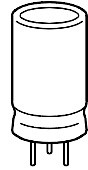


LL grade

Especially long useful life
High volumetric efficiency



KAL0275-I

Construction

- Charge-discharge proof, polar
- Aluminum case with insulating sleeve
- Solder pin terminals brought out at one end to fit standardized PCB spacings
- Negative potential can be applied to third pin; this pin does not serve as a minus pole, however

Construction

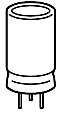
- Low equivalent series resistance R_{ESR}
- Very high ripple current capability
- Very long useful life
- Wide temperature range
- Pinning ensures correct insertion

Applications

- Specially suitable for use in output circuits of switch-mode power supplies
- General industrial electronics, telecommunications and data processing equipment

Specifications and characteristics in brief

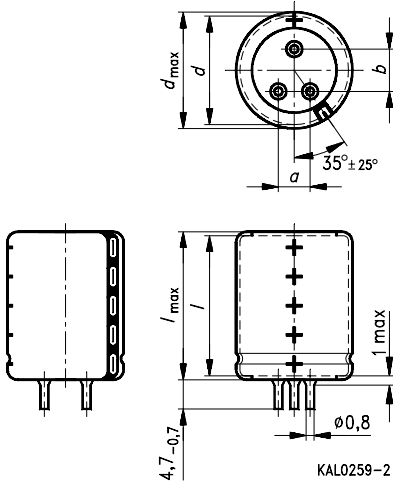
Rated voltage U_R	6,3 ... 63 V-
Surge voltage U_S	$1,15 \cdot U_R$
Rated capacitance C_R	1 000 ... 33 000 μ F
Capacitance tolerance	$\pm 20 \% \triangleq M$
Useful life	
40 °C, U_R	$> 200\,000$ h ($2,9 \cdot I_{-R,105^\circ C}$)
85 °C, U_R ; I_{-max}	$> 12\,000$ h
105 °C, U_R ; I_{-R}	$\geq 5\,000$ h
Failure percentage	$\leq 1 \%$ (during useful life)
Failure rate	≤ 20 fit ($\leq 20 \cdot 10^{-9}/h$)
Voltage endurance test	2 000 h, 105 °C (at U_R)
Leakage current I_{lka} (5 min, 20 °C)	$I_{lka} \leq 0,3 \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{U_R}{V} \right)^{0,7} + 4 \mu A$
Self-inductance L_{ESL}	approx. 10 nH



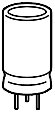
Specifications and characteristics in brief

IEC climatic category	in accordance with IEC 68-1 55/105/56 (– 55 °C/+ 105 °C, 56 days damp heat test)
Detail specification	–
Sectional specification	IEC 384-4
Vibration resistance	in accordance with IEC 68-2-6, test Fc: displacement amplitude 0,35 mm, frequency range 10 ... 55 Hz, acceleration max. 5 g, duration 3 × 2 h

Dimensional drawing



Dimensions (mm)				Approximate weight (g)	Packing units (pieces)
$d \times l$	$d_{\max} \times l_{\max}$	$a^{+0,4}_{-0,2}$	$b^{+0,4}_{-0,2}$		
18 × 30	18,8 × 30,5	5	7,5	11	600
18 × 40	18,8 × 40,5	5	7,5	14	600
22 × 30	22,8 × 30,5	7,5	10	14	384
22 × 40	22,8 × 40,5	7,5	10	18	256
25 × 30	25,8 × 30,5	7,5	10	18	384
25 × 40	25,8 × 40,5	7,5	10	26	256



B 41 538

Not for new design

Overview of available types

U_R (V-)	6,3	10	16	25	40	63
C_R (μ F)	Case dimensions $d \times l$ (mm)					
1 000						18 × 30
1 500						18 × 40 22 × 30
2 200					18 × 30	22 × 40 25 × 30
3 300				18 × 30	18 × 40 22 × 30	25 × 40
4 700			18 × 30	18 × 40 22 × 30	22 × 40 25 × 30	
6 800		18 × 30	18 × 40 22 × 30	22 × 40 25 × 30	25 × 40	
10 000	18 × 30	18 × 40 22 × 30	22 × 40 25 × 30	25 × 40		
15 000	18 × 40 22 × 30	22 × 40 25 × 30	25 × 40			
22 000	22 × 40 25 × 30	25 × 40				
33 000	25 × 40					

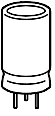
The capacitance and voltage ratings listed above are available in different cases upon request. Other voltage and capacitance ratings are also available upon request.



Technical data and ordering codes

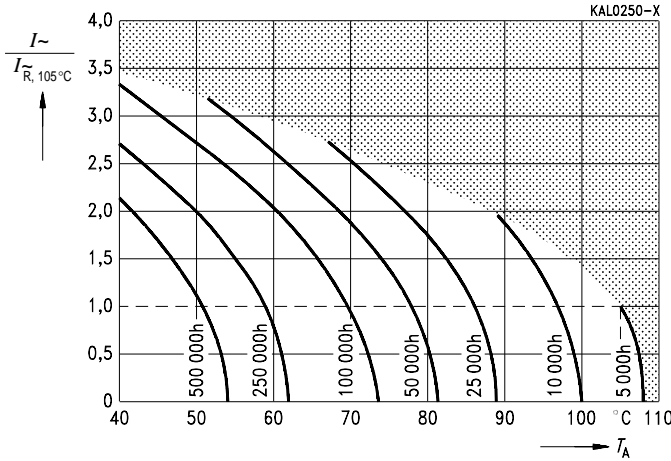
U_R	C_R	Case dimensions $d \times l$ mm	$R_{ESR, typ}$ 20 kHz 20 °C mΩ	$R_{ESR, max}$ 20 kHz 20 °C mΩ	Z_{max} 200 kHz 20 °C mΩ	I_{-max} 20 kHz 40 °C A	I_{-max} 20 kHz 85 °C A	I_{-R} 20 kHz 105 °C A	Ordering code 1) Short code
6,3	10 000	18 × 30	22	33	32	7,4	4,5	2,2	-A2109-M
	15 000	18 × 40	19	29	28	8,8	5,3	2,6	-A2159-M
	15 000	22 × 30	19	29	28	8,8	5,3	2,6	-J2159-M
	22 000	22 × 40	17	26	25	10	6,2	3,0	-A2229-M
	22 000	25 × 30	17	26	25	10	6,2	3,0	-J2229-M
	33 000	25 × 40	15	23	24	12	7,5	3,6	-A2339-M
10	6 800	18 × 30	22	33	32	7,4	4,5	2,2	-A3688-M
	10 000	18 × 40	19	29	28	8,8	5,3	2,6	-A3109-M
	10 000	22 × 30	19	29	28	8,8	5,3	2,6	-J3109-M
	15 000	22 × 40	16	24	25	11	6,4	3,1	-A3159-M
	15 000	25 × 30	16	24	25	11	6,4	3,1	-J3159-M
	22 000	25 × 40	15	23	24	12	7,5	3,6	-A3229-M
16	4 700	18 × 30	22	33	32	7,4	4,5	2,2	-A4478-M
	6 800	18 × 40	19	29	28	8,8	5,3	2,6	-A4688-M
	6 800	22 × 30	19	29	28	8,8	5,3	2,6	-J4688-M
	10 000	22 × 40	16	24	25	11	6,4	3,1	-A4109-M
	10 000	25 × 30	16	24	25	11	6,4	3,1	-J4109-M
	15 000	25 × 40	15	23	24	12	7,5	3,6	-A4159-M
25	3 300	18 × 30	21	32	31	7,6	4,6	2,2	-A5338-M
	4 700	18 × 40	18	27	27	9,1	5,5	2,6	-A5478-M
	4 700	22 × 30	18	27	27	9,1	5,5	2,6	-J5478-M
	6 800	22 × 40	16	24	25	11	6,4	3,1	-A5688-M
	6 800	25 × 30	16	24	25	11	6,4	3,1	-J5688-M
	10 000	25 × 40	15	23	24	12	7,5	3,6	-A5109-M
40	2 200	18 × 30	21	32	31	7,6	4,6	2,2	-A7228-M
	3 300	18 × 40	18	27	27	9,1	5,5	2,6	-A7338-M
	3 300	22 × 30	18	27	27	9,1	5,5	2,6	-J7338-M
	4 700	22 × 40	16	24	25	11	6,4	3,1	-A7478-M
	4 700	25 × 30	16	24	25	11	6,4	3,1	-J7478-M
	6 800	25 × 40	15	22	24	12	7,5	3,6	-A7688-M
63	1 000	18 × 30	50	75	75	4,9	3,0	1,4	-A8108-M
	1 500	18 × 40	35	53	53	6,5	3,9	1,9	-A8158-M
	1 500	22 × 30	35	53	53	6,5	3,9	1,9	-J8158-M
	2 200	22 × 40	25	38	38	8,8	5,1	2,5	-A8228-M
	2 200	25 × 30	25	38	38	8,8	5,1	2,5	-J8228-M
	3 300	25 × 40	19	28	28	11	6,7	3,2	-A8338-M

1) To obtain the required ordering code, prefix the type number to the short code. E. g.: B41538-A2109-M

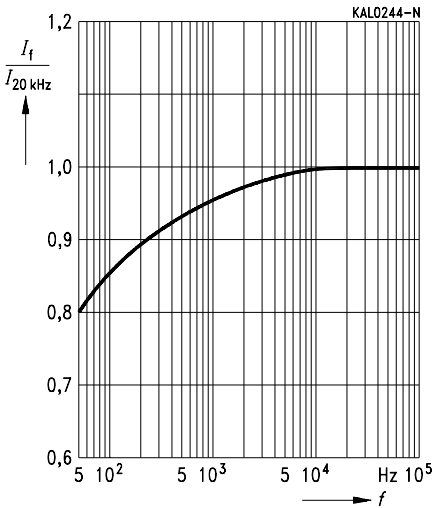


Useful life

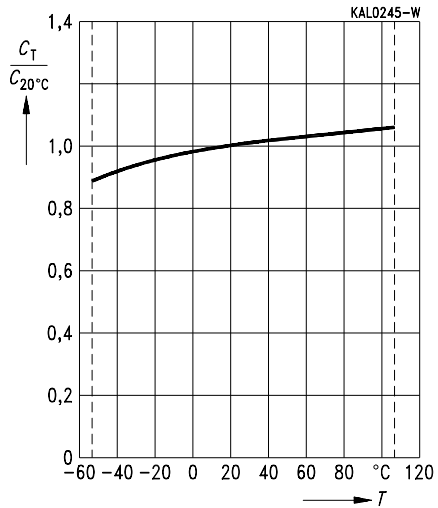
versus ambient temperature T_A under ripple current operating conditions ¹⁾



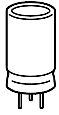
Permissible ripple current I_{\sim}
versus frequency f
Typical behavior



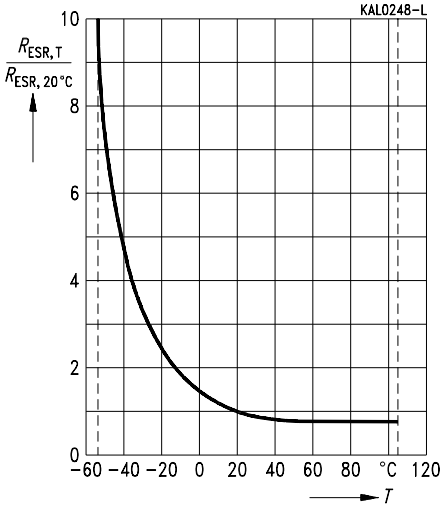
Series capacitance C_s at $f = 100$ Hz
versus temperature T
Typical behavior



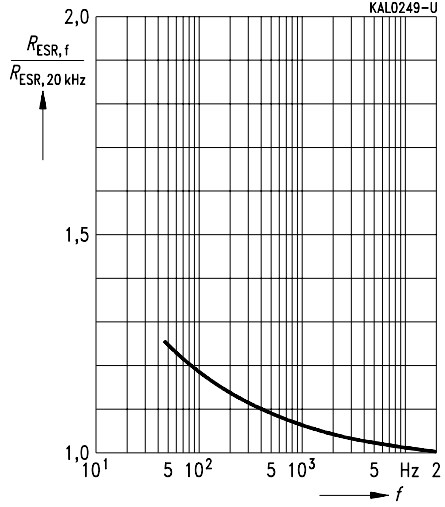
1) Refer to page 34 for an explanation on how to interpret the useful life graphs.



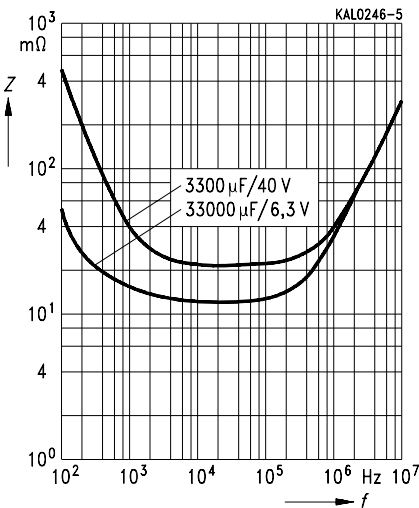
Equivalent series resistance R_{ESR}
at 100 Hz versus temperature T
Typical behavior



Equivalent series resistance R_{ESR}
versus frequency f
Typical behavior



Impedance Z
versus frequency f at 20 °C
Typical behavior



Impedance Z at 20 kHz
versus temperature T
Typical behavior

