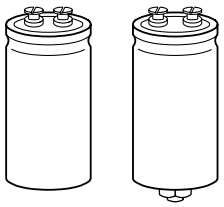
Long-life grade capacitors



KAL0567-B

B43456 B43458

Applications

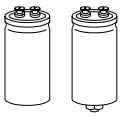
- Frequency converters
- Professional power supplies
- Uninterruptible power supplies

Features

- Extremely compact, i. e. high CU product
- High reliability and ripple current capability
- All-welded construction ensures reliable electrical contact
- Version with optimized construction for base cooling (2-pad solution) available
- Version with low-inductance design available

Construction

- Charge-discharge proof, polar
- Aluminum case with insulating sleeve
- Poles with screw terminal connections
- Mounting with ring clips, clamps or threaded stud
- The bases of types with threaded stud and $d \leq 76{,}9$ mm are not insulated, types with $d = 91$ mm have fully insulated bases



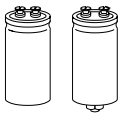
Specifications and characteristics in brief

Rated voltage U_R	350 … 450 VDC	
Surge voltage U_S	$1{,}10 \cdot U_R$	
Rated capacitance C_R	1 000 … 18 000 µF	
Capacitance tolerance	± 20 % ≙ M	
Leakage current I_L (5 min, 20 °C)	$I_L \leq 0{,}3\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{U_R}{V}\right)^{0,7} + 4\ \mu A$	
Self-inductance *ESL*	Approx. 20 nH Capacitors with low inductance design: $d \geq 64{,}3$ mm: approx. 13 nH	
Useful life		Requirements:
85 °C; U_R; $I_{\sim R}$	> 12 000 h	$\Delta C/C$ ≤ ± 30 % of initial value
40 °C; U_R; $1{,}5 \cdot I_{\sim R}$	> 250 000 h	*ESR* ≤ 3 times initial specified limit
		I_L ≤ initial specified limit
		Failure percentage: ≤ 1 %
		Failure rate: ≤ 40 fit (≤ $40 \cdot 10^{-9}$/h)
		(for definiton “fit”, refer to chapter *“Quality”*, page 62)
Voltage endurance test		Post test requirements:
85 °C; U_R	2 000 h	$\Delta C/C$ ≤ ± 10 % of initial value
		ESR ≤ 1,3 times initial specified limit
		I_L ≤ initial specified limit
Vibration resistance	To IEC 60068-2-6, test Fc: displacement amplitude 0,75 mm, frequency range 10 to 55 Hz, acceleration max. 10 *g*, duration 3 × 2 h	
IEC climatic category	To IEC 60068-1: $U_R \leq 400$ VDC: 40/085/56 (– 40 °C/+ 85 °C/56 days damp heat test) $U_R = 450$ VDC: 25/085/56 (– 25 °C/+ 85 °C/56 days damp heat test)	
Detail specifications	Similar to CECC 30301-803, CECC 30301-807	
Sectional specification	IEC 60384-4	

Ripple current capability

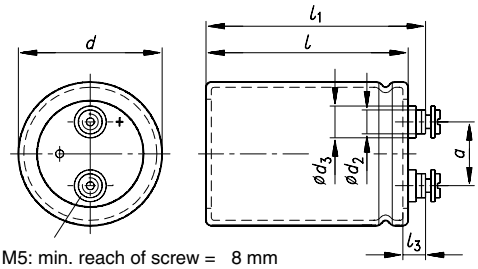
Due to the ripple current capability of the contact elements, the following current upper limits must not be exceeded:

Capacitor diameter	51,6 mm	64,3 mm	76,9 mm	91,0 mm
$I_{\sim max}$	30 A	40 A	50 A	70 A

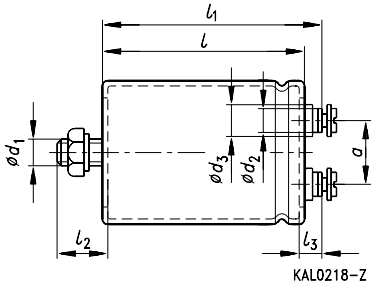


Dimensional drawings

Type B43456
Ring clip/clamp mounting



Type B43458
Threaded stud mounting



M5: min. reach of screw = 8 mm
M6: min. reach of screw = 12 mm*)
*) 8 mm for low-inductance design

Positive pole marking: +

The base of types with threaded stud and d = 91 mm is fully insulated (the lengths l and l_1 are increased by 0,5 mm in these cases). For types with threaded stud and $d \leq 76$ mm the base is not insulated. Also refer to the notes on mounting given on page 168.

Screw terminals with UNF threads are available upon request.

Dimensions and weights

Terminal	Dimensions (mm) with insulating sleeve									Approx. wt. (g)
	d	$l \pm 1$	$l_1 \pm 1$	l_2 $^{+0}_{-1}$	l_3	d_1	d_2 max	d_3 max	a $^{+0,2}_{-0,4}$	
M 5	51,6 +0/–0,8	80,7	87,2	17	7,0 +0,2/– 1	M 12	8,2	13,5	22,2	220
M 5	51,6 +0/–0,8	105,7	112,2	17	7,0 +0,2/– 1	M 12	8,2	13,5	22,2	280
M 5	64,3 +0/–0,8	105,7	112,2	17	7,0 +0,2/– 1	M 12	8,2	13,5	28,5	440
M 6	76,9 +0/–0,7	105,7	111,5	17	6,4 +1,1/– 0,8	M 12	17,7	17,7	31,7	540
M 6	76,9 +0/–0,7	143,2	149,0	17	6,4 +1,1/– 0,8	M 12	17,7	17,7	31,7	840
M 6	76,9 +0/–0,7	220,7	226,5	17	6,4 +1,1/– 0,8	M 12	17,7	17,7	31,7	1300
M 6	91,0 +0/–2	144,5	149,8	17	6,4 +1,1/– 0,8	M 12	17,7	17,7	31,7	1200
M 6	91,0 +0/–2	221,0	226,3	17	6,4 +1,1/– 0,8	M 12	17,7	17,7	31,7	1900

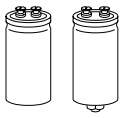
Dimensions are also valid for 2-pad solution and low-inductance design.

Packing

For ecological reasons the packing is pure cardboard.

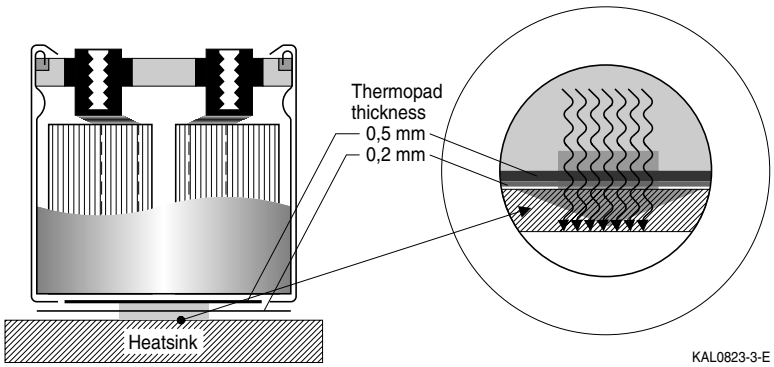
Capacitor diameter d	Packing units (pieces)
51,6 mm	22
64,3 mm	15

Capacitor diameter d	Packing units (pieces)
76,9 mm	12
91,0 mm	8



Special designs

- Low-inductance design
- 2-pad solution
  Design for optimized connection of the capacitor to the heatsink when using base cooling. This version is available for capacitors without threaded stud and for diameters ≥ 64,3 mm (cf. $I_{\sim R}$(B) in table “Technical data and ordering codes” and useful life graphs).



Ordering codes:

Design	Identification in 3rd block of ordering code	Remark
Low inductance (13 nH)	M003	For capacitors with diameter $d \geq 64{,}3$ mm
2-pad solution	M006	For capacitors with diameter $d \geq 64{,}3$ mm and without threaded stud

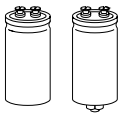
Accessories

The following items are included in the delivery package, but are not fastened to the capacitors:

	Thread	Toothed washers	Screws/Nuts	Maximum torque
For terminals	M 5	A 5,1 DIN 6797	Cylinder-head screw M 5 × 8 DIN 84-4.8	2 Nm
	M 6	A 6,4 DIN 6797	Cylinder-head screw M 6 × 12 DIN 85-4.8	2,5 Nm
For mounting	M 12	J 12,5 DIN 6797	Hex nut BM 12 DIN 439	10 Nm

The following must be ordered separately:

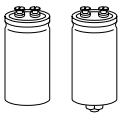
Ring clips	B 44 030 (cf. page 169)
Clamps for capacitors with $d \geq 64{,}3$ mm	B 44 030 (cf. page 173)
Insulating parts	B 44 020 (cf. page 166)



Overview of available types

U_R (VDC)	350	400	450
C_R (µF)	Case dimensions $d \times l$ (mm)		
1 000		51,6 × 80,7	51,6 × 80,7
1 500	51,6 × 80,7	51,6 × 80,7	51,6 × 105,7
2 200	51,6 × 105,7	51,6 × 105,7	64,3 × 105,7
3 300		64,3 × 105,7	76,9 × 105,7
3 900	64,3 × 105,7		
4 700		76,9 × 105,7	
5 600	76,9 × 105,7		76,9 × 143,2
6 800		76,9 × 143,2	91,0 × 144,5
8 200	76,9 × 143,2		76,9 × 220,7
10 000		91,0 × 144,5	
12 000	91,0 × 144,5	76,9 × 220,7	91,0 × 221,0
15 000	76,9 × 220,7	91,0 × 221,0	
18 000	91,0 × 221,0		

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



EPCOS

B43456 / B43458

Compact – 85 °C

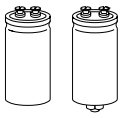
Technical data and ordering codes

U_R VDC	C_R 100 Hz 20 °C µF	Case dimensions $d \times l$ mm	ESR_{max} 100 Hz 20 °C mΩ	Z_{max} 10 kHz 20 °C mΩ	$I_{\sim max}$ 100 Hz 40 °C A	$I_{\sim R}$ 100 Hz 85 °C A	$I_{\sim R}$(B) 100 Hz 85 °C A	Ordering code[1]
350	1 500	51,6 × 80,7	110	93	16	5,7	11	B4345*A4158M000
	2 200	51,6 × 105,7	73	63	21	7,6	14	B4345*A4228M000
	3 900	64,3 × 105,7	41	38	32	12	21	B4345*A4398M000[2]
	5 600	76,9 × 105,7	29	28	43	15	30	B4345*A4568M000[2]
	8 200	76,9 × 143,2	20	20	50	20	36	B4345*A4828M000[2]
	12 000	91,0 × 144,5	14	14	70	28	52	B4345*A4129M000[2]
	15 000	76,9 × 220,7	11	11	50	34	50	B4345*A4159M000[2]
	18 000	91,0 × 221,0	9	9	70	38	58	B4345*A4189M000[2]
400	1 000	51,6 × 80,7	160	133	13	4,6	8,2	B4345*A9108M000
	1 500	51,6 × 80,7	110	93	17	6,0	13	B4345*A9158M000
	2 200	51,6 × 105,7	73	63	22	8,0	15	B4345*A9228M000
	3 300	64,3 × 105,7	49	44	30	11	20	B4345*A9338M000[2]
	4 700	76,9 × 105,7	34	32	40	14	29	B4345*A9478M000[2]
	6 800	76,9 × 143,2	24	24	50	19	33	B4345*A9688M000[2]
	10 000	91,0 × 144,5	16	16	70	25	48	B4345*A9109M000[2]
	12 000	76,9 × 220,7	14	14	50	31	46	B4345*A9129M000[2]
	15 000	91,0 × 221,0	11	11	70	35	54	B4345*A9159M000[2]
450	1 000	51,6 × 80,7	220	190	13	4,8	9,6	B4345*A5108M000
	1 500	51,6 × 105,7	150	130	18	6,5	12	B4345*A5158M000
	2 200	64,3 × 105,7	100	85	24	8,4	15	B4345*A5228M000[2]
	3 300	76,9 × 105,7	65	57	32	12	23	B4345*A5338M000[2]
	5 600	76,9 × 143,2	38	35	49	17	31	B4345*A5568M000[2]
	6 800	91,0 × 144,5	32	31	57	20	37	B4345*A5688M000[2]
	8 200	76,9 × 220,7	26	26	50	24	36	B4345*A5828M000[2]
	12 000	91,0 × 221,0	18	18	70	32	51	B4345*A5129M000[2]

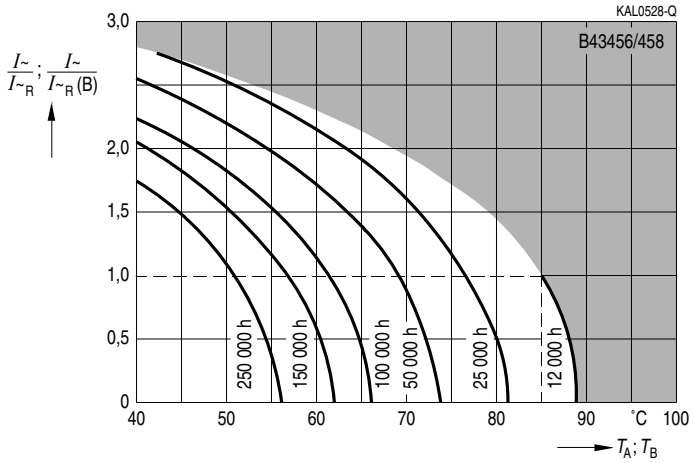
Preferred types

1) * "6" = for capacitors with ring clip/clamp mounting
"8" = for capacitors with threaded stud

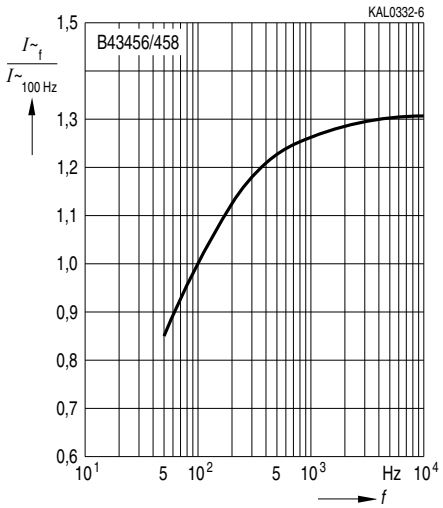
2) For 2-pad solution (types withoud threaded stud) and for low-inductance design, see page 128.



Useful life
depending on ambient temperature T_A (for natural cooling) and versus temperature of case base T_B (for base cooling) under ripple current operating conditions[1)]

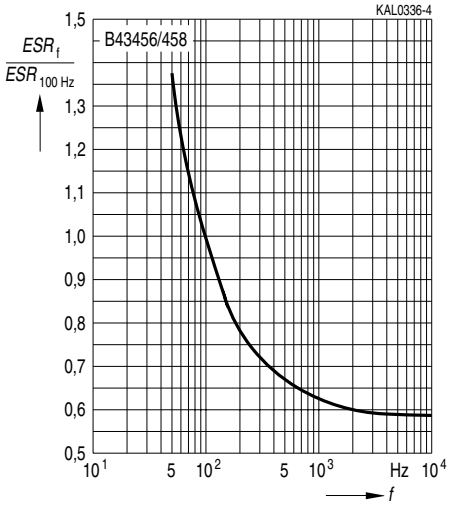


Frequency factor of permissible ripple current *I*~
versus frequency *f*

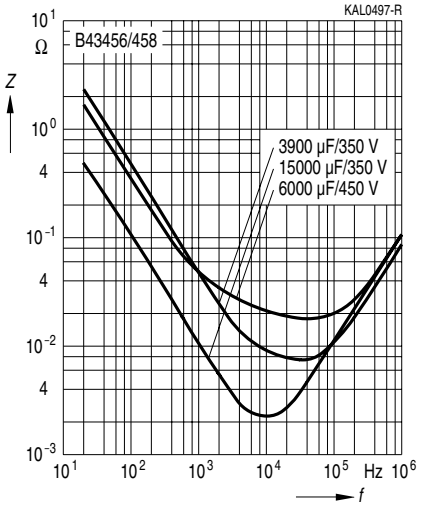


1) The ripple current refers to $I\sim_R$ for natural cooling or to $I\sim_R(B)$ for base cooling, respectively.
Refer to page 40 for an explanation on how to interpret the useful life graphs.

Frequency characteristics of *ESR*
Typical behavior



Impedance *Z*
versus frequency *f*
Typical behavior at 20 °C



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