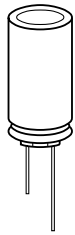
Aluminum electrolytic capacitors
Alu-X product lines

Bipolar single-ended capacitors

Series/Type: **B42002, B42021**
Date: August 2008

General-purpose grade capacitors



Applications

- Audio frequency dividers
- For filtering, coupling and pulse circuits

Features

- RoHS-compatible
- Load life: 2000 h at 85 °C (B42002)
  1000 h at 105 °C (B42021)

Construction

- Aluminum case, fully insulated
- Non polarized
- Charge-discharge proof
- Case with safety vent

Specifications and characteristics in brief

Rated voltage V_R	6.3 ... 100 V DC					
Operating temp. range	–40 °C … +85 °C (B42002) –40 °C … +105 °C (B42021)					
Rated capacitance C_R (20 °C, 120 Hz)	0.1 … 4700 µF (B42002) 0.47 … 2200 µF (B42021)					
Capacitance tolerance	±20% ≙ M					
Load life B42002 (85 °C, V_R, $I_{AC,R}$) B42021 (105 °C, V_R, $I_{AC,R}$)	2000 h 1000 h	Requirements: $\Delta C/C$ ≤ ±20% of initial value tan δ ≤ 2 times initial specified limit I_{leak} ≤ initial specified limit				
Leakage current I_{leak} (20 °C, after 5 minutes)	$I_{leak} \leq 0.03\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)$ or 3 µA					
Low temperature stability (impedance ratio) (120 Hz)	V_R (V DC)	6.3	10	16	25	35 ... 100
	$\frac{Z(-25\ °C)}{Z(+20\ °C)}$	4	3	2	2	2
	$\frac{Z(-40\ °C)}{Z(+20\ °C)}$	10	8	6	4	3
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
	0.1 … 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 ... 4700 µF	0.85	1.00	1.03	1.05	1.08

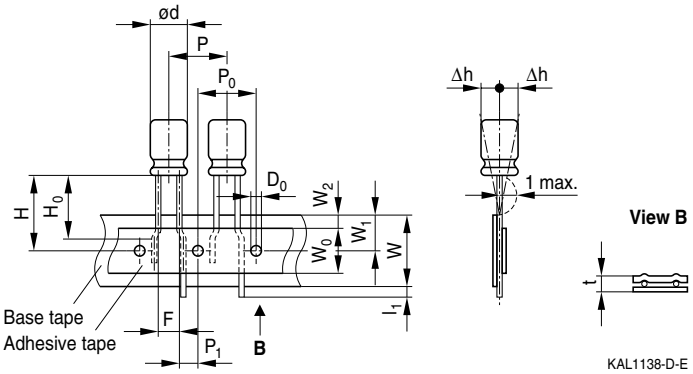
Temperature multiplier for rated ripple current	B42002				
	Temperature	+50 °C	+70 °C	+85 °C	
	Multiplier	1.50	1.27	1.00	
	B42021				
	Temperature	+50 °C	+70 °C	+85 °C	+105 °C
	Multiplier	2.10	1.78	1.40	1.00

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

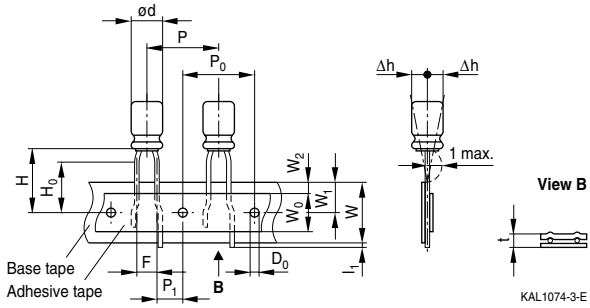


Dimensions in mm

∅ 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

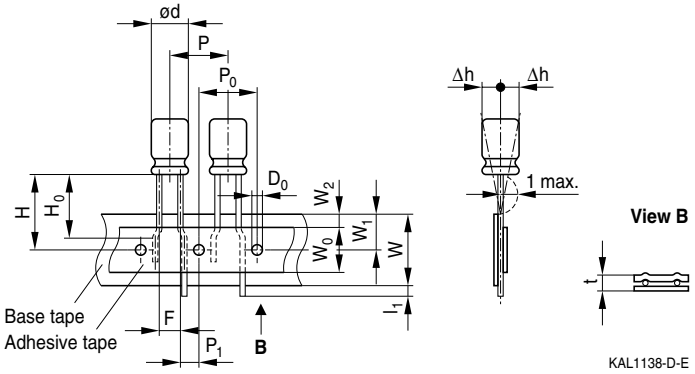


Dimensions in mm

∅ 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

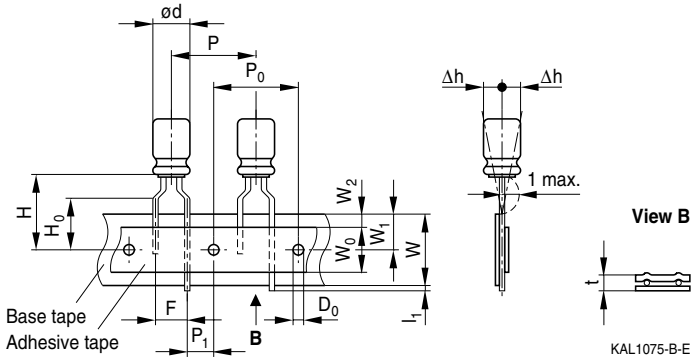


Dimensions in mm

∅ 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

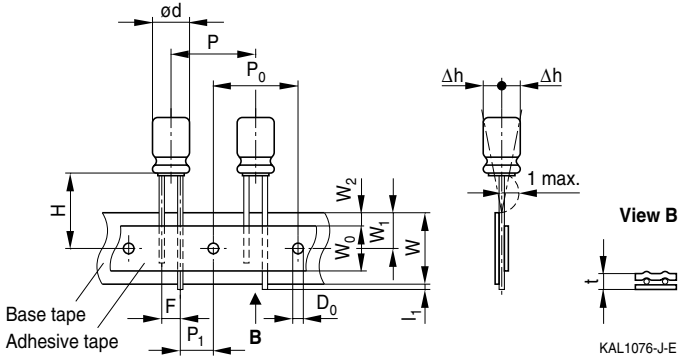
Lead spacing 5.0 mm (∅ d = 4 ... 8 mm)

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

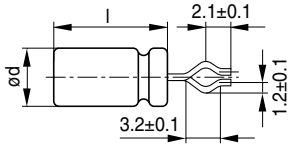
Taping is available up to dimensions d × l = 10 × 20 mm. For ∅ 12.5, 16 and 18 mm taping is not available.

Kinked or cut leads

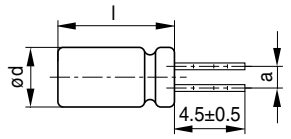
Single-ended capacitors are available with kinked or cut leads. Other lead configurations also available on request.

Kinked leads

Last 3 digits of ordering code: 001



KAL1137-5



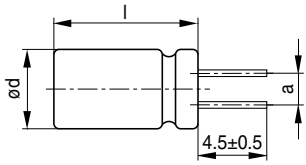
KAL1084-A

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 11.

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.

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