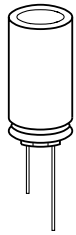
Aluminum electrolytic capacitors
Alu-X product lines

Single-ended capacitors

Series/Type: **B41828, B43828**
Date: August 2008

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General-purpose grade capacitors



Applications

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

Features

- Miniaturized dimensions
- RoHS-compatible
- Load 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
- Kinked

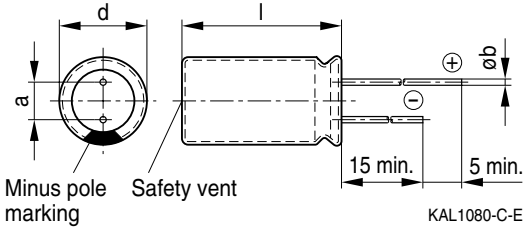
Specifications and characteristics in brief

Series	B41828					B43828					
Rated voltage V_R	6.3 … 100 V DC					160 … 400 V DC					
Operating temperature range	–40 °C … +105 °C					–40 °C … +105 °C					
Rated capacitance C_R (20 °C, 120 Hz)	0.47 … 15000 µF					0.47 … 220 µF					
Capacitance tolerance	±20% ≙ M					±20% ≙ M					
Load 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				2000 h	Requirements: ΔC/C ≤ ±20% of initial value tan δ ≤ 2 times initial specified value I_{leak} ≤ initial specified limit					
Leakage current I_{leak} (20 °C, after 5 minutes)	$I_{leak} \le 0.01\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)$ or 3 µA, whichever is greater					$I_{leak} \le 0.03\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right) + 10\ \mu A$					
Dissipation factor (max.) (20 °C, 120 Hz)	V_R (V DC)	6.3	10	16	25	35	50	63	100	160… 250	315 … 400
	tan δ	0.24	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.12	0.15
	0.02 is added to every 1000 µF, increase over 1000 µF										
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.										

Frequency multiplier for rated ripple current	50 Hz	120 Hz	300 Hz	1 kHz	10 kHz
0.47 … 4.7 µF	0.65	1.00	1.35	1.75	2.30
10 … 47 µF	0.75	1.00	1.25	1.50	1.75
100 … 1000 µF	0.80	1.00	1.15	1.30	1.40
≥2200 µF	0.85	1.00	1.03	1.05	1.08

Temperature multiplier for rated ripple current	+50 °C	+70 °C	+85 °C	+105 °C
	2.10	1.78	1.40	1.00

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 × 20	17.0 × 22.0	7.5 ±0.5	0.80 ±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 × 31.5	19.0 × 33.5	7.5 ±0.5	0.80 ±0.1
18 × 35.5	19.0 × 37.5	7.5 ±0.5	0.80 ±0.1
18 × 40	19.0 × 42.0	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
22			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			

Overview of available types B41828

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	10 × 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
	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
2.2	6.3 × 11	6.3 × 11	8 × 11.5	8 × 11.5	10 × 12.5
3.3	8 × 11.5	8 × 11.5	10 × 12.5	10 × 12.5	10 × 16
4.7	8 × 11.5	10 × 12.5	10 × 12.5	10 × 16	10 × 20
10	10 × 12.5	10 × 16	10 × 20	12.5 × 20	12.5 × 20
22	10 × 16	10 × 20	12.5 × 25	16 × 25	16 × 25
33	12.5 × 20	12.5 × 25	12.5 × 25	16 × 25	16 × 31.5
47	12.5 × 25	12.5 × 25	16 × 25	16 × 35.5	18 × 35.5
100	16 × 25	16 × 31.5	18 × 35.5		
220	18 × 35.5	18 × 40			

Technical data and ordering codes B41828

V_R V DC	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)
6.3	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***
10	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***
16	10	5 × 11	35	B41828A4106M***
	22	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***

*** = 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
007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm
006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm
008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm, d ≤ 10 mm

Technical data and ordering codes B41828

V_R V DC	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)
25	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***
35	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***
50	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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006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm
008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm, d ≤ 10 mm

Technical data and ordering codes B41828

V_R V DC	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)
63	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	10 × 20	374	B41828A8227M***
	330	12.5 × 20	570	B41828A8337M***
	470	12.5 × 25	715	B41828A8477M***
	1000	16 × 31.5	1043	B41828A8108M***
100	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***

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007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm
006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm
008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm, d ≤ 10 mm

Technical data and ordering codes B43828

V_R V DC	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)
160	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***
200	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***
250	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***

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006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm
008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm, d ≤ 10 mm

Technical data and ordering codes B43828

V_R V DC	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)
350	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***
400	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***

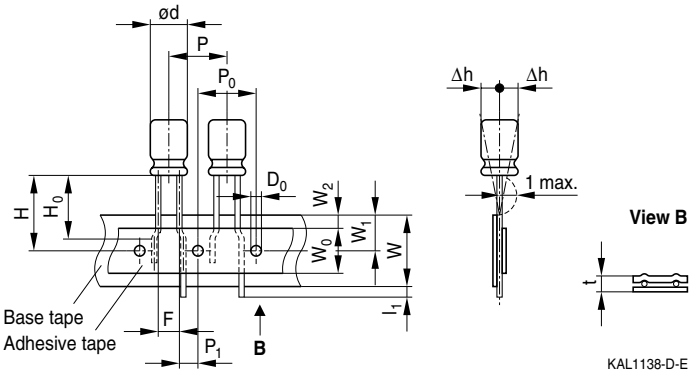
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007 = for taped leads, Ammo pack, lead spacing F = 2.5 mm
006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm
008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm, d ≤ 10 mm

Taping, packing and lead configurations of single-ended capacitors

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

Lead spacing 2.0 mm (∅ d = 4 ... 5 mm)

Last 3 digits of ordering code: 016

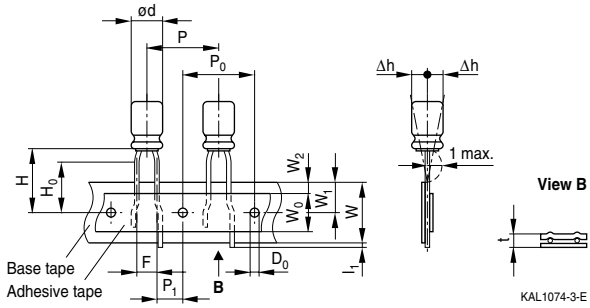


Dimensions in mm

∅ d	F	H	W	W_0	W_1	W_2	P	P_0	P_1	l_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
	–0.2	±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

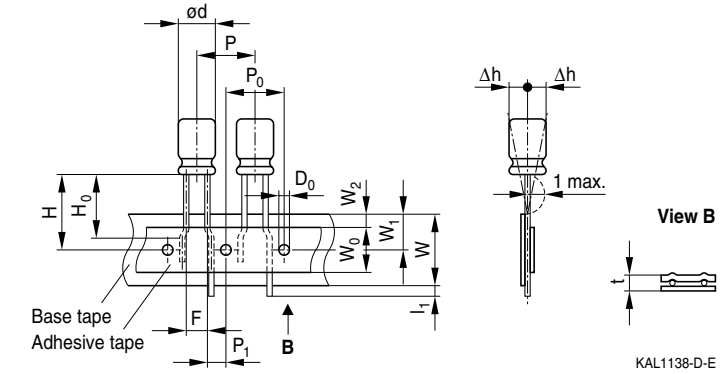


Dimensions in mm

∅ d	F	H	H_0	W	W_0	W_1	W_2	P	P_0	P_1	l_1	t	Δh	D_0
4 ... 6.3	2.5	18.5	16.0	18.0	7.0	9.0	3.0	12.7	12.7	5.10	1.0	0.7	0	4.0
Tolerance	–0.2	±0.75	±0.5	±0.5	min.	±0.5	max.	±1.0	±0.3	±0.7	max.	±0.2	±1.0	±0.2

Lead spacing 3.5 mm (∅ d = 8 mm)

Last 3 digits of ordering code: 006

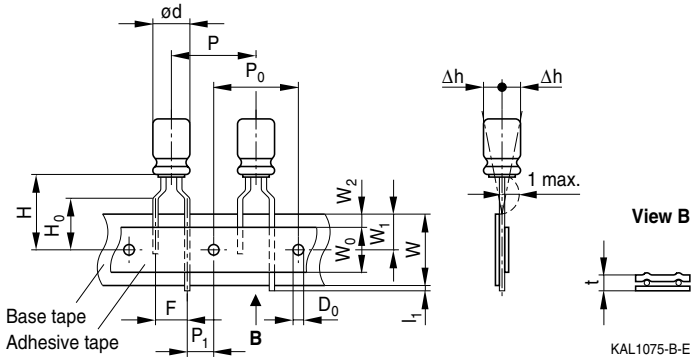


Dimensions in mm

∅ 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	5.10	1.0	0.7	1	4.0
Tolerance	±0.5	±0.75	±0.5	min.	±0.5	max.	±1.0	±0.3	±0.7	max.	±0.2	max.	±0.2

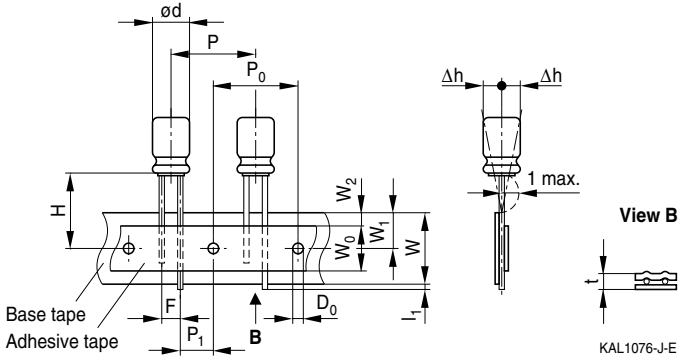
Lead spacing 5.0 mm (∅ d = 4 ... 8 mm)

Last 3 digits of ordering code: 008



Lead spacing 5.0 mm (∅ d = 10 mm)

Last 3 digits of ordering code: 008



Dimensions in mm

∅ d	F	H	H_0	W	W_0	W_1	W_2	P	P_0	P_1	L_1	t	Δh	D_0
4 ... 6.3	5.0	18.5	16	18.0	7.0	9.0	3.0	12.7	12.7	3.85	1.0	0.6	2.0	4.0
8	5.0	18.5	16	18.0	10	9.0	3.0	12.7	12.7	3.85	1.0	0.6	2.0	4.0
10	5.0	18.5	–	18.0	12.5	9.0	3.0	12.7	12.7	3.85	1.0	0.6	2.0	4.0
Tolerance	+0.6 −0.2	±0.75	±0.5	+1.0 −0.5	+1.0 −0	±0.5	max.	±0.5	±0.3	±0.7	max.	+0.3 −0.2	max.	±0.2

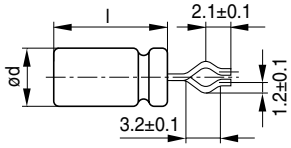
Taping is available up to dimensions d × l = 10 × 20 mm. For ∅ 12.5, 16 and 18 mm taping is not available.

Kinked or cut leads

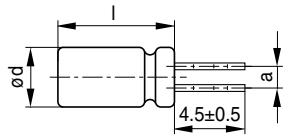
Single-ended capacitors are available with kinked or cut leads. Other lead configurations also available on request.

Kinked leads

Last 3 digits of ordering code: 001



KAL1137-5



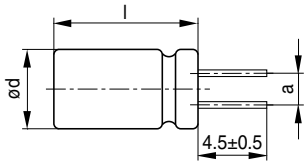
KAL1084-A

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

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

Cut leads

Last 3 digits of ordering code: 002



KAL1086-R

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

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

General

Also see “Important notes” on page 19.

1 Aluminum electrolytic capacitors have a bi-polar structure. This is marked on the body of the capacitor. A capacitor must not be mounted with reversed polarity. The application of an AC or reverse voltage may cause a short circuit or damage the capacitor. Bi-polar capacitors must not be used in AC applications, where the polarity may be reversed in the circuits or is unknown.

2 The DC voltage applied to the capacitor terminal must not exceed its rated operating voltage, as this will result in a rapid increase of the leakage current and may damage the capacitor. It is recommended to operate the capacitor at 70–80% of its rated voltage to optimize its service life.

3 The ripple current applied to the capacitor must be within the permitted range. An excessive ripple current leads to impaired electrical properties and may damage the capacitor. Note that the sum of the peak values of the ripple voltage and the DC operating voltage must not exceed the rated DC voltage.

4 Capacitors must be used within their permitted range of operating temperature. Operation at room temperature optimizes their service life.

5 Capacitors with case diameter ≥8 mm are equipped with a safety vent. In capacitors fitted with a lead or soldering lug, the safety vent is usually located at the base of the case. It needs sufficient space around it to operate optimally. The following dimensions are recommended: for case diameter d = 8 to 16 mm, more than 2 mm; for d = 18 to 35 mm, more than 3 mm; and for d = 42 mm or more, more than 5 mm.

6 Capacitors should not be mounted with the safety vent face down on the board. Do not locate any wire or copper trace near the safety vent. Do not reverse the voltage, as this may result in excess pressure and the leakage of electrolyte.

7 Gas is released through the safety vent when the pressure inside the capacitor is too high. A gaseous liquid around the safety vent does not indicate a leakage of electrolyte.

8 The capacitor should be stored under conditions of normal temperature and in a non-acid, non-alkali environment of normal humidity. Exposure to high temperatures, for example under direct sunlight, will reduce its operating life. If the capacitor is stored in an environment containing acids or alkalis, the solderability of the leads may be affected.

9 The leakage current of an aluminum electrolytic capacitor may increase after a long period of storage. After such storage, the capacitor must be aged by applying the rated operating voltage for 6–8 hours before use.

10 Manual soldering:

a Soldering must be performed within the specified conditions.
Bit temperature: 350 °C; application time of soldering iron: 3 seconds.

b Ensure that the soldering iron does not touch any part of the capacitor body.

11 Do not apply excessive force to the leads and terminals. Do not move the capacitor after soldering it onto the PC board and do not carry the PC board by gripping the capacitor. Observe the following rules to prevent undue stress to the capacitor:

a Do not tilt or bend the capacitor after soldering.
b Ensure that the terminal spacing matches the corresponding hole spacing on the PC board.

12 The aluminum case is not insulated from the cathode. Do not place a conductor under the aluminum capacitors on the PC board as this may cause a short circuit. The case and top of capacitors used in switched mode power supplies have a high-voltage-resistant heat shrink sleeve to ensure safe usage.

13 The leads of capacitors with a case diameter exceeding 14 mm cannot be used for fixing.

Important notes

The following applies to all products named in this publication:

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

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