



# **Aluminum electrolytic capacitors**

## Alu-X product lines

Single-ended capacitors

**Series/Type:**            **B41827, B43827**  
**Date:**                      August 2008

## 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

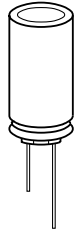
- Miniaturized dimensions
- RoHS-compatible
- Load life of 2000 h at 85 °C

### 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

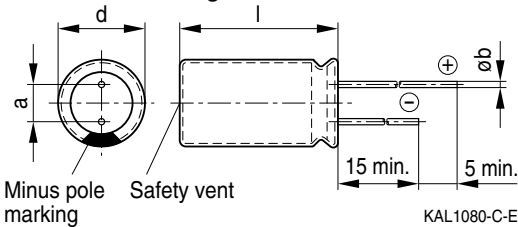
### Delivery mode

- Bulk
- Taped, Ammo pack
- Cut
- Kinked



**Specifications and characteristics in brief**

Series	B41827					B43827						
Rated voltage $V_R$	6.3 ... 100 V DC					160 ... 450 V DC						
Operating temperature range	–40 °C ... +85 °C					160 ... 400 V DC: –40 °C ... +85 °C 450 V DC: –25 °C ... +85 °C						
Surge voltage $V_S$	$1.15 \cdot V_R$					$1.1 \cdot V_R$						
Rated capacitance $C_R$ (20 °C, 120 Hz)	0.47 ... 22000 $\mu$ F					0.47 ... 330 $\mu$ F						
Capacitance tolerance	$\pm 20\% \triangleq M$					$\pm 20\% \triangleq M$						
Load life (85 °C, $V_R$ , $I_{AC,R}$ )	2000 h	Requirements: $\Delta C/C \leq \pm 20\%$ of initial value $\tan \delta \leq 2$ times initial specified value $I_{leak} \leq$ initial specified limit				2000 h	Requirements: $\Delta C/C \leq \pm 20\%$ of initial value $\tan \delta \leq 2$ times initial specified value $I_{leak} \leq$ initial specified limit					
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 $\mu A$ , whichever is greater					$I_{leak} \leq 0.03 \mu A \cdot \left( \frac{C_R}{\mu F} \cdot \frac{V_R}{V} \right) + 10 \mu A$						
Dissipation factor (max.) (20 °C, 120 Hz)	$V_R$ (V DC)	6.3	10	16	25	35	50	63	100	160 ... 250	350 ... 400	450
	$\tan \delta$	0.22	0.20	0.16	0.14	0.12	0.10	0.09	0.08	0.18	0.20	0.23
	0.02 is added to every 1000 $\mu$ F, increase over 1000 $\mu$ F											
Shelf life	After storage for 1000 h at 85 °C, the capacitors shall meet the requirement of load life test after reforming process. After test: $V_R$ to be applied for 30 minutes, 24 to 48 hours before measurement.											
Frequency multiplier for rated ripple current		50 Hz		120 Hz		300 Hz		1 kHz		10 kHz		
	0.47 ... 4.7 $\mu$ F	0.65		1.00		1.35		1.75		2.30		
	10 ... 47 $\mu$ F	0.75		1.00		1.25		1.50		1.75		
	100 ... 1000 $\mu$ F	0.80		1.00		1.15		1.30		1.40		
	$\geq 2200 \mu F$	0.85		1.00		1.03		1.05		1.08		
Temperature multiplier for rated ripple current	+50 °C			+70 °C			+85 °C					
	1.50			1.27			1.00					

**Dimensional drawing**


Safety vent for diameter  $\geq 8$  mm.

**Case dimensions**

$d \times l$ mm	$d_{\max} \times l_{\max}$ mm	a mm	b mm
5 × 11	5.5 × 12.5	2.0 ± 0.5	0.50 ± 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 B41827**

$V_R$ (V DC)	6.3	10	16	25
	Case dimensions $d \times l$ (mm)			
$C_R$ ( $\mu$ F)				
47				5 × 11
100		5 × 11	5 × 11	6.3 × 11
220	5 × 11	6.3 × 11	6.3 × 11	8 × 11.5
330	6.3 × 11	6.3 × 11	8 × 11.5	10 × 12.5
470	6.3 × 11	8 × 11.5	8 × 11.5	10 × 12.5
1000	10 × 12.5	10 × 12.5	10 × 16	10 × 20
2200	10 × 20	10 × 20	12.5 × 20	12.5 × 25
3300	12.5 × 20	12.5 × 20	12.5 × 25	16 × 25
4700	12.5 × 25	12.5 × 25	16 × 25	16 × 31.5
6800	16 × 25			
10000	16 × 25	16 × 35.5	18 × 35.5	
15000	16 × 35.5	18 × 35.5		
22000	18 × 40			

**Overview of available types B41827**

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

**Overview of available types B43827**

$V_R$ (V DC)	160	200	250
	Case dimensions $d \times l$ (mm)		
$C_R$ ( $\mu$ F)			
0.47	5 × 11		5 × 11
1.0	5 × 11		5 × 11
2.2	5 × 11		6.3 × 11
3.3	6.3 × 11	6.3 × 11	6.3 × 11
4.7	6.3 × 11	8 × 11.5	8 × 11.5
10	8 × 11.5	10 × 12.5	10 × 12.5
22	10 × 16	10 × 20	10 × 20
33	10 × 20	12.5 × 20	12.5 × 25
47	12.5 × 25	12.5 × 20	12.5 × 25
100	16 × 25	16 × 25	16 × 31.5
220	16 × 35.5	18 × 35.5	
330	18 × 35.5		

$V_R$ (V DC)	350	400	450
	Case dimensions $d \times l$ (mm)		
$C_R$ ( $\mu$ F)			
0.47		6.3 × 11	8 × 11.5
1.0	6.3 × 11	6.3 × 11	8 × 11.5
2.2	8 × 11.5	8 × 11.5	10 × 12.5
3.3	10 × 12.5	10 × 12.5	10 × 16
4.7	10 × 12.5	10 × 16	10 × 20
10	10 × 20	12.5 × 20	12.5 × 20
22	12.5 × 25	16 × 25	16 × 25
33	16 × 25	16 × 25	16 × 31.5
47	16 × 35.5	16 × 35.5	18 × 40
100	18 × 40		

**Technical data and ordering codes B41827**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V DC	μF			
6.3	220	5 × 11	200	B41827A2227M***
	330	6.3 × 11	270	B41827A2337M***
	470	6.3 × 11	321	B41827A2477M***
	1000	10 × 12.5	542	B41827A2108M***
	2200	10 × 20	1005	B41827A2228M***
	3300	12.5 × 20	1195	B41827A2338M***
	4700	12.5 × 25	1560	B41827A2478M***
	6800	16 × 25	1925	B41827A2688M***
	10000	16 × 25	2360	B41827A2109M***
	15000	16 × 35.5	2855	B41827A2159M***
	22000	18 × 40	3345	B41827A2229M***
10	100	5 × 11	130	B41827A3107M***
	220	6.3 × 11	280	B41827A3227M***
	330	6.3 × 11	290	B41827A3337M***
	470	8 × 11.5	385	B41827A3477M***
	1000	10 × 12.5	650	B41827A3108M***
	2200	10 × 20	1082	B41827A3228M***
	3300	12.5 × 20	1436	B41827A3338M***
	4700	12.5 × 25	1783	B41827A3478M***
	10000	16 × 35.5	2700	B41827A3109M***
	15000	18 × 35.5	3100	B41827A3159M***
16	100	5 × 11	160	B41827A4107M***
	220	6.3 × 11	261	B41827A4227M***
	330	8 × 11.5	373	B41827A4337M***
	470	8 × 11.5	446	B41827A4477M***
	1000	10 × 16	790	B41827A4108M***
	2200	12.5 × 20	1310	B41827A4228M***
	3300	12.5 × 25	1695	B41827A4338M***
	4700	16 × 25	2100	B41827A4478M***
	10000	18 × 35.5	2980	B41827A4109M***

\*\*\* = 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 B41827**

$V_R$	$C_R$	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)	
V DC	120 Hz 20 °C μF				
	25	47	5 × 11	108	B41827A5476M***
		100	6.3 × 11	192	B41827A5107M***
		220	8 × 11.5	335	B41827A5227M***
		330	10 × 12.5	446	B41827A5337M***
		470	10 × 12.5	547	B41827A5477M***
		1000	10 × 20	962	B41827A5108M***
		2200	12.5 × 25	1560	B41827A5228M***
		3300	16 × 25	1985	B41827A5338M***
	4700	16 × 31.5	2455	B41827A5478M***	
35	33	5 × 11	102	B41827A7336M***	
	47	5 × 11	130	B41827A7476M***	
	100	6.3 × 11	212	B41827A7107M***	
	220	10 × 12.5	390	B41827A7227M***	
	330	10 × 12.5	495	B41827A7337M***	
	470	10 × 16	652	B41827A7477M***	
	1000	12.5 × 25	1158	B41827A7108M***	
	2200	16 × 25	1810	B41827A7228M***	
	3300	16 × 31.5	2293	B41827A7338M***	
	4700	18 × 35.5	2710	B41827A7478M***	
	50	10	5 × 11	58	B41827A6106M***
22		5 × 11	85	B41827A6226M***	
33		5 × 11	117	B41827A6336M***	
47		6.3 × 11	155	B41827A6476M***	
100		8 × 11.5	260	B41827A6107M***	
220		10 × 12.5	430	B41827A6227M***	
330		10 × 16	510	B41827A6337M***	
470		10 × 20	700	B41827A6477M***	
1000		16 × 20	1100	B41827A6108M***	
2200		16 × 31.5	1540	B41827A6228M***	

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

**Technical data and ordering codes B41827**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions $d \times l$ mm	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V DC	$\mu F$			
63	10	5 × 11	60	B41827A8106M***
	22	6.3 × 11	100	B41827A8226M***
	33	6.3 × 11	140	B41827A8336M***
	47	6.3 × 11	170	B41827A8476M***
	100	10 × 12.5	300	B41827A8107M***
	220	10 × 20	475	B41827A8227M***
	330	12.5 × 20	710	B41827A8337M***
	470	12.5 × 25	900	B41827A8477M***
	1000	16 × 31.5	1300	B41827A8108M***
100	0.47	5 × 11	13	B41827A9474M***
	1.0	5 × 11	20	B41827A9105M***
	2.2	5 × 11	29	B41827A9225M***
	3.3	5 × 11	36	B41827A9335M***
	4.7	5 × 11	43	B41827A9475M***
	10	6.3 × 11	75	B41827A9106M***
	22	8 × 11.5	130	B41827A9226M***
	33	10 × 12.5	180	B41827A9336M***
	47	10 × 12.5	230	B41827A9476M***
	100	10 × 20	370	B41827A9107M***
	220	12.5 × 25	620	B41827A9227M***
	330	16 × 25	760	B41827A9337M***
	470	16 × 31.5	1000	B41827A9477M***
	1000	18 × 40	1380	B41827A9108M***

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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,  $d \leq 10$  mm

**Technical data and ordering codes B43827**

$V_R$	$C_R$	Case dimensions	$I_{AC,R}$	Ordering code
	120 Hz	d × l	120 Hz	(composition see below)
V DC	20 °C	mm	85 °C	
	μF		mA	
160	0.47	5 × 11	15	B43827A1474M***
	1.0	5 × 11	22	B43827A1105M***
	2.2	5 × 11	33	B43827A1225M***
	3.3	6.3 × 11	40	B43827A1335M***
	4.7	6.3 × 11	49	B43827A1475M***
	10	8 × 11.5	80	B43827A1106M***
	22	10 × 16	152	B43827A1226M***
	33	10 × 20	203	B43827A1336M***
	47	12.5 × 25	268	B43827A1476M***
	100	16 × 25	423	B43827A1107M***
	220	16 × 35.5	786	B43827A1227M***
	330	18 × 35.5	945	B43827A1337M***
	200	3.3	6.3 × 11	40
4.7		8 × 11.5	56	B43827A2475M***
10		10 × 12.5	95	B43827A2106M***
22		10 × 20	170	B43827A2226M***
33		12.5 × 20	225	B43827A2336M***
47		12.5 × 20	267	B43827A2476M***
100		16 × 25	490	B43827A2107M***
220		18 × 35.5	815	B43827A2227M***
250	0.47	5 × 11	15	B43827F2474M***
	1.0	5 × 11	22	B43827F2105M***
	2.2	6.3 × 11	33	B43827F2225M***
	3.3	6.3 × 11	47	B43827F2335M***
	4.7	8 × 11.5	56	B43827F2475M***
	10	10 × 12.5	103	B43827F2106M***
	22	10 × 20	185	B43827F2226M***
	33	12.5 × 25	225	B43827F2336M***
	47	12.5 × 25	268	B43827F2476M***
	100	16 × 31.5	525	B43827F2107M***

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**Technical data and ordering codes B43827**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions $d \times l$ mm	$I_{AC,R}$ 120 Hz 85 °C mA	Ordering code (composition see below)
V DC	$\mu F$	mm	mA	
350	1.0	6.3 × 11	22	B43827A4105M***
	2.2	8 × 11.5	38	B43827A4225M***
	3.3	10 × 12.5	54	B43827A4335M***
	4.7	10 × 12.5	65	B43827A4475M***
	10	10 × 20	115	B43827A4106M***
	22	12.5 × 25	185	B43827A4226M***
	33	16 × 25	276	B43827A4336M***
	47	16 × 35.5	334	B43827A4476M***
	100	18 × 40	510	B43827A4107M***
400	0.47	6.3 × 11	15	B43827A9474M***
	1.0	6.3 × 11	23	B43827A9105M***
	2.2	8 × 11.5	40	B43827A9225M***
	3.3	10 × 12.5	55	B43827A9335M***
	4.7	10 × 16	67	B43827A9475M***
	10	12.5 × 20	118	B43827A9106M***
	22	16 × 25	200	B43827A9226M***
	33	16 × 25	280	B43827A9336M***
	47	16 × 35.5	362	B43827A9476M***
450	0.47	8 × 11.5	18	B43827A5474M***
	1.0	8 × 11.5	24	B43827A5105M***
	2.2	10 × 12.5	36	B43827A5225M***
	3.3	10 × 16	44	B43827A5335M***
	4.7	10 × 20	56	B43827A5475M***
	10	12.5 × 20	95	B43827A5106M***
	22	16 × 25	170	B43827A5226M***
	33	16 × 31.5	235	B43827A5336M***
	47	18 × 40	302	B43827A5476M***

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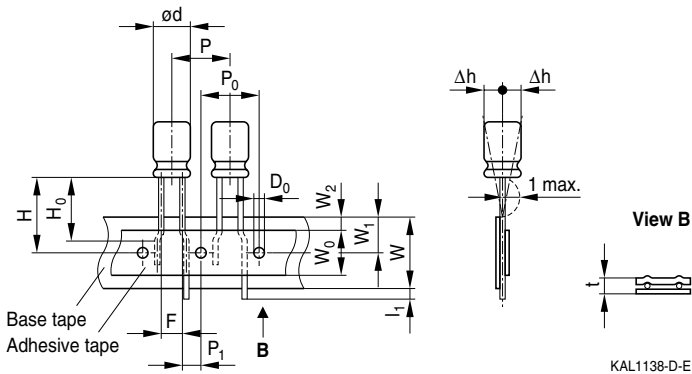
008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm,  $d \leq 10$  mm

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

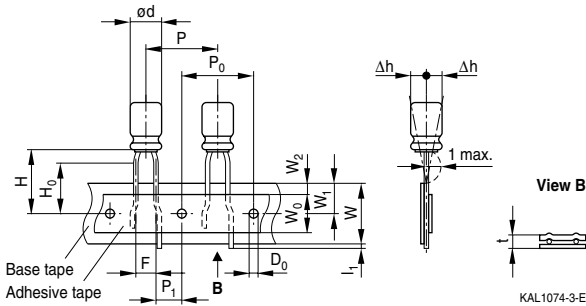
Last 3 digits of ordering code: 016


**Dimensions in mm**

$\varnothing d$	F	H	W	$W_0$	$W_1$	$W_2$	P	$P_0$	$P_1$	$I_1$	t	$\Delta h$	$D_0$
4 ... 5	2.0	18.5	18.0	7.0	9.0	3.0	12.7	12.7	5.10	1.0	0.7	1	4.0
	-0.2	$\pm 0.75$	$\pm 0.5$	min.	$\pm 0.5$	max.	$\pm 1.0$	$\pm 0.3$	$\pm 0.7$	max.	$\pm 0.2$	$\pm 1.0$	$\pm 0.2$

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

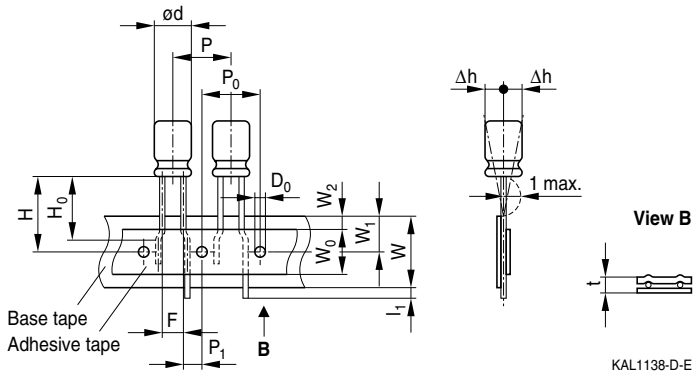
Last 3 digits of ordering code: 007


**Dimensions in mm**

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

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

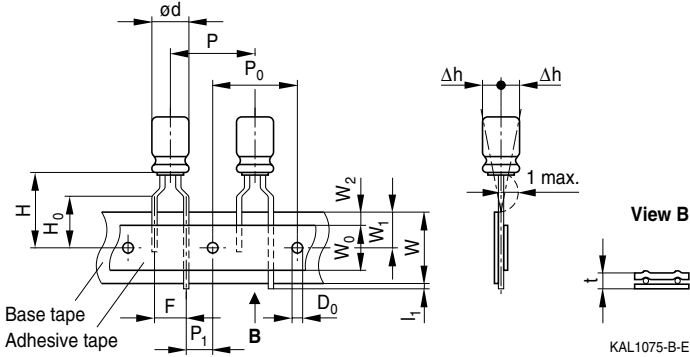
Last 3 digits of ordering code: 006


**Dimensions in mm**

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

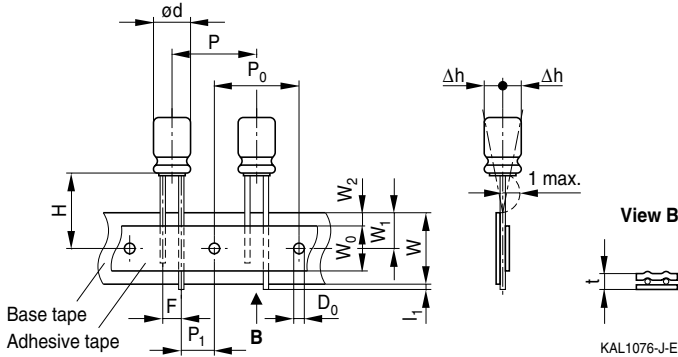
**Lead spacing 5.0 mm ( $\varnothing d = 4 \dots 8$  mm)**

Last 3 digits of ordering code: 008



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

Last 3 digits of ordering code: 008



**Dimensions in mm**

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

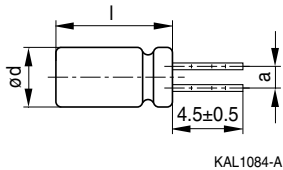
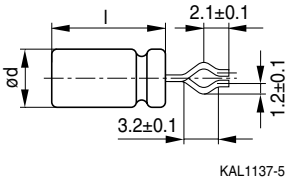
Taping is available up to dimensions  $d \times l = 10 \times 20$  mm. For  $\varnothing 12.5, 16$  and  $18$  mm taping is not available.

**Kinked or cut leads**

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

**Kinked leads**

Last 3 digits of ordering code: 001



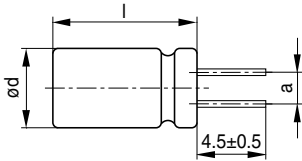
Case size d × l (mm)	a (mm)
4 × 7	1.5
5 × 7	2.0
5 × 11	2.0
6.3 × 7	2.5
6.3 × 11	2.5
6.3 × 15	2.5
8 × 7	3.5
8 × 11.5	3.5
8 × 15	3.5
8 × 20	3.5
10 × 12.5	5.0
10 × 16	5.0
10 × 20	5.0
10 × 25	5.0
10 × 31.5	5.0

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



**Cut leads**

Last 3 digits of ordering code: 002



KAL1086-R

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

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

## Cautions and warnings

### General

Also see "Important notes" on page 20.

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

## Cautions and warnings

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

## Important notes

The following applies to all products named in this publication:

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