

Long-life grade capacitors

Applications

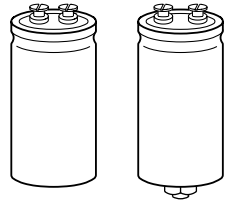
- General industrial electronics
- For switch-mode power supplies in professional equipment

Features

- High reliability
- High ripple current capability
- All-welded construction ensures reliable electrical contact
- Version with low-inductance design available

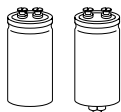
Construction

- 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 are not insulated


B43456

KAL0567-B

B43458

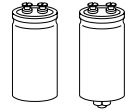

Specifications and characteristics in brief

Rated voltage U_R	16 ... 100 VDC	
Surge voltage U_S	$1,15 \cdot U_R$	
Rated capacitance C_R	2 200 ... 680 000 μ F	
Capacitance tolerance	$\pm 20 \% \triangleq M$	
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 85 °C; U_R ; $I_{\sim R}$ 40 °C; U_R ; $2,9 \cdot I_{\sim R}$	> 12 000 h > 200 000 h	Requirements: $\Delta C/C \leq \pm 45 \%$ of initial value $ESR \leq 3$ times initial specified limit $I_L \leq$ initial specified limit Failure percentage: $\leq 1 \%$ Failure rate: ≤ 40 fit ($\leq 40 \cdot 10^{-9}/h$) (for definition "fit", refer to chapter "Quality", page 62)
Voltage endurance test 85 °C; U_R	2 000 h	Post test requirements: $\Delta C/C \leq \pm 15 \%$ of initial value $ESR \leq 1,3$ times initial specified limit $I_L \leq$ 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: 40/085/56 (– 40 °C/+ 85 °C/56 days damp heat test)	
Detail specification	Similar to CECC 30301-810	
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:

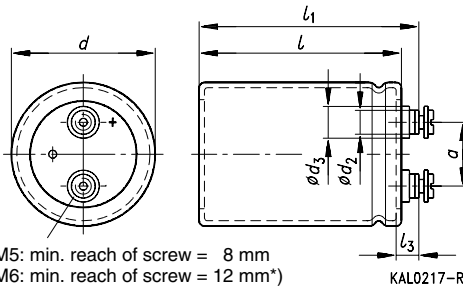
Capacitor diameter	$\leq 51,6$ mm	64,3 mm	76,9 mm
$I_{\sim \max}$	30 A	40 A	50 A



Dimensional drawings

Type B41456

Ring clip/clamp mounting

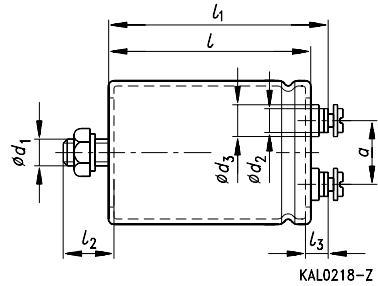


M5: min. reach of screw = 8 mm
M6: min. reach of screw = 12 mm*)
) 8 mm for low-inductance design

KAL0217-R

Type B41458

Threaded stud mounting



KAL0218-Z

Positive pole marking: +

Screw terminals with UNF threads are available upon request.

Dimensions and weights

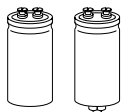
Ter- minal	Dimensions (mm) with insulating sleeve									Approx. wt. (g)
	<i>d</i>	<i>l</i> ± 1	<i>l</i> ₁ ± 1	<i>l</i> ₂ ⁺⁰ ₋₁	<i>l</i> ₃	<i>d</i> ₁	<i>d</i> ₂ max	<i>d</i> ₃ max	<i>a</i> ^{+0,2} _{-0,4}	
M 5	35,7+ 0/- 0,8	55,7	62,2	13	7,0+ 0,2/- 1	M 8	8,2	13,5	12,7	65
M 5	35,7+ 0/- 0,8	80,7	87,2	13	7,0+ 0,2/- 1	M 8	8,2	13,5	12,7	105
M 5	35,7+ 0/- 0,8	105,7	112,2	13	7,0+ 0,2/- 1	M 8	8,2	13,5	12,7	135
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

Dimensions are also valid for low-inductance design.

Packing

For ecological reasons the packing is pure cardboard.

Capacitor diameter d	Packing units (pieces)
35,7 mm	36
51,6 mm	22
64,3 mm	15
76,9 mm	12



Special designs

- Low-inductance design

Ordering code:

Design	Identification in 3rd block of ordering code	Remark
Low inductance (13 nH)	M003	For capacitors with diameter $d \geq 64,3$ mm

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 8	J 8,2 DIN 6797	Hex nut BM 8 DIN 439	4 Nm
	M 12	J 12,5 DIN 6797	Hex nut BM 12 DIN 439	10 Nm

The following must be ordered separately:

Ring clips

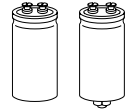
B44030 (cf. page 169)

Clamps for capacitors with $d \geq 64,3$ mm

B44030 (cf. page 173)

Insulating parts

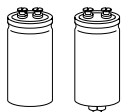
B44020 (cf. page 166)



Overview of available types

U_R (VDC)	16	25	40	63	100
C_R (μF)	Case dimensions $d \times l$ (mm)				
2 200					35,7 × 55,7
3 300					35,7 × 80,7
4 700				35,7 × 55,7	35,7 × 80,7
6 800				35,7 × 55,7	35,7 × 105,7
10 000			35,7 × 55,7	35,7 × 80,7	51,6 × 80,7
15 000			35,7 × 80,7	35,7 × 105,7	51,6 × 105,7
22 000	35,7 × 55,7	35,7 × 55,7	35,7 × 80,7	51,6 × 80,7	64,3 × 105,7
33 000	35,7 × 55,7	35,7 × 80,7	35,7 × 105,7	51,6 × 105,7	76,9 × 105,7
47 000	35,7 × 80,7	35,7 × 105,7	51,6 × 80,7	64,3 × 105,7	76,9 × 143,2
68 000	35,7 × 105,7	51,6 × 80,7	51,6 × 105,7	76,9 × 105,7	
100 000	51,6 × 80,7	51,6 × 105,7	64,3 × 105,7	76,9 × 143,2	
150 000	51,6 × 80,7	64,3 × 105,7	76,9 × 105,7	76,9 × 220,7	
220 000	64,3 × 105,7	64,3 × 105,7	76,9 × 143,2		
330 000	64,3 × 105,7	76,9 × 143,2			
470 000	76,9 × 143,2	76,9 × 220,7			
680 000	76,9 × 143,2				

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

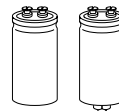
U_R VDC	C_R 100 Hz 20 °C μF	Case dimensions $d \times l$ mm	ESR_{max} 100 Hz 20 °C m Ω	Z_{max} 10 kHz 20 °C m Ω	$I_{\sim\text{max}}$ 100 Hz 40 °C A	$I_{\sim R}$ 100 Hz 85 °C A	Ordering code ¹⁾
16	22 000	35,7 × 55,7	28	23	21	7,1	B4145*B4229M000
	33 000	35,7 × 55,7	21	17	24	8,3	B4145*B4339M000
	47 000	35,7 × 80,7	16	13	30	11	B4145*B4479M000
	68 000	35,7 × 105,7	13	10	30	13	B4145*B4689M000
	100 000	51,6 × 80,7	10	8,2	30	14	B4145*B4100M000
	150 000	51,6 × 80,7	8,4	6,8	30	15	B4145*B4150M000
	220 000	64,3 × 105,7	7,3	5,9	40	20	B4145*B4220M000 ²⁾
	330 000	64,3 × 105,7	6,6	5,3	40	21	B4145*B4330M000 ²⁾
	470 000	76,9 × 143,2	6,1	4,9	50	25	B4145*B4470M000 ²⁾
	680 000	76,9 × 143,2	5,8	4,6	50	26	B4145*B4680M000 ²⁾
25	22 000	35,7 × 55,7	25	20	22	7,7	B4145*B5229M000
	33 000	35,7 × 80,7	19	15	29	10	B4145*B5339M000
	47 000	35,7 × 105,7	15	12	30	12	B4145*B5479M000
	68 000	51,6 × 80,7	12	9,3	30	13	B4145*B5689M000
	100 000	51,6 × 105,7	9,5	7,6	30	16	B4145*B5100M000
	150 000	64,3 × 105,7	8,0	6,4	40	20	B4145*B5150M000 ²⁾
	220 000	64,3 × 105,7	7,0	5,6	40	21	B4145*B5220M000 ²⁾
	330 000	76,9 × 143,2	6,4	5,1	50	25	B4145*B5330M000 ²⁾
	470 000	76,9 × 220,7	6,0	4,8	50	31	B4145*B5470M000 ²⁾
40	10 000	35,7 × 55,7	37	34	18	6,3	B4145*B7109M000
	15 000	35,7 × 80,7	27	24	24	8,3	B4145*B7159M000
	22 000	35,7 × 80,7	20	18	28	9,6	B4145*B7229M000
	33 000	35,7 × 105,7	15	13	30	12	B4145*B7339M000
	47 000	51,6 × 80,7	12	10	30	13	B4145*B7479M000
	68 000	51,6 × 105,7	10	8,4	30	16	B4145*B7689M000
	100 000	64,3 × 105,7	8,2	7,0	40	19	B4145*B7100M000 ²⁾
	150 000	76,9 × 105,7	7,2	6,0	50	21	B4145*B7150M000 ²⁾
	220 000	76,9 × 143,2	6,5	5,4	50	25	B4145*B7220M000 ²⁾

Preferred types

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

"8" = for capacitors with threaded stud

2) For low-inductance design, see page 76.



Technical data and ordering codes

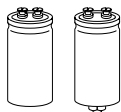
U_R	C_R 100 Hz 20 °C μF	Case dimensions $d \times l$ mm	$ESR_{\max}$ 100 Hz 20 °C mΩ	$Z_{\max}$ 10 kHz 20 °C mΩ	$I_{\sim \max}$ 100 Hz 40 °C A	I_{-R} 100 Hz 85 °C A	Ordering code ¹⁾
VDC							
63	4 700	35,7 × 55,7	60	58	14	4,9	B4145*B8478M000
	6 800	35,7 × 55,7	43	42	17	5,9	B4145*B8688M000
	10 000	35,7 × 80,7	31	30	23	7,7	B4145*B8109M000
	15 000	35,7 × 105,7	22	21	30	10	B4145*B8159M000
	22 000	51,6 × 80,7	16	16	30	11	B4145*B8229M000
	33 000	51,6 × 105,7	12	12	30	14	B4145*B8339M000
	47 000	64,3 × 105,7	10	9,4	40	18	B4145*B8479M000 ²⁾
	68 000	76,9 × 105,7	7,9	7,8	50	20	B4145*B8689M000 ²⁾
	100 000	76,9 × 143,2	6,7	6,6	50	25	B4145*B8100M000 ²⁾
	150 000	76,9 × 220,7	5,8	5,7	50	31	B4145*B8150M000 ²⁾
100	2 200	35,7 × 55,7	80	70	13	4,3	B4145*B9228M000
	3 300	35,7 × 80,7	55	48	17	5,8	B4145*B9338M000
	4 700	35,7 × 80,7	40	35	20	6,7	B4145*B9478M000
	6 800	35,7 × 105,7	29	25	25	8,7	B4145*B9688M000
	10 000	51,6 × 80,7	22	18	30	10	B4145*B9109M000
	15 000	51,6 × 105,7	16	14	30	13	B4145*B9159M000
	22 000	64,3 × 105,7	13	11	40	17	B4145*B9229M000 ²⁾
	33 000	76,9 × 105,7	10	8,4	50	19	B4145*B9339M000 ²⁾
	47 000	76,9 × 143,2	8,5	7,1	50	24	B4145*B9479M000 ²⁾

Preferred types

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

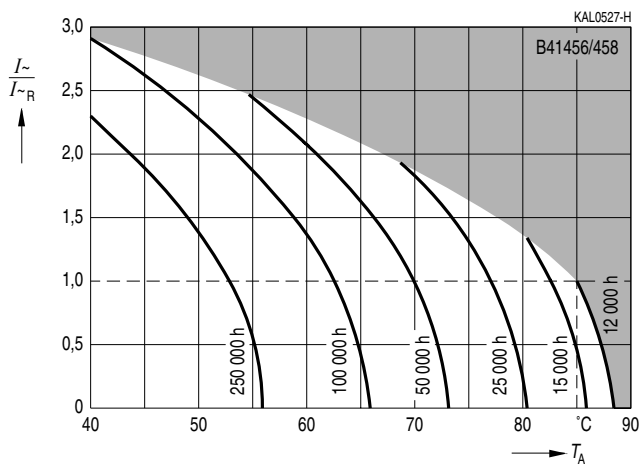
"8" = for capacitors with threaded stud

2) For low-inductance design, see page 76.

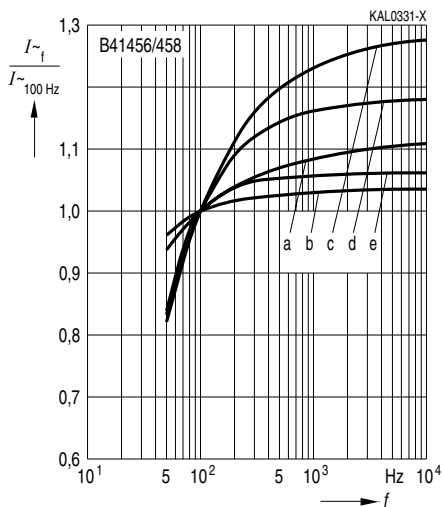


Useful life

depending on ambient temperature T_A under ripple current operating conditions¹⁾

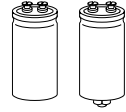


Frequency factor of permissible ripple current $I_{\sim}$ versus frequency f



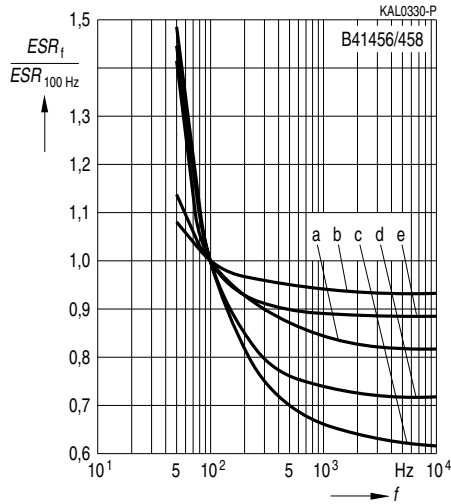
d (mm)	35,7	51,6	64,3	76,9
≤ 63 VDC	a	a	a	b
100 VDC	c	d	d	e

1) Refer to page 40 for an explanation on how to interpret the useful life graphs.



Frequency characteristics of ESR

Typical behavior

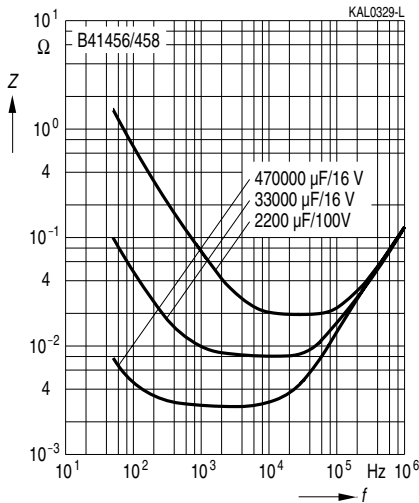


d (mm)	35,7	51,6	64,3	76,9
≤ 63 VDC	a	a	a	b
100 VDC	c	d	d	e

Impedance Z

versus frequency f

Typical behavior at 20 °C



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