



Aluminum Electrolytic Capacitors

Alu-X Product Line

Series/Type: SMD
Ordering code: B41121

Date: October 2006
Version: 1

General-purpose grade capacitors

Applications

- For general-purpose applications in the entertainment industry



Features

- Miniaturized dimensions
- RoHS-compatible
- Load life of 1000 h at 105 °C

Construction

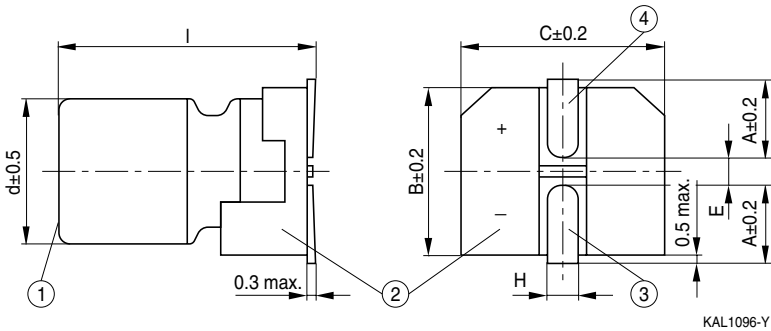
- Surface mounting device
- Suitable for reflow soldering
- Minus pole identification on case

Delivery mode

- Taped and reeled

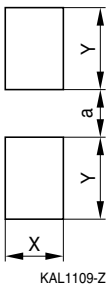
Specifications and characteristics in brief

Rated voltage V_R	4 ... 50 V DC							
Operating temperature range	−40 °C ... +105 °C							
Rated capacitance C_R (20 °C, 120 Hz)	0.1 ... 1000 μF							
Capacitance tolerance	±20% ≐ M							
Load life (105 °C; V_R)	1000 h	Post test requirements: $\Delta C/C \leq \pm 20\%$ of initial value (≤16 V: within ±25% of the initial value) $\tan \delta \leq 2$ times initial specified value $I_{leak} \leq$ initial specified limit						
Leakage current I_{leak} (20 °C, after 2 minutes)	$I_{leak} \leq 0.01 C_R V_R$ or 3 (μA), whichever is greater							
Dissipation factor (max.)	V_R (V DC)	4	6.3	10	16	25	35	50
	$\tan \delta$	0.35	0.26	0.20	0.16	0.14	0.12	0.12
Low temperature stability (impedance ratio) (120 Hz)	V_R (V DC)	4	6.3	10	16	25	35	50
	$Z(-25\text{ °C})/Z(+20\text{ °C})$	7	4	3	2	2	2	2
	$Z(-40\text{ °C})/Z(+20\text{ °C})$	15	8	6	4	4	3	3
Shelf life	After storage for 1000 h at 105 °C, the capacitors shall meet the requirement of load life above.							
Frequency multiplier for rated ripple current	Frequency	50 Hz	120 Hz	300 Hz	1 kHz	≥10 kHz		
	Multiplier	0.70	1.00	1.17	1.36	1.50		

Dimensions


①	Case
②	Terminal base board
③	Minus pole
④	Plus pole

Case dimensions $d \times l$ (mm)	4×5.4	5×5.4	6.3×5.4	8×10	10×10
A	1.8	2.1	2.4	2.9	3.2
B	4.3	5.3	6.6	8.3	10.3
C	4.3	5.3	6.6	8.3	10.3
E	1.0	1.3	2.2	3.1	4.5
H	0.5 ... 0.8			0.8 ... 1.1	

Recommended land size


d (mm)	X	Y	a
4	1.6	2.6	1.0
5	1.6	3.0	1.4
6.3	1.6	3.5	2.1
8	2.5	3.5	3.0
10	2.5	4.0	4.0

Overview of available types

V _R (V DC)	4	6.3	10	16	25	35	50
	Case dimensions d × l (mm)						
C _R (μF)							
0.1							4 × 5.4
0.22							4 × 5.4
0.33							4 × 5.4
0.47							4 × 5.4
1.0							4 × 5.4
2.2							4 × 5.4
3.3						4 × 5.4	4 × 5.4
4.7					4 × 5.4	4 × 5.4	5 × 5.4
10				4 × 5.4	5 × 5.4	5 × 5.4	6.3 × 5.4
22		4 × 5.4	5 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 5.4	
33	4 × 5.4	5 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 5.4	6.3 × 5.4	
47	4 × 5.4	5 × 5.4	6.3 × 5.4	6.3 × 5.4	6.3 × 5.4		
100	5 × 5.4	6.3 × 5.4	6.3 × 5.4	6.3 × 5.4		8 × 10	8 × 10
220	6.3 × 5.4				8 × 10	10 × 10	
330			8 × 10	8 × 10	10 × 10		
470		8 × 10	8 × 10	8 × 10			
680	8 × 10	8 × 10	10 × 10	10 × 10			
1000	8 × 10	10 × 10					

Technical data and ordering codes

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
4	33 47 100 220 680 1000	4 × 5.4 4 × 5.4 5 × 5.4 6.3 × 5.4 8 × 10 8 × 10	18 23 42 68 210 260	B41121A1336M000 B41121A1476M000 B41121A1107M000 B41121A1227M000 B41121A1687M000 B41121A1108M000
6.3	22 33 47 100 470 680 1000	4 × 5.4 5 × 5.4 5 × 5.4 6.3 × 5.4 8 × 10 8 × 10 10 × 10	22 27 33 50 170 210 230	B41121A2226M000 B41121A2336M000 B41121A2476M000 B41121A2107M000 B41121A2477M000 B41121A2687M000 B41121A2108M000

Technical data and ordering codes

V_R	C_R 120 Hz 20 °C μF	Case dimensions $d \times l$ mm	$I_{AC,R}$ 120 Hz 105 °C mA	Ordering code
10	22 33 47 100 330 470 680	5×5.4 5×5.4 6.3×5.4 6.3×5.4 8×10 8×10 10×10	25 30 41 53 175 210 310	B41121A3226M000 B41121A3336M000 B41121A3476M000 B41121A3107M000 B41121A3337M000 B41121A3477M000 B41121A3687M000
16	10 22 33 47 100 330 470 680	4×5.4 5×5.4 6.3×5.4 6.3×5.4 6.3×5.4 8×10 8×10 10×10	18 27 40 48 60 195 310 350	B41121A4106M000 B41121A4226M000 B41121A4336M000 B41121A4476M000 B41121A4107M000 B41121A4337M000 B41121A4477M000 B41121A4687M000
25	4.7 10 22 33 47 220 330	4×5.4 5×5.4 6.3×5.4 6.3×5.4 6.3×5.4 8×10 10×10	13 20 36 44 48 175 220	B41121A5475M000 B41121A5106M000 B41121A5226M000 B41121A5336M000 B41121A5476M000 B41121A5227M000 B41121A5337M000
35	3.3 4.7 10 22 33 100 220	4×5.4 4×5.4 5×5.4 6.3×5.4 6.3×5.4 8×10 10×10	13 14 21 38 42 155 300	B41121A7335M000 B41121A7475M000 B41121A7106M000 B41121A7226M000 B41121A7336M000 B41121A7107M000 B41121A7227M000
50	0.1 0.22 0.33 0.47 1.0 2.2 3.3 4.7 10 100	4×5.4 4×5.4 4×5.4 4×5.4 4×5.4 4×5.4 4×5.4 5×5.4 6.3×5.4 8×10	0.7 1.6 2.5 3.5 7 11 13 16 24 155	B41121A6104M000 B41121A6224M000 B41121A6334M000 B41121A6474M000 B41121A6105M000 B41121A6225M000 B41121A6335M000 B41121A6475M000 B41121A6106M000 B41121A6107M000

SMD capacitors

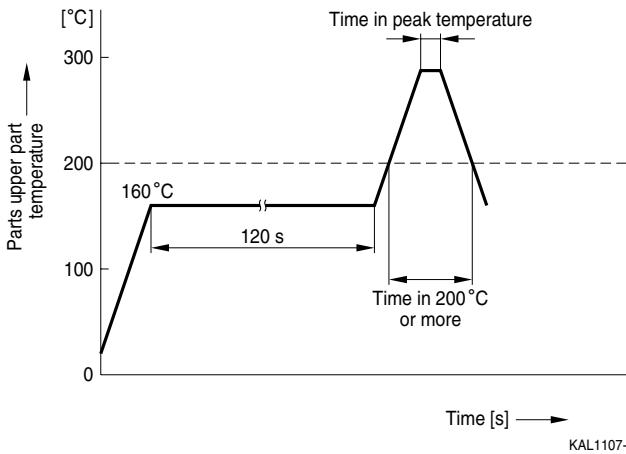
Mounting instructions

Soldering

Recommended conditions

For reflow, use thermal conduction systems such as infrared radiation (IR) or hot blast. Vapor heat transfer systems (VPS) are not recommended.

- Observe proper soldering conditions (temperature, time, etc.).
- Do not exceed the specified limits.
- Temperature measuring method: Measure temperature in assuming quantitative production, by sticking the thermo-couple to the capacitor upper part with epoxy adhesives.
- Reflow should be performed one time.
- Consult use for additional reflow restrictions.



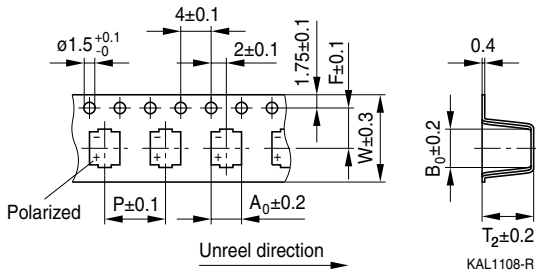
Lead-free reflow

d (mm)	4 ... 6.3	8 ... 10
Peak temperature	250 °C	235 °C
Time in peak temperature	5 s	5 s
Time in 200 °C or more	60 s	60 s
Time of reflow	1 time	1 time

SMD capacitors

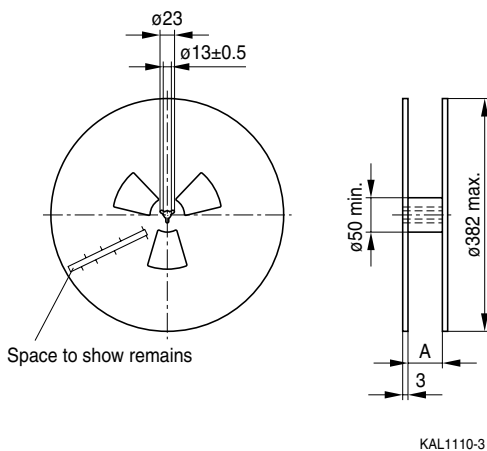
Taping and packing

Taping of SMD capacitors



Case dimensions $d \times l$ (mm)	4×5.4	5×5.4	6.3×5.4	8×10	10×10
W	12.0	12.0	16.0	24.0	24.0
P	8.0	12.0	12.0	16.0	16.0
F	5.5	5.5	7.5	11.5	11.5
A_0	5.0	6.0	7.0	8.7	10.7
B_0	5.0	6.0	7.0	8.7	10.7
T_2	5.8	5.8	5.8	11.0	11.0

Reel packing



d (mm)	Quantity/reel
4	2000 pcs.
5, 6.3	1000 pcs.
8, 10	500 pcs.

d (mm)	4	5	6.3	8	10
A	14	14	18	26	26

Cautions and warnings

General

Also see "Important notes" on next page.

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 6 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.

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