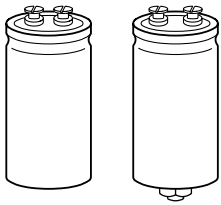
Long-life grade capacitors



KAL0567-B

B43566 B43586

Applications

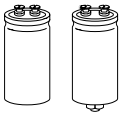
- Frequency converters

Features

- Extended useful life, high reliability
- Good electrical characteristics and small dimensions
- Extremely high 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
- Self-extinguishing electrolyt

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

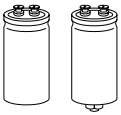
Rated voltage U_R	350 … 450 VDC	
Surge voltage U_S	1,10 · U_R	
Rated capacitance C_R	470 … 6 800 µF	
Capacitance tolerance	– 10/+ 30 % ≙ Q	
Leakage current I_L (5 min, 20 °C)	$I_L \leq 0{,}3\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{U_R}{V}\right)^{0{,}7} + 4\ \mu A$	
Self-inductance *ESL*	*d* = 51,6 mm: approx. 15 nH *d* = 76,9 mm: approx. 20 nH *d* = 91,0 mm: approx. 20 nH Capacitors with low-inductance design: *d* ≥ 64,3 mm: approx. 13 nH	
Useful life 85 °C; U_R; $I_{\sim R}$ 40 °C; U_R; 2 · $I_{\sim R}$	 > 24 000 h > 250 000 h	Requirements: $\Delta C/C$ ≤ ± 30 % of initial value *ESR* ≤ 3 times initial specified limit I_L ≤ initial specified limit Failure percentage: ≤ 1 % Failure rate: ≤ 30 fit (≤ 30 · 10^{-9}/h) (for definiton “fit”, rrefer to chapter *“Quality”*, page 62)
Voltage endurance test 85 °C; U_R; $I_{\sim R}$	 5 000 h	Post test requirements: $\Delta C/C$ ≤ ± 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: 350 VDC: 40/085/56 (– 40 °C/+ 85 °C/56 days damp heat test)[1)] ≥ 400 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:

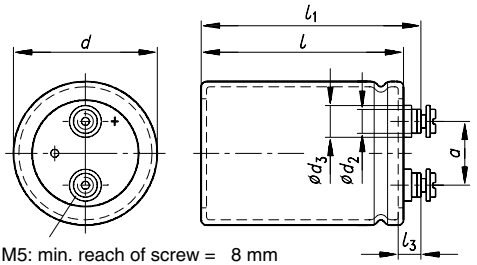
Capacitor diameter	51,6 mm	64,3 mm	76,9 mm	91,0 mm
$I_{\sim max}$	30 A	40 A	50 A	70 A

1) For case dimensions 76,9 mm × 220,7 mm: IEC climatic category 25/085/56



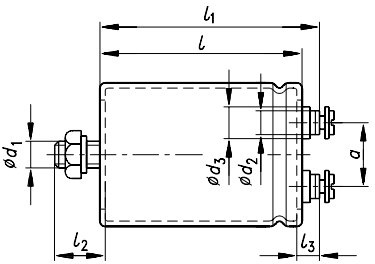
Dimensional drawings

Type B43566
Ring clip/clamp mounting



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

Type B43586
Threaded stud mounting



Positive pole marking: +

The base of all 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.

Dimensions and weights

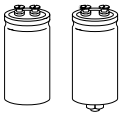
Terminal	Dimensions (mm) with insulating sleeve									Approx. wt. (g)
	d	$l \pm 1$	$l_1 \pm 1$	$l_{2\ -1}^{\ +0}$	l_3	d_1	d_2 max	d_3 max	$a_{\ -0,4}^{\ +0,2}$	
M 5	51,6 +0/–0,8	80,7	87,2	17	7,0 +0,2/–1	M 12	8,2	13,5	22,2	220
M 5	51,6 +0/–0,8	105,7	112,2	17	7,0 +0,2/–1	M 12	8,2	13,5	22,2	280
M 5	64,3 +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

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

Packing

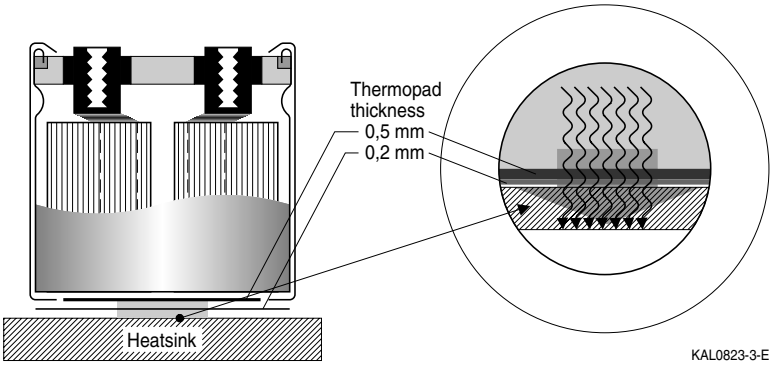
For ecological reasons the packing is pure cardboard.

Capacitor diameter d	Packing units (pieces)
51,6 mm	22
64,3 mm	15
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)	Q003	For capacitors with diameter $d \geq 64{,}3$ mm
2-pad solution	Q006	For capacitors with diameter $d \geq 64{,}3$ mm and without threaded stud

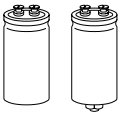
Accessories

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:

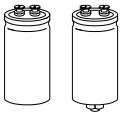
Ring clips	B44030 (cf. page 169)
Clamps for capacitors with $d \geq 64{,}3$ mm	B44030 (cf. page 173)
Insulating parts	B44020 (cf. page 166)



Overview of available types

U_R (VDC)	350	400	450
C_R (µF)	Case dimensions $d \times l$ (mm)		
470		51,6 × 80,7	51,6 × 80,7
680	51,6 × 80,7	51,6 × 80,7	51,6 × 105,7
1 000	51,6 × 80,7	51,6 × 105,7	64,3 × 105,7
1 500	51,6 × 105,7	64,3 × 105,7	76,9 × 105,7
2 200	64,3 × 105,7	76,9 × 105,7	76,9 × 143,2
2 700			91,0 × 144,5
3 300	76,9 × 105,7	76,9 × 143,2	76,9 × 220,7
4 700	76,9 × 143,2	76,9 × 220,7 91,0 × 144,5	
6 000	76,9 × 220,7 91,0 × 144,5	76,9 × 220,7	
6 800	76,9 × 220,7		

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

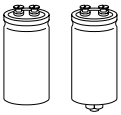


Technical data and ordering codes

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	$I_{\sim max}$ 100 Hz 85 °C A	$I_{\sim R}$ 100 Hz 85 °C A	$I_{\sim R}(B)$ 100 Hz 85 °C A	Ordering code[1]
350	680	51,6 × 80,7	120	100	13	5,0	4,4	8,0	B435*6A4687Q000
	1 000	51,6 × 80,7	84	73	16	6,3	5,6	12	B435*6B4108Q000
	1 500	51,6 × 105,7	59	52	21	8,3	7,3	14	B435*6B4158Q000
	2 200	64,3 × 105,7	43	39	28	11	9,4	17	B435*6A4228Q000[2]
	3 300	76,9 × 105,7	32	29	33	13	12	21	B435*6A4338Q000[2]
	4 700	76,9 × 143,2	25	23	44	17	15	27	B435*6A4478Q000[2]
	6 000	76,9 × 220,7	22	21	50	20	18	25	B435*6B4608Q000[2]
	6 000	91,0 × 144,5	23	22	51	20	18	32	B435*6J4608Q000[2]
	6 800	76,9 × 220,7	20	19	50	22	19	28	B435*6B4688Q000[2]
400	470	51,6 × 80,7	325	290	10	4,0	3,5	6,2	B435*6A0477Q000
	680	51,6 × 80,7	225	200	13	5,1	4,5	9,0	B435*6A0687Q000
	1 000	51,6 × 105,7	160	140	17	6,6	5,8	11	B435*6A0108Q000
	1 500	64,3 × 105,7	100	92	22	8,5	7,5	13	B435*6A0158Q000[2]
	2 200	76,9 × 105,7	83	65	29	11	9,9	19	B435*6A0228Q000[2]
	3 300	76,9 × 143,2	58	47	38	15	13	23	B435*6A0338Q000[2]
	4 700	76,9 × 220,7	43	40	50	19	17	24	B435*6A0478Q000[2]
	4 700	91,0 × 144,5	38	40	53	21	18	34	B435*6J0478Q000[2]
	6 000	76,9 × 220,7	35	33	50	24	21	31	B435*6A0608Q000[2]
450	470	51,6 × 80,7	350	310	11	4,2	3,7	7,4	B435*6A5477Q000
	680	51,6 × 105,7	250	220	14	5,4	4,8	8,6	B435*6A5687Q000
	1 000	64,3 × 105,7	190	173	17	6,7	6,0	11	B435*6A5108Q000[2]
	1 500	76,9 × 105,7	125	120	24	9,3	8,2	16	B435*6A5158Q000[2]
	2 200	76,9 × 143,2	95	90	30	12	10	17	B435*6A5228Q000[2]
	2 700	91,0 × 144,5	75	83	36	14	12	21	B435*6A5278Q000[2]
	3 300	76,9 × 220,7	70	67	40	15	14	19	B435*6A5338Q000[2]

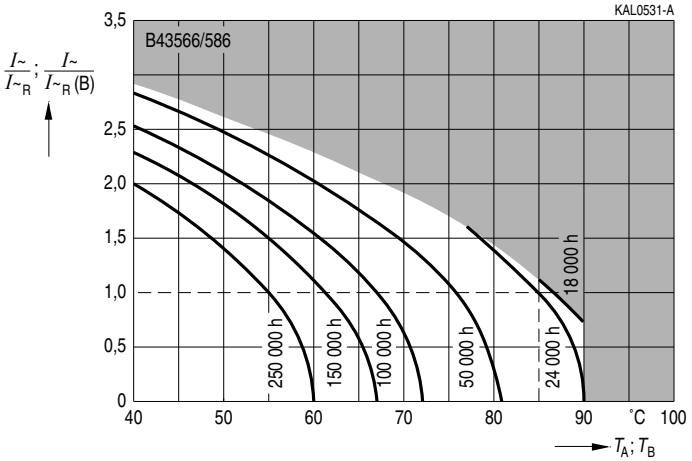
1) * "6" = for capacitors with ring clip/clamp mounting
"8" = for capacitors with threaded stud

2) For 2-pad solution (types without threaded stud) and for low-inductance design, see page 145.



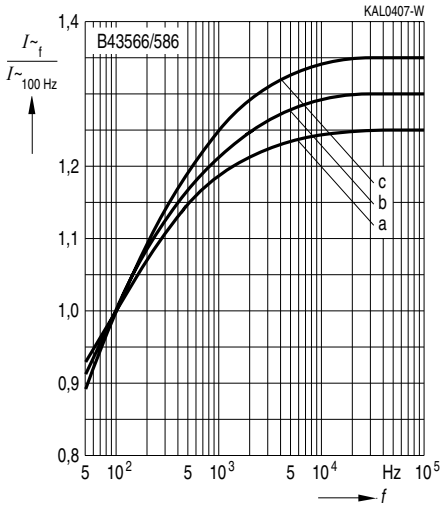
Useful life

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)]



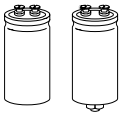
Frequency factor of permissible ripple current *I~*

versus frequency *f*



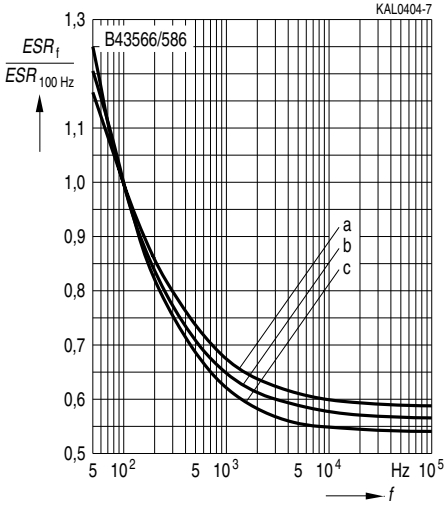
d (mm)	51,6	64,3	76,9	91,0
Curve	c	b	a	c

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



d (mm)	51,6	64,3	76,9	91,0
Curve	c	b	a	a

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Unternehmenskommunikation, Postfach 80 17 09, 81617 München, DEUTSCHLAND
☎ ++49 89 636 09, FAX (0 89) 636-2 26 89

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