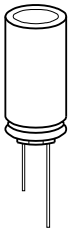
Aluminum electrolytic capacitors

Single-ended capacitors

Series/Type: **B41821, B43821**
Date: December 2006



General-purpose grade capacitors

Applications
- General-purpose applications in the entertainment industry
- Semi-professional to professional application range
- For filtering, coupling and pulse circuits

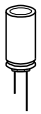
Features
- Compact dimensions
- High CV product, i.e. very compact
- Good electrical characteristics

Construction
- Radial leads
- Charge-discharge proof, polar
- Aluminum case with insulating sleeve
- Minus pole marking on the insulating sleeve
- Case with safety vent from diameter 6.3 mm

Delivery mode

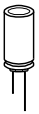
Terminal configurations and packing:
- Bulk
- Taped, Ammo pack
- Cut
- Kinked
- PAPR (protection against polarity reversal): crimped leads, J leads, bent leads

Refer to chapter "Single-ended capacitors – Taping, packing and lead configurations" for further details and ordering example.



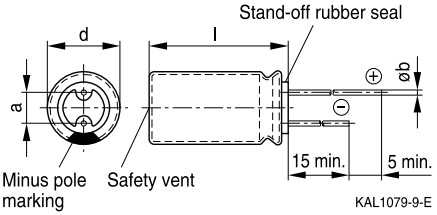
Specifications and characteristics in brief

Series	B41821				B43821					
Rated voltage V_R	6.3 ... 100 V DC				160 ... 450 V DC					
Surge voltage V_S	1.15 · V_R				1.1 · V_R					
Rated capacitance C_R	0.1 ... 10000 µF				0.47 ... 560 µF					
Capacitance tolerance	±20% ≙ M				±20% ≙ M					
Dissipation factor tan δ (20 °C, 120 Hz)	For capacitance higher than 1000 µF add 0.02 for every increase of 1000 µF.									
	V_R (V DC)	6.3	10	16	25	35	50	63	100	160 ... 450
	tan δ (max.)	0.28	0.24	0.20	0.16	0.14	0.12	0.12	0.10	0.20
Leakage current I_{leak} (20 °C, 5 min)	$I_{leak}=0.01\,\mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)$ or 3 µA, whichever is greater				$I_{leak}= 0.03\,\mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right) + 15\,\mu A$					
Self-inductance ESL	Diameter (mm)	≤ 6.3		8 ... 12.5		16		18		20 ... 25
	ESL (nH)	15		20		26		34		40
Useful life										
85 °C, V_R, $I_{AC,R}$	> 2000 h				> 3000 h					
40 °C, V_R, 1.3 · $I_{AC,R}$	> 100000 h				–					
40 °C, V_R, 1.6 · $I_{AC,R}$	–				> 100000 h					
Requirements	ΔC/C ≤ ±45% of initial value tan δ ≤ 3 times initial specified limit I_{leak} ≤ initial specified limit									
Voltage endurance test										
85 °C, V_R	2000 h				2000 h					
Post test requirements	ΔC/C ≤ ±30% of initial value tan δ ≤ 2 times initial specified limit I_{leak} ≤ initial specified limit									
Vibration resistance test	To IEC 60068-2-6, test Fc: Displacement amplitude 0.75 mm, frequency range 10 ... 2000 Hz, acceleration max. 20 *g,* duration 3 × 2 h. Capacitor rigidly clamped by the aluminum case.									
IEC climatic category	To IEC 60068-1: V_R ≤ 250 V: 40/085/56 (–40 °C/+85 °C/56 days damp heat test) V_R ≥ 350 V: 25/085/56 (–25 °C/+85 °C/56 days damp heat test)									
Sectional specification	IEC 60384-4									

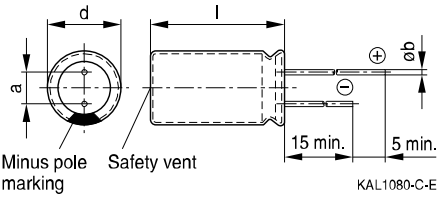


Dimensional drawings

With stand-off rubber seal
Diameters (mm):
6.3, 8, 10, 12.5, 16, 18, 22, 25



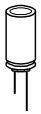
With flat rubber seal
Diameters (mm):
5, 8, 20



Safety vent for diameter ≥ 6.3 mm.

Dimensions and weights

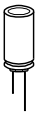
Dimensions (mm)				Approx. weight
d +0.5	l	a ±0.5	b	g
5	11 +1.0	2.0	0.50 ±0.05	0.5
6.3	11 +1.0	2.5	0.50 ±0.05	0.7
8	11.5 +1.5	3.5	0.60 ±0.05	1.0
10	12.5 +1.0	5.0	0.60 ±0.05	1.6
10	16 +1.0	5.0	0.60 ±0.05	1.9
10	20 +2.0	5.0	0.60 ±0.05	2.6
12.5	20 +2.0	5.0	0.60 ±0.05	3.6
12.5	25 +2.0	5.0	0.60 ±0.05	4.5
16	20 +2.0	7.5	0.80 ±0.05	5.5
16	25 +2.0	7.5	0.80 ±0.05	7.5
16	31.5 +2.0	7.5	0.80 ±0.05	7.8
18	31.5 +2.0	7.5	0.80 ±0.1	11.0
18	35 +2.0	7.5	0.80 ±0.1	13.0
18	40 +2.0	7.5	0.80 ±0.1	16.0
20	30 +2.0	10.0	1.0 ±0.1	14.0
20	35 +2.0	10.0	1.0 ±0.1	18.0
20	40 +2.0	10.0	1.0 ±0.1	20.0
22	35 +2.0	10.0	1.0 ±0.1	21.0
22	40 +2.0	10.0	1.0 ±0.1	23.0
25	40 +2.0	12.5	1.0 ±0.1	25.0



Overview of available types – B41821

Other voltage and capacitance ratings are available upon request.

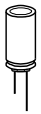
V_R (V DC)	6.3	10	16	25	35
	Case dimensions d × l (mm)				
C_R (µF)					
33					5 × 11
47				5 × 11	5 × 11
68			5 × 11		6.3 × 11
100		5 × 11	5 × 11	6.3 × 11	6.3 × 11
150		6.3 × 11	6.3 × 11	6.3 × 11	8 × 11.5
220	6.3 × 11	6.3 × 11	6.3 × 11	8 × 11.5	8 × 11.5
270	6.3 × 11	6.3 × 11	8 × 11.5	8 × 11.5	10 × 12.5
330	6.3 × 11	8 × 11.5	8 × 11.5	8 × 11.5 10 × 12.5	10 × 12.5
470	8 × 11.5	8 × 11.5	8 × 11.5	10 × 12.5	10 × 16
560	8 × 11.5	8 × 11.5	10 × 12.5	10 × 16	10 × 20
680	10 × 12.5	10 × 12.5	10 × 12.5	10 × 16	10 × 20
1000	10 × 12.5	10 × 12.5	10 × 16	10 × 20	12.5 × 20
1500	10 × 16	10 × 20	10 × 20	12.5 × 20	16 × 20
2200	10 × 20	10 × 20	12.5 × 20	12.5 × 25	16 × 25
3300	10 × 20	12.5 × 25	12.5 × 25 16 × 25	16 × 25	16 × 31.5
4700	12.5 × 25	16 × 20	16 × 25	16 × 31.5	18 × 35
6800		16 × 25	16 × 31.5 18 × 31.5	18 × 35	18 × 40
8200		16 × 31.5	18 × 31.5	18 × 40	
10000		18 × 31.5	18 × 35	20 × 40	



B41821

Standard series – 85 °C

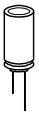
V_R (V DC)	50	63	100
	Case dimensions d × l (mm)		
C_R (µF)			
0.10			5 × 11
0.22			5 × 11
0.33			5 × 11
0.47			5 × 11
0.68			5 × 11
1.0			5 × 11
1.5			5 × 11
2.2			5 × 11
3.3			5 × 11
4.7			5 × 11
6.8		5 × 11	
10	5 × 11	5 × 11	6.3 × 11
22	5 × 11	5 × 11 6.3 × 11	8 × 11.5
33	6.3 × 11	6.3 × 11	10 × 12.5
47	6.3 × 11	6.3 × 11 8 × 11.5	10 × 12.5
68	6.3 × 11	8 × 11.5	10 × 16
100	8 × 11.5	8 × 11.5	10 × 20
150	8 × 11.5	10 × 12.5	12.5 × 25
220	10 × 12.5	10 × 16	12.5 × 25
270	10 × 16	10 × 20	16 × 25
330	10 × 16	10 × 20	16 × 25
470	10 × 20	12.5 × 20 12.5 × 25	16 × 31.5
560	12.5 × 20	12.5 × 25	16 × 31.5
680	12.5 × 20	16 × 20	18 × 40
1000	12.5 × 25	16 × 25 16 × 31.5	20 × 40
1500	16 × 25	18 × 31.5	
2200	16 × 31.5 18 × 35	18 × 35 18 × 40	
3300	18 × 35	20 × 40	
4700	20 × 40	25 × 40	



Overview of available types – B43821

Other voltage and capacitance ratings are available upon request.

V_R (V DC)	160	200	250	350	400	450
	Case dimensions d × l (mm)					
C_R (µF)						
0.47	6.3 × 11	6.3 × 11	6.3 × 11	6.3 × 11		
0.68	6.3 × 11	6.3 × 11	6.3 × 11	6.3 × 11		
1.0	6.3 × 11	6.3 × 11	6.3 × 11	6.3 × 11		
1.5	6.3 × 11	6.3 × 11	6.3 × 11	8 × 11.5		
2.2	6.3 × 11	6.3 × 11	6.3 × 11	8 × 11.5	10 × 12.5	10 × 12.5
3.3	6.3 × 11	6.3 × 11	8 × 11.5	10 × 12.5	10 × 12.5	10 × 16
4.7	6.3 × 11	8 × 11.5	8 × 11.5	10 × 12.5	10 × 16	10 × 16
6.8	8 × 11.5	10 × 12.5	10 × 12.5	10 × 16	10 × 16	10 × 20
10	8 × 11.5	10 × 12.5	10 × 12.5 10 × 16	10 × 20	10 × 20	10 × 20
22	10 × 12.5 10 × 16	10 × 16 10 × 20	10 × 20	12.5 × 25	12.5 × 25	12.5 × 25 16 × 25
33	10 × 16 10 × 20	10 × 20	12.5 × 20	12.5 × 25	16 × 20	16 × 25 16 × 31.5
47	12.5 × 20 12.5 × 25	12.5 × 20 12.5 × 25	12.5 × 25 16 × 20	16 × 25	16 × 25	16 × 31.5 18 × 31.5
68	12.5 × 25 16 × 20	12.5 × 25 16 × 20	16 × 25	18 × 31.5	18 × 31.5	18 × 35
100	12.5 × 25 16 × 25	16 × 25	16 × 31.5	18 × 35 20 × 30	18 × 40 20 × 35	20 × 40
150	16 × 31.5	18 × 31.5	18 × 40	20 × 40	20 × 40	
220	16 × 31.5 18 × 31.5	18 × 35	18 × 40			
270	18 × 35 18 × 40	20 × 35	22 × 35			
330	18 × 35 20 × 30	22 × 35	22 × 40			
470	22 × 35					
560	22 × 40					



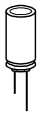
Technical data and ordering codes – B41821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 6.3 V DC						
220	6.3 × 11	2.1	1.6	1.5	230	B41821A2227M***
270	6.3 × 11	1.7	1.3	1.2	250	B41821A2277M***
330	6.3 × 11	1.4	1.1	1.0	280	B41821A2337M***
470	8 × 11.5	1.0	0.77	0.71	380	B41821A2477M***
560	8 × 11.5	0.83	0.64	0.59	410	B41821A2567M***
680	10 × 12.5	0.68	0.52	0.49	520	B41821A2687M***
1000	10 × 12.5	0.46	0.35	0.33	650	B41821A2108M***
1500	10 × 16	0.31	0.24	0.22	750	B41821A2158M***
2200	10 × 20	0.23	0.18	0.16	1000	B41821A2228M***
3300	10 × 20	0.16	0.12	0.11	1190	B41821A2338M***
4700	12.5 × 25	0.12	0.09	0.09	1600	B41821A2478M***
V_R = 10 V DC						
100	5 × 11	4.0	3.1	2.90	145	B41821A3107M***
150	6.3 × 11	2.7	2.1	1.90	160	B41821A3157M***
220	6.3 × 11	1.8	1.4	1.30	240	B41821A3227M***
270	6.3 × 11	1.5	1.2	1.10	255	B41821F3277M***
330	8 × 11.5	1.2	0.92	0.86	290	B41821A3337M***
470	8 × 11.5	0.85	0.65	0.61	400	B41821A3477M***
560	8 × 11.5	0.71	0.55	0.51	410	B41821F3567M***
680	10 × 12.5	0.59	0.45	0.42	460	B41821A3687M***
1000	10 × 12.5	0.40	0.31	0.29	650	B41821A3108M***
1500	10 × 20	0.27	0.21	0.19	740	B41821A3158M***
2200	10 × 20	0.20	0.15	0.14	1100	B41821A3228M***
3300	12.5 × 25	0.14	0.11	0.10	1550	B41821A3338M***
4700	16 × 20	0.11	0.08	0.08	1700	B41821A3478M***
6800	16 × 25	0.08	0.06	0.06	2250	B41821F3688M***
8200	16 × 31.5	0.08	0.06	0.06	2300	B41821F3828M***
10000	18 × 31.5	0.07	0.05	0.05	2600	B41821F3109M***

Composition of ordering code

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



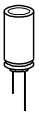
Technical data and ordering codes – B41821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 16 V DC						
68	5 × 11	4.9	3.8	3.50	100	B41821A4686M***
100	5 × 11	3.3	2.6	2.40	180	B41821A4107M***
150	6.3 × 11	2.2	1.7	1.60	185	B41821A4157M***
220	6.3 × 11	1.5	1.2	1.10	260	B41821F4227M***
270	8 × 11.5	1.2	0.94	0.88	270	B41821A4277M***
330	8 × 11.5	1.0	0.77	0.72	370	B41821A4337M***
470	8 × 11.5	0.71	0.54	0.50	440	B41821F4477M***
560	10 × 12.5	0.59	0.46	0.42	550	B41821A4567M***
680	10 × 12.5	0.49	0.38	0.35	600	B41821F4687M***
1000	10 × 16	0.33	0.26	0.24	790	B41821A4108M***
1500	10 × 20	0.22	0.17	0.16	950	B41821F4158M***
2200	12.5 × 20	0.17	0.13	0.12	1300	B41821K4228M***
3300	12.5 × 25	0.12	0.09	0.09	1700	B41821F4338M***
3300	16 × 25	0.12	0.09	0.09	1800	B41821A4338M***
4700	16 × 25	0.09	0.07	0.07	2100	B41821A4478M***
6800	16 × 31.5	0.07	0.06	0.05	2300	B41821F4688M***
6800	18 × 31.5	0.07	0.06	0.05	2400	B41821A4688M***
8200	18 × 31.5	0.07	0.05	0.05	2450	B41821F4828M***
10000	18 × 35	0.06	0.05	0.04	2750	B41821F4109M***
V_R = 25 V DC						
47	5 × 11	5.6	4.3	4.0	115	B41821A5476M***
100	6.3 × 11	2.7	2.0	1.9	190	B41821A5107M***
150	6.3 × 11	1.8	1.4	1.3	195	B41821F5157M***
220	8 × 11.5	1.2	0.93	0.86	330	B41821A5227M***
270	8 × 11.5	1.0	0.76	0.70	350	B41821F5277M***
330	8 × 11.5	0.80	0.62	0.57	440	B41821F5337M***
330	10 × 12.5	0.80	0.62	0.57	440	B41821A5337M***
470	10 × 12.5	0.56	0.43	0.40	550	B41821B5477M***

Composition of ordering code

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



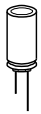
Technical data and ordering codes – B41821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 25 V DC						
560	10 × 16	0.47	0.36	0.34	580	B41821A5567M***
680	10 × 16	0.39	0.30	0.28	630	B41821F5687M***
1000	10 × 20	0.27	0.20	0.19	960	B41821A5108M***
1500	12.5 × 20	0.18	0.14	0.13	1100	B41821F5158M***
2200	12.5 × 25	0.14	0.10	0.10	1550	B41821F5228M***
3300	16 × 25	0.10	0.08	0.07	1980	B41821A5338M***
4700	16 × 31.5	0.08	0.06	0.06	2450	B41821A5478M***
6800	18 × 35	0.06	0.05	0.05	2650	B41821F5688M***
8200	18 × 40	0.06	0.05	0.04	2750	B41821F5828M***
10000	20 × 40	0.06	0.04	0.04	2900	B41821F5109M***
V_R = 35 V DC						
33	5 × 11	7.0	5.4	5.0	105	B41821A7336M***
47	5 × 11	4.9	3.8	3.5	130	B41821A7476M***
68	6.3 × 11	3.4	2.6	2.4	160	B41821A7686M***
100	6.3 × 11	2.3	1.8	1.7	210	B41821F7107M***
150	8 × 11.5	1.5	1.2	1.1	300	B41821A7157M***
220	8 × 11.5	1.1	0.81	0.75	385	B41821F7227M***
270	10 × 12.5	0.86	0.66	0.61	430	B41821A7277M***
330	10 × 12.5	0.70	0.54	0.50	490	B41821A7337M***
470	10 × 16	0.49	0.38	0.35	650	B41821A7477M***
560	10 × 20	0.41	0.32	0.30	770	B41821A7567M***
680	10 × 20	0.34	0.26	0.24	840	B41821A7687M***
1000	12.5 × 20	0.23	0.18	0.17	1150	B41821K7108M***
1500	16 × 20	0.15	0.12	0.11	1400	B41821F7158M***
2200	16 × 25	0.12	0.09	0.09	1800	B41821F7228M***
3300	16 × 31.5	0.09	0.07	0.06	2100	B41821F7338M***
4700	18 × 35	0.07	0.05	0.05	2550	B41821F7478M***
6800	18 × 40	0.06	0.05	0.04	2800	B41821K7688M***

Composition of ordering code

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



Technical data and ordering codes – B41821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 50 V DC						
10	5 × 11	20	15	14	60	B41821A6106M***
22	5 × 11	9.0	7.0	6.5	95	B41821A6226M***
33	6.3 × 11	6.0	4.6	4.3	110	B41821A6336M***
47	6.3 × 11	4.2	3.3	3.0	155	B41821A6476M***
68	6.3 × 11	2.9	2.3	2.1	210	B41821F6686M***
100	8 × 11.5	2.0	1.5	1.4	260	B41821A6107M***
150	8 × 11.5	1.3	1.0	0.95	300	B41821F6157M***
220	10 × 12.5	0.90	0.70	0.65	430	B41821A6227M***
270	10 × 16	0.74	0.57	0.53	520	B41821A6277M***
330	10 × 16	0.60	0.46	0.43	590	B41821A6337M***
470	10 × 20	0.42	0.33	0.30	760	B41821A6477M***
560	12.5 × 20	0.36	0.27	0.25	930	B41821F6567M***
680	12.5 × 20	0.29	0.23	0.21	1000	B41821F6687M***
1000	12.5 × 25	0.20	0.15	0.14	1350	B41821F6108M***
1500	16 × 25	0.13	0.10	0.09	1800	B41821F6158M***
2200	16 × 31.5	0.11	0.08	0.08	1980	B41821F6228M***
2200	18 × 35	0.11	0.08	0.08	2200	B41821A6228M***
3300	18 × 35	0.08	0.06	0.06	2500	B41821F6338M***
4700	20 × 40	0.06	0.05	0.05	2800	B41821K6478M***
V_R = 63 V DC						
6.8	5 × 11	29	23	21	50	B41821A8685M***
10	5 × 11	20	15	14	65	B41821A8106M***
22	5 × 11	9.0	7.0	6.5	100	B41821F8226M***
22	6.3 × 11	9.0	7.0	6.5	110	B41821A8226M***
33	6.3 × 11	6.0	4.6	4.3	140	B41821A8336M***
47	6.3 × 11	4.2	3.3	3.0	170	B41821F8476M***
47	8 × 11.5	4.2	3.3	3.0	180	B41821A8476M***
68	8 × 11.5	2.9	2.3	2.1	220	B41821F8686M***

Composition of ordering code

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- 000 = for standard leads, bulk
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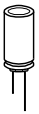
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



Technical data and ordering codes – B41821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 63 V DC						
100	8 × 11.5	2.0	1.5	1.4	280	B41821F8107M***
150	10 × 12.5	1.3	1.0	0.95	360	B41821F8157M***
220	10 × 16	0.90	0.70	0.65	490	B41821A8227M***
270	10 × 20	0.74	0.57	0.53	580	B41821A8277M***
330	10 × 20	0.60	0.46	0.43	710	B41821A8337M***
470	12.5 × 20	0.42	0.33	0.30	900	B41821F8477M***
470	12.5 × 25	0.42	0.33	0.30	930	B41821A8477M***
560	12.5 × 25	0.36	0.27	0.25	1000	B41821F8567M***
680	16 × 20	0.29	0.23	0.21	1100	B41821F8687M***
1000	16 × 25	0.20	0.15	0.14	1300	B41821F8108M***
1000	16 × 31.5	0.20	0.15	0.14	1400	B41821A8108M***
1500	18 × 31.5	0.13	0.10	0.09	1800	B41821F8158M***
2200	18 × 35	0.11	0.08	0.08	2300	B41821K8228M***
2200	18 × 40	0.11	0.08	0.08	2400	B41821F8228M***
3300	20 × 40	0.08	0.06	0.06	2700	B41821A8338M***
4700	25 × 40	0.06	0.05	0.05	3200	B41821F8478M***
V_R = 100 V DC						
0.1	5 × 11	1658	1275	1184	2	B41821A9104M***
0.22	5 × 11	754	580	538	5	B41821A9224M***
0.33	5 × 11	502	386	359	7	B41821A9334M***
0.47	5 × 11	353	271	252	10	B41821A9474M***
0.68	5 × 11	244	188	174	13	B41821A9684M***
1	5 × 11	166	128	118	21	B41821A9105M***
1.5	5 × 11	111	85	79	24	B41821A9155M***
2.2	5 × 11	75	58	54	30	B41821A9225M***
3.3	5 × 11	50	39	36	40	B41821A9335M***
4.7	5 × 11	35	27	25	45	B41821A9475M***
10	6.3 × 11	17	13	12	75	B41821A9106M***

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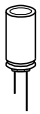
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



Technical data and ordering codes – B41821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 100 V DC						
22	8 × 11.5	7.5	5.8	5.4	140	B41821A9226M***
33	10 × 12.5	5.0	3.9	3.6	190	B41821A9336M***
47	10 × 12.5	3.5	2.7	2.5	230	B41821B9476M***
68	10 × 16	2.4	1.9	1.7	280	B41821A9686M***
100	10 × 20	1.7	1.3	1.2	350	B41821A9107M***
150	12.5 × 25	1.1	0.85	0.79	550	B41821A9157M***
220	12.5 × 25	0.75	0.58	0.54	620	B41821A9227M***
270	16 × 25	0.61	0.47	0.44	770	B41821A9277M***
330	16 × 25	0.50	0.39	0.36	800	B41821A9337M***
470	16 × 31.5	0.35	0.27	0.25	1000	B41821A9477M***
560	16 × 31.5	0.30	0.23	0.21	1050	B41821A9567M***
680	18 × 40	0.24	0.19	0.17	1100	B41821F9687M***
1000	20 × 40	0.17	0.13	0.12	1400	B41821A9108M***

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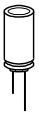
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



Technical data and ordering codes – B43821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 160 V DC						
0.47	6.3 × 11	395	296	158	15	B43821A1474M***
0.68	6.3 × 11	273	205	109	18	B43821A1684M***
1	6.3 × 11	186	139	74	22	B43821A1105M***
1.5	6.3 × 11	124	93	50	30	B43821A1155M***
2.2	6.3 × 11	85	63	34	33	B43821A1225M***
3.3	6.3 × 11	56	42	22	40	B43821A1335M***
4.7	6.3 × 11	40	30	16	50	B43821F1475M***
6.8	8 × 11.5	27	21	11	65	B43821A1685M***
10	8 × 11.5	18	14	7.4	80	B43821F1106M***
22	10 × 12.5	13	9.5	5.0	130	B43821F1226M***
22	10 × 16	8.4	6.3	3.4	155	B43821A1226M***
33	10 × 16	7.5	5.6	3.0	180	B43821F1336M***
33	10 × 20	5.6	4.2	2.2	205	B43821A1336M***
47	12.5 × 20	4.5	3.4	1.8	270	B43821F1476M***
47	12.5 × 25	4.0	3.0	1.6	290	B43821A1476M***
68	12.5 × 25	2.7	2.1	1.1	350	B43821F1686M***
68	16 × 20	2.7	2.1	1.1	365	B43821A1686M***
100	12.5 × 25	2.3	1.7	0.92	430	B43821F1107M***
100	16 × 25	1.8	1.4	0.74	475	B43821A1107M***
150	16 × 31.5	1.2	0.92	0.49	600	B43821A1157M***
220	16 × 31.5	1.0	0.71	0.38	760	B43821F1227M***
220	18 × 31.5	0.84	0.63	0.34	800	B43821A1227M***
270	18 × 35	0.75	0.56	0.30	900	B43821F1277M***
270	18 × 40	0.67	0.50	0.27	950	B43821A1277M***
330	18 × 35	0.70	0.53	0.28	995	B43821F1337M***
330	20 × 30	0.56	0.42	0.22	1000	B43821A1337M***
470	22 × 35	0.40	0.30	0.16	1300	B43821A1477M***
560	22 × 40	0.33	0.25	0.13	1500	B43821A1567M***

Composition of ordering code

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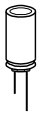
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



Technical data and ordering codes – B43821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 200 V DC						
0.47	6.3 × 11	395	296	158	15	B43821A2474M***
0.68	6.3 × 11	273	205	109	18	B43821A2684M***
1	6.3 × 11	186	139	74	22	B43821A2105M***
1.5	6.3 × 11	124	93	50	30	B43821A2155M***
2.2	6.3 × 11	85	63	34	33	B43821A2225M***
3.3	6.3 × 11	56	42	22	40	B43821A2335M***
4.7	8 × 11.5	40	30	16	55	B43821A2475M***
6.8	10 × 12.5	27	21	11	78	B43821A2685M***
10	10 × 12.5	18	14	7.4	95	B43821B2106M***
22	10 × 16	8.4	6.3	3.4	155	B43821B2226M***
22	10 × 20	8.4	6.3	3.4	170	B43821A2226M***
33	10 × 20	5.6	4.2	2.2	205	B43821B2336M***
47	12.5 × 20	4.5	3.4	1.8	270	B43821B2476M***
47	12.5 × 25	4.0	3.0	1.6	290	B43821A2476M***
68	12.5 × 25	3.3	2.5	1.3	350	B43821B2686M***
68	16 × 20	2.7	2.1	1.1	365	B43821A2686M***
100	16 × 25	1.8	1.4	0.74	475	B43821A2107M***
150	18 × 31.5	1.2	0.92	0.49	640	B43821A2157M***
220	18 × 35	0.84	0.63	0.34	770	B43821A2227M***
270	20 × 35	0.67	0.50	0.27	910	B43821A2277M***
330	22 × 35	0.56	0.42	0.22	1060	B43821A2337M***

Composition of ordering code

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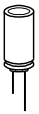
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



Technical data and ordering codes – B43821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 250 V DC						
0.47	6.3 × 11	395	296	158	15	B43821F2474M***
0.68	6.3 × 11	273	205	109	18	B43821F2684M***
1	6.3 × 11	186	139	74	22	B43821F2105M***
1.5	6.3 × 11	124	93	50	30	B43821F2155M***
2.2	6.3 × 11	85	63	34	33	B43821F2225M***
3.3	8 × 11.5	56	42	22	50	B43821F2335M***
4.7	8 × 11.5	40	30	16	55	B43821K2475M***
6.8	10 × 12.5	27	21	11	78	B43821F2685M***
10	10 × 12.5	23	17	9.0	95	B43821K2106M***
10	10 × 16	18	14	7.4	105	B43821F2106M***
22	10 × 20	8.4	6.3	3.4	170	B43821F2226M***
33	12.5 × 20	5.6	4.2	2.2	230	B43821K2336M***
47	12.5 × 25	4.3	3.2	1.7	290	B43821K2476M***
47	16 × 20	4.0	3.0	1.6	300	B43821F2476M***
68	16 × 25	2.7	2.1	1.1	380	B43821F2686M***
100	16 × 31.5	1.8	1.4	0.74	520	B43821K2107M***
150	18 × 40	1.2	0.92	0.49	615	B43821F2157M***
220	18 × 40	0.84	0.63	0.34	680	B43821F2227M***
270	22 × 35	0.67	0.50	0.27	810	B43821F2277M***
330	22 × 40	0.56	0.42	0.22	940	B43821F2337M***

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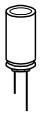
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



Technical data and ordering codes – B43821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 350 V DC						
0.47	6.3 × 11	395	296	158	15	B43821A4474M***
0.68	6.3 × 11	273	205	109	18	B43821A4684M***
1	6.3 × 11	186	139	74	22	B43821A4105M***
1.5	8 × 11.5	124	93	50	32	B43821A4155M***
2.2	8 × 11.5	85	63	34	38	B43821A4225M***
3.3	10 × 12.5	56	42	22	55	B43821A4335M***
4.7	10 × 12.5	40	30	16	65	B43821A4475M***
6.8	10 × 16	27	21	11	85	B43821A4685M***
10	10 × 20	18	14	7.4	115	B43821A4106M***
22	12.5 × 25	8.4	6.3	3.4	200	B43821A4226M***
33	12.5 × 25	5.6	4.2	2.2	240	B43821F4336M***
47	16 × 25	4.0	3.0	1.6	300	B43821F4476M***
68	18 × 31.5	2.7	2.1	1.1	420	B43821A4686M***
100	18 × 35	2.3	1.7	0.90	520	B43821F4107M***
100	20 × 30	1.8	1.4	0.74	530	B43821A4107M***
150	20 × 40	1.2	0.92	0.49	700	B43821A4157M***
V_R = 400 V DC						
2.2	10 × 12.5	85	63	34	45	B43821A9225M***
3.3	10 × 12.5	56	42	22	55	B43821A9335M***
4.7	10 × 16	40	30	16	70	B43821A9475M***
6.8	10 × 16	27	21	11	85	B43821A9685M***
10	10 × 20	18	14	7.4	115	B43821A9106M***
22	12.5 × 25	8.4	6.3	3.4	200	B43821F9226M***
33	16 × 20	5.6	4.2	2.2	240	B43821F9336M***
47	16 × 25	4.0	3.0	1.6	280	B43821F9476M***
68	18 × 31.5	2.8	2.1	1.1	420	B43821A9686M***
100	18 × 40	1.9	1.4	0.74	450	B43821F9107M***
100	20 × 35	1.8	1.4	0.74	460	B43821A9107M***
150	20 × 40	1.2	0.92	0.49	600	B43821A9157M***

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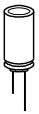
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



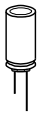
Technical data and ordering codes – B43821

C_R 120 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 120 Hz 20 °C Ω	ESR_{max} 10 kHz 20 °C Ω	Z_{max} 100 kHz 20 °C Ω	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V_R = 450 V DC						
2.2	10 × 12.5	85	63	34	35	B43821A5225M***
3.3	10 × 16	56	42	22	45	B43821A5335M***
4.7	10 × 16	40	30	16	50	B43821F5475M***
6.8	10 × 20	27	21	11	75	B43821A5685M***
10	10 × 20	26	19	10	80	B43821F5106M***
22	12.5 × 25	14	10	5.4	140	B43821F5226M***
22	16 × 25	8.4	6.3	3.4	165	B43821A5226M***
33	16 × 25	7.6	5.7	3.0	180	B43821F5336M***
33	16 × 31.5	5.6	4.2	2.2	190	B43821A5336M***
47	16 × 31.5	4.8	3.6	1.9	220	B43821F5476M***
47	18 × 31.5	4.0	3.0	1.6	265	B43821A5476M***
68	18 × 35	2.7	2.1	1.1	275	B43821A5686M***
100	20 × 40	1.8	1.4	0.74	295	B43821A5107M***

Composition of ordering code

*** = Version

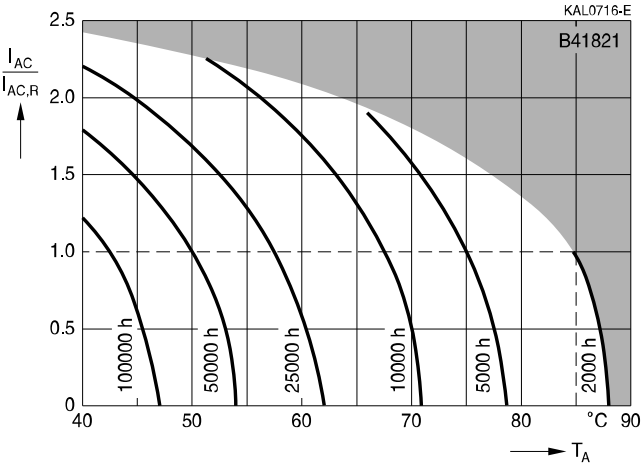
- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 6.3 × 11 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



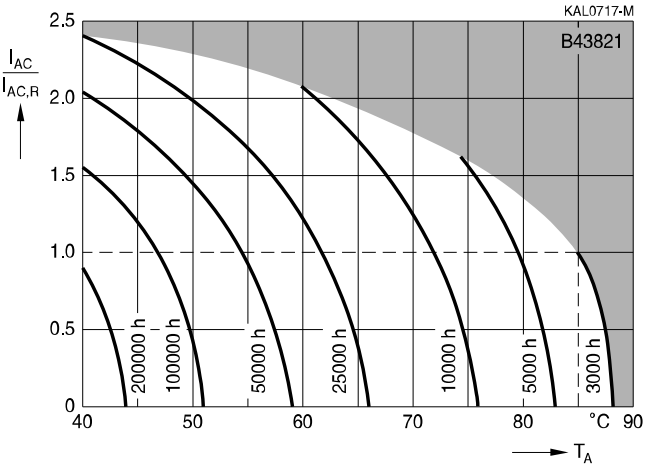
Useful life

depending on ambient temperature T_A under ripple current operating conditions[1)]

V_R = 6.3 ... 100 V DC



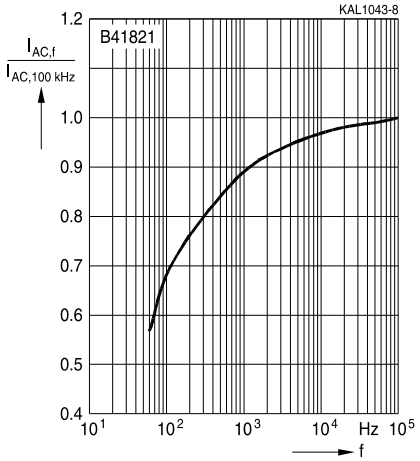
V_R = 160 ... 450 V DC



1) Refer to chapter "General technical information, 5.3 Calculation of useful life" for an explanation on how to interpret the useful life graphs.

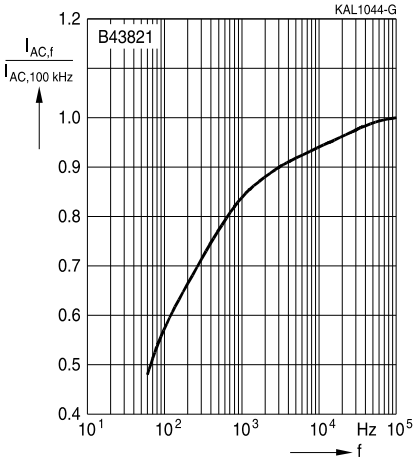
Frequency factor of permissible ripple current I_{AC} versus frequency f

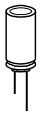
$V_R \leq 100$ V DC



Frequency factor of permissible ripple current I_{AC} versus frequency f

$V_R \geq 160$ V DC



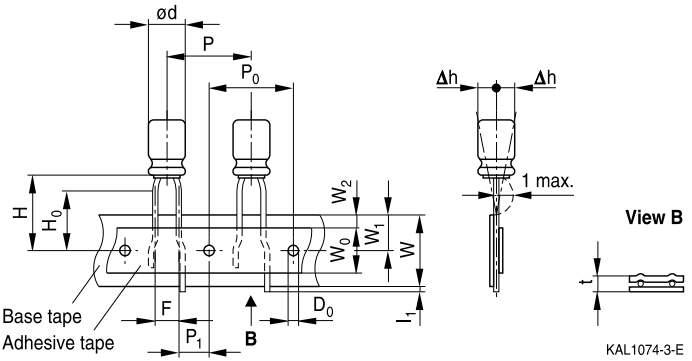


Taping, packing and lead configurations

Taping

Single-ended capacitors are available taped in Ammo pack from diameter 5 to 18 mm as follows:
Lead spacing F = 2.5 mm (∅ d = 5 … 6.3 mm)
Lead spacing F = 3.5 mm (∅ d = 8 mm)
Lead spacing F = 5.0 mm (∅ d = 5 … 12.5 mm)
Lead spacing F = 7.5 mm (∅ d = 16 ... 18 mm).

Lead spacing 2.5 mm (∅ d = 5 ... 6.3 mm)
Last 3 digits of ordering code: 007

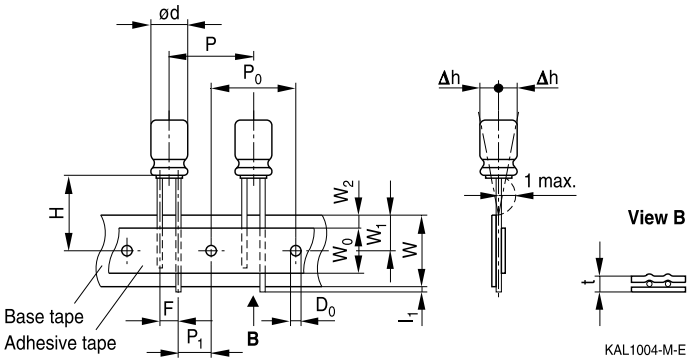


Dimensions in mm

∅ d	F	H	W	W_0	W_1	W_2	H_0	P	P_0	P_1	l_1	t	Δh	D_0
5 6.3	2.5	18.5	18.0	5.5	9.0	1.5	16.0	12.7	12.7	5.1	1.0	0.7	1.0	4.0
Tolerance	+0.8 −02	±0.75	±0.5	min.	±0.5	max.	±0.5	±1.0	±0.2	±0.5	max.	±0.2	max.	±0.2

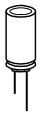
Lead spacing 3.5 mm (∅ d = 8 mm)

Last 3 digits of ordering code: 006



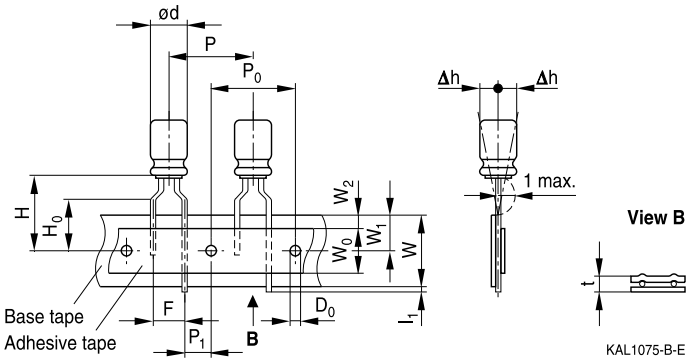
Dimensions in mm

∅ d	F	H	W	W_0	W_1	W_2	P	P_0	P_1	l_1	t	Δh	D_0
8	3.5	18.5	18.0	12.5	9.0	1.5	12.7	12.7	4.6	1.0	0.7	1.0	4.0
Tolerance	+0.8 −02	1.0	±0.5	min.	±0.5	max.	±1.0	±0.2	±0.5	max.	±0.2	max.	±0.2



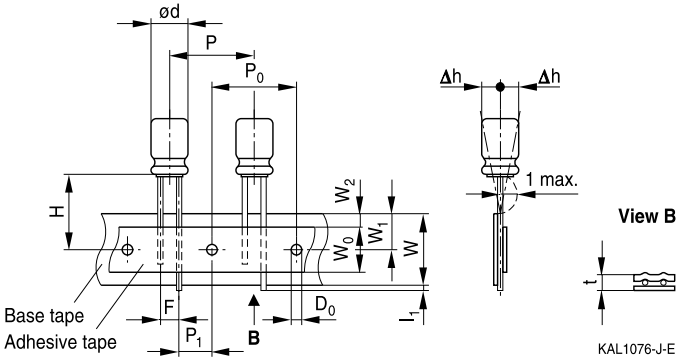
Lead spacing 5.0 mm (∅ d = 5 ... 8 mm)

Last 3 digits of ordering code: 008



Lead spacing 5.0 mm (∅ d = 10 ... 12.5 mm)

Last 3 digits of ordering code: 008

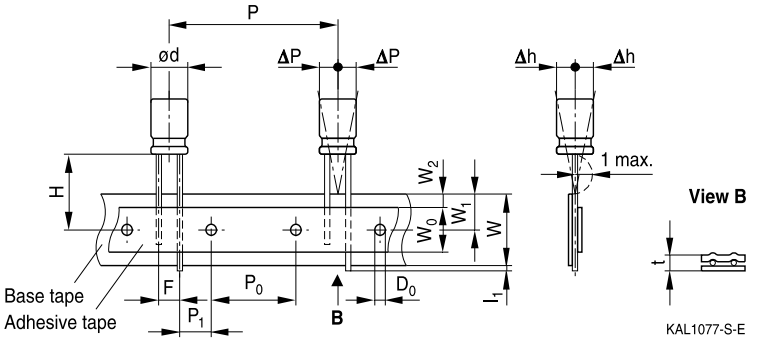


Dimensions in mm

∅ d	F	H	W	W_0	W_1	W_2	H_0	P	P_0	P_1	l_1	t	Δh	D_0
5	5.0	18.5	18.0	5.5	9.0	1.5	16.0	12.7	12.7	3.85	1.0	0.7	1.0	4.0
6.3														
8	5.0	20.0	18.0	12.5	9.0	1.5	16.0	12.7	12.7	3.85	1.0	0.7	1.0	4.0
10		19.0					–	12.7	12.7	3.85				
12.5		19.0					–	15.0	15.0	5.0				
Tolerance	+0.8 −02	±0.75	±0.5	min.	±0.5	max.	±0.5	±1.0	±0.2	±0.5	max.	±0.2	max.	±0.2

Lead spacing 7.5 mm (∅ d = 16 ...18 mm)

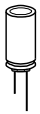
Last 3 digits of ordering code: 009



Dimensions in mm

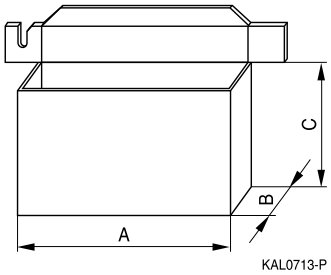
∅ d	F	H	W	W_0	W_1	W_2	P	P_0	P_1	l_1	t	ΔP	Δh	D_0
16 18 *)	7.5	18.5	18.0	12.5	9.0	1.5	30.0	15.0	3.75	1.0	0.7	0	0	4.0
Tolerance	±0.8	−0.5 +0.75	±0.5	min.	±0.5	max.	±1.0	±0.2	±0.5	max.	±0.2	±1.0	±1.0	±0.2

*) Available only for case dimensions 18 × 20, 18 × 25 and 18 × 31.5 mm

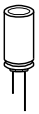


Packing units and box dimensions

Ammo pack



Case size d × l	Dimensions (mm)			Packing units
mm	A_{max}	B_{max}	C_{max}	pcs.
5 × 11	345	55	240	2000
6.3 × 11	345	55	290	2000
8 × 11.5	345	55	240	1000
10 × 12.5	345	55	280	750
10 × 16	345	60	200	500
10 × 20	345	60	200	500
12.5 × 20	345	65	280	500
12.5 × 25	345	65	280	500
12.5 × 25	345	65	280	500
12.5 × 30	345	65	275	500
16 × 20	315	65	275	300
16 × 25	315	65	275	300
16 × 31.5	315	65	275	300
18 × 20	315	65	275	250
18 × 25	315	65	275	250
18 × 31.5	315	65	275	250



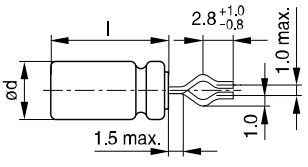
Kinked or cut leads

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

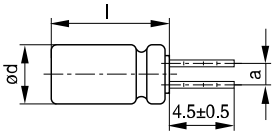
Kinked leads

Last 3 digits of ordering code: 001

With stand-off rubber seal

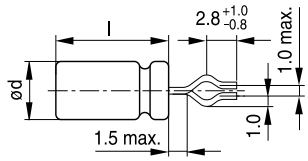


KAL1081-K

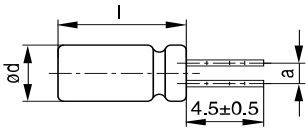


KAL1083-2

With flat rubber seal

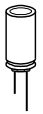


KAL1082-T



KAL1084-A

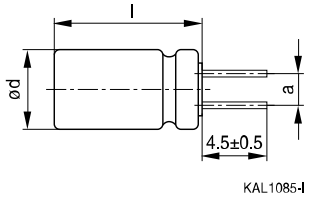
Case size d × l (mm)	Dimensions (mm) a ±0.5
10 × 20	5.0
12.5 × 20	5.0
12.5 × 25	5.0
12.5 × 30	5.0
12.5 × 35	5.0
12.5 × 40	5.0
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35	7.5
18 × 40	7.5
20 × 20	10.0
20 × 25	10.0
20 × 40	10.0
22 × 30	10.0
22 × 35	10.0
22 × 40	10.0



Cut leads

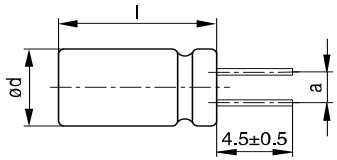
Last 3 digits of ordering code: 002

With stand-off rubber seal



KAL1085-I

With flat rubber seal



KAL1086-R

Case size d × l (mm)	Dimensions (mm) a ±0.5
10 × 12.5	5.0
10 × 16	5.0
10 × 20	5.0
12.5 × 20	5.0
12.5 × 25	5.0
12.5 × 30	5.0
12.5 × 35	5.0
12.5 × 40	5.0
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35	7.5
18 × 40	7.5
20 × 20	10.0
20 × 25	10.0
20 × 40	10.0

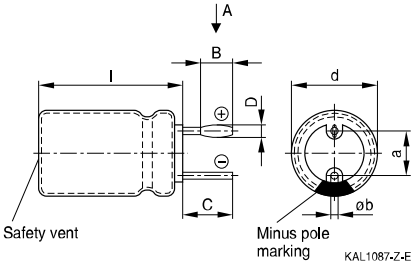
PAPR leads (Protection Against Polarity Reversal)

These lead configurations ensure correct placement of the capacitor on the PCB with regard to polarity. PAPR leads are available for diameters from 10 mm up to 20 mm.
There are three configurations available: Crimped leads, J leads, bent 90° leads

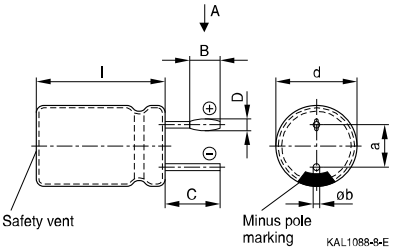
Crimped leads

Last 3 digits of ordering code: 003

With stand-off rubber seal

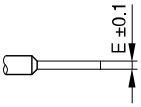


With flat rubber seal

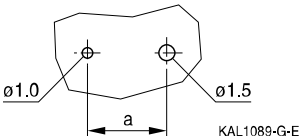


Suggestion for PCB hole diameter

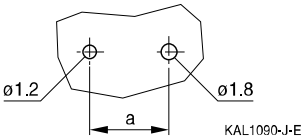
View A



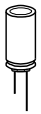
Suggestion for PCB hole diameter, wire ø0.8 mm



Suggestion for PCB hole diameter, wire ø1.0 mm

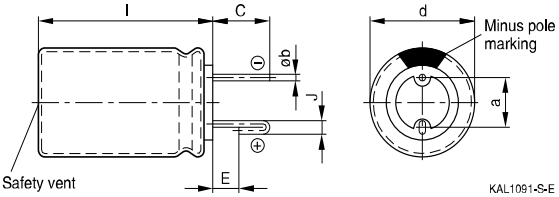


Case size	Dimensions (mm)					
d × l (mm)	B ±0.2	C ±0.5	D ±0.1	E ±0.1	a ±0.5	∅b
16 × 20	1.5	3.0	1.3	0.3	7.5	0.8 ±0.05
16 × 25	1.5	3.0	1.3	0.3	7.5	0.8 ±0.05
16 × 31.5	1.5	3.0	1.3	0.3	7.5	0.8 ±0.05
18 × 20	1.5	3.0	1.3	0.3	7.5	0.8 ±0.1
18 × 25	1.5	3.0	1.3	0.3	7.5	0.8 ±0.1
18 × 31.5	1.5	3.0	1.3	0.3	7.5	0.8 ±0.1
18 × 35	1.5	3.0	1.3	0.3	7.5	0.8 ±0.1
18 × 40	1.5	3.0	1.3	0.3	7.5	0.8 ±0.1
20 × 20	1.5	3.0	1.6	0.3	10.0	1.0 ±0.1
20 × 25	1.5	3.0	1.6	0.3	10.0	1.0 ±0.1
20 × 40	1.5	3.0	1.6	0.3	10.0	1.0 ±0.1



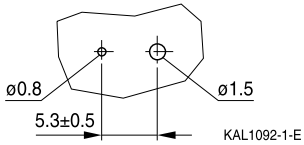
J leads

Last 3 digits of ordering code: 004

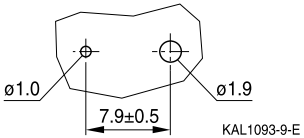


Suggestion for PCB hole diameter

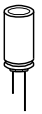
Suggestion for PCB hole diameter, wire ø0.6 mm



Suggestion for PCB hole diameter, wire ø0.8 mm

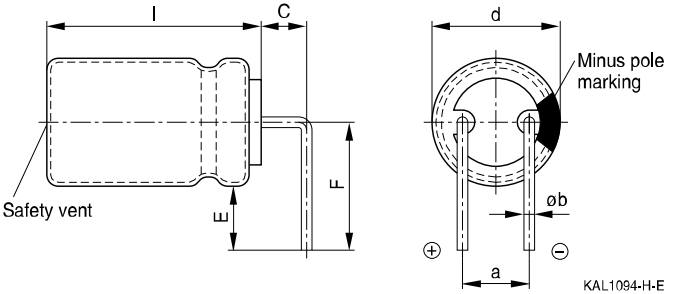


Case size	Dimensions (mm)				
d × l (mm)	C ±0.5	E ±0.5	J ±0.2	a ±0.5	∅b
10 × 12.5	3.2	0.7	1.2	5.0	0.6 ±0.05
10 × 16	3.2	0.7	1.2	5.0	0.6 ±0.05
10 × 20	3.2	0.7	1.2	5.0	0.6 ±0.05
12.5 × 20	3.2	0.7	1.2	5.0	0.6 ±0.05
12.5 × 25	3.2	0.7	1.2	5.0	0.6 ±0.05
16 × 20	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 25	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 31.5	3.5	0.7	1.6	7.5	0.8 ±0.05
18 × 20	3.5	0.7	1.6	7.5	0.8 ±0.1
18 × 25	3.5	0.7	1.6	7.5	0.8 ±0.1
18 × 31.5	3.5	0.7	1.6	7.5	0.8 ±0.1
18 × 35	3.5	0.7	1.6	7.5	0.8 ±0.1



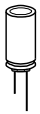
Bent 90° leads for horizontal mounting pinning

Last 3 digits of ordering code: 012



Case size	Dimensions (mm)				
d × l (mm)	C ±0.5	E ±0.5	F ±0.5	a ±0.5	∅b
16 × 20	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 25	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 31.5	4.0	4.0	12.0	7.5	0.8 ±0.05
18 × 20	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 25	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 31.5	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 35	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 40	4.0	4.0	13.0	7.5	0.8 ±0.1

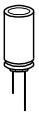
Bent leads for diameter 12.5 mm available upon request.



Overview of packing units and code numbers for case sizes 5 × 11 ... 16 × 31.5

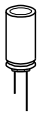
						PAPR		
Case size d × l	Standard, bulk	Taped, Ammo pack			Kinked leads, bulk	Cut leads, bulk	Crimped leads	J leads	Bent 90° leads, blister
mm	pcs.	pcs.			pcs.	pcs.	pcs.	pcs.	pcs.
5 × 11	2000	2000			–	–	–	–	
6.3 × 11	2500	2000			–	–	–	–	
8 × 11.5	1000	1000			–	–	–	–	
10 × 12.5	1000	750			–	1000	–	675	
10 × 16	100	500			–	1000	–	675	
10 × 20	500	500			500	500	–	500	
12.5 × 20	350	500			350	350	–	300	1)
12.5 × 25	250	500			500	500	–	225	1)
12.5 × 30	200	500			175	175	–	180	1)
12.5 × 35	175	-			175	175	–	150	1)
12.5 × 40	175	-			175	175	–	150	1)
16 × 20	250	300			200	200	200	200	120
16 × 25	250	300			200	200	200	200	120
16 × 31.5	200	300			250	250	344	344	120
The last three digits of the complete ordering code state the lead configuration	**000**	Code	F (mm)	d (mm)	**001**	**002**	**003**	**004**	**012**
		006	3.5	8					
		007	2.5	5...6.3					
		008	5	5...12.5					
		009	7.5	16...18					

1) Available upon request



Overview of packing units and code numbers for case sizes 18 × 20 ... 25 × 40

						PAPR		
Case size d × l	Standard, bulk	Taped, Ammo pack			Kinked leads, bulk	Cut leads, bulk	Crimped leads	J leads	Bent 90° leads, blister
mm	pcs.	pcs.			pcs.	pcs.	pcs.	pcs.	pcs.
18 × 20	175	250			175	175	200	200	120
18 × 25	150	250			150	150	200	200	120
18 × 31.5	100	250			100	100	150	150	120
18 × 35	100	–			100	100	150	150	150
18 × 40	125	–			100	100	120	–	72
20 × 20	125	–			125	125	200	–	–
20 × 25	125	–			125	125	200	–	–
20 × 30	100	–			100	100	120	–	–
20 × 35	100	–			100	100	120	–	–
20 × 40	100	–			100	100	120	–	–
22 × 30	80	–			100	100	–	–	–
22 × 35	80	–			100	100	–	–	–
22 × 40	80	–			100	100	–	–	–
25 × 40	40	–			100	–	–	–	–
The last three digits of the complete ordering code state the lead configuration	**000**	Code	F (mm)	d (mm)	**001**	**002**	**003**	**004**	**012**
		007	2.5	4...6.3					
		008	5	6.3...12.5					
		009	7.5	16...18					



Cautions and warnings

Personal safety

The electrolytes used by EPCOS have not only been optimized with a view to the intended application, but also with regard to health and environmental compatibility. They do not contain any solvents that are detrimental to health, e.g. dimethyl formamide (DMF) or dimethyl acetamide (DMAC).

Furthermore, part of the high-voltage electrolytes used by EPCOS are self-extinguishing. They contain flame-retarding substances which will quickly extinguish any flame that may have been ignited.

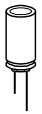
As far as possible, EPCOS does not use any dangerous chemicals or compounds to produce operating electrolytes. However, in exceptional cases, such materials must be used in order to achieve specific physical and electrical properties because no safe substitute materials are currently known. However, the amount of dangerous materials used in our products has been limited to an absolute minimum. Nevertheless, the following rules should be observed when handling Al electrolytic capacitors:

- Any escaping electrolyte should not come into contact with eyes or skin.
- If electrolyte does come into contact with the skin, wash the affected parts immediately with running water. If the eyes are affected, rinse them for 10 minutes with plenty of water. If symptoms persist, seek medical treatment.
- Avoid breathing in electrolyte vapor or mists. Workplaces and other affected areas should be well ventilated. Clothing that has been contaminated by electrolyte must be changed and rinsed in water.

Product safety

The table below summarize the safety instructions that must be observed without fail. A detailed description can be found in the relevant sections of chapter "General technical information".

Topic	Safety information	Reference Chapter "General technical information"
Polarity	Make sure that polar capacitors are connected with the right polarity.	1 "Basic construction of aluminum electrolytic capacitors"
Reverse voltage	Voltages polarity classes should be prevented by connecting a diode.	3.1.6 "Reverse voltage"
Upper category temperature	Do not exceed the upper category temperatur.	7.2 "Maximum permissible operating temperature"
Maintenance	Make periodic inspections of the capacitors. Before the inspection, make sure that the power supply is turned off and carefully discharge the electricity of the capacitors. Do not apply any mechanical stress to the capacitor terminals.	10 "Maintenance"
Mounting position of screw terminal capacitors	Do not mount the capacitor with the terminals (safety vent) upside down.	11.1. "Mounting positions of capacitors with screw terminals"
Mounting of single-ended capacitors	The internal structure of single-ended capacitors might be damaged if excessive force is applied to the lead wires. Avoid any compressive, tensile or flexural stress. Do not move the capacitor after soldering to PC board. Do not pick up the PC board by the soldered capacitor. Do not insert the capacitor on the PC board with a hole space different to the lead space specified.	11.4 "Mounting considerations for single-ended capacitors"
Robustness of terminals	The following maximum tightening torques must not be exceeded when connecting screw terminals: M5: 2 Nm M6: 2.5 Nm	11.3 "Mounting torques"
Soldering	Do not exceed the specified time or temperature limits during soldering.	11.5 "Soldering"



Topic	Safety information	Reference Chapter "General technical information"
Soldering, cleaning agents	Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors.	11.6 "Cleaning agents"
Passive flammability	Avoid external energy, such as fire or electricity.	8.1 "Passive flammability"
Active flammability	Avoid overload of the capacitors.	8.2 "Active flammability"
		Reference Chapter "Capacitors with screw terminals"
Breakdown strength of insulating sleeves	Do not damage the insulating sleeve, especially when ring clips are used for mounting.	"Screw terminals - accessories"

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 passive 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 a passive 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 a passive 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). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.
6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI)**.
7. The trade names EPCOS, EPCOS-JONES, BAOKE, Alu-X, CeraDiode, CSSP, MLSC, PhaseCap, PhaseMod, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMID, SIOV, SIP5D, SIP5K, UltraCap, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.