Aluminum electrolytic capacitors

Single-ended capacitors

Series/Type: **B41828, B43828**

Date: December 2010

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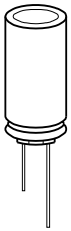


General-purpose grade capacitors

Applications

- General-purpose applications
- Semi-professional to professional application range
- For filtering, coupling and pulse circuits

Features

- Miniaturized dimensions
- RoHS-compatible
- Useful life of 2000 h at 105 °C

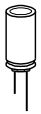
Construction

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

Delivery mode

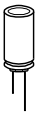
- Bulk
- Taped, Ammo pack
- Cut (see chapter "Single-ended – Taping, packing and lead configurations, Cut leads (Chapter A)")
- Kinked (see chapter "Single-ended – Taping, packing and lead configurations, Kinked leads (Chapter A)")

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

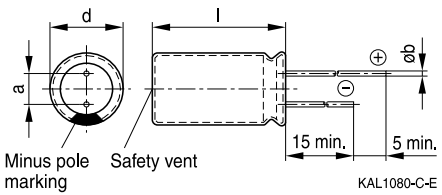


Specifications and characteristics in brief

Series	B41828					B43828					
Rated voltage V_R	6.3 ... 100 V DC					160 ... 450 V DC					
Surge voltage V_S	$V_R \leq 250$ V DC: 1.15 · V_R (at room temperature) $V_R > 250$ V DC: 1.1 · V_R (at room temperature)										
Rated capacitance C_R	0.47 ... 15000 µF					0.47 ... 220 µF					
Capacitance tolerance	±20% ≙ M					±20% ≙ M					
Dissipation factor (max.) (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 ... 250	315 ... 450
	tan δ	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.12	0.15
Leakage current I_{leak} (20 °C, after 5 minutes)	$I_{leak} \leq 0.01\,\mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)$ or 3 µA, whichever is greater					$I_{leak} \leq 0.03\,\mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right) + 10\,\mu A$					
Useful life 105 °C; V_R; $I_{AC,R}$	> 2000 h										
Requirements	ΔC/C ≤ ±20% of initial value tan δ ≤ 2 times initial specified value I_{leak} ≤ initial specified limit										
Shelf life	After storage for 1000 h at 105 °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.										
Vibration resistance test	To IEC 60068-2-6, test Fc: Frequency range 10 ... 55 Hz, displacement amplitude 0.75 mm, acceleration max. 10 *g,* duration 3 × 0.5 h. If can size D <16 mm, capacitor is mounted by the leads If can size D ≥16 mm, capacitor rigidly clamped by the aluminum case										
IEC climatic category	To IEC 60068-1: $V_R \leq 200$ V DC: 40/105/56 (−40 °C/+105 °C/56 days damp heat test) $V_R \geq 250$ V DC: 25/105/56 (−25 °C/+105 °C/56 days damp heat test)										



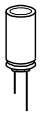
Dimensional drawing



Safety vent for diameter ≥ 8 mm.

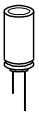
Case Dimensions

d × l mm	$d_{max} \times l_{max}$ mm	a mm	b mm
5 × 11	5.5 × 12.5	2.0 ±0.5	0.50 ±0.1
6.3 × 11	6.8 × 12.5	2.5 ±0.5	0.50 ±0.1
8 × 11.5	8.5 × 13.0	3.5 ±0.5	0.60 ±0.1
10 × 12.5	11.0 × 14.0	5.0 ±0.5	0.60 ±0.1
10 × 16	11.0 × 17.5	5.0 ±0.5	0.60 ±0.1
10 × 20	11.0 × 22.0	5.0 ±0.5	0.60 ±0.1
12.5 × 20	13.5 × 22.0	5.0 ±0.5	0.60 ±0.1
12.5 × 25	13.5 × 27.0	5.0 ±0.5	0.60 ±0.1
16 × 25	17.0 × 27.0	7.5 ±0.5	0.80 ±0.1
16 × 31.5	17.0 × 33.5	7.5 ±0.5	0.80 ±0.1
16 × 35.5	17.0 × 37.5	7.5 ±0.5	0.80 ±0.1
18 × 35.5	19.0 × 37.5	7.5 ±0.5	0.80 ±0.1



Overview of available types – B41828

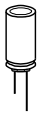
V_R (V DC)	6.3	10	16	25
	Case dimensions d × l (mm)			
C_R (µF)				
10			5 × 11	5 × 11
20			5 × 11	
33			5 × 11	
47	5 × 11	5 × 11	5 × 11	5 × 11
100	5 × 11	5 × 11	6.3 × 11	6.3 × 11
220	6.3 × 11	6.3 × 11	8 × 11.5	8 × 11.5
330	6.3 × 11	8 × 11.5	8 × 11.5	10 × 12.5
470	8 × 11.5	8 × 11.5	8 × 11.5	10 × 16
1000	10 × 12.5	10 × 16	10 × 20	10 × 20
2200	12.5 × 20	12.5 × 20	12.5 × 20	16 × 25
3300	12.5 × 20	12.5 × 25	16 × 25	16 × 31.5
4700	16 × 25	16 × 25	16 × 31.5	18 × 35.5
10000	16 × 31.5	18 × 35.5		
15000	18 × 35.5			



B41828

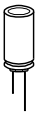
Standard series – 105 °C

V_R (V DC)	35	50	63	100
	Case dimensions d × l (mm)			
C_R (µF)				
0.47				5 × 11
1.0		5 × 11		5 × 11
2.2				5 × 11
3.3				5 × 11
4.7	5 × 11			5 × 11
10	5 × 11	5 × 11	5 × 11	6.3 × 11
22	5 × 11	5 × 11	6.3 × 11	8 × 11.5
33	5 × 11	6.3 × 11	6.3 × 11	10 × 12.5
47	6.3 × 11	6.3 × 11	8 × 11.5	10 × 16
100	6.3 × 11	8 × 11.5	10 × 12.5	12.5 × 20
220	10 × 12.5	10 × 16	12.5 × 20	16 × 25
330	10 × 16	10 × 20	12.5 × 20	16 × 25
470	10 × 20	12.5 × 20	12.5 × 25	16 × 31.5
1000	12.5 × 25	16 × 25	16 × 31.5	
2200	16 × 31.5	18 × 35.5		
3300	18 × 35.5			



Overview of available types – B43828

V_R (V DC)	160	200	250	350	400	450
	Case dimensions d × l (mm)					
C_R (µF)						
0.47	5 × 11		6.3 × 11			
1.0	5 × 11	6.3 × 11	6.3 × 11	6.3 × 11	8 × 11.5	8 × 11.5
1.5						10 × 12.5
2.2	6.3 × 11	6.3 × 11	8 × 11.5	8 × 11.5	10 × 12.5	10 × 12.5
3.3	8 × 11.5	8 × 11.5	10 × 12.5	10 × 12.5	10 × 16	10 × 16
4.7	8 × 11.5	10 × 12.5	10 × 12.5	10 × 16	10 × 20	10 × 20
6.8						12.5 × 20
10	10 × 12.5	10 × 16	10 × 20	12.5 × 20	12.5 × 20	12.5 × 20
15						12.5 × 25
22	10 × 16	10 × 20	12.5 × 25	16 × 25	16 × 25	16 × 25
33	12.5 × 20	12.5 × 25	12.5 × 25	16 × 25	16 × 31.5	16 × 31.5
47	12.5 × 25	12.5 × 25	16 × 25	16 × 35.5	18 × 35.5	16 × 35.5 18 × 35.5
68						18 × 35.5
100	16 × 25	16 × 31.5	18 × 35.5			
220	18 × 35.5	18 × 40				



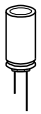
Technical data and ordering codes – B41828

C_R 120 Hz, 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz, 105 °C mA	Ordering code (composition see below)
V_R = 6.3 V DC			
47	5 × 11	66	B41828A2476M***
100	5 × 11	97	B41828A2107M***
220	6.3 × 11	162	B41828A2227M***
330	6.3 × 11	198	B41828A2337M***
470	8 × 11.5	259	B41828A2477M***
1000	10 × 12.5	454	B41828A2108M***
2200	12.5 × 20	793	B41828A2228M***
3300	12.5 × 20	939	B41828A2338M***
4700	16 × 25	1378	B41828A2478M***
10000	16 × 31.5	1852	B41828A2109M***
15000	18 × 35.5	2131	B41828A2159M***
V_R = 10 V DC			
47	5 × 11	68	B41828A3476M***
100	5 × 11	106	B41828A3107M***
220	6.3 × 11	177	B41828A3227M***
330	8 × 11.5	236	B41828A3337M***
470	8 × 11.5	281	B41828A3477M***
1000	10 × 16	520	B41828A3108M***
2200	12.5 × 20	849	B41828A3228M***
3300	12.5 × 25	1118	B41828A3338M***
4700	16 × 25	1425	B41828A3478M***
10000	18 × 35.5	2004	B41828A3109M***

Composition of ordering code

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk
- 002 = for cut leads, bulk
- 016 = for taped leads, Ammo pack, lead spacing F = 2.0 mm (for ∅ 5 mm)
- 007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm (for ∅ 5 ... 6.3 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 5 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm, excluding d × l = 16 × 35.5 mm)



Technical data and ordering codes – B41828

C_R 120 Hz, 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz, 105 °C mA	Ordering code (composition see below)
V_R = 16 V DC			
10	5 × 11	35	B41828A4106M***
20	5 × 11	55	B41828A4226M***
33	5 × 11	66	B41828A4336M***
47	5 × 11	80	B41828A4476M***
100	6.3 × 11	129	B41828A4107M***
220	8 × 11.5	214	B41828A4227M***
330	8 × 11.5	266	B41828A4337M***
470	8 × 11.5	314	B41828A4477M***
1000	10 × 20	626	B41828A4108M***
2200	12.5 × 20	1028	B41828A4228M***
3300	16 × 25	1323	B41828A4338M***
4700	16 × 31.5	1661	B41828A4478M***
V_R = 25 V DC			
10	5 × 11	37	B41828A5106M***
47	5 × 11	85	B41828A5476M***
100	6.3 × 11	143	B41828A5107M***
220	8 × 11.5	245	B41828A5227M***
330	10 × 12.5	319	B41828A5337M***
470	10 × 16	429	B41828A5477M***
1000	10 × 20	680	B41828A5108M***
2200	16 × 25	1233	B41828A5228M***
3300	16 × 31.5	1571	B41828A5338M***
4700	18 × 35.5	1925	B41828A5478M***

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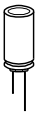
- 007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm (for ∅ 5 ... 6.3 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 5 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm, excluding d × l = 16 × 35.5 mm)



Technical data and ordering codes – B41828

C_R 120 Hz, 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz, 105 °C mA	Ordering code (composition see below)
V_R = 35 V DC			
4.7	5 × 11	28	B41828A7475M***
10	5 × 11	42	B41828A7106M***
22	5 × 11	62	B41828A7226M***
33	5 × 11	76	B41828A7336M***
47	6.3 × 11	104	B41828A7476M***
100	6.3 × 11	169	B41828A7107M***
220	10 × 12.5	278	B41828A7227M***
330	10 × 16	395	B41828A7337M***
470	10 × 20	514	B41828A7477M***
1000	12.5 × 25	905	B41828A7108M***
2200	16 × 31.5	1403	B41828A7228M***
3300	18 × 35.5	1707	B41828A7338M***
V_R = 50 V DC			
1.0	5 × 11	14	B41828A6105M***
10	5 × 11	48	B41828A6106M***
22	5 × 11	70	B41828A6226M***
33	6.3 × 11	101	B41828A6336M***
47	6.3 × 11	118	B41828A6476M***
100	8 × 11.5	193	B41828A6107M***
220	10 × 16	369	B41828A6227M***
330	10 × 20	458	B41828A6337M***
470	12.5 × 20	535	B41828A6477M***
1000	16 × 25	1085	B41828A6108M***
2200	18 × 35.5	1559	B41828A6228M***

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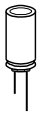
- 007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm (for ∅ 5 ... 6.3 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 5 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm, excluding d × l = 16 × 35.5 mm)



Technical data and ordering codes – B41828

C_R 120 Hz, 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz, 105 °C mA	Ordering code (composition see below)
V_R = 63 V DC			
10	5 × 11	50	B41828A8106M***
22	6.3 × 11	79	B41828A8226M***
33	6.3 × 11	103	B41828A8336M***
47	8 × 11.5	135	B41828A8476M***
100	10 × 12.5	217	B41828A8107M***
220	12.5 × 20	374	B41828A8227M***
330	12.5 × 20	570	B41828A8337M***
470	12.5 × 25	715	B41828A8477M***
1000	16 × 31.5	1043	B41828A8108M***
V_R = 100 V DC			
0.47	5 × 11	11	B41828A9474M***
1.0	5 × 11	17	B41828A9105M***
2.2	5 × 11	25	B41828A9225M***
3.3	5 × 11	31	B41828A9335M***
4.7	5 × 11	37	B41828A9475M***
10	6.3 × 11	55	B41828A9106M***
22	8 × 11.5	104	B41828A9226M***
33	10 × 12.5	145	B41828A9336M***
47	10 × 16	186	B41828A9476M***
100	12.5 × 20	296	B41828A9107M***
220	16 × 25	497	B41828A9227M***
330	16 × 25	609	B41828A9337M***
470	16 × 31.5	802	B41828A9477M***

Composition of ordering code

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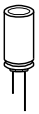
- 007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm (for ∅ 5 ... 6.3 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 5 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm, excluding d × l = 16 × 35.5 mm)



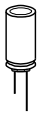
Technical data and ordering codes – B43828

C_R 120 Hz, 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz, 105 °C mA	Ordering code (composition see below)
V_R = 160 V DC			
0.47	5 × 11	12	B43828A1474M***
1.0	5 × 11	18	B43828A1105M***
2.2	6.3 × 11	26	B43828A1225M***
3.3	8 × 11.5	33	B43828A1335M***
4.7	8 × 11.5	38	B43828A1475M***
10	10 × 12.5	56	B43828A1106M***
22	10 × 16	111	B43828A1226M***
33	12.5 × 20	162	B43828A1336M***
47	12.5 × 25	218	B43828A1476M***
100	16 × 25	322	B43828A1107M***
220	18 × 35.5	604	B43828A1227M***
V_R = 200 V DC			
1.0	6.3 × 11	18	B43828A2105M***
2.2	6.3 × 11	26	B43828A2225M***
3.3	8 × 11.5	33	B43828A2335M***
4.7	10 × 12.5	43	B43828A2475M***
10	10 × 16	73	B43828A2106M***
22	10 × 20	122	B43828A2226M***
33	12.5 × 25	178	B43828A2336M***
47	12.5 × 25	218	B43828A2476M***
100	16 × 31.5	376	B43828A2107M***
220	18 × 40	610	B43828A2227M***

Composition of ordering code

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk
- 002 = for cut leads, bulk
- 016 = for taped leads, Ammo pack, lead spacing F = 2.0 mm (for ∅ 5 mm)
- 007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm (for ∅ 5 ... 6.3 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 5 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm, excluding d × l = 16 × 35.5 mm)



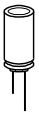
Technical data and ordering codes – B43828

C_R 120 Hz, 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz, 105 °C mA	Ordering code (composition see below)
V_R = 250 V DC			
0.47	6.3 × 11	12	B43828F2474M***
1.0	6.3 × 11	18	B43828F2105M***
2.2	8 × 11.5	29	B43828F2225M***
3.3	10 × 12.5	36	B43828F2335M***
4.7	10 × 12.5	43	B43828F2475M***
10	10 × 20	82	B43828F2106M***
22	12.5 × 25	132	B43828F2226M***
33	12.5 × 25	178	B43828F2336M***
47	16 × 25	237	B43828F2476M***
100	18 × 35.5	410	B43828F2107M***
V_R = 350 V DC			
1.0	6.3 × 11	18	B43828A4105M***
2.2	8 × 11.5	29	B43828A4225M***
3.3	10 × 12.5	36	B43828A4335M***
4.7	10 × 16	50	B43828A4475M***
10	12.5 × 20	89	B43828A4106M***
22	16 × 25	149	B43828A4226M***
33	16 × 25	196	B43828A4336M***
47	16 × 35.5	272	B43828A4476M***

Composition of ordering code

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk
- 002 = for cut leads, bulk
- 016 = for taped leads, Ammo pack, lead spacing F = 2.0 mm (for ∅ 5 mm)
- 007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm (for ∅ 5 ... 6.3 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 5 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm, excluding d × l = 16 × 35.5 mm)



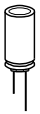
Technical data and ordering codes – B43828

C_R 120 Hz, 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz, 105 °C mA	Ordering code (composition see below)
V_R = 400 V DC			
1.0	8 × 11.5	18	B43828A9105M***
2.2	10 × 12.5	32	B43828A9225M***
3.3	10 × 16	42	B43828A9335M***
4.7	10 × 20	55	B43828A9475M***
10	12.5 × 20	89	B43828A9106M***
22	16 × 25	149	B43828A9226M***
33	16 × 31.5	217	B43828A9336M***
47	18 × 35.5	289	B43828A9476M***
V_R = 450 V DC			
1.0	8 × 11.5	18	B43828A5105M***
1.5	10 × 12.5	26	B43828A5155M***
2.2	10 × 12.5	32	B43828A5225M***
3.3	10 × 16	42	B43828A5335M***
4.7	10 × 20	55	B43828A5475M***
6.8	12.5 × 20	73	B43828A5685M***
10	12.5 × 20	89	B43828A5106M***
15	12.5 × 25	120	B43828A5156M***
22	16 × 25	149	B43828A5226M***
33	16 × 31.5	217	B43828A5336M***
47	16 × 35.5	273	B43828B5476M***
47	18 × 35.5	289	B43828A5476M***
68	18 × 35.5	351	B43828A5686M***

Composition of ordering code

*** = Version

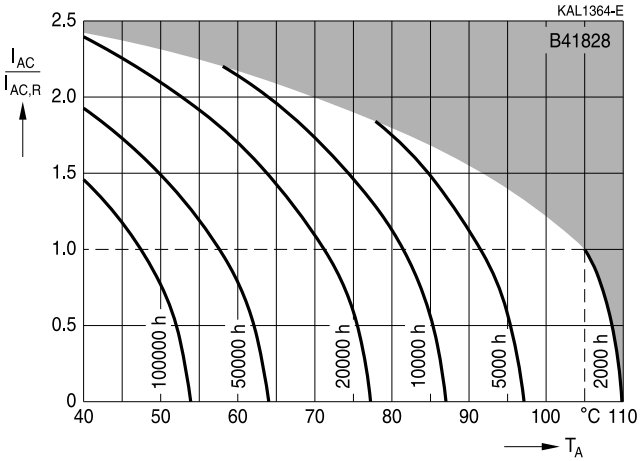
- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk
- 002 = for cut leads, bulk
- 016 = for taped leads, Ammo pack, lead spacing F = 2.0 mm (for ∅ 5 mm)
- 007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm (for ∅ 5 ... 6.3 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 5 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm, excluding d × l = 16 × 35.5 mm)



Useful life

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

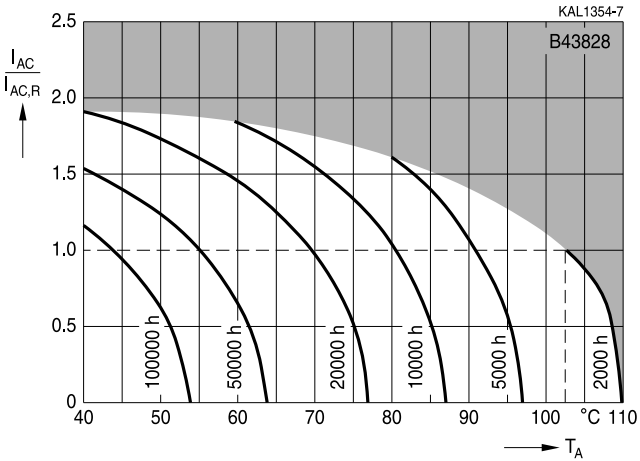
B41828



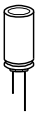
Useful life

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

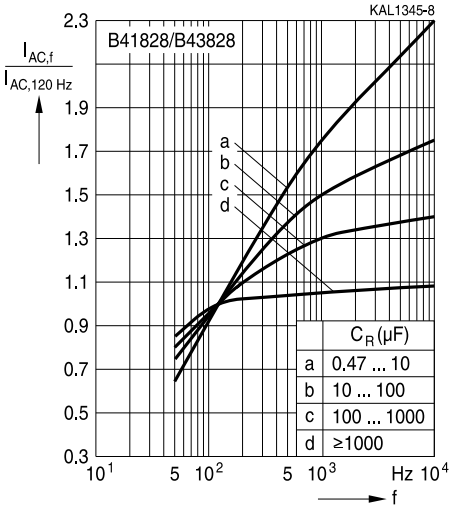
B43828

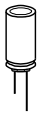


1) Refer to chapter "General technical information, 5.3 Calculation of useful life" for an explanation on how to interpret the useful life graphs.



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



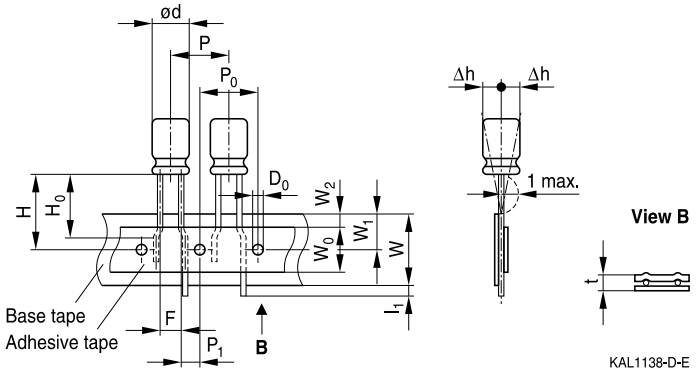


Taping, packing and lead configurations

Taping

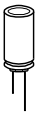
Single-ended capacitors are available taped in Ammo pack from diameter 4 to 18 mm as follows:
Lead spacing F = 2.0 mm (∅ d = 4 … 5 mm)
Lead spacing F = 2.5 mm (∅ d = 4 … 6.3 mm)
Lead spacing F = 3.5 mm (∅ d = 8 mm)
Lead spacing F = 5.0 mm (∅ d = 4 … 12.5 mm)
Lead spacing F = 7.5 mm (∅ d = 16 ... 18 mm).

Lead spacing 2.0 mm (∅ d = 4 ... 5 mm)
Last 3 digits of ordering code: 016



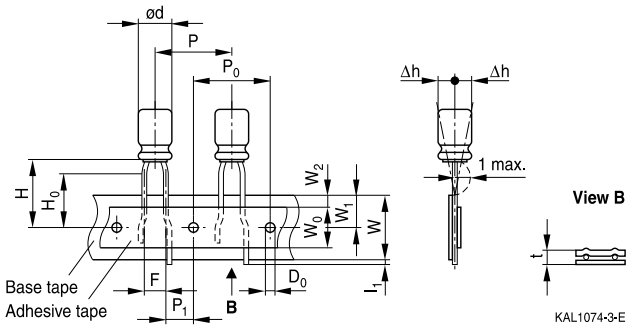
Dimensions in mm

∅ d	F	H	W	W_0	W_1	W_2	P	P_0	P_1	I_1	t	Δh	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
	+0.8 −0.2	±0.75	±0.5	min.	±0.5	max.	±1.0	±0.3	±0.7	max.	±0.2	±1.0	±0.2



Lead spacing 2.5 mm (∅ d = 4 ... 6.3 mm)

Last 3 digits of ordering code: 007

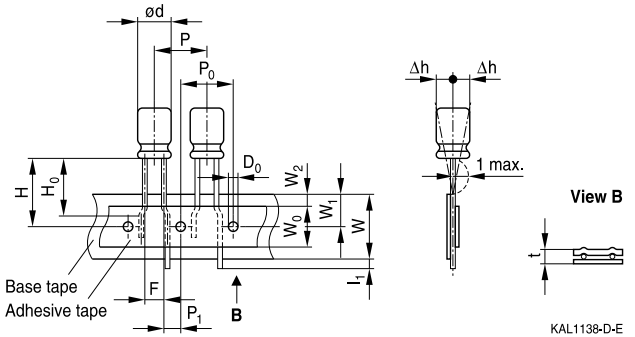


Dimensions in mm

∅ d	F	H	W	W_0	W_1	W_2	H_0	P	P_0	P_1	l_1	t	Δh	D_0
4 ... 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
Toler-rance	+0.8 −0.2	±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)

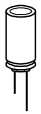
Last 3 digits of ordering code: 006



Dimensions in mm

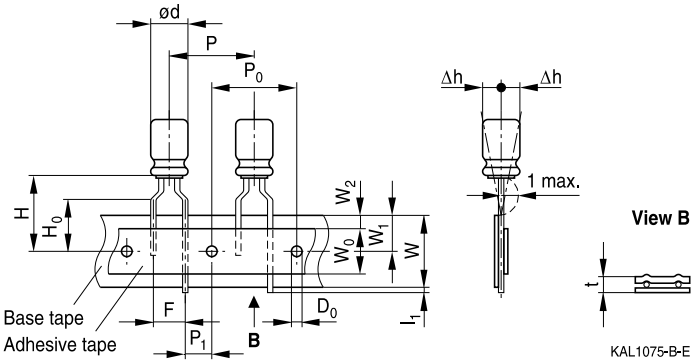
∅ d	F	H	W	W_0	W_1	W_2	P	P_0	P_1	l_1	t	Δh	D_0
8	3.5	18.5	18.0	10	9.0	3.0	12.7	12.7	4.6	1.0	0.7	1.0	4.0
Toler-rance	+0.8 −0.2	±1.0	±0.5	min.	±0.5	max.	±1.0	±0.3	±0.6	max.	±0.2	max.	±0.2

Leads can also run straight through the taping area. Taping is available up to dimensions $d \times l = 8 \times 15$ mm.



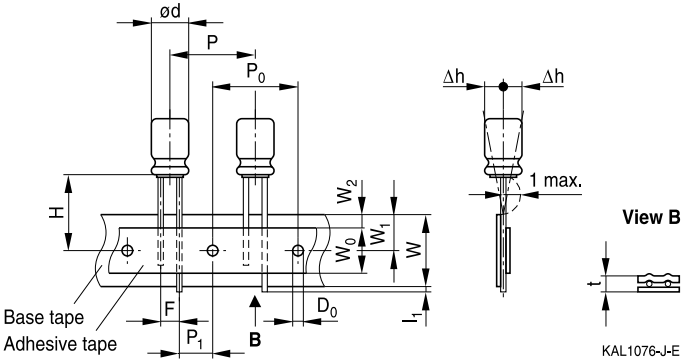
Lead spacing 5.0 mm (∅ d = 4 ... 8 mm)

Last 3 digits of ordering code: 008



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

Last 3 digits of ordering code: 008

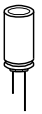


Dimensions in mm

∅ d	F	H	W	W_0	W_1	W_2	H_0	P	P_0	P_1	l_1	t	Δh	D_0
4 ... 6.3	5.0	18.5	18.0	5.5	9.0	1.5	16.0	12.7	12.7	3.85	1.0	0.6	1.0	4.0
8		20.0		10.0			16.0	12.7	12.7	3.85				
10	5.0	19.0	18.0	12.5	9.0	1.5	–	12.7	12.7	3.85	1.0	0.6	1.0	4.0
12.5		19.0		12.5			–	15.0	15.0	5.0				
Tolerance	+0.8 −0.2	±0.75	±0.5	min.	±0.5	max.	±0.5	±1.0	±0.2	±0.5	max.	+0.3 −0.2	max.	±0.2

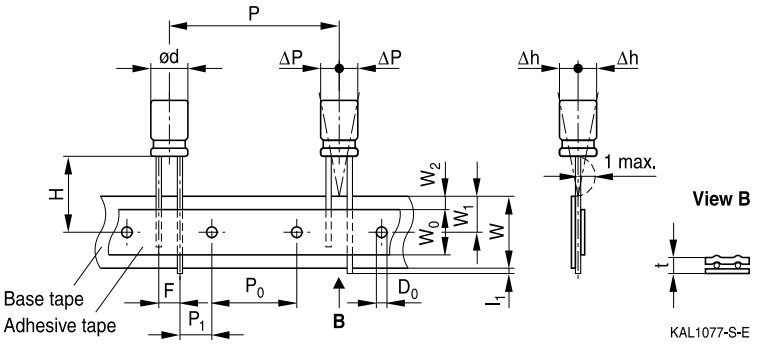
Taping is available up to dimensions d × l = 12.5 × 25 mm.

Taping is not available for d × l = 8 × 20 mm.



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

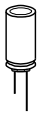
Last 3 digits of ordering code: 009



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

Taping is available up to dimensions d × l = 16 × 31.5 mm and 18 × 31.5 mm.



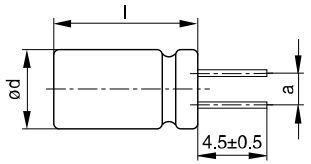
Cut or kinked leads

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

Cut leads (Chapter A)

Available for series B41002, B41022, B41044, B41827, B41828, B43044, B43082, B43086, B43088, B43827, B43828.

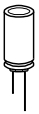
Last 3 digits of ordering code: 002



KAL1086-R

Case size d x l (mm)	Dimensions (mm) a ±0.5
4 x 7	1.5
5 x 7	2.0
5 x 11	2.0
6.3 x 7	2.5
6.3 x 11	2.5
8 x 7	3.5
8 x 11.5	3.5
8 x 15	3.5
8 x 20	3.5
10 x 12.5	5.0
10 x 16	5.0
10 x 20	5.0
10 x 25	5.0

Case size d x l (mm)	Dimensions (mm) a ±0.5
12.5 x 16	5.0
12.5 x 20	5.0
12.5 x 25	5.0
12.5 x 31.5	5.0
12.5 x 35.5	5.0
12.5 x 40	5.0
16 x 20	7.5
16 x 25	7.5
16 x 31.5	7.5
16 x 35.5	7.5
16 x 40	7.5
18 x 20	7.5
18 x 25	7.5
18 x 31.5	7.5
18 x 35.5	7.5
18 x 40	7.5

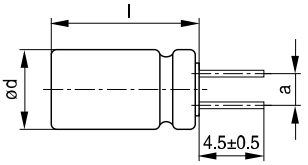


Cut leads (Chapter B)

Available for series B41858, B41859, B41863, B41866, B41868, B41888, B41890, B41896, B42824, B42851, B43866, B43867, B43890, B43896.

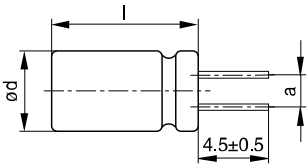
Last 3 digits of ordering code: 002

With stand-off rubber seal



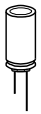
KAL1085-I

With flat rubber seal



KAL1086-R

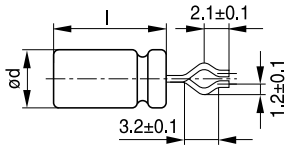
Case size d × l (mm)	Dimensions (mm) a ±0.5
10 × 12.5	5.0
10 × 16	5.0
10 × 20	5.0
12.5 × 20	5.0
12.5 × 25	5.0
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
16 × 35.5	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35	7.5
18 × 40	7.5



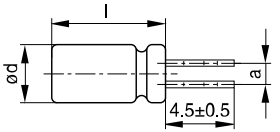
Kinked leads (Chapter A)

Available for series B41002, B41022, B41044, B41827, B41828, B43044, B43082, B43086, B43088, B43827, B43828.

Last 3 digits of ordering code: 001



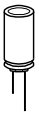
KAL1137-5



KAL1084-A

Case size d x l (mm)	Dimensions (mm) a ±0.5
4 x 7	1.5
5 x 7	2.0
5 x 11	2.0
6.3 x 7	2.5
6.3 x 11	2.5
8 x 7	3.5
8 x 11.5	3.5
8 x 15	3.5
8 x 20	3.5
10 x 12.5	5.0
10 x 16	5.0
10 x 20	5.0
10 x 25	5.0

Case size d x l (mm)	Dimensions (mm) a ±0.5
12.5 x 16	5.0
12.5 x 20	5.0
12.5 x 25	5.0
12.5 x 31.5	5.0
12.5 x 35.5	5.0
12.5 x 40	5.0
16 x 20	7.5
16 x 25	7.5
16 x 31.5	7.5
16 x 35.5	7.5
16 x 40	7.5
18 x 20	7.5
18 x 25	7.5
18 x 31.5	7.5
18 x 35.5	7.5
18 x 40	7.5

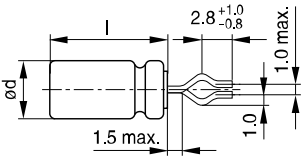


Kinked leads (Chapter B)

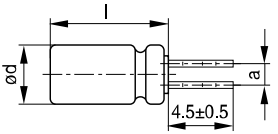
Available for series B41858, B41859, B41863, B41866, B41868, B41888, B41890, B41896, B42824, B42851, B43866, B43867, B43890, B43896.

Last 3 digits of ordering code: 001

With stand-off rubber seal

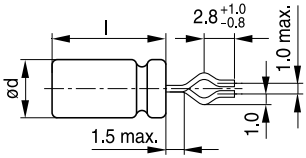


KAL1081-K

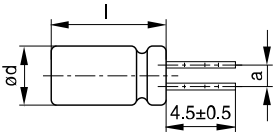


KAL1083-2

With flat rubber seal

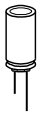


KAL1082-T



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
16 × 20	7.5
16 × 25	7.5
16 × 31.5	7.5
16 × 35.5	7.5
18 × 20	7.5
18 × 25	7.5
18 × 31.5	7.5
18 × 35	7.5
18 × 40	7.5



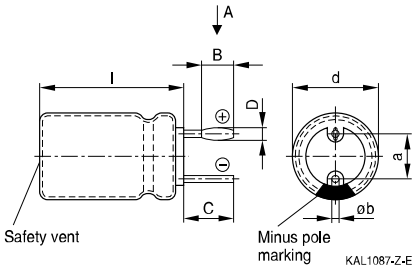
PAPR leads (Protection Against Polarity Reversal)

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 18 mm.
There are three configurations available: Crimped leads, J leads, bent 90° leads

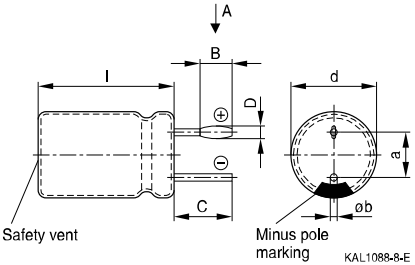
Available for series B41858, B41859, B41863, B41866, B41868, B41888, B41890, B41896, B42824, B42851, B43866, B43867, B43890, B43896.

Crimped leads
Last 3 digits of ordering code: 003

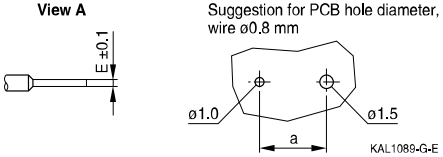
With stand-off rubber seal

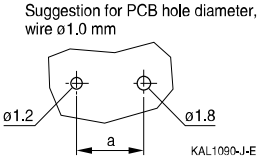


With flat rubber seal

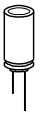


Suggestion for PCB hole diameter



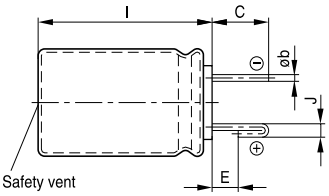


Case size	Dimensions (mm)					
d × l (mm)	B ±0.2	C ±0.5	D ±0.1	E ±0.1	a ±0.5	∅b
16 × 20	1.5	3.0	1.3	0.3	7.5	0.8 ±0.05
16 × 25	1.5	3.0	1.3	0.3	7.5	0.8 ±0.05
16 × 31.5	1.5	3.0	1.3	0.3	7.5	0.8 ±0.05
16 × 35.5	1.5	3.0	1.3	0.3	7.5	0.8 ±0.05
18 × 20	1.5	3.0	1.3	0.3	7.5	0.8 ±0.1
18 × 25	1.5	3.0	1.3	0.3	7.5	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



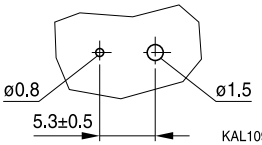
J leads

Last 3 digits of ordering code: 004

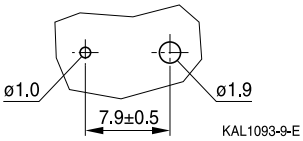


Suggestion for PCB hole diameter

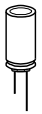
Suggestion for PCB hole diameter, wire ø0.6 mm



Suggestion for PCB hole diameter, wire ø0.8 mm

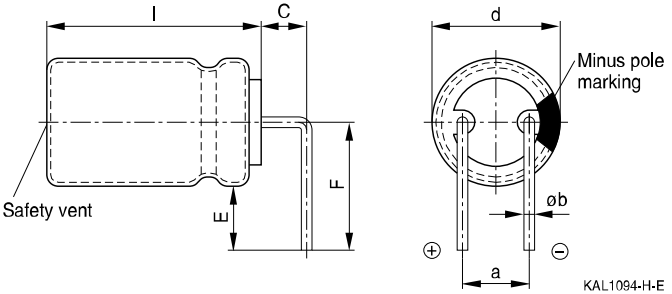


Case size	Dimensions (mm)				
d × l (mm)	C ±0.5	E ±0.5	J ±0.2	a ±0.5	∅b
10 × 12.5	3.2	0.7	1.2	5.0	0.6 ±0.05
10 × 16	3.2	0.7	1.2	5.0	0.6 ±0.05
10 × 20	3.2	0.7	1.2	5.0	0.6 ±0.05
12.5 × 20	3.2	0.7	1.2	5.0	0.6 ±0.05
12.5 × 25	3.2	0.7	1.2	5.0	0.6 ±0.05
16 × 20	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 25	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 31.5	3.5	0.7	1.6	7.5	0.8 ±0.05
16 × 35.5	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



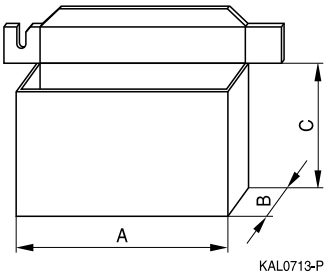
Case size	Dimensions (mm)				
d × l (mm)	C ±0.5	E ±0.5	F ±0.5	a ±0.5	∅b
16 × 20	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 25	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 31.5	4.0	4.0	12.0	7.5	0.8 ±0.05
16 × 35.5	4.0	4.0	12.0	7.5	0.8 ±0.05
18 × 20	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 25	4.0	4.0	13.0	7.5	0.8 ±0.1
18 × 31.5	4.0	4.0	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.

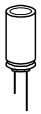
Packing units and box dimensions

Ammo pack

Valid for series B41002, B41022, B41044, B41827, B41828, B43044, B43082, B43086, B43088, B43827, B43828.

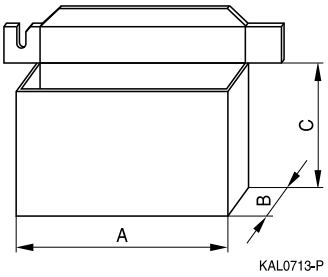


Case size d × l	Dimensions (mm)			Packing units
mm	A_{max}	B_{max}	C_{max}	pcs.
4 × 7	330	50	196	2000
5 × 7	330	50	226	2000
5 × 11	330	50	226	2000
6.3 × 7	330	50	286	2000
6.3 × 11	330	50	286	2000
8 × 7	330	50	246	1000
8 × 11.5	330	50	246	1000
8 × 15	330	50	246	500
10 × 12.5	330	50	196	500
10 × 16	330	54	196	500
10 × 20	330	58	196	500
12.5 × 20	341	60	272	500
12.5 × 25	341	65	272	500
16 × 25	320	65	270	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



Ammo pack

Valid for series B41858, B41859, B41863, B41866, B41868, B41888, B41890, B41896, B42824, B42851, B43866, B43867, B43890, B43896.

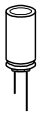


Case size d × l	Dimensions (mm)			Packing units
mm	A_{max}	B_{max}	C_{max}	pcs.
8 × 11.5	345	55	240	1000
10 × 12.5	345	55	280	750
10 × 16	345	60	200	500
10 × 20	345	60	200	500
12.5 × 20	345	65	280	500
12.5 × 25	345	65	280	500
16 × 20	315	65	275	300
16 × 25	315	65	275	300
16 × 31.5	315	65	275	300
18 ×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

Overview of packing units and code numbers for case sizes 4 x 7 ... 16 x 40

Valid for series B41002, B41022, B41044, B41827, B41828, B43044, B43082, B43086, B43088, B43827, B43828.

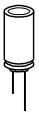
Case size d x l mm	Standard, bulk pcs.	Taped, Ammo pack pcs.			Kinked leads, bulk pcs.	Cut leads, bulk pcs.
4 x 7	10000	2000			15000	15000
5 x 7	7500	2000			10000	10000
5 x 11	5000	2000			10000	10000
6.3 x 7	5000	2000			10000	10000
6.3 x 11	5000	2000			5000	5000
8 x 7	5000	1000			5000	5000
8 x 11.5	2500	1000			4000	4000
8 x 15	2000	1000			2500	2500
8 x 20	1500	–			2000	2000
10 x 12.5	2000	500			2500	2500
10 x 16	1500	500			2000	2000
10 x 20	1000	500			1500	1500
10 x 25	1000	500			1250	1250
12.5 x 16	750	500			1000	1000
12.5 x 20	750	500			500	500
12.5 x 25	750	500			500	500
12.5 x 31.5	500	–			750	750
12.5 x 35.5	500	–			750	750
12.5 x 40	500	–			750	750
16 x 20	375	300			500	500
16 x 25	375	300			500	500
16 x 31.5	250	300			375	375
16 x 35.5	250	–			375	375
16 x 40	250	–			375	375
The last three digits of the complete ordering code state the lead configuration	**000**	Code	F (mm)	d (mm)	**001**	**002**
		006	3.5	8		
		007	2.5	4 ... 6.3		
		008	5.0	4 ... 12.5		
		009	7.5	16 ... 18		
		016	2.0	4 ... 5		



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

Valid for series B41002, B41022, B41044, B41827, B41828, B43044, B43082, B43086, B43088, B43827, B43828.

Case size d x l mm	Standard, bulk pcs.	Taped, Ammo pack pcs.			Kinked leads, bulk pcs.	Cut leads, bulk pcs.
18 x 20	250	250			100	100
18 x 25	250	250			100	100
18 x 31.5	250	250			100	100
18 x 35.5	250	–			100	100
18 x 40	250	–			100	100
The last three digits of the complete ordering code state the lead configuration	**000**	Code	F (mm)	d (mm)	**001**	**002**
		009	7.5	16 ... 18		

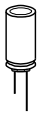


Overview of packing units and code numbers for case sizes 8 × 11.5 ... 16 × 35.5

Valid for series B41858, B41859, B41863, B41866, B41868, B41888, B41890, B41896, B42824, B42851, B43866, B43867, B43890, B43896.

							PAPR		
Case size d × l mm	Standard, bulk pcs.	Taped, Ammo pack pcs.			Kinked leads, bulk pcs.	Cut leads, bulk pcs.	Crimped leads, blister pcs.	J leads, blister pcs.	Bent 90° leads, blister pcs.
8 × 11.5	1000	1000			–	–	–	–	
10 × 12.5	1000	750			–	1000	–	675	
10 × 16	1000	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	–			–	–	–	–	
12.5 × 35	175	–			–	–	–	–	
12.5 × 40	175	–			–	–	–	–	
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
16 × 35.5	100	–			100	100	150	150	150
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					
		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 ... 18 × 40

Valid for series B41858, B41859, B41863, B41866, B41868, B41888, B41890, B41896, B42824, B42851, B43866, B43867, B43890, B43896.

							PAPR		
Case size d × l	Stan-dard, bulk	Taped, Ammo pack			Kinked leads, bulk	Cut leads, bulk	Crimped leads, blister	J leads, blister	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
The last three digits of the complete ordering code state the lead configuration	**000**	Code	F (mm)	d (mm)	**001**	**002**	**003**	**004**	**012**
		009	7.5	16...18					

Cautions and warnings

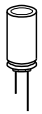
Personal safety

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 aluminum electrolytic capacitors:

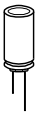
- Any escaping electrolyte should not come into contact with eyes or skin.
- If electrolyte does come into contact with the skin, wash the affected parts immediately with running water. If the eyes are affected, rinse them for 10 minutes with plenty of water. If symptoms persist, seek medical treatment.
- 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.



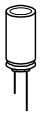
Product safety

The table below summarizes 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 temperature.	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"



Symbols and terms

Symbol	English	German
C	Capacitance	Kapazität
C_R	Rated capacitance	Nennkapazität
C_S	Series capacitance	Serienkapazität
$C_{S,T}$	Series capacitance at temperature T	Serienkapazität bei Temperatur T
C_f	Capacitance at frequency f	Kapazität bei Frequenz f
d	Case diameter, nominal dimension	Gehäusedurchmesser, Nennmaß
d_{max}	Maximum case diameter	Maximaler Gehäusedurchmesser
ESL	Self-inductance	Eigeninduktivität
ESR	Equivalent series resistance	Ersatzserienwiderstand
ESR_f	Equivalent series resistance at frequency f	Ersatzserienwiderstand bei Frequenz f
ESR_T	Equivalent series resistance at temperature T	Ersatzserienwiderstand bei Temperatur T
f	Frequency	Frequenz
I	Current	Strom
I_{AC}	Alternating current (ripple current)	Wechselstrom
$I_{AC,rms}$	Root-mean-square value of alternating current	Wechselstrom, Effektivwert
$I_{AC,f}$	Ripple current at frequency f	Wechselstrom bei Frequenz f
$I_{AC,max}$	Maximum permissible ripple current	Maximal zulässiger Wechselstrom
$I_{AC,R}$	Rated ripple current	Nennwechselstrom
$I_{AC,R}$ (B)	Rated ripple current for base cooling	Nennwechselstromstrom für Bodenkühlung
I_{leak}	Leakage current	Reststrom
$I_{leak,op}$	Operating leakage current	Betriebsreststrom
l	Case length, nominal dimension	Gehäuselänge, Nennmaß
l_{max}	Maximum case length (without terminals and mounting stud)	Maximale Gehäuselänge (ohne Anschlüsse und Gewindebolzen)
R	Resistance	Widerstand
R_{ins}	Insulation resistance	Isolationswiderstand
R_{symm}	Balancing resistance	Symmetrierwiderstand
T	Temperature	Temperatur
ΔT	Temperature difference	Temperaturdifferenz
T_A	Ambient temperature	Umgebungstemperatur
T_C	Case temperature	Gehäusetemperatur
T_B	Capacitor base temperature	Temperatur des Becherbodens
t	Time	Zeit
Δt	Period	Zeitraum
t_b	Service life (operating hours)	Brauchbarkeitsdauer (Betriebszeit)

Symbol	English	German
V	Voltage	Spannung
V_F	Forming voltage	Formierspannung
V_{op}	Operating voltage	Betriebsspannung
V_R	Rated voltage, DC voltage	Nennspannung, Gleichspannung
V_S	Surge voltage	Spitzenspannung
X_C	Capacitive reactance	Kapazitiver Blindwiderstand
X_L	Inductive reactance	Induktiver Blindwiderstand
Z	Impedance	Scheinwiderstand
Z_T	Impedance at temperature T	Scheinwiderstand bei Temperatur T
tan δ	Dissipation factor	Verlustfaktor
λ	Failure rate	Ausfallrate
ε_0	Absolute permittivity	Elektrische Feldkonstante
ε_r	Relative permittivity	Dielektrizitätszahl
ω	Angular velocity; $2 \cdot \pi \cdot f$	Kreisfrequenz; $2 \cdot \pi \cdot f$

Note

All dimensions are given in mm.

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