



# **Aluminum electrolytic capacitors**

## **Alu-X product lines**

Single-ended capacitors

**Series/Type:**            **B41004, B43004**  
**Date:**                      August 2008

## Long-life grade capacitors

### Applications

- For low impedance applications
- Semi-professional to professional application range
- For filtering, coupling and pulse circuits

### Features

- Miniaturized dimensions
- RoHS-compatible
- Load life of 2000 hours at 85 °C

### Construction

- Radial leads
- Charge-discharge proof, polar
- Aluminum case with insulating sleeve
- Minus pole marking on the insulation sleeve
- Case with safety vent from diameter 8 mm

### Delivery mode

- Bulk
- Taped, Ammo pack
- Cut
- Kinked



**Specifications and characteristics in brief**

Rated voltage $V_R$	6.3 ... 450 V DC												
Operating temperature range	$V_R \leq 100$ V DC: –40 °C ... +85 °C												
	$V_R \geq 160$ V DC: –25 °C ... +85 °C												
Rated capacitance $C_R$ (20 °C, 120 Hz)	0.1 ... 15000 $\mu$ F												
Capacitance tolerance	$\pm 20\% \triangleq M$												
Load life (85 °C, $V_R$ , $I_{AC,R}$ )	2000 h												
	Requirements: $\Delta C/C \leq \pm 20\%$ of initial value $\tan \delta \leq 2$ times initial specified limit $I_{leak} \leq$ initial specified limit												
Dissipation factor $\tan \delta$ (20 °C, 120 Hz)	For capacitance higher than 1000 $\mu$ F add 0.02 for every increase of 1000 $\mu$ F												
	$V_R$ (V DC)	6.3	10	16	25	35	50	63	100	160 ... 250	350	400	450
	$\tan \delta$	0.24	0.20	0.18	0.16	0.14	0.12	0.12	0.10	0.15	0.20	0.20	0.24
Leakage current $I_{leak}$ (20 °C, after 5 minutes)	$I_{leak} \leq 0.03 \mu A \cdot \left( \frac{C_R}{\mu F} \cdot \frac{V_R}{V} \right)$												
Low temperature stability (impedance ratio) (120 Hz)	$V_R$ (V DC)	6.3 ... 16			25 ... 100			160	250 ... 450				
	$\frac{Z(-25 \text{ °C})}{Z(+20 \text{ °C})}$	–			–			4	7				
	$\frac{Z(-40 \text{ °C})}{Z(+20 \text{ °C})}$	5			4			–	–				
Shelf life	After storage for 1000 h at 85 °C, the capacitors shall meet the requirement of load life test after reforming process. After test: $V_R$ to be applied for 30 minutes, 24 to 48 hours before measurement.												
Frequency multiplier for rated ripple cur- rent	$V_R$	$C_R$	Frequency										
			50 Hz	120 Hz	1 kHz	10 kHz	100 kHz						
	6.3 ... 100 V	0.1 ... 6.8 $\mu$ F	–	0.4	0.7	0.8	1						
		10 ... 68 $\mu$ F	–	0.5	0.8	0.9	1						
		100 ... 200 $\mu$ F	–	0.7	0.9	0.9	1						
		330 ... 1000 $\mu$ F	–	0.8	0.9	1	1						
		2200 ... 15000 $\mu$ F	–	0.9	1	1	1						
160 ... 400 V	0.47 ... 330	0.8	1	1.3	1.4	1.6							
450 V	1.0 ... 33	0.8	1	1.3	1.4	1.5							
Temperature multi- plier for rated ripple current	+50 °C		+70 °C			+85 °C							
	1.50		1.27			1.00							

**Dimensional drawing**


Minus pole marking  
Safety vent

KAL1080-C-E

Safety vent for diameter  $\geq 8$  mm.

**Case dimensions**

$d \times l$ mm	$d_{\max} \times l_{\max}$ mm	a mm	b mm
5 × 11	5.5 × 12.5	2.0 ± 0.5	0.5 ± 0.1
6.3 × 11	6.8 × 12.5	2.5 ± 0.5	0.5 ± 0.1
8 × 11.5	8.5 × 13.0	3.5 ± 0.5	0.6 ± 0.1
10 × 12.5	11 × 14.0	5.0 ± 0.5	0.6 ± 0.1
10 × 16	11 × 17.5	5.0 ± 0.5	0.6 ± 0.1
10 × 20	11 × 21.5	5.0 ± 0.5	0.6 ± 0.1
12.5 × 20	13.5 × 22.0	5.0 ± 0.5	0.6 ± 0.1
12.5 × 25	13.5 × 27.0	5.0 ± 0.5	0.6 ± 0.1
16 × 25	17 × 27.0	7.5 ± 0.5	0.8 ± 0.1
16 × 31.5	17 × 33.5	7.5 ± 0.5	0.8 ± 0.1
16 × 35.5	17 × 37.5	7.5 ± 0.5	0.8 ± 0.1
18 × 35.5	19 × 37.5	7.5 ± 0.5	0.8 ± 0.1
18 × 40	19 × 42.0	7.5 ± 0.5	0.8 ± 0.1

**Overview of available types B41004**

$V_R$ (V DC)	6.3	10	16	25
	Case dimensions $d \times l$ (mm)			
$C_R$ ( $\mu$ F)				
4.7				5 × 11
6.8				5 × 11
10			5 × 11	5 × 11
15			5 × 11	5 × 11
22		5 × 11	5 × 11	5 × 11
33	5 × 11	5 × 11	5 × 11	5 × 11
47	5 × 11	5 × 11	5 × 11	5 × 11
68	5 × 11	5 × 11	6.3 × 11	6.3 × 11
100	5 × 11	5 × 11	6.3 × 11	8 × 11.5
150	6.3 × 11	6.3 × 11	8 × 11.5	8 × 11.5
220	6.3 × 11	8 × 11.5	8 × 11.5	10 × 12.5
330	8 × 11.5	8 × 11.5	10 × 12.5	10 × 16
470	8 × 11.5	10 × 12.5	10 × 12.5	10 × 16
680	10 × 12.5	10 × 12.5	10 × 16	12.5 × 20
1000	10 × 16	10 × 16	10 × 20	12.5 × 20
1500	10 × 20	10 × 20	12.5 × 20	16 × 25
2200	12.5 × 20	12.5 × 20	12.5 × 25	16 × 25
3300	12.5 × 25	12.5 × 25	16 × 25	16 × 31.5
4700	16 × 25	16 × 25	16 × 31.5	16 × 35.5
6800	16 × 31.5	16 × 31.5	18 × 35.5	
10000	16 × 35.5	18 × 35.5		
15000	18 × 35.5			

**Overview of available types B41004**

$V_R$ (V DC)	35	50	63	100
	Case dimensions $d \times l$ (mm)			
$C_R$ ( $\mu$ F)				
0.1		5 × 11	5 × 11	5 × 11
0.15		5 × 11	5 × 11	5 × 11
0.22		5 × 11	5 × 11	5 × 11
0.33		5 × 11	5 × 11	5 × 11
0.47		5 × 11	5 × 11	5 × 11
0.68		5 × 11	5 × 11	5 × 11
1.0		5 × 11	5 × 11	5 × 11
1.5		5 × 11	5 × 11	5 × 11
2.2	5 × 11	5 × 11	5 × 11	5 × 11
3.3	5 × 11	5 × 11	5 × 11	5 × 11
4.7	5 × 11	5 × 11	5 × 11	5 × 11
6.8	5 × 11	5 × 11	5 × 11	6.3 × 11
10	5 × 11	5 × 11	5 × 11	8 × 11.5
15	5 × 11	5 × 11	6.3 × 11	10 × 12.5
22	5 × 11	6.3 × 11	8 × 11.5	10 × 12.5
33	5 × 11	6.3 × 11	8 × 11.5	10 × 16
47	6.3 × 11	8 × 11.5	8 × 11.5	10 × 16
68	8 × 11.5	10 × 12.5	10 × 12.5	12.5 × 20
100	8 × 11.5	10 × 12.5	10 × 16	12.5 × 20
150	10 × 12.5	10 × 16	10 × 20	16 × 25
220	10 × 16	10 × 20	12.5 × 20	16 × 25
330	10 × 16	12.5 × 20	12.5 × 25	16 × 31.5
470	10 × 20	12.5 × 25	16 × 25	16 × 35.5
680	12.5 × 25	16 × 25	16 × 31.5	
1000	16 × 25	16 × 31.5	16 × 35.5	
1500	16 × 31.5	16 × 35.5		
2200	16 × 31.5	18 × 35.5		
3300	18 × 35.5			
4700	18 × 40			

**Overview of available types B43004**

$V_R$ (V DC)	160	200	250
	Case dimensions $d \times l$ (mm)		
$C_R$ ( $\mu\text{F}$ )			
0.47	$6.3 \times 11$	$6.3 \times 11$	$6.3 \times 11$
0.68	$6.3 \times 11$	$6.3 \times 11$	$6.3 \times 11$
1.0	$6.3 \times 11$	$6.3 \times 11$	$6.3 \times 11$
1.5	$6.3 \times 11$	$6.3 \times 11$	$6.3 \times 11$
2.2	$6.3 \times 11$	$6.3 \times 11$	$8 \times 11.5$
3.3	$8 \times 11.5$	$8 \times 11.5$	$10 \times 12.5$
4.7	$8 \times 11.5$	$10 \times 12.5$	$10 \times 12.5$
6.8	$10 \times 12.5$	$10 \times 16$	$10 \times 16$
10	$10 \times 12.5$	$10 \times 16$	$10 \times 20$
15	$10 \times 16$	$10 \times 20$	$12.5 \times 20$
22	$10 \times 20$	$12.5 \times 20$	$12.5 \times 25$
33	$12.5 \times 20$	$12.5 \times 25$	$16 \times 25$
47	$12.5 \times 25$	$12.5 \times 25$	$16 \times 25$
68	$16 \times 25$	$16 \times 31.5$	$16 \times 31.5$
100	$16 \times 31.5$	$16 \times 31.5$	$18 \times 35.5$
150	$16 \times 35.5$	$18 \times 35.5$	
220	$18 \times 35.5$	$18 \times 40$	
330	$18 \times 40$		

**Overview of available types B43004**

$V_R$ (V DC)	350	400	450
	Case dimensions $d \times l$ (mm)		
$C_R$ ( $\mu$ F)			
0.47	6.3 × 11		
0.68	8 × 11.5		
1.0	8 × 11.5	8 × 11.5	10 × 12.5
1.5	10 × 12.5	10 × 12.5	10 × 16
2.2	10 × 12.5	10 × 12.5	10 × 16
3.3	10 × 16	10 × 16	10 × 20
4.7	10 × 20	10 × 20	12.5 × 20
6.8	12.5 × 20	12.5 × 25	12.5 × 25
10	12.5 × 20	12.5 × 25	12.5 × 25
15	16 × 25	16 × 25	16 × 31.5
22	16 × 25	16 × 31.5	16 × 31.5
33	16 × 31.5	16 × 31.5	18 × 35.5
47	18 × 35.5	18 × 35.5	



**Technical data and ordering codes B41004**

$V_R$	$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions $d \times l$ mm	Z 100 kHz 20 °C $\Omega$	$I_{AC,R}$ 100 kHz 85 °C mA	Ordering code (composition see below)
6.3	33	5 × 11	3.000	70	B41004A2336M***
	47	5 × 11	1.800	85	B41004A2476M***
	68	5 × 11	1.560	105	B41004A2686M***
	100	5 × 11	1.440	130	B41004A2107M***
	150	6.3 × 11	1.200	170	B41004A2157M***
	220	6.3 × 11	1.044	200	B41004A2227M***
	330	8 × 11.5	0.696	280	B41004A2337M***
	470	8 × 11.5	0.468	326	B41004A2477M***
	680	10 × 12.5	0.420	450	B41004A2687M***
	1000	10 × 16	0.276	540	B41004A2108M***
	1500	10 × 20	0.216	800	B41004A2158M***
	2200	12.5 × 20	0.114	990	B41004A2228M***
	3300	12.5 × 25	0.108	1150	B41004A2338M***
	4700	16 × 25	0.096	1550	B41004A2478M***
	6800	16 × 31.5	0.073	1900	B41004A2688M***
	10000	16 × 35.5	0.067	2250	B41004A2109M***
	15000	18 × 35.5	0.054	2850	B41004A2159M***
10	22	5 × 11	3.000	65	B41004A3226M***
	33	5 × 11	2.280	75	B41004A3336M***
	47	5 × 11	1.800	89	B41004A3476M***
	68	5 × 11	1.680	107	B41004A3686M***
	100	5 × 11	1.440	130	B41004A3107M***
	150	6.3 × 11	0.960	170	B41004A3157M***
	220	8 × 11.5	0.696	240	B41004A3227M***
	330	8 × 11.5	0.564	280	B41004A3337M***
	470	10 × 12.5	0.468	360	B41004A3477M***
	680	10 × 12.5	0.360	450	B41004A3687M***
	1000	10 × 16	0.216	650	B41004A3108M***
	1500	10 × 20	0.180	900	B41004A3158M***
	2200	12.5 × 20	0.120	1050	B41004A3228M***
	3300	12.5 × 25	0.096	1350	B41004A3338M***
	4700	16 × 25	0.082	1800	B41004A3478M***
	6800	16 × 31.5	0.067	2200	B41004A3688M***
	10000	18 × 35.5	0.054	2700	B41004A3109M***

\*\*\* = Version

000 = for standard leads, bulk

001 = for kinked leads

002 = for cut leads, bulk

016 = for taped leads, Ammo pack, lead spacing a = 2.0 mm

007 = for taped leads, Ammo pack, lead spacing a = 2.5 mm

006 = for taped leads, Ammo pack, lead spacing a = 3.5 mm

008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

**Technical data and ordering codes B41004**

V <sub>R</sub>	C <sub>R</sub> 120 Hz 20 °C	Case dimensions d × l mm	Z 100 kHz 20 °C Ω	I <sub>AC,R</sub> 100 kHz 85 °C mA	Ordering code (composition see below)
V DC	μF				
16	10	5 × 11	3	55	B41004A4106M***
	15	5 × 11	2.64	66	B41004A4156M***
	22	5 × 11	2.28	80	B41004A4226M***
	33	5 × 11	1.8	96	B41004A4336M***
	47	5 × 11	1.68	116	B41004A4476M***
	68	6.3 × 11	1.2	130	B41004A4686M***
	100	6.3 × 11	0.84	176	B41004A4107M***
	150	8 × 11.5	0.6	220	B41004A4157M***
	220	8 × 11.5	0.564	300	B41004A4227M***
	330	10 × 12.5	0.468	350	B41004A4337M***
	470	10 × 12.5	0.3	496	B41004A4477M***
	680	10 × 16	0.204	616	B41004A4687M***
	1000	10 × 20	0.144	850	B41004A4108M***
	1500	12.5 × 20	0.12	1050	B41004A4158M***
	2200	12.5 × 25	0.096	1300	B41004A4228M***
	3300	16 × 25	0.072	1650	B41004A4338M***
	4700	16 × 31.5	0.067	2100	B41004A4478M***
6800	18 × 35.5	0.054	2500	B41004A4688M***	
25	4.7	5 × 11	3.6	40	B41004A5475M***
	6.8	5 × 11	3.24	48	B41004A5685M***
	10	5 × 11	3	60	B41004A5106M***
	15	5 × 11	2.64	69	B41004A5156M***
	22	5 × 11	2.28	87	B41004A5226M***
	33	5 × 11	1.92	110	B41004A5336M***
	47	5 × 11	1.44	116	B41004A5476M***
	68	6.3 × 11	0.96	160	B41004A5686M***
	100	8 × 11.5	0.696	190	B41004A5107M***
	150	8 × 11.5	0.6	270	B41004A5157M***
	220	10 × 12.5	0.564	340	B41004A5227M***
	330	10 × 16	0.372	520	B41004A5337M***
	470	10 × 16	0.264	625	B41004A5477M***
	680	12.5 × 20	0.168	850	B41004A5687M***
	1000	12.5 × 20	0.12	1050	B41004A5108M***
	1500	16 × 25	0.096	1230	B41004A5158M***
	2200	16 × 25	0.084	1550	B41004A5228M***
3300	16 × 31.5	0.067	2100	B41004A5338M***	
4700	16 × 35.5	0.054	2450	B41004A5478M***	

\*\*\* = Version

000 = for standard leads, bulk

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002 = for cut leads, bulk

016 = for taped leads, Ammo pack, lead spacing a = 2.0 mm

007 = for taped leads, Ammo pack, lead spacing a = 2.5 mm

006 = for taped leads, Ammo pack, lead spacing a = 3.5 mm

008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

**Technical data and ordering codes B41004**

V <sub>R</sub>	C <sub>R</sub> 120 Hz 20 °C μF	Case dimensions d × l mm	Z 100 kHz 20 °C Ω	I <sub>AC,R</sub> 100 kHz 85 °C mA	Ordering code (composition see below)
35	2.2	5 × 11	4	26	B41004A7225M***
	3.3	5 × 11	3.5	32	B41004A7335M***
	4.7	5 × 11	3	50	B41004A7475M***
	6.8	5 × 11	2.64	60	B41004A7685M***
	10	5 × 11	2.28	70	B41004A7106M***
	15	5 × 11	2.04	88	B41004A7156M***
	22	5 × 11	1.8	110	B41004A7226M***
	33	5 × 11	1.44	130	B41004A7336M***
	47	6.3 × 11	0.828	160	B41004A7476M***
	68	8 × 11.5	0.6	210	B41004A7686M***
	100	8 × 11.5	0.468	320	B41004A7107M***
	150	10 × 12.5	0.43	390	B41004A7157M***
	220	10 × 16	0.4	530	B41004A7227M***
	330	10 × 16	0.324	650	B41004A7337M***
	470	10 × 20	0.228	850	B41004A7477M***
	680	12.5 × 25	0.156	1050	B41004A7687M***
	1000	16 × 25	0.108	1230	B41004A7108M***
	1500	16 × 31.5	0.096	1560	B41004A7158M***
	2200	16 × 31.5	0.084	2100	B41004A7228M***
	3300	18 × 35.5	0.054	2460	B41004A7338M***
4700	18 × 40	0.045	2500	B41004A7478M***	
50	0.1	5 × 11	24	10	B41004A6104M***
	0.15	5 × 11	20	11	B41004A6154M***
	0.22	5 × 11	18	15	B41004A6224M***
	0.33	5 × 11	15.6	19	B41004A6334M***
	0.47	5 × 11	12	25	B41004A6474M***
	0.68	5 × 11	8.4	30	B41004A6684M***
	1	5 × 11	7.2	35	B41004A6105M***
	1.5	5 × 11	6.24	40	B41004A6155M***
	2.2	5 × 11	5.88	45	B41004A6225M***
	3.3	5 × 11	5.4	55	B41004A6335M***
	4.7	5 × 11	4.8	76	B41004A6475M***
	6.8	5 × 11	3.84	86	B41004A6685M***

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008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

**Technical data and ordering codes B41004**

V <sub>R</sub>	C <sub>R</sub> 120 Hz 20 °C μF	Case dimensions d × l mm	Z 100 kHz 20 °C Ω	I <sub>AC,R</sub> 100 kHz 85 °C mA	Ordering code (composition see below)
50	10	5 × 11	3.24	95	B41004A6106M***
	15	5 × 11	2.64	105	B41004A6156M***
	22	6.3 × 11	2.28	135	B41004A6226M***
	33	6.3 × 11	1.32	186	B41004A6336M***
	47	8 × 11.5	1.08	210	B41004A6476M***
	68	10 × 12.5	0.84	320	B41004A6686M***
	100	10 × 12.5	0.6	420	B41004A6107M***
	150	10 × 16	0.56	530	B41004A6157M***
	220	10 × 20	0.408	620	B41004A6227M***
	330	12.5 × 20	0.276	730	B41004A6337M***
	470	12.5 × 25	0.18	980	B41004A6477M***
	680	16 × 25	0.132	1160	B41004A6687M***
	1000	16 × 31.5	0.096	1560	B41004A6108M***
	1500	16 × 35.5	0.082	1820	B41004A6158M***
	2200	18 × 35.5	0.06	2300	B41004A6228M***
63	0.1	5 × 11	24	10	B41004A8104M***
	0.15	5 × 11	20	11	B41004A8154M***
	0.22	5 × 11	18	15	B41004A8224M***
	0.33	5 × 11	15.6	19	B41004A8334M***
	0.47	5 × 11	12	25	B41004A8474M***
	0.68	5 × 11	8.4	30	B41004A8684M***
	1	5 × 11	7.2	35	B41004A8105M***
	1.5	5 × 11	6.24	40	B41004A8155M***
	2.2	5 × 11	5.88	45	B41004A8225M***
	3.3	5 × 11	5.4	55	B41004A8335M***
	4.7	5 × 11	6.96	76	B41004A8475M***
	6.8	5 × 11	5.4	88	B41004A8685M***
	10	5 × 11	4.32	96	B41004A8106M***
	15	6.3 × 11	3.36	115	B41004A8156M***
	22	8 × 11.5	2.52	136	B41004A8226M***
	33	8 × 11.5	2.04	190	B41004A8336M***
	47	8 × 11.5	1.44	310	B41004A8476M***
68	10 × 12.5	1.08	356	B41004A8686M***	
100	10 × 16	0.816	440	B41004A8107M***	

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**Technical data and ordering codes B41004**

$V_R$	$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions $d \times l$ mm	Z 100 kHz 20 °C $\Omega$	$I_{AC,R}$ 100 kHz 85 °C mA	Ordering code (composition see below)
63	150	10 × 20	0.522	540	B41004A8157M***
	220	12.5 × 20	0.384	630	B41004A8227M***
	330	12.5 × 25	0.264	740	B41004A8337M***
	470	16 × 25	0.192	1000	B41004A8477M***
	680	16 × 31.5	0.144	1200	B41004A8687M***
	1000	16 × 35.5	0.117	1500	B41004A8108M***
100	0.1	5 × 11	26	10	B41004A9104M***
	0.15	5 × 11	24	11	B41004A9154M***
	0.22	5 × 11	22	15	B41004A9224M***
	0.33	5 × 11	20	20	B41004A9334M***
	0.47	5 × 11	18	25	B41004A9474M***
	0.68	5 × 11	15.6	30	B41004A9684M***
	1	5 × 11	14.4	35	B41004A9105M***
	1.5	5 × 11	13.2	45	B41004A9155M***
	2.2	5 × 11	12	55	B41004A9225M***
	3.3	5 × 11	8.64	65	B41004A9335M***
	4.7	5 × 11	7.56	75	B41004A9475M***
	6.8	6.3 × 11	5.4	90	B41004A9685M***
	10	8 × 11.5	3.96	120	B41004A9106M***
	15	10 × 12.5	3.36	150	B41004A9156M***
	22	10 × 12.5	1.68	190	B41004A9226M***
	33	10 × 16	1.128	310	B41004A9336M***
	47	10 × 16	0.816	350	B41004A9476M***
	68	12.5 × 20	0.48	440	B41004A9686M***
	100	12.5 × 20	0.336	600	B41004A9107M***
	150	16 × 25	0.264	690	B41004A9157M***
220	16 × 25	0.192	1050	B41004A9227M***	
330	16 × 31.5	0.156	1380	B41004A9337M***	
470	16 × 35.5	0.144	1400	B41004A9477M***	

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006 = for taped leads, Ammo pack, lead spacing a = 3.5 mm

008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

**Technical data and ordering codes B43004**

V <sub>R</sub>	C <sub>R</sub> 120 Hz 20 °C μF	Case dimensions d × l mm	I <sub>AC,R</sub> 100 kHz 85 °C mA	Ordering code (composition see below)
160	0.47	6.3 × 11	16	B43004A1474M***
	0.68	6.3 × 11	20	B43004A1684M***
	1	6.3 × 11	24	B43004A1105M***
	1.5	6.3 × 11	30	B43004A1155M***
	2.2	6.3 × 11	37	B43004A1225M***
	3.3	8 × 11.5	45	B43004A1335M***
	4.7	8 × 11.5	55	B43004A1475M***
	6.8	10 × 12.5	60	B43004A1685M***
	10	10 × 12.5	85	B43004A1106M***
	15	10 × 16	120	B43004A1156M***
	22	10 × 20	160	B43004A1226M***
	33	12.5 × 20	210	B43004A1336M***
	47	12.5 × 25	270	B43004A1476M***
	68	16 × 25	320	B43004A1686M***
	100	16 × 31.5	430	B43004A1107M***
150	16 × 35.5	550	B43004A1157M***	
220	18 × 35.5	790	B43004A1227M***	
330	18 × 40	950	B43004A1337M***	
200	0.47	6.3 × 11	16	B43004A2474M***
	0.68	6.3 × 11	20	B43004A2684M***
	1	6.3 × 11	24	B43004A2105M***
	1.5	6.3 × 11	30	B43004A2155M***
	2.2	6.3 × 11	37	B43004A2225M***
	3.3	8 × 11.5	45	B43004A2335M***
	4.7	10 × 12.5	60	B43004A2475M***
	6.8	10 × 16	80	B43004A2685M***
	10	10 × 16	100	B43004A2106M***
	15	10 × 20	130	B43004A2156M***
	22	12.5 × 20	170	B43004A2226M***
	33	12.5 × 25	230	B43004A2336M***
	47	12.5 × 25	270	B43004A2476M***
	68	16 × 31.5	355	B43004A2686M***
	100	16 × 31.5	450	B43004A2107M***
150	18 × 35.5	640	B43004A2157M***	
220	18 × 40	800	B43004A2227M***	

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008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

**Technical data and ordering codes B43004**

V <sub>R</sub>	C <sub>R</sub> 120 Hz 20 °C	Case dimensions d × l mm	I <sub>AC,R</sub> 100 kHz 85 °C mA	Ordering code (composition see below)	
V DC	μF				
	250	0.47	6.3 × 11	16	B43004F2474M***
		0.68	6.3 × 11	20	B43004F2684M***
		1	6.3 × 11	24	B43004F2105M***
		1.5	6.3 × 11	30	B43004F2155M***
		2.2	8 × 11.5	39	B43004F2225M***
		3.3	10 × 12.5	50	B43004F2335M***
		4.7	10 × 12.5	60	B43004F2475M***
		6.8	10 × 16	70	B43004F2685M***
		10	10 × 20	110	B43004F2106M***
		15	12.5 × 20	140	B43004F2156M***
		22	12.5 × 25	190	B43004F2226M***
		33	16 × 25	230	B43004F2336M***
		47	16 × 25	260	B43004F2476M***
	68	16 × 31.5	340	B43004F2686M***	
	100	18 × 35.5	480	B43004F2107M***	
350	0.47	6.3 × 11	13	B43004A4474M***	
	0.68	8 × 11.5	20	B43004A4684M***	
	1	8 × 11.5	24	B43004A4105M***	
	1.5	10 × 12.5	30	B43004A4155M***	
	2.2	10 × 12.5	40	B43004A4225M***	
	3.3	10 × 16	55	B43004A4335M***	
	4.7	10 × 20	60	B43004A4475M***	
	6.8	12.5 × 20	98	B43004A4685M***	
	10	12.5 × 20	120	B43004A4106M***	
	15	16 × 25	150	B43004A4156M***	
	22	16 × 25	190	B43004A4226M***	
	33	16 × 31.5	280	B43004A4336M***	
	47	18 × 35.5	300	B43004A4476M***	

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008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

**Technical data and ordering codes B43004**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions $d \times l$ mm	$I_{AC,R}$ 100 kHz 85 °C mA	Ordering code (composition see below)
400	1	8 × 11.5	25	B43004A9105M***
	1.5	10 × 12.5	35	B43004A9155M***
	2.2	10 × 12.5	43	B43004A9225M***
	3.3	10 × 16	58	B43004A9335M***
	4.7	10 × 20	70	B43004A9475M***
	6.8	12.5 × 25	100	B43004A9685M***
	10	12.5 × 25	120	B43004A9106M***
	15	16 × 25	130	B43004A9156M***
	22	16 × 31.5	200	B43004A9226M***
	33	16 × 31.5	240	B43004A9336M***
	47	18 × 35.5	320	B43004A9476M***
450	1	10 × 12.5	20	B43004A5105M***
	1.5	10 × 16	30	B43004A5155M***
	2.2	10 × 16	38	B43004A5225M***
	3.3	10 × 20	45	B43004A5335M***
	4.7	12.5 × 20	60	B43004A5475M***
	6.8	12.5 × 25	82	B43004A5685M***
	10	12.5 × 25	105	B43004A5106M***
	15	16 × 31.5	150	B43004A5156M***
	22	16 × 31.5	160	B43004A5226M***
	33	18 × 35.5	235	B43004A5336M***

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006 = for taped leads, Ammo pack, lead spacing a = 3.5 mm

008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm



**Taping, packing and lead configurations of single-ended capacitors**

Single-ended capacitors are available taped in Ammo pack from diameter 4 to 10 mm as follows:

**Lead spacing 2.0 mm ( $\varnothing d = 4 \dots 5$  mm)**

Last 3 digits of ordering code: 016


**Dimensions in mm**

$\varnothing d$	F	H	W	$W_0$	$W_1$	$W_2$	P	$P_0$	$P_1$	$l_1$	t	$\Delta h$	$D_0$
4 ... 5	2.0	18.5	18.0	7.0	9.0	3.0	12.7	12.7	5.10	1.0	0.7	1	4.0
	-0.2	$\pm 0.75$	$\pm 0.5$	min.	$\pm 0.5$	max.	$\pm 1.0$	$\pm 0.3$	$\pm 0.7$	max.	$\pm 0.2$	$\pm 1.0$	$\pm 0.2$

**Lead spacing 2.5 mm ( $\varnothing d = 4 \dots 6.3$  mm)**

Last 3 digits of ordering code: 007


**Dimensions in mm**

$\varnothing d$	F	H	H <sub>0</sub>	W	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	P	P <sub>0</sub>	P <sub>1</sub>	l <sub>1</sub>	t	$\Delta h$	D <sub>0</sub>
4 ... 6.3	2.5	18.5	16.0	18.0	7.0	9.0	3.0	12.7	12.7	5.10	1.0	0.7	0	4.0
Tolerance	-0.2	±0.75	±0.5	±0.5	min.	±0.5	max.	±1.0	±0.3	±0.7	max.	±0.2	±1.0	±0.2

**Lead spacing 3.5 mm ( $\varnothing d = 8$  mm)**

Last 3 digits of ordering code: 006


**Dimensions in mm**

$\varnothing d$	F	H	W	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	P	P <sub>0</sub>	P <sub>1</sub>	l <sub>1</sub>	t	$\Delta h$	D <sub>0</sub>
8	3.5	18.5	18.0	10	9.0	3.0	12.7	12.7	5.10	1.0	0.7	1	4.0
Tolerance	±0.5	±0.75	±0.5	min.	±0.5	max.	±1.0	±0.3	±0.7	max.	±0.2	max.	±0.2

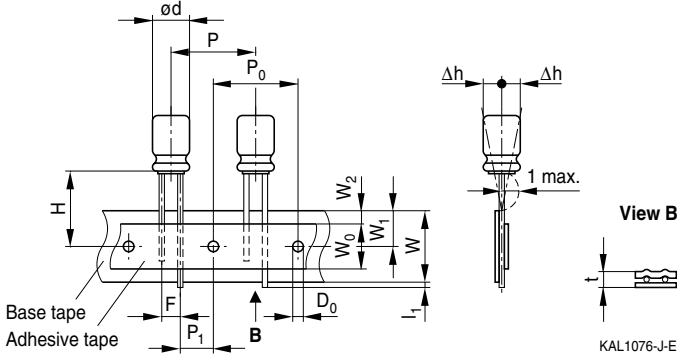
**Lead spacing 5.0 mm ( $\varnothing d = 4 \dots 8$  mm)**

Last 3 digits of ordering code: 008



**Lead spacing 5.0 mm ( $\varnothing d = 10$  mm)**

Last 3 digits of ordering code: 008



**Dimensions in mm**

$\varnothing d$	F	H	H <sub>0</sub>	W	W <sub>0</sub>	W <sub>1</sub>	W <sub>2</sub>	P	P <sub>0</sub>	P <sub>1</sub>	L <sub>1</sub>	t	$\Delta h$	D <sub>0</sub>
4 ... 6.3	5.0	18.5	16	18.0	7.0	9.0	3.0	12.7	12.7	3.85	1.0	0.6	2.0	4.0
8	5.0	18.5	16	18.0	10	9.0	3.0	12.7	12.7	3.85	1.0	0.6	2.0	4.0
10	5.0	18.5	—	18.0	12.5	9.0	3.0	12.7	12.7	3.85	1.0	0.6	2.0	4.0
Tolerance	+0.6 -0.2	$\pm 0.75$	$\pm 0.5$	+1.0 -0.5	+1.0 -0	$\pm 0.5$	max.	$\pm 0.5$	$\pm 0.3$	$\pm 0.7$	max.	+0.3 -0.2	max.	$\pm 0.2$

Taping is available up to dimensions  $d \times l = 10 \times 20$  mm. For  $\varnothing 12.5, 16$  and  $18$  mm taping is not available.

**Kinked or cut leads**

Single-ended capacitors are available with kinked or cut leads. Other lead configurations also available on request.

**Kinked leads**

Last 3 digits of ordering code: 001



Case size d × l (mm)	a (mm)
4 × 7	1.5
5 × 7	2.0
5 × 11	2.0
6.3 × 7	2.5
6.3 × 11	2.5
6.3 × 15	2.5
8 × 7	3.5
8 × 11.5	3.5
8 × 15	3.5
8 × 20	3.5
10 × 12.5	5.0
10 × 16	5.0
10 × 20	5.0
10 × 25	5.0
10 × 31.5	5.0

Case size d × l (mm)	a (mm)
12.5 × 16	5.0
12.5 × 20	5.0
12.5 × 25	5.0
12.5 × 31.5	5.0
12.5 × 35.5	5.0
12.5 × 40	5.0
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
16 × 35.5	7.5
16 × 40	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35.5	7.5
18 × 40	7.5

**Cut leads**

Last 3 digits of ordering code: 002



KAL1086-R

Case size d × l (mm)	a (mm)
4 × 7	1.5
5 × 7	2.0
5 × 11	2.0
6.3 × 7	2.5
6.3 × 11	2.5
6.3 × 15	2.5
8 × 7	3.5
8 × 11.5	3.5
8 × 15	3.5
8 × 20	5.0
10 × 12.5	5.0
10 × 16	5.0
10 × 20	5.0
10 × 25	5.0
10 × 31.5	5.0

Case size d × l (mm)	a (mm)
12.5 × 16	5.0
12.5 × 20	5.0
12.5 × 25	5.0
12.5 × 31.5	5.0
12.5 × 35.5	5.0
12.5 × 40	5.0
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
16 × 35.5	7.5
16 × 40	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35.5	7.5
18 × 40	7.5

## Cautions and warnings

### General

Also see "Important notes" on page 24.

- 1 Aluminum electrolytic capacitors have a bi-polar structure. This is marked on the body of the capacitor. A capacitor must not be mounted with reversed polarity. The application of an AC or reverse voltage may cause a short circuit or damage the capacitor. Bi-polar capacitors must not be used in AC applications, where the polarity may be reversed in the circuits or is unknown.
- 2 The DC voltage applied to the capacitor terminal must not exceed its rated operating voltage, as this will result in a rapid increase of the leakage current and may damage the capacitor. It is recommended to operate the capacitor at 70–80% of its rated voltage to optimize its service life.
- 3 The ripple current applied to the capacitor must be within the permitted range. An excessive ripple current leads to impaired electrical properties and may damage the capacitor. Note that the sum of the peak values of the ripple voltage and the DC operating voltage must not exceed the rated DC voltage.
- 4 Capacitors must be used within their permitted range of operating temperature. Operation at room temperature optimizes their service life.
- 5 Capacitors with case diameter  $\geq 8$  mm are equipped with a safety vent. In capacitors fitted with a lead or soldering lug, the safety vent is usually located at the base of the case. It needs sufficient space around it to operate optimally. The following dimensions are recommended: for case diameter  $d = 8$  to 16 mm, more than 2 mm; for  $d = 18$  to 35 mm, more than 3 mm; and for  $d = 42$  mm or more, more than 5 mm.
- 6 Capacitors should not be mounted with the safety vent face down on the board. Do not locate any wire or copper trace near the safety vent. Do not reverse the voltage, as this may result in excess pressure and the leakage of electrolyte.
- 7 Gas is released through the safety vent when the pressure inside the capacitor is too high. A gaseous liquid around the safety vent does not indicate a leakage of electrolyte.
- 8 The capacitor should be stored under conditions of normal temperature and in a non-acid, non-alkali environment of normal humidity. Exposure to high temperatures, for example under direct sunlight, will reduce its operating life. If the capacitor is stored in an environment containing acids or alkalis, the solderability of the leads may be affected.
- 9 The leakage current of an aluminum electrolytic capacitor may increase after a long period of storage. After such storage, the capacitor must be aged by applying the rated operating voltage for 6–8 hours before use.
- 10 Manual soldering:
  - a Soldering must be performed within the specified conditions.  
Bit temperature: 350 °C; application time of soldering iron: 3 seconds.
  - b Ensure that the soldering iron does not touch any part of the capacitor body.

## Cautions and warnings

- 11 Do not apply excessive force to the leads and terminals. Do not move the capacitor after soldering it onto the PC board and do not carry the PC board by gripping the capacitor. Observe the following rules to prevent undue stress to the capacitor:
  - a Do not tilt or bend the capacitor after soldering.
  - b Ensure that the terminal spacing matches the corresponding hole spacing on the PC board.
- 12 The aluminum case is not insulated from the cathode. Do not place a conductor under the aluminum capacitors on the PC board as this may cause a short circuit. The case and top of capacitors used in switched mode power supplies have a high-voltage-resistant heat shrink sleeve to ensure safe usage.
- 13 The leads of capacitors with a case diameter exceeding 14 mm cannot be used for fixing.

## Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that in **individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.epcos.com/material](http://www.epcos.com/material)). Should you have any more detailed questions, please contact our sales offices.
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