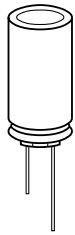
Aluminum electrolytic capacitors
Alu-X product lines

Single-ended capacitors

Series/Type: **B43081**
Date: August 2008

Long-life grade capacitors for professional applications



Applications

- Electronic ballast applications

Features

- RoHS-compatible
- Very high ripple current
- High reliability
- Load life of 3000 h at 105 °C

Construction

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

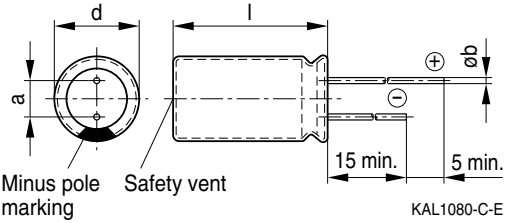
Delivery mode

- Bulk
- Taped, Ammo pack
- Cut
- Kinked

Specifications and characteristics in brief

Rated voltage V_R	160 ... 400 V DC						
Operating temperature range	–25 °C … +105 °C						
Rated capacitance C_R (20 °C, 120 Hz)	0.1 … 100 µF						
Capacitance tolerance	±20% ≙ M						
Load life (105 °C, V_R, $I_{AC,R}$)	3000 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)	$I_{leak} \leq 0.02\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)$						
Dissipation factor (max.) (20 °C, 120 Hz)	tan δ ≤ 0.12						
Low temperature stability (impedance ratio) (120 Hz)	$\frac{Z(-25\ °C)}{Z(+20\ °C)} \leq 7$						
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	100 kHz	
	0.3	0.5	0.6	0.8	0.9	1.0	
Temperature multiplier for rated ripple current	+50 °C	+70 °C	+85 °C		+105 °C		
	2.1	1.8	1.4		1.0		

Dimensional drawing



Safety vent for diameter ≥ 8 mm.

Case dimensions

d × l mm	$d_{max} \times l_{max}$ mm	a mm	b mm
6.3 × 11	6.8 × 12.5	2.5 ±0.5	0.5 ±0.1
8 × 11.5	8.5 × 13.0	3.5 ±0.5	0.6 ±0.1
8 × 15	8.5 × 16.5	3.5 ±0.5	0.6 ±0.1
8 × 20	8.5 × 21.5	3.5 ±0.5	0.6 ±0.1
10 × 16	11.0 × 17.5	5.0 ±0.5	0.6 ±0.1
10 × 20	11.0 × 22.0	5.0 ±0.5	0.6 ±0.1
12.5 × 20	13.5 × 22.0	5.0 ±0.5	0.6 ±0.1
12.5 × 25	13.5 × 27.0	5.0 ±0.5	0.6 ±0.1
16 × 20	17.0 × 22.0	7.5 ±0.5	0.8 ±0.1
16 × 25	17.0 × 27.0	7.5 ±0.5	0.8 ±0.1
16 × 31.5	17.0 × 33.5	7.5 ±0.5	0.8 ±0.1
18 × 20	19.0 × 22.0	7.5 ±0.5	0.8 ±0.1
18 × 25	19.0 × 27.0	7.5 ±0.5	0.8 ±0.1
18 × 31.5	19.0 × 33.5	7.5 ±0.5	0.8 ±0.1

Overview of available types

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

Technical data and ordering codes

V_R V DC	C_R 120 Hz 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 100 kHz 105 °C mA	Ordering code (composition see below)
160	22	10 × 20	500	B43081A1226M***
	33	10 × 20	500	B43081A1336M***
	47	12.5 × 20	600	B43081A1476M***
	47	12.5 × 25	670	B43081B1476M***
	68	12.5 × 25	750	B43081A1686M***
	100	16 × 25	1100	B43081A1107M***
200	4.7	8 × 11.5	158	B43081A2475M***
	6.8	10 × 16	230	B43081A2685M***
	10	10 × 16	310	B43081A2106M***
	15	10 × 20	400	B43081A2156M***
	22	10 × 20	500	B43081A2226M***
	33	12.5 × 20	600	B43081A2336M***
	47	12.5 × 20	600	B43081A2476M***
	68	12.5 × 25	750	B43081A2686M***
	68	16 × 20	750	B43081B2686M***
	100	16 × 25	1100	B43081A2107M***
	100	18 × 20	1100	B43081B2107M***
250	1.0	8 × 11.5	18	B43081F2105M***
	4.7	10 × 16	200	B43081F2475M***
	6.8	10 × 16	240	B43081F2685M***
	10	10 × 16	300	B43081F2106M***
	15	10 × 16	380	B43081F2156M***
	22	10 × 20	500	B43081F2226M***
	22	12.5 × 20	600	B43081G2226M***
	33	12.5 × 20	600	B43081F2336M***
	33	12.5 × 25	670	B43081G2336M***
	47	12.5 × 25	700	B43081F2476M***
	47	16 × 25	780	B43081G2476M***
	68	16 × 25	1000	B43081F2686M***
	68	18 × 35.5	1200	B43081G2686M***
	100	18 × 25	1200	B43081F2107M***
350	10	10 × 20	250	B43081A4106M***
	22	12.5 × 20	350	B43081A4226M***
	33	16 × 20	500	B43081A4336M***
	47	16 × 25	650	B43081A4476M***
	68	18 × 25	800	B43081A4686M***

*** = Version
000 = for standard leads, bulk
001 = for kinked leads, bulk
002 = for cut leads, bulk
007 = for taped leads, Ammo pack, lead spacing a = 2.5 mm
006 = for taped leads, Ammo pack, lead spacing a = 3.5 mm
008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

Technical data and ordering codes

V_R V DC	C_R 120 Hz 20 °C µF	Case dimensions d × l mm	$I_{AC,R}$ 100 kHz 105 °C mA	Ordering code (composition see below)
400	1.0	6.3 × 11.5	18	B43081A9105M***
	2.2	8 × 15	108	B43081A9225M***
	3.3	8 × 15	108	B43081A9335M***
	3.3	8 × 20	121	B43081B9335M***
	4.7	10 × 20	180	B43081A9475M***
	6.8	10 × 20	220	B43081A9685M***
	6.8	12.5 × 20	240	B43081B9685M***
	10	10 × 20	250	B43081A9106M***
	10	12.5 × 20	270	B43081B9106M***
	15	16 × 25	400	B43081A9156M***
	22	12.5 × 25	400	B43081A9226M***
	22	16 × 25	500	B43081B9226M***
	33	16 × 25	600	B43081A9336M***
	33	16 × 31.5	670	B43081B9336M***
	47	16 × 35.5	750	B43081A9476M***
	47	18 × 25	750	B43081B9476M***

*** = Version
000 = for standard leads, bulk
001 = for kinked leads, bulk
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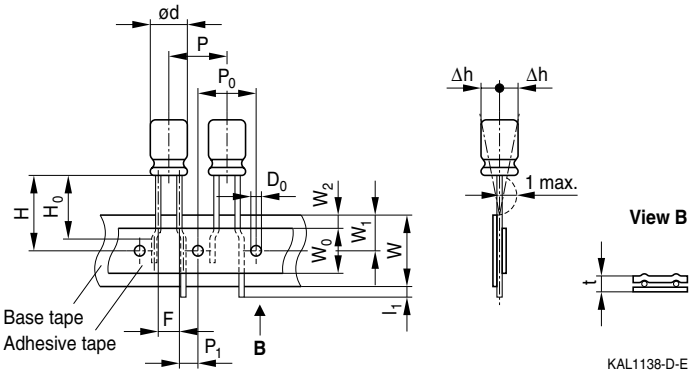
007 = for taped leads, Ammo pack, lead spacing a = 2.5 mm
006 = for taped leads, Ammo pack, lead spacing a = 3.5 mm
008 = for taped leads, Ammo pack, lead spacing a = 5.0 mm

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

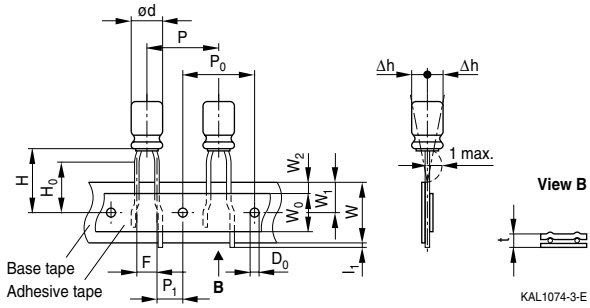


Dimensions in mm

∅ 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

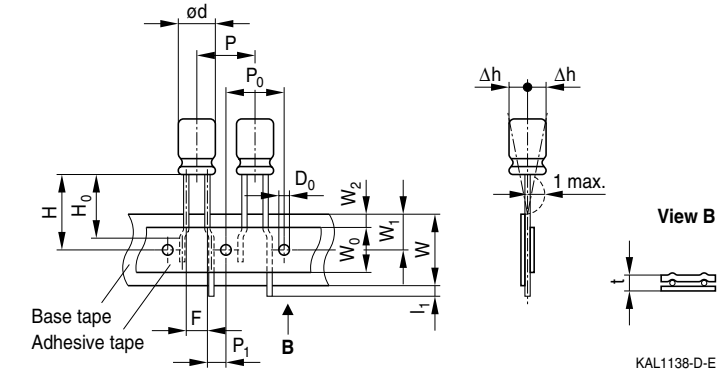


Dimensions in mm

∅ 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

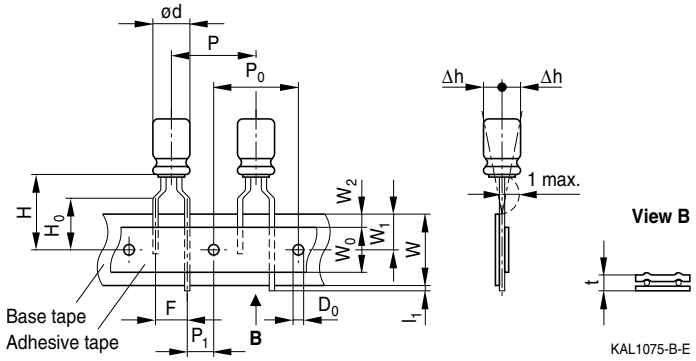


Dimensions in mm

∅ 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

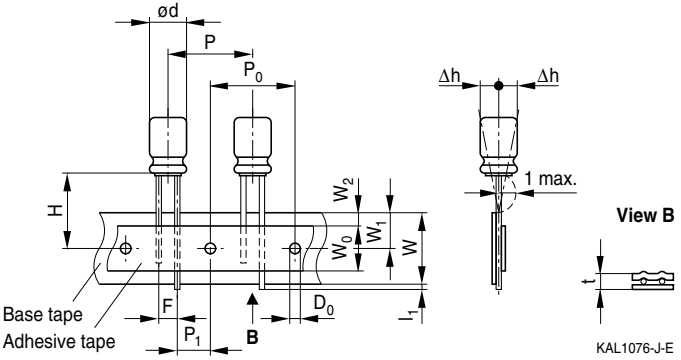
Lead spacing 5.0 mm (∅ d = 4 ... 8 mm)

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

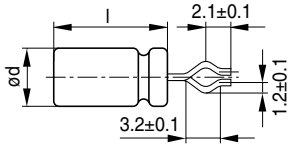
Taping is available up to dimensions d × l = 10 × 20 mm. For ∅ 12.5, 16 and 18 mm taping is not available.

Kinked or cut leads

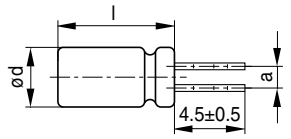
Single-ended capacitors are available with kinked or cut leads. Other lead configurations also available on request.

Kinked leads

Last 3 digits of ordering code: 001



KAL1137-5



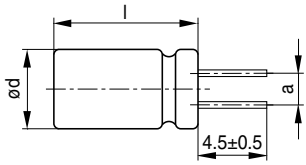
KAL1084-A

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 15.

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.
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