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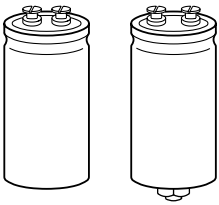
Long-life grade capacitors



KAL0567-B

B43564 B43584

Applications

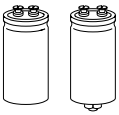
- Frequency converters
- Uninterruptible power supplies
- For switch-mode power supplies in professional equipments

Features

- High reliability
- Extremely good electrical characteristics and small dimensions
- 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



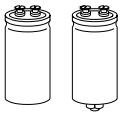
Specifications and characteristics in brief

Rated voltage U_R	350 … 500 VDC		
Surge voltage U_S	1,15 · U_R (for $U_R \leq$ 250 VDC) 1,10 · U_R (for $U_R \geq$ 350 VDC)		
Rated capacitance C_R	820 … 10 000 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	350…450 V	500 V	Requirements:
85 °C; U_R; $I_{\sim R}$	> 15 000 h	> 12 000 h	$\Delta C/C$ ≤ ± 30 % of initial value
40 °C; U_R; 1,5 · $I_{\sim R}$	> 250 000 h	–	*ESR* ≤ 3 times initial specified limit
40 °C; U_R; 1,4 · $I_{\sim R}$		> 250 000 h	I_L ≤ initial specified limit
			Failure percentage: ≤ 1 % Failure rate: ≤ 40 fit (≤ 40 · 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: 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

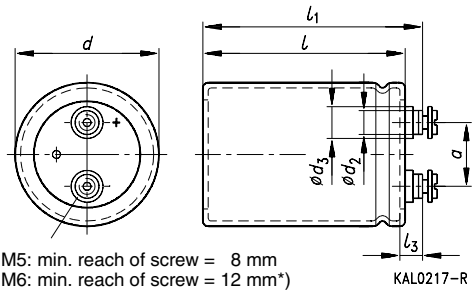
Due to the ripple current capability of the contact elements, the following current upper limits must not be exceeded:

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

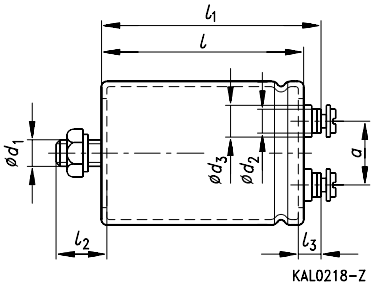


Dimensional drawings

Type B43564
Ring clip/clamp mounting



Type B43584
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 stud mounting 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 stud mounting 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 $^{+0}_{-1}$	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	97,0	103,3	17	6,4 +1,1/–0,8	M 12	17,7	17,7	31,7	750
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

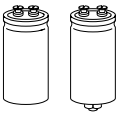
Dimensions are also valid for 2-pad solution and low-inductance design.

Packing

For ecological reasons the packing is pure cardboard.

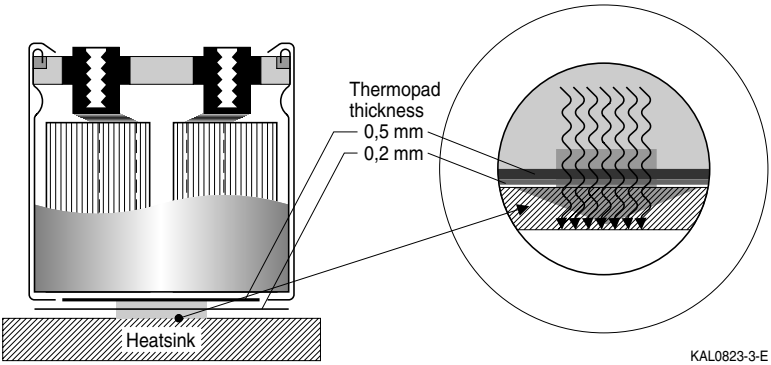
Capacitor diameter d	Packing units (pieces)
51,6 mm	22
64,3 mm	15

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

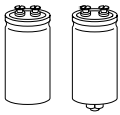
Accessories

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:

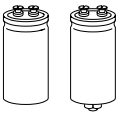
Ring clips	B44030 (cf. page 169)
Clamps for capacitors with $d \geq 64,3$ mm	B44030 (cf. page 173)
Insulating parts	B44020 (cf. page 166)



Overview of available types

U_R (VDC)	350	400	450	500
C_R (µF)	Case dimensions $d \times l$ (mm)			
820				51,6 × 80,7
1 000	51,6 × 80,7	51,6 × 80,7	51,6 × 105,7	
1 200				51,6 × 105,7
1 500	51,6 × 105,7	51,6 × 105,7	64,3 × 105,7	
1 800				64,3 × 105,7
2 200	51,6 × 105,7	64,3 × 105,7	76,9 × 105,7	
2 700				76,9 × 105,7
3 300	64,3 × 105,7	76,9 × 143,2	76,9 × 143,2	
3 900				76,9 × 143,2
4 700	76,9 × 105,7	91,0 × 97,0	76,9 × 220,7 91,0 × 144,5	
6 000	76,9 × 143,2	76,9 × 220,7	76,9 × 220,7	
6 800		91,0 × 144,5		
8 200	91,0 × 144,5			
10 000	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.



B43564 / B43584

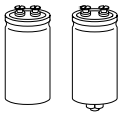
Long Useful Life – 85 °C

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	$I_{\sim max}$ 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	1 000	51,6 × 80,7	130	120	14	6,4	5,1	8,8	B435*4A4108M000
	1 500	51,6 × 105,7	93	93	17	8,1	6,5	10	B435*4A4158M000
	2 200	51,6 × 105,7	72	66	21	10	8,0	14	B435*4B4228M000
	3 300	64,3 × 105,7	48	47	29	14	11	19	B435*4B4338M000[2]
	4 700	76,9 × 105,7	38	38	36	17	13	25	B435*4B4478M000[2]
	6 000	76,9 × 143,2	32	32	41	19	15	25	B435*4A4608M000[2]
	8 200	91,0 × 144,5	23	23	57	27	21	36	B435*4A4828M000[2]
	10 000	76,9 × 220,7	20	20	50	29	23	32	B435*4A4109M000[2]
400	1 000	51,6 × 80,7	130	120	14	6,6	5,2	9,8	B435*4A0108M000
	1 500	51,6 × 105,7	93	81	18	7,7	6,7	11	B435*4A0158M000
	2 200	64,3 × 105,7	72	65	22	9,7	8,3	14	B435*4A0228M000[2]
	3 300	76,9 × 143,2	54	51	29	13	11	16	B435*4A0338M000[2]
	4 700	91,0 × 97,0	35	35	41	19	15	32	B435*4B0478M000[2]
	6 000	76,9 × 220,7	32	32	44	21	16	22	B435*4A0608M000[2]
	6 800	91,0 × 144,5	27	27	53	25	20	33	B435*4A0688M000[2]
450	1 000	51,6 × 105,7	140	130	15	6,9	5,4	8,9	B435*4A5108M000
	1 500	64,3 × 105,7	99	89	19	8,9	7,0	12	B435*4A5158M000[2]
	2 200	76,9 × 105,7	72	65	25	12	9,2	16	B435*4A5228M000[2]
	3 300	76,9 × 143,2	51	49	32	15	12	19	B435*4A5338M000[2]
	4 700	76,9 × 220,7	38	38	42	20	16	20	B435*4A5478M000[2]
	4 700	91,0 × 144,5	38	38	46	21	17	28	B435*4J5478M000[2]
	6 000	76,9 × 220,7	32	32	49	23	18	25	B435*4A5608M000[2]
500	820	51,6 × 80,7	195	177	11,9	4,4	4,4	8,6	B435*4A6827M000
	1 200	51,6 × 105,7	132	120	16,1	6,0	6,0	10,5	B435*4A6128M000
	1 800	64,3 × 105,7	89	80	21,1	7,9	7,9	13,7	B435*4A6188M000[2]
	2 700	76,9 × 105,7	60	55	28,2	10,5	10,5	20,0	B435*4A6278M000[2]
	3 900	76,9 × 143,2	42	38	38,2	14,2	14,2	23,7	B435*4A6398M000[2]

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

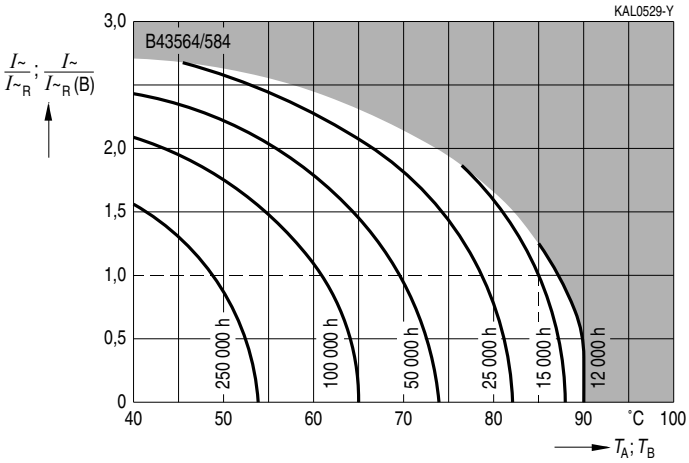
2) For 2-pad solution (types without threaded stud) and for low-inductance design, see page 136.



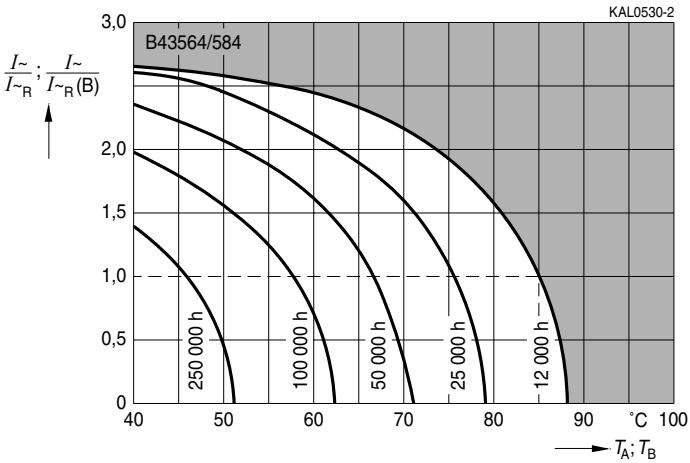
Useful life

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)]

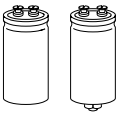
U_R = 350 … 450 V



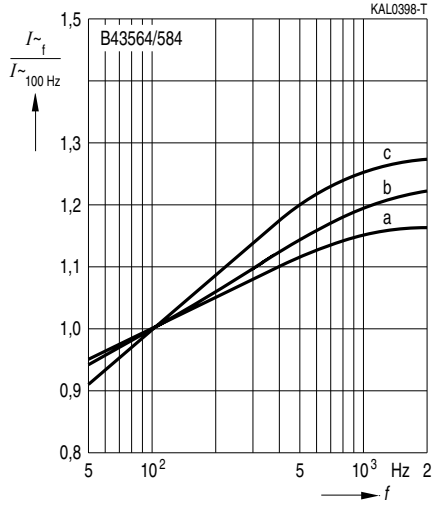
U_R = 500 V



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.

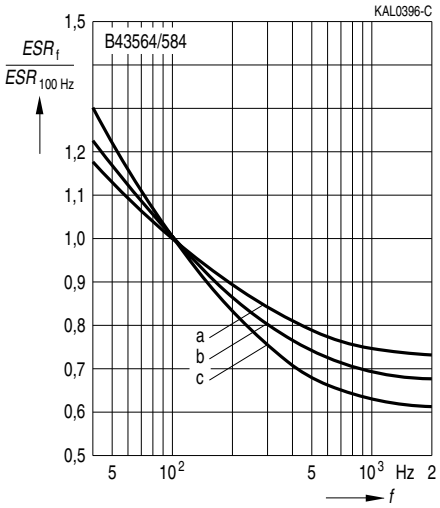


Frequency factor of permissible ripple current *I*~
versus frequency *f*

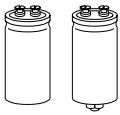


d (mm)	51,6	64,3	76,9	91,0
Curve	c	b	a	c

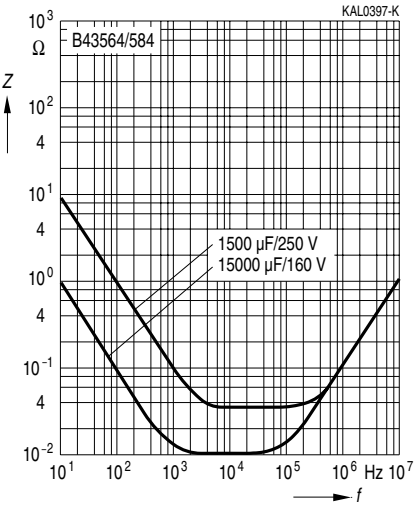
Frequency characteristics of *ESR*
Typical behavior



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



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



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