electrolytic capacitors

Snap-in capacitors

Series/Type: **B43543**

Date: December 2010

Long-life grade capacitors



Applications

- Frequency converters
- Professional power supplies in industrial electronics and in data processing equipment
- Switch-mode power supplies in entertainment electronics

Features

- Outstanding ripple current capability
- Very high CV product, ultra compact
- High reliability
- Extremely improved performance at high frequencies
- Outstanding low ESR at operating conditions above 50 °C
- Optimized internal thermal resistance
- Different case sizes available for each capacitance value
- Capacitors with all insulation versions pass the needle flame test according to IEC 60695-11-5 for all flame exposure times up to 120 s
- RoHS-compatible

Construction

- Charge/discharge-proof, polar
- Aluminum case, fully insulated with PVC
- Version with PET insulation available
- Version with additional PET insulation cap on terminal side available for insulating the capacitor from the PCB
- Snap-in solder pins to hold component in place on PC-board
- Minus pole marking on case surface
- Minus pole not insulated from case
- Overload protection by safety vent on the case wall

Terminals

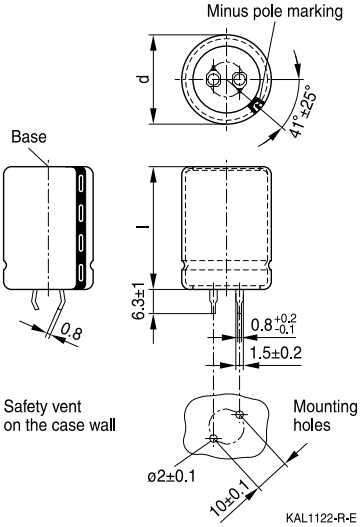
- Standard version with 2 terminals, 2 lengths available: 6.3 and 4.5 mm
- 3 terminals to ensure correct insertion: length 4.5 mm

Specifications and characteristics in brief

Rated voltage V_R Surge voltage V_S	200 ... 450 V DC 1.15 · V_R (for $V_R \le 250$ V DC) 1.10 · V_R (for $V_R \ge 400$ V DC)	
Rated capacitance C_R Capacitance tolerance	100 ... 2700 µF ±20% ≙ M	
Dissipation factor tan δ (20 °C, 120 Hz)	$V_R \le 400$ V DC: tan δ ≤ 0.15 V_R = 450 V DC: tan δ ≤ 0.20	
Leakage current I_{leak} (5 min, 20 °C)	$I_{leak} \le 0.3\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)^{0.7} + 4\ \mu A$	
Self-inductance ESL	Approx. 20 nH	
Useful life 105 °C; V_R; $I_{AC,R}$ 85 °C; V_R; $I_{AC,max}$ 40 °C; V_R; 2.05 · $I_{AC,R}$	 > 3000 h > 7000 h > 250000 h	Requirements: ΔC/C ≤ ±30% of initial value tan δ ≤ 3 times initial specified limit I_{leak} ≤ initial specified limit
Load life test 105 °C; V_R; $I_{AC,R}$	 2000 h	Post test requirements ΔC/C ≤ ±20% of initial value tan δ ≤ 2 times initial specified limit I_{leak} ≤ initial specified limit
Voltage endurance test 105 °C; V_R	 2000 h	Post test requirements: ΔC/C ≤ ±10% of initial value tan δ ≤ 1.3 times initial specified limit I_{leak} ≤ initial specified limit
Vibration resistance test	To IEC 60068-2-6, test Fc: Frequency range 10 Hz ... 55 Hz, displacement amplitude 0.35 mm, acceleration max. 5 *g*, duration 3 × 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 ≤ 400 V: $Z_{-25\,°C} / Z_{20\,°C}$ = 3; $Z_{-40\,°C} / Z_{20\,°C}$ = 7 V_R = 450 V: $Z_{-25\,°C} / Z_{20\,°C}$ = 7; $Z_{-40\,°C} / Z_{20\,°C}$ = 12
IEC climatic category	To IEC 60068-1: $V_R \le 400$ V DC: 40/105/56 (−40 °C/+105 °C/56 days damp heat test) V_R = 450 V DC: 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 +85 °C but the impedance at −40 °C should be taken into consideration.	
Detail specification Sectional specification	Similar to CECC 30301-809 IEC 60384-4	

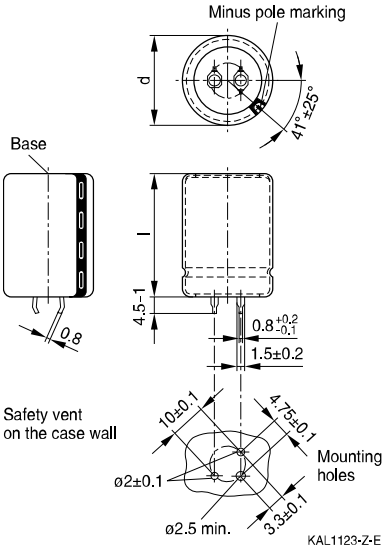
Dimensional drawings

Snap-in capacitors with standard insulation (PVC or PET)



Snap-in terminals, length (6.3 ±1) mm. Also available in a shorter version with a length of (4.5 −1) mm. PET insulation is marked with label "PET" on the sleeve.

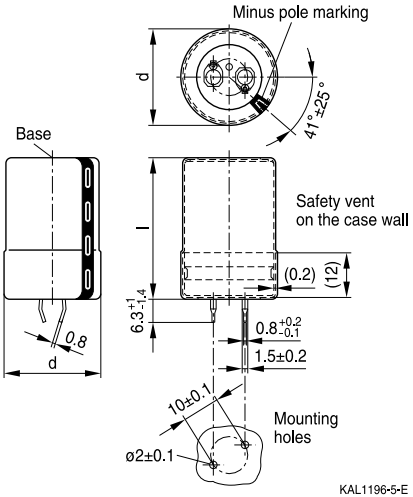
Dimensions (mm)		Approx.	Packing
d +1	l ±2	weight (g)	units (pcs.)
25	25	13	130
25	30	17	130
25	35	19	130
25	40	22	130
25	45	25	130
25	50	29	130
25	55	32	130

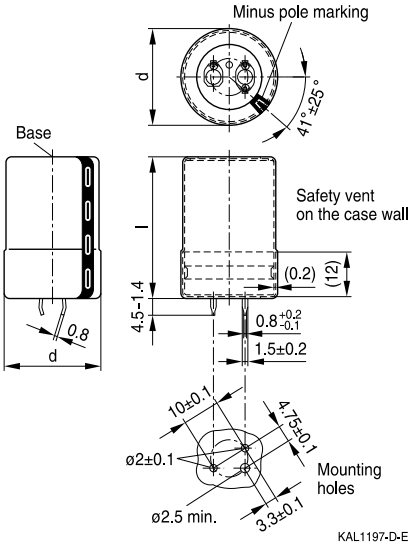


Snap-in capacitors are also available with 3 terminals (length (4.5 −1) mm). PET insulation is marked with label "PET" on the sleeve.

Dimensions (mm)		Approx.	Packing
d +1	l ±2	weight (g)	units (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
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

Snap-in capacitors with PVC insulation and PET insulation cap on terminal side





Snap-in terminals, length (6.3 +1/−1.4) mm. Also available in a shorter version with a length of (4.5 −1.4) mm. PET insulation cap is positioned under the insulation sleeve.

Dimensions (mm)		Approx.	Packing
d +1.4	l +2.2/−2	weight (g)	units (pcs.)
25	25	13	130
25	30	17	130
25	35	19	130
25	40	22	130
25	45	25	130
25	50	29	130
25	55	32	130

Snap-in capacitors are also available with 3 terminals (length (4.5 −1.4) mm). PET insulation cap is positioned under the insulation sleeve.

Dimensions (mm)		Approx.	Packing
d +1.4	l +2.2/−2	weight (g)	units (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
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

Packing of snap-in capacitors

For ecological reasons the packing is pure cardboard. Components can be withdrawn (in full or in part) in the correct position for insertion.

Ordering codes for terminal styles and insulation features

Identification in 3rd block of ordering code

Snap-in capacitors			
Terminal version	Insulation version		
	PVC	PET	PVC plus PET cap
Standard terminals 6.3 mm	M000	M060	M080
Short terminals 4.5 mm	M007	M067	M087
3 terminals 4.5 mm	M002	M062	M082

Ordering examples:

B43543A5107M007 } snap-in capacitor with short terminals and standard PVC insulation

B43543A5107M062 } snap-in capacitor with 3 terminals and PET insulation

B43543A5107M080 } snap-in capacitor with standard terminals and PVC insulation with additional PET insulation cap on terminal side

Overview of available types

V_R (V DC)	200	250	400	450
	Case dimensions d × l (mm)			
C_R (µF)				
100				25 × 25
120			25 × 25	25 × 30
150			25 × 30	25 × 35 30 × 25
180			25 × 35 30 × 25	25 × 40 30 × 30 35 × 25
220			25 × 40 30 × 30	25 × 45 30 × 35 35 × 30
270			25 × 45 30 × 35 35 × 25	25 × 50 30 × 40 35 × 30
330		25 × 25	25 × 50 30 × 35 35 × 30	30 × 45 35 × 35
390	25 × 25	25 × 30	25 × 55 30 × 40 35 × 35	30 × 50 35 × 40
470	25 × 30	25 × 30 30 × 25	30 × 45 35 × 40	30 × 55 35 × 45
560	25 × 30	25 × 35 30 × 30	30 × 55 35 × 40	35 × 50
680	25 × 35 30 × 25	25 × 40 30 × 30 35 × 25	35 × 50	
820	25 × 40 30 × 30 35 × 25	25 × 45 30 × 35 35 × 30	35 × 55	
1000	25 × 45 30 × 35 35 × 30	25 × 55 30 × 40 35 × 35		
1200	25 × 50 30 × 40 35 × 30	30 × 45 35 × 35		

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Outstanding ripple current, ultra compact – 105 °C

V_R (V DC)	200	250	400	450
	Case dimensions d × l (mm)			
C_R (µF)				
1500	30 × 45 35 × 35	30 × 55 35 × 40		
1800	30 × 50 35 × 40	35 × 50		
2200	30 × 55 35 × 45	35 × 55		
2700	35 × 55			

The capacitance and voltage ratings listed above are available in different cases upon request. Other voltage and capacitance ratings are also available upon request.

Technical data and ordering codes

C_R 100 Hz 20 °C µF	Case dimensions d × l mm	ESR_{typ} 100 Hz 20 °C mΩ	ESR_{typ} 300 Hz 60 °C mΩ	Z_{max} 10 kHz 20 °C mΩ	$I_{AC,max}$ 100 Hz 60 °C A	$I_{AC,max}$ 100 Hz 85 °C A	$I_{AC,R}$[1] 100 Hz 105 °C A	Ordering code (composition see below)
V_R = 200 V DC								
390	25 × 25	220	100	270	3.36	2.58	1.19	B43543A2397M0*#
470	25 × 30	180	80	230	3.86	2.97	1.37	B43543A2477M0*#
560	25 × 30	150	65	190	4.22	3.24	1.50	B43543A2567M0*#
680	25 × 35	120	55	160	4.84	3.72	1.72	B43543A2687M0*#
680	30 × 25	120	45	150	5.19	3.99	1.84	B43543B2687M0*#
820	25 × 40	100	45	130	5.51	4.23	1.96	B43543A2827M0*#
820	30 × 30	100	40	120	5.96	4.58	2.12	B43543B2827M0*#
820	35 × 25	100	50	140	5.60	4.30	1.99	B43543C2827M0*#
1000	25 × 45	85	38	110	6.28	4.83	2.23	B43543A2108M0*#
1000	30 × 35	80	32	100	6.85	5.26	2.43	B43543B2108M0*#
1000	35 × 30	85	40	110	6.88	5.29	2.44	B43543C2108M0*#
1200	25 × 50	70	32	90	7.08	5.44	2.52	B43543A2128M0*#
1200	30 × 40	65	26	85	8.27	6.36	2.94	B43543B2128M0*#
1200	35 × 30	70	34	100	7.53	5.79	2.68	B43543C2128M0*#
1500	30 × 45	50	20	65	9.55	7.34	3.39	B43543A2158M0*#
1500	35 × 35	55	26	75	8.75	6.73	3.11	B43543B2158M0*#
1800	30 × 50	45	17	55	10.7	8.27	3.83	B43543A2188M0*#
1800	35 × 40	50	22	65	9.92	7.63	3.53	B43543B2188M0*#
2200	30 × 55	36	14	45	12.2	9.38	4.34	B43543A2228M0*#
2200	35 × 45	40	18	50	11.3	8.70	4.02	B43543B2228M0*#
2700	35 × 55	32	15	45	13.2	10.1	4.70	B43543A2278M0*#
V_R = 250 V DC								
330	25 × 25	210	95	260	3.27	2.51	1.16	B43543E2337M0*#
390	25 × 30	180	80	220	3.73	2.86	1.32	B43543E2397M0*#
470	25 × 30	150	65	180	4.09	3.14	1.45	B43543E2477M0*#
470	30 × 25	140	55	170	4.51	3.46	1.60	B43543F2477M0*#
560	25 × 35	120	55	150	4.65	3.57	1.65	B43543E2567M0*#
560	30 × 30	120	45	140	5.15	3.96	1.83	B43543F2567M0*#
680	25 × 40	100	45	130	5.31	4.08	1.89	B43543E2687M0*#

Composition of ordering code

* = Insulation feature
- 0 = PVC insulation
- 6 = PET insulation
- 8 = PVC insulation with additional PET insulation cap on terminal side

\# = Terminal style
- 0 = snap-in standard terminals (6.3 mm)
- 2 = snap-in 3 terminals (4.5 mm)
- 7 = snap-in short terminals (4.5 mm)

1) 120-Hz conversion factor of ripple current: I_{AC} (120 Hz) = 1.03 · I_{AC} (100 Hz)

B43543

Outstanding ripple current, ultra compact – 105 °C

Technical data and ordering codes

C_R 100 Hz 20 °C µF	Case dimensions d × l mm	ESR_{typ} 100 Hz 20 °C mΩ	ESR_{typ} 300 Hz 60 °C mΩ	Z_{max} 10 kHz 20 °C mΩ	$I_{AC,max}$ 100 Hz 60 °C A	$I_{AC,max}$ 100 Hz 85 °C A	$I_{AC,R}$ [2] 100 Hz 105 °C A	Ordering code (composition see below)
V_R = 250 V DC								
680	30 × 30	100	40	120	5.68	4.36	2.02	B43543F2687M0*#
680	35 × 25	100	45	130	5.41	4.16	1.92	B43543G2687M0*#
820	25 × 45	85	38	110	6.02	4.63	2.14	B43543E2827M0*#
820	30 × 35	80	32	100	6.49	4.98	2.31	B43543F2827M0*#
820	35 × 30	85	40	110	6.61	5.08	2.35	B43543G2827M0*#
1000	25 × 55	70	30	85	7.02	5.40	2.50	B43543E2108M0*#
1000	30 × 40	65	26	80	7.90	6.07	2.81	B43543F2108M0*#
1000	35 × 35	70	32	90	7.59	5.83	2.70	B43543G2108M0*#
1200	30 × 45	55	22	65	8.93	6.86	3.17	B43543E2128M0*#
1200	35 × 35	60	26	75	8.32	6.39	2.96	B43543F2128M0*#
1500	30 × 55	45	17	55	10.5	8.10	3.75	B43543E2158M0*#
1500	35 × 40	45	22	60	9.62	7.39	3.42	B43543F2158M0*#
1800	35 × 50	40	18	50	11.1	8.59	3.97	B43543E2188M0*#
2200	35 × 55	32	15	40	12.6	9.74	4.51	B43543E2228M0*#
V_R = 400 V DC								
120	25 × 25	540	170	630	2.22	1.71	0.79	B43543A9127M0*#
150	25 × 30	430	140	510	2.60	2.00	0.92	B43543A9157M0*#
180	25 × 35	360	110	420	2.97	2.28	1.05	B43543A9187M0*#
180	30 × 25	320	110	380	3.03	2.33	1.07	B43543B9187M0*#
220	25 × 40	290	90	350	3.41	2.62	1.21	B43543A9227M0*#
220	30 × 30	260	85	310	3.50	2.69	1.24	B43543B9227M0*#
270	25 × 45	240	75	280	3.90	2.99	1.38	B43543A9277M0*#
270	30 × 35	210	70	250	4.04	3.10	1.43	B43543B9277M0*#
270	35 × 25	220	75	260	3.89	2.99	1.38	B43543C9277M0*#
330	25 × 50	200	60	230	4.43	3.41	1.57	B43543A9337M0*#
330	30 × 35	180	55	210	4.47	3.43	1.59	B43543B9337M0*#
330	35 × 30	180	65	210	4.78	3.67	1.70	B43543C9337M0*#
390	25 × 55	170	50	200	4.95	3.80	1.76	B43543A9397M0*#
390	30 × 40	150	50	180	5.36	4.12	1.90	B43543B9397M0*#

Composition of ordering code

* = Insulation feature
- 0 = PVC insulation
- 6 = PET insulation
- 8 = PVC insulation with additional PET insulation cap on terminal side

\# = Terminal style
- 0 = snap-in standard terminals (6.3 mm)
- 2 = snap-in 3 terminals (4.5 mm)
- 7 = snap-in short terminals (4.5 mm)

2) 120-Hz conversion factor of ripple current: I_{AC} (120 Hz) = 1.03 · I_{AC} (100 Hz)

Technical data and ordering codes

C_R 100 Hz 20 °C µF	Case dimensions d × l mm	ESR_{typ} 100 Hz 20 °C mΩ	ESR_{typ} 300 Hz 60 °C mΩ	Z_{max} 10 kHz 20 °C mΩ	$I_{AC,max}$ 100 Hz 60 °C A	$I_{AC,max}$ 100 Hz 85 °C A	$I_{AC,R}$ [3] 100 Hz 105 °C A	Ordering code (composition see below)
V_R = 400 V DC								
390	35 × 35	150	55	180	5.40	4.15	1.92	B43543C9397M0*#
470	30 × 45	120	40	150	6.07	4.66	2.16	B43543A9477M0*#
470	35 × 40	130	45	150	6.14	4.72	2.18	B43543B9477M0*#
560	30 × 55	100	34	120	6.99	5.37	2.48	B43543A9567M0*#
560	35 × 40	110	38	130	6.70	5.15	2.38	B43543B9567M0*#
680	35 × 50	85	30	110	7.83	6.01	2.78	B43543A9687M0*#
820	35 × 55	70	26	85	8.82	6.78	3.13	B43543A9827M0*#
V_R = 450 V DC								
100	25 × 25	1120	270	1620	1.97	1.51	0.70	B43543A5107M0*#
120	25 × 30	940	230	1350	2.26	1.74	0.80	B43543A5127M0*#
150	25 × 35	750	180	1080	2.64	2.02	0.93	B43543A5157M0*#
150	30 × 25	680	170	970	2.67	2.05	0.95	B43543B5157M0*#
180	25 × 40	620	150	900	2.99	2.30	1.06	B43543A5187M0*#
180	30 × 30	560	150	810	3.06	2.35	1.09	B43543B5187M0*#
180	35 × 25	570	150	830	3.09	2.37	1.10	B43543C5187M0*#
220	25 × 45	510	120	740	3.42	2.62	1.21	B43543A5227M0*#
220	30 × 35	460	120	670	3.52	2.71	1.25	B43543B5227M0*#
220	35 × 30	470	130	680	3.80	2.92	1.35	B43543C5227M0*#
270	25 × 50	420	100	600	3.89	2.99	1.38	B43543A5277M0*#
270	30 × 40	380	100	540	4.30	3.31	1.53	B43543B5277M0*#
270	35 × 30	380	100	550	4.21	3.23	1.49	B43543C5277M0*#
330	30 × 45	310	80	450	4.91	3.77	1.74	B43543A5337M0*#
330	35 × 35	310	85	450	4.84	3.72	1.72	B43543B5337M0*#
390	30 × 50	260	65	380	5.49	4.22	1.95	B43543A5397M0*#
390	35 × 40	260	70	380	5.44	4.18	1.93	B43543B5397M0*#
470	30 × 55	220	55	310	6.18	4.75	2.20	B43543A5477M0*#
470	35 × 45	220	60	320	6.16	4.73	2.19	B43543B5477M0*#
560	35 × 50	180	50	270	6.91	5.31	2.46	B43543A5567M0*#

Composition of ordering code

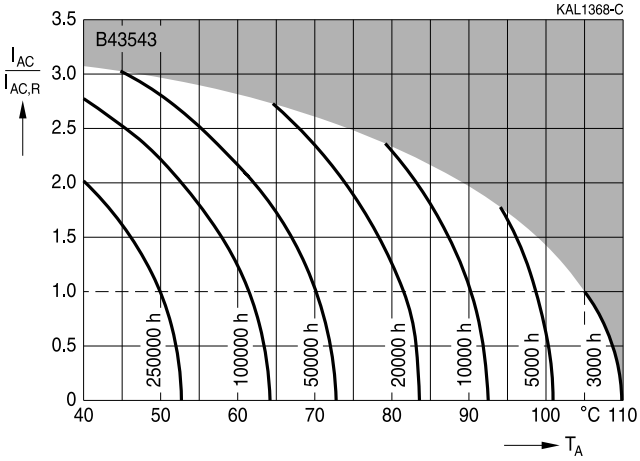
* = Insulation feature
- 0 = PVC insulation
- 6 = PET insulation
- 8 = PVC insulation with additional PET insulation cap on terminal side

\# = Terminal style
- 0 = snap-in standard terminals (6.3 mm)
- 2 = snap-in 3 terminals (4.5 mm)
- 7 = snap-in short terminals (4.5 mm)

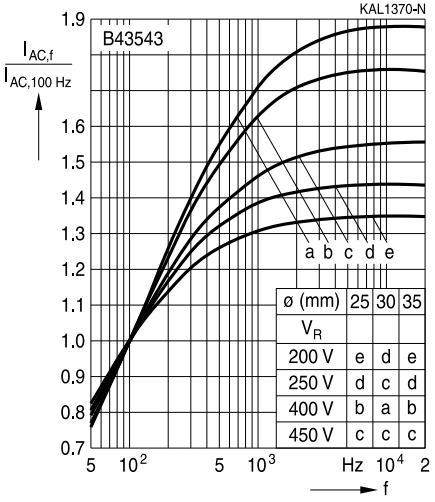
3) 120-Hz conversion factor of ripple current: I_{AC} (120 Hz) = 1.03 · I_{AC} (100 Hz)

Useful life

depending on ambient temperature T_A under ripple current operating conditions[1)]

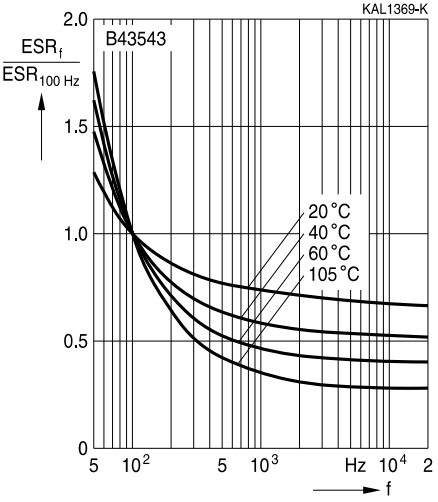


Frequency factor of permissible ripple current I_{AC} versus frequency f



Frequency characteristics of ESR

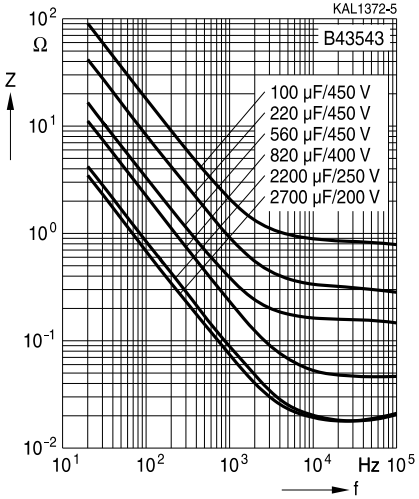
Typical behavior



1) Refer to chapter "General technical information, 5.3 Calculation of useful life" for an explanation on how to interpret the useful life graphs.

Impedance Z versus frequency f

Typical behavior at 20 °C



Cautions and warnings

Personal safety

The electrolytes used by EPCOS have not only been optimized with a view to the intended application, but also 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, part of the high-voltage electrolytes used by EPCOS are self-extinguishing. They contain flame-retarding substances which will quickly extinguish any flame that may have been ignited.

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 safe substitute materials are currently known. However, the amount of dangerous materials used in our products has been limited to an absolute minimum. Nevertheless, the following rules should be observed when handling aluminum electrolytic capacitors:

- Any escaping electrolyte should not come into contact with eyes or skin.
- If electrolyte does come into contact with the skin, wash the affected parts 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 breathing in 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 "Basic construction of aluminum electrolytic capacitors"
Reverse voltage	Voltages polarity classes should be prevented by connecting a diode.	3.1.6 "Reverse voltage"
Upper category temperature	Do not exceed the upper category temperature.	7.2 "Maximum permissible operating temperature"
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 any mechanical stress to the capacitor terminals.	10 "Maintenance"
Mounting position of screw-terminal capacitors	Do not mount the capacitor with the terminals (safety vent) upside down.	11.1. "Mounting positions of capacitors with screw terminals"
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"
Robustness of terminals	The following maximum tightening torques must not be exceeded when connecting screw terminals: M5: 2 Nm M6: 2.5 Nm	11.3 "Mounting torques"
Soldering	Do not exceed the specified time or temperature limits during soldering.	11.5 "Soldering"

B43543

Outstanding ripple current, ultra compact – 105 °C

Topic	Safety information	Reference chapter "General technical information"
Soldering, cleaning agents	Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors.	11.6 "Cleaning agents"
Passive flammability	Avoid external energy, such as fire or electricity.	8.1 "Passive flammability"
Active flammability	Avoid overload of the capacitors.	8.2 "Active flammability"
		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"

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
$I_{AC,R}$ (B)	Rated ripple current for base cooling	Nennwechselstromstrom für Bodenkühlung
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 Becherbodens
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; $2 \cdot \pi \cdot f$	Kreisfrequenz; $2 \cdot \pi \cdot f$

Note

All dimensions are given in mm.

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