# Aluminum electrolytic capacitors

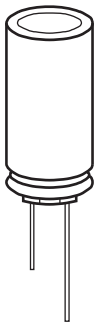
## Single-ended capacitors

**Series/Type:** **B41856**

Date: December 2019

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## Long-life grade capacitors



### Applications

- For use in output circuits of switch-mode power supplies of compact design
- For professional industrial electronics, telecommunications and data processing equipment
- Not for automotive applications unless otherwise specified

### Features

- Very low impedance at high frequency
- Low ESR
- High ripple current capability
- RoHS-compatible

### Construction

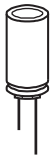
- Radial leads
- Charge-discharge proof, polar
- Aluminum case with insulating sleeve
- Minus pole marking on the insulating sleeve
- Case with safety vent

### Delivery mode

Terminal configurations and packing:

- Bulk
- Taped, Ammo pack
- Cut
- Kinked
- PAPR (Protection Against Polarity Reversal): crimped leads, J leads, bent leads

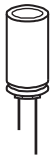
Refer to chapter "Single-ended capacitors – Taping, packing and lead configurations" for further details.



## Specifications and characteristics in brief

| | | | | | | |
|---|---|---|---|---|---|---|
| Rated voltage $V_R$<br>Surge voltage $V_S$ | 16 ... 100 V DC<br>1.15 · $V_R$ | | | | | |
| Rated capacitance $C_R$<br>Capacitance tolerance | 22 ... 2200 µF<br>±20% ≙ M | | | | | |
| Dissipation factor tan δ (20 °C, 120 Hz) | For capacitance higher than 1000 µF add 0.02 for every increase of 1000 µF. | | | | | |
| | $V_R$ (V DC) | 16 | 25 | 35 | 50 | 63 |
| | tan δ (max.) | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 |
| Leakage current $I_{leak}$ (20 °C, 5 min) | $I_{leak} = 0.01\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right)$ | | | | | |
| Self-inductance ESL | Diameter (mm) | 8 ... 12.5 | 16 | 18 | | |
| | ESL (nH) | 20 | 26 | 34 | | |
| Useful life[1)]<br>105 °C; $V_R$; $I_{AC,R}$ | > 2000 h for d = 8 mm<br>> 3000 h for d = 10 mm<br>> 4000 h for d ≥ 12.5 mm | | Requirements:<br>\|ΔC/C\| ≤ 40% of initial value<br>tan δ ≤ 3 times initial specified limit<br>$I_{leak}$ ≤ initial specified limit | | | |
| Voltage endurance test<br>105 °C; $V_R$ | 2000 h for d = 8 mm<br>3000 h for d = 10 mm<br>4000 h for d = 12.5 mm | | Post test requirements:<br>\|ΔC/C\| ≤ 30% of initial value<br>tan δ ≤ 2 times initial specified value<br>$I_{leak}$ ≤ initial specified limit | | | |
| Vibration resistance test | To IEC 60068-2-6, test Fc:<br>Frequency range 10 Hz ... 2 kHz, displacement amplitude max. 0.75 mm, acceleration max. 10 *g*, duration 3 × 2 h.<br>Capacitor rigidly clamped by the aluminum case e.g. using our standard fixture | | | | | |
| IEC climatic category | To IEC 60068-1:<br>40/105/56 (−40 °C/+105 °C/56 days damp heat test) | | | | | |
| Sectional specification | IEC 60384-4 | | | | | |

1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life.



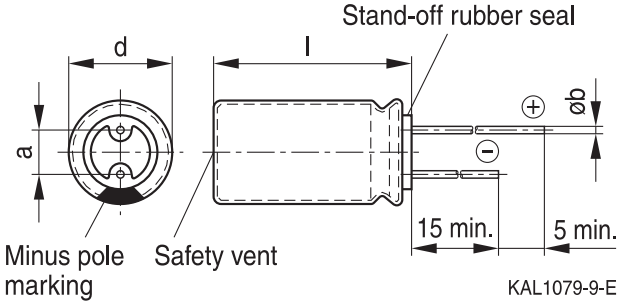
**B41856**

**Low impedance – 105 °C**

## Dimensional drawings

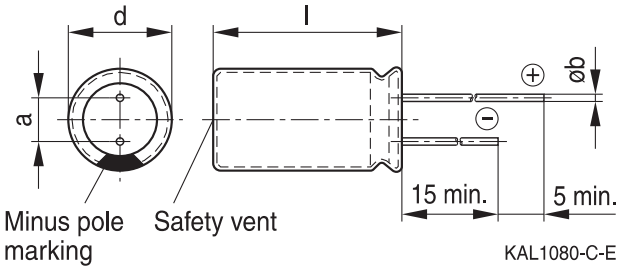
### With stand-off rubber seal

Diameters (mm): 10, 12.5, 16, 18



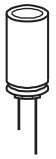

### With flat rubber seal

Diameter (mm): 8




## Dimensions and weights

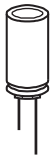
| Dimensions (mm) | | | | Approx. weight |
|---|---|---|---|---|
| d +0.5 | l | a ±0.5 | b | g |
| 8 | 11.5 +1.5 | 3.5 | 0.60 ±0.05 | 1.0 |
| 10 | 12.5 +1.0 | 5.0 | 0.60 ±0.05 | 1.6 |
| 10 | 16 +1.0 | 5.0 | 0.60 ±0.05 | 1.9 |
| 10 | 20 +2.0 | 5.0 | 0.60 ±0.05 | 2.6 |
| 12.5 | 20 +2.0 | 5.0 | 0.60 ±0.05 | 3.6 |
| 12.5 | 25 +2.0 | 5.0 | 0.60 ±0.05 | 4.5 |
| 16 | 20 +2.0 | 7.5 | 0.80 ±0.05 | 5.5 |
| 16 | 25 +2.0 | 7.5 | 0.80 ±0.05 | 7.5 |
| 16 | 31.5 +2.0 | 7.5 | 0.80 ±0.05 | 7.8 |
| 18 | 20 +2.0 | 7.5 | 0.80 ±0.1 | 8.0 |
| 18 | 25 +2.0 | 7.5 | 0.80 ±0.1 | 9.0 |
| 18 | 31.5 +2.0 | 7.5 | 0.80 ±0.1 | 11.0 |
| 18 | 35 +2.0 | 7.5 | 0.80 ±0.1 | 13.0 |



## Overview of available types

Other voltage and capacitance ratings are available upon request.

| $V_R$ (V DC) | 16 | 25 | 35 | 50 | 63 | 100 |
|---|---|---|---|---|---|---|
| | Case dimensions d × l (mm) | | | | | |
| $C_R$ (µF) | | | | | | |
| 22 | | | | | | 8 × 11.5 |
| 33 | | | | | | 8 × 11.5 |
| 47 | | | | | | 10 × 12.5 |
| 68 | | | | | 8 × 11.5 | 10 × 16 |
| 100 | | | 8 × 11.5 | 8 × 11.5 | 8 × 11.5<br>10 × 12.5 | 10.0 × 20 |
| 150 | | | | | 10 × 16 | 12.5 × 20 |
| 220 | 8 × 11.5 | 8 × 11.5 | 10 × 12.5 | 10 × 16 | 10 × 20 | 16 × 20 |
| 330 | 8 × 11.5 | 10 × 12.5 | 10 × 16 | 10 × 20 | 12.5 × 25 | 16 × 25<br>18 × 20 |
| 470 | 10 × 12.5 | 10 × 16 | 10 × 20 | 12.5 × 20 | 12.5 × 25<br>16 × 20 | 16 × 31.5<br>18 × 25 |
| 680 | 10 × 16 | 10 × 20 | 12.5 × 20 | 12.5 × 25 | 16 × 25<br>18 × 20 | 18 × 35 |
| 1000 | 10 × 20 | 12.5 × 20 | 12.5 × 25 | | 16 × 31.5 | |
| 1200 | | | | | 18 × 31.5 | |
| 1500 | 12.5 × 20 | 12.5 × 25 | | | 18 × 35 | |
| 2200 | 12.5 × 25 | | | | | |



**B41856**

**Low impedance − 105 °C**

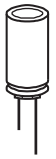
## Technical data and ordering codes

| $C_R$ 120 Hz 20 °C µF | Case dimensions d × l mm | $Z_{max}$ 100 kHz −10 °C Ω | $Z_{max}$ 100 kHz 20 °C Ω | $I_{AC,R}$ 100 kHz 105 °C mA | Ordering code (composition see below) |
|---|---|---|---|---|---|
| $V_R$ = 16 V DC | | | | | |
| 220 | 8 × 11.5 | 0.400 | 0.100 | 700 | B41856C4227M*** |
| 330 | 8 × 11.5 | 0.400 | 0.100 | 700 | B41856C4337M*** |
| 470 | 10 × 12.5 | 0.250 | 0.070 | 900 | B41856C4477M*** |
| 680 | 10 × 16 | 0.180 | 0.055 | 1300 | B41856C4687M*** |
| 1000 | 10 × 20 | 0.140 | 0.042 | 1500 | B41856C4108M*** |
| 1500 | 12.5 × 20 | 0.099 | 0.030 | 2000 | B41856C4158M*** |
| 2200 | 12.5 × 25 | 0.082 | 0.025 | 2300 | B41856C4228M*** |
| $V_R$ = 25 V DC | | | | | |
| 220 | 8 × 11.5 | 0.400 | 0.100 | 700 | B41856C5227M*** |
| 330 | 10 × 12.5 | 0.250 | 0.070 | 900 | B41856C5337M*** |
| 470 | 10 × 16 | 0.180 | 0.055 | 1300 | B41856C5477M*** |
| 680 | 10 × 20 | 0.140 | 0.042 | 1500 | B41856C5687M*** |
| 1000 | 12.5 × 20 | 0.099 | 0.030 | 2000 | B41856C5108M*** |
| 1500 | 12.5 × 25 | 0.082 | 0.025 | 2300 | B41856C5158M*** |
| $V_R$ = 35 V DC | | | | | |
| 100 | 8 × 11.5 | 0.400 | 0.100 | 700 | B41856C7107M*** |
| 220 | 10 × 12.5 | 0.250 | 0.070 | 900 | B41856C7227M*** |
| 330 | 10 × 16 | 0.180 | 0.055 | 1300 | B41856C7337M*** |
| 470 | 10 × 20 | 0.140 | 0.042 | 1500 | B41856C7477M*** |
| 680 | 12.5 × 20 | 0.099 | 0.030 | 2000 | B41856C7687M*** |
| 1000 | 12.5 × 25 | 0.082 | 0.025 | 2300 | B41856C7108M*** |
| $V_R$ = 50 V DC | | | | | |
| 100 | 8 × 11.5 | 0.600 | 0.150 | 600 | B41856C6107M*** |
| 220 | 10 × 16 | 0.280 | 0.070 | 1100 | B41856C6227M*** |
| 330 | 10 × 20 | 0.200 | 0.050 | 1300 | B41856C6337M*** |
| 470 | 12.5 × 20 | 0.130 | 0.040 | 1700 | B41856C6477M*** |
| 680 | 12.5 × 25 | 0.090 | 0.030 | 2100 | B41856C6687M*** |

### Composition of ordering code

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for d × l = 10 × 20 mm and ∅ 12.5 … 18 mm)
- 002 = for cut leads, bulk (for ∅ 10 ... 18 mm)
- 003 = for crimped leads, blister (for ∅ 16 … 18 mm)
- 004 = for J leads, blister (for ∅ 10 ... 18 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 8 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm and d × l = 18 × 20 … 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 … 18 mm)



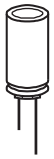
## Technical data and ordering codes

| $C_R$ 120 Hz 20 °C µF | Case dimensions d × l mm | $Z_{max}$ 100 kHz −10 °C Ω | $Z_{max}$ 100 kHz 20 °C Ω | $I_{AC,R}$ 100 kHz 105 °C mA | Ordering code (composition see below) |
|---|---|---|---|---|---|
| $V_R$ = 63 V DC | | | | | |
| 68 | 8 × 11.5 | 1.080 | 0.207 | 500 | B41856C8686M*** |
| 100 | 8 × 11.5 | 1.080 | 0.207 | 500 | B41856C8476M*** |
| 100 | 10 × 12.5 | 0.600 | 0.150 | 690 | B41856C8107M*** |
| 150 | 10 × 16 | 0.400 | 0.100 | 950 | B41856C8157M*** |
| 220 | 10 × 20 | 0.300 | 0.075 | 1150 | B41856C8227M*** |
| 330 | 12.5 × 25 | 0.123 | 0.041 | 1900 | B41856C8337M*** |
| 470 | 12.5 × 25 | 0.123 | 0.041 | 1900 | B41856C8477M*** |
| 470 | 16 × 20 | 0.126 | 0.042 | 2000 | B41856D8477M*** |
| 680 | 16 × 25 | 0.099 | 0.033 | 2600 | B41856C8687M*** |
| 680 | 18 × 20 | 0.117 | 0.039 | 2500 | B41856D8687M*** |
| 1000 | 16 × 31.5 | 0.081 | 0.027 | 2850 | B41856C8108M*** |
| 1200 | 18 × 31.5 | 0.078 | 0.026 | 3300 | B41856C8128M*** |
| 1500 | 18 × 35 | 0.069 | 0.023 | 3400 | B41856C8158M*** |
| $V_R$ = 100 V DC | | | | | |
| 22 | 8 × 11.5 | 1.440 | 0.360 | 355 | B41856C9226M*** |
| 33 | 8 × 11.5 | 1.440 | 0.360 | 355 | B41856C9336M*** |
| 47 | 10 × 12.5 | 0.680 | 0.170 | 480 | B41856C9476M*** |
| 68 | 10 × 16 | 0.440 | 0.110 | 600 | B41856C9686M*** |
| 100 | 10.0 × 20 | 0.336 | 0.084 | 800 | B41856C9107M*** |
| 150 | 12.5 × 20 | 0.186 | 0.062 | 1100 | B41856C9157M*** |
| 220 | 16 × 20 | 0.144 | 0.048 | 1350 | B41856C9227M*** |
| 330 | 16 × 25 | 0.114 | 0.038 | 1700 | B41856C9337M*** |
| 330 | 18 × 20 | 0.135 | 0.045 | 1500 | B41856D9337M*** |
| 470 | 16 × 31.5 | 0.096 | 0.032 | 1850 | B41856C9477M*** |
| 470 | 18 × 25 | 0.108 | 0.036 | 1750 | B41856D9477M*** |
| 680 | 18 × 35 | 0.081 | 0.027 | 2200 | B41856C9687M*** |

**Composition of ordering code**

*** = Version

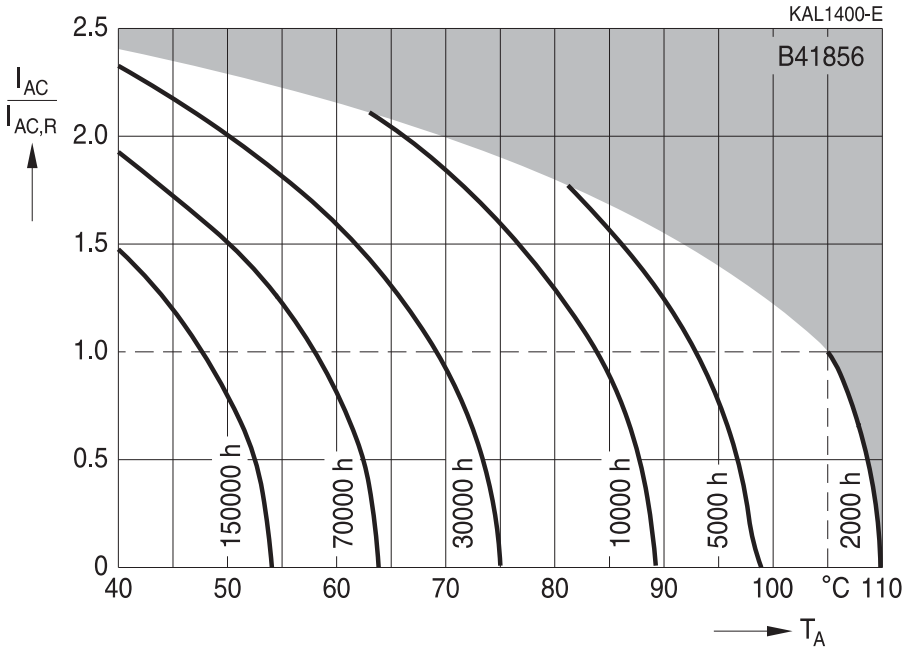
- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for d × l = 10 × 20 mm and ∅ 12.5 … 18 mm)
- 002 = for cut leads, bulk (for ∅ 10 ... 18 mm)
- 003 = for crimped leads, blister (for ∅ 16 … 18 mm)
- 004 = for J leads, blister (for ∅ 10 ... 18 mm)
- 006 = for taped leads, Ammo pack, lead spacing F = 3.5 mm (for ∅ 8 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (for ∅ 8 ... 12.5 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (for ∅ 16 mm and d × l = 18 × 20 … 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 … 18 mm)



**Useful life**[1)]

depending on ambient temperature $T_A$ under ripple current operating conditions

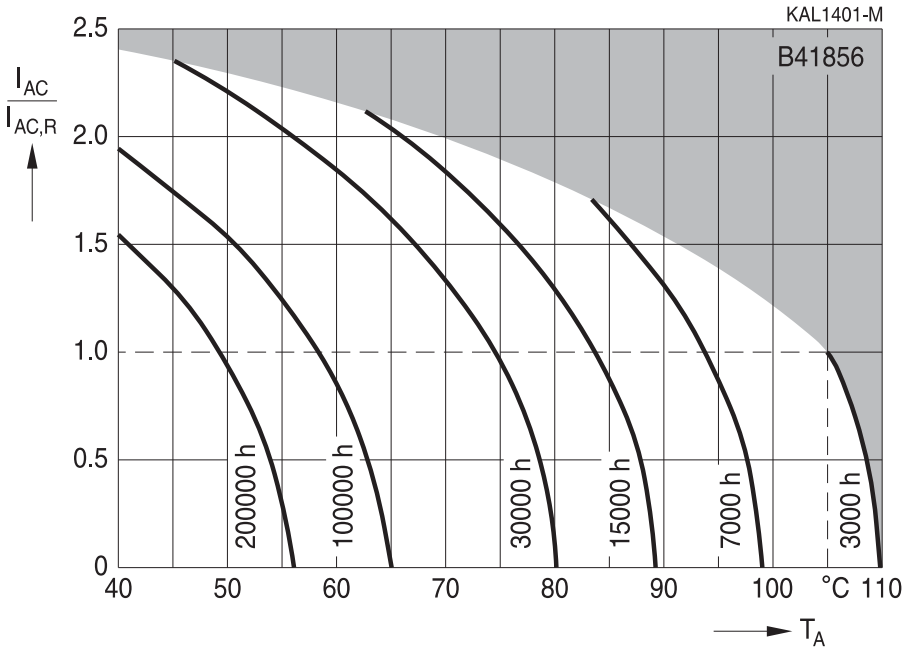
d = 8 mm



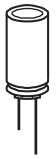

**Useful life**[1)]

depending on ambient temperature $T_A$ under ripple current operating conditions

d = 10 mm



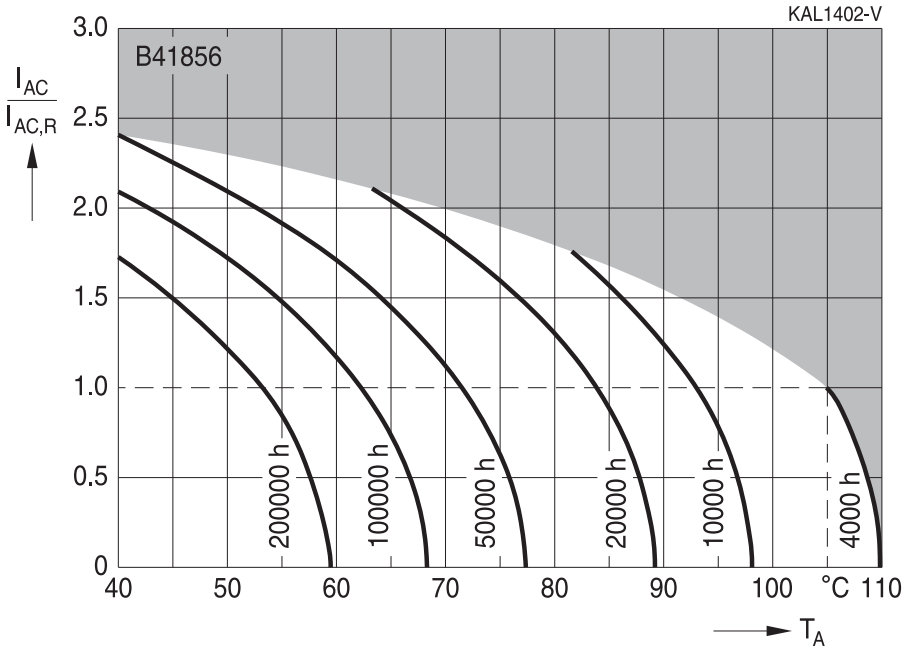

1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life.



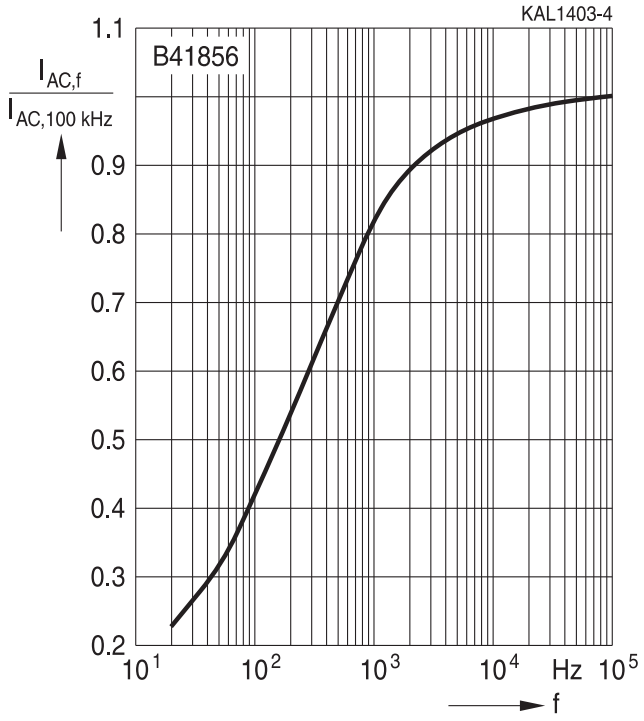
**Useful life**[1)]

depending on ambient temperature $T_A$ under ripple current operating conditions

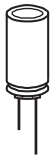
d ≥ 12.5 mm




**Frequency factor of permissible ripple current $I_{AC}$ versus frequency f**




1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life.



## Taping

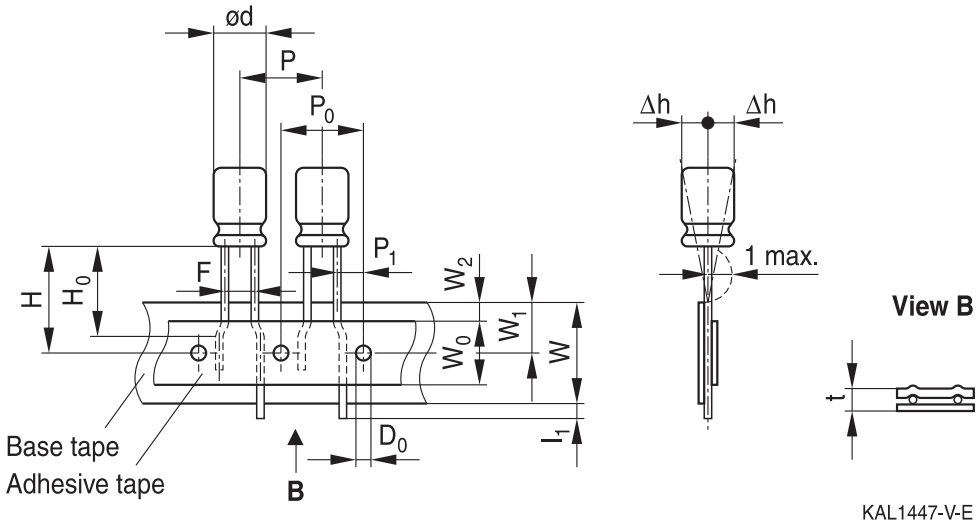
Single-ended capacitors are available taped in Ammo pack from diameter 8 to 18 mm as follows:

Lead spacing F = 3.5 mm (∅ d = 8 mm)
Lead spacing F = 5.0 mm (∅ d = 8 … 12.5 mm)
Lead spacing F = 7.5 mm (∅ d = 16 ... 18 mm).

The dimensions for F, $P_1$ and 1 max. are specified with reference to the center of the terminal wires.

### Lead spacing 3.5 mm (∅ d = 8 mm)

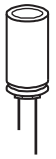
Last 3 digits of ordering code: 006




### Dimensions in mm

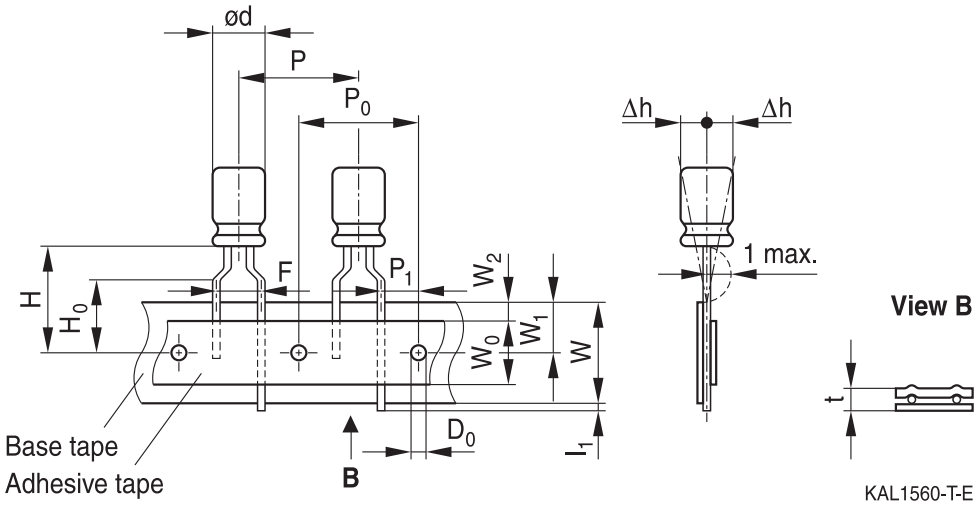
| ∅ d | F | H | W | $W_0$ | $W_1$ | $W_2$ | P | $P_0$ | $P_1$ | $I_1$ | t | Δh | $D_0$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | 3.5 | 18.5 | 18.0 | 9.5 | 9.0 | 3.0 | 12.7 | 12.7 | 4.6 | 1.0 | 0.7 | 1.0 | 4.0 |
| Tolerance | +0.8 −0.2 | ±1.0 | ±0.5 | min. | ±0.5 | max. | ±1.0 | ±0.3 | ±0.6 | max. | ±0.2 | max. | ±0.2 |

Leads can also run straight through the taping area.



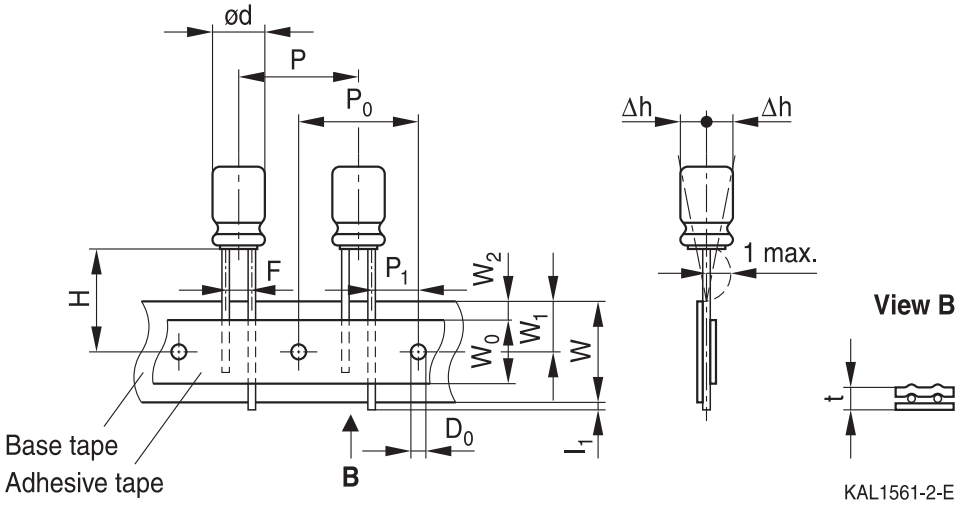
### Lead spacing 5.0 mm (∅ d = 8 mm)

Last 3 digits of ordering code: 008




### Lead spacing 5.0 mm (∅ d = 10 ... 12.5 mm)

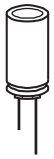
Last 3 digits of ordering code: 008




### Dimensions in mm

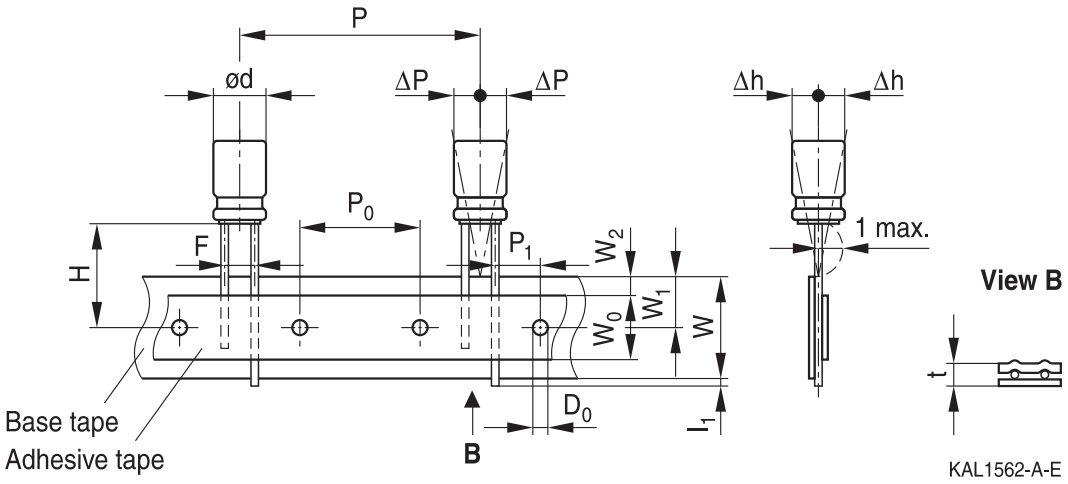
| ∅ d | F | H | W | $W_0$ | $W_1$ | $W_2$ | $H_0$ | P | $P_0$ | $P_1$ | $I_1$ | t | Δh | $D_0$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | | 20.0 | | 9.5 | | | 16.0 | 12.7 | 12.7 | 3.85 | | | | |
| 10 | 5.0 | 19.0 | 18.0 | 9.5 | 9.0 | 1.5 | – | 12.7 | 12.7 | 3.85 | 1.0 | 0.6 | 1.0 | 4.0 |
| 12.5 | | 19.0 | | 11.5 | | | – | 15.0 | 15.0 | 5.0 | | | | |
| Tolerance | +0.8 −0.2 | ±0.75 | ±0.5 | min. | ±0.5 | max. | ±0.5 | ±1.0 | ±0.2 | ±0.5 | max. | +0.3 −0.2 | max. | ±0.2 |

Taping is available up to dimensions d × l = 12.5 × 25 mm.



## Lead spacing 7.5 mm (∅ d = 16 ...18 mm)

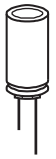
Last 3 digits of ordering code: 009




## Dimensions in mm

| ∅ d | F | H | W | $W_0$ | $W_1$ | $W_2$ | P | $P_0$ | $P_1$ | $l_1$ | t | ΔP | Δh | $D_0$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16<br>18 | 7.5 | 18.5 | 18.0 | 12.5 | 9.0 | 1.5 | 30.0 | 15.0 | 3.75 | 1.0 | 0.7 | 0 | 0 | 4.0 |
| Tolerance | ±0.8 | −0.5<br>+0.75 | ±0.5 | min. | ±0.5 | max. | ±1.0 | ±0.2 | ±0.5 | max. | ±0.2 | ±1.0 | ±1.0 | ±0.2 |

Taping is available up to dimensions d × l = 16 × 31.5 mm and 18 × 31.5 mm.



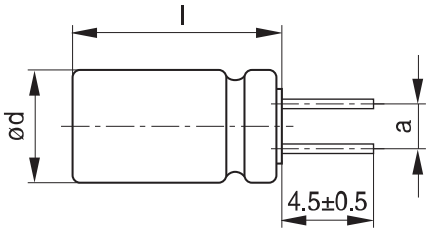
## Cut or kinked leads

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

## Cut leads

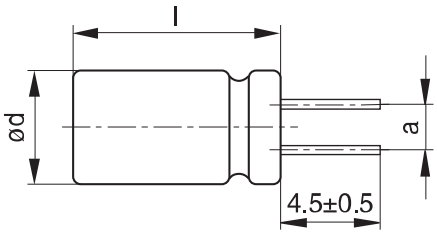
Last 3 digits of ordering code: 002

### With stand-off rubber seal



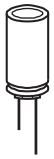

KAL1085-I

### With flat rubber seal




KAL1086-R

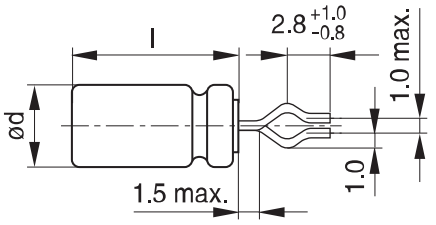
| Case size<br>d × l (mm) | Dimensions (mm)<br>a ±0.5 |
|---|---|
| 10 × 12.5 | 5.0 |
| 10 × 16 | 5.0 |
| 10 × 20 | 5.0 |
| 12.5 × 20 | 5.0 |
| 12.5 × 25 | 5.0 |
| 16 × 20 | 7.5 |
| 16 × 25 | 7.5 |
| 16 × 31.5 | 7.5 |
| 16 × 35.5 | 7.5 |
| 16 × 40 | 7.5 |
| 18 × 20 | 7.5 |
| 18 × 25 | 7.5 |
| 18 × 31.5 | 7.5 |
| 18 × 35 | 7.5 |
| 18 × 40 | 7.5 |



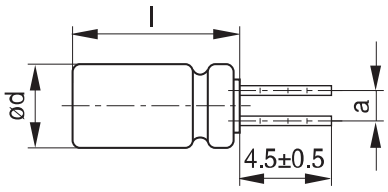
## Kinked leads

Last 3 digits of ordering code: 001

### With stand-off rubber seal

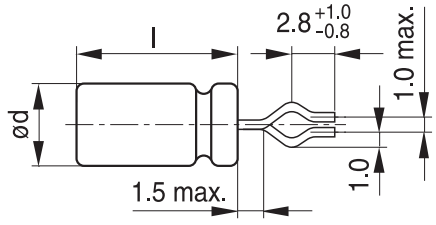



KAL1081-K

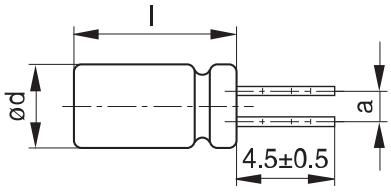



KAL1083-2

### With flat rubber seal

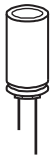



KAL1082-T




KAL1084-A

| Case size<br>d × l (mm) | Dimensions (mm)<br>a ±0.5 |
|---|---|
| 10 × 20 | 5.0 |
| 12.5 × 20 | 5.0 |
| 12.5 × 25 | 5.0 |
| 16 × 20 | 7.5 |
| 16 × 25 | 7.5 |
| 16 × 31.5 | 7.5 |
| 16 × 35.5 | 7.5 |
| 18 × 20 | 7.5 |
| 18 × 25 | 7.5 |
| 18 × 31.5 | 7.5 |
| 18 × 35 | 7.5 |
| 18 × 40 | 7.5 |



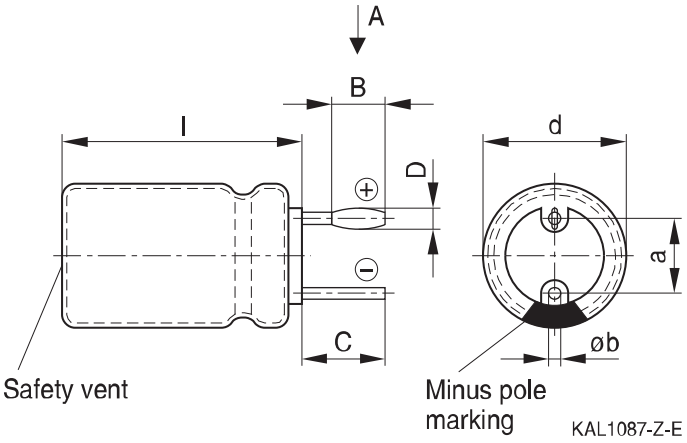
**PAPR leads** (Protection Against Polarity Reversal)

These lead configurations ensure correct placement of the capacitor on the PCB with regard to polarity. PAPR leads are available for diameters from 10 mm up to 18 mm.
There are three configurations available: Crimped leads, J leads, bent 90° leads.

### Crimped leads

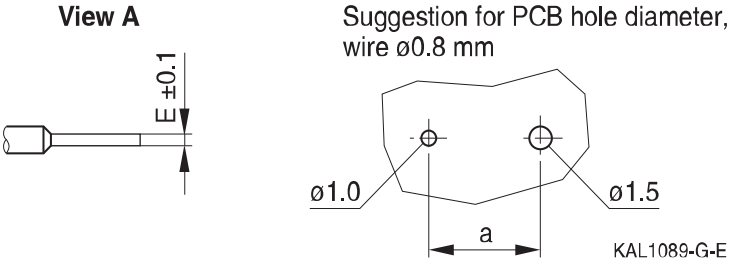
Last 3 digits of ordering code: 003

### With stand-off rubber seal

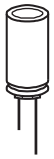



The series B41897 and B41898 have no sleeve nor minus pole marking, the positive pole is marked on the aluminum case side instead.

### Suggestion for PCB hole diameter

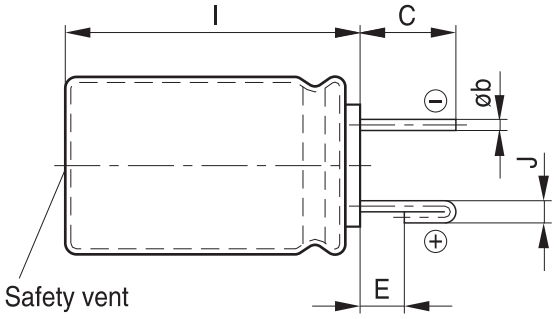


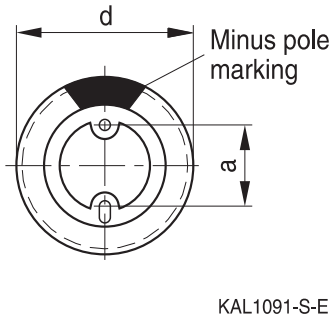

| Case size | Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|
| d × l (mm) | B ±0.2 | C ±0.5 | D ±0.1 | E ±0.1 | a ±0.5 | ∅b |
| 16 × 20 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.05 |
| 16 × 25 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.05 |
| 16 × 31.5 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.05 |
| 16 × 35.5 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.05 |
| 18 × 20 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.1 |
| 18 × 25 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.1 |
| 18 × 31.5 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.1 |
| 18 × 35 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.1 |
| 18 × 40 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.1 |



## J leads

Last 3 digits of ordering code: 004

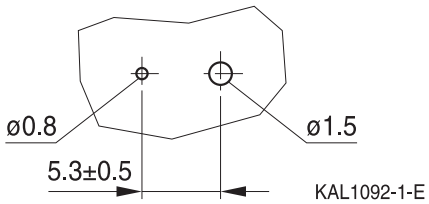


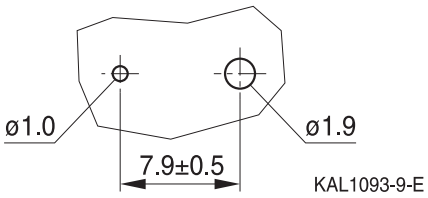

The series B41897 and B41898 have no sleeve nor minus pole marking, the positive pole is marked on the aluminum case side instead.

## Suggestion for PCB hole diameter

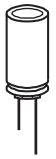
Suggestion for PCB hole diameter, wire ø0.6 mm




Suggestion for PCB hole diameter, wire ø0.8 mm

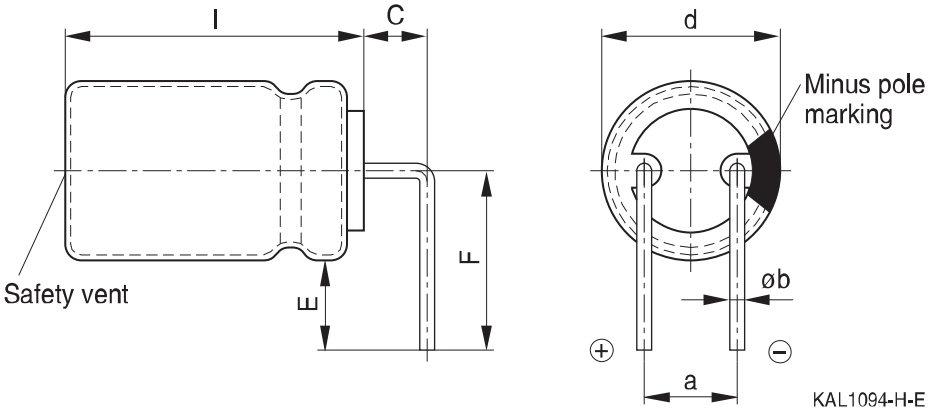



| Case size | Dimensions (mm) | | | | |
|---|---|---|---|---|---|
| d × l (mm) | C ±0.5 | E ±0.5 | J ±0.2 | a ±0.5 | ∅b |
| 10 × 12.5 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 10 × 16 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 10 × 20 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 12.5 × 20 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 12.5 × 25 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 16 × 20 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.05 |
| 16 × 25 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.05 |
| 16 × 31.5 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.05 |
| 16 × 35.5 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.05 |
| 16 × 40 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.05 |
| 18 × 20 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.1 |
| 18 × 25 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.1 |
| 18 × 31.5 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.1 |
| 18 × 35 | 3.5 | 0.7 | 1.6 | 7.5 | 0.8 ±0.1 |



## Bent 90° leads for horizontal mounting pinning

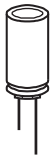
Last 3 digits of ordering code: 012




The series B41897 and B41898 have no sleeve nor minus pole marking, the positive pole is marked on the aluminum case side instead.

| Case size | Dimensions (mm) | | | | |
|---|---|---|---|---|---|
| d × l (mm) | C ±0.5 | E ±0.5 | F ±0.5 | a ±0.5 | ∅b |
| 16 × 20 | 4.0 | 4.0 | 12.0 | 7.5 | 0.8 ±0.05 |
| 16 × 25 | 4.0 | 4.0 | 12.0 | 7.5 | 0.8 ±0.05 |
| 16 × 31.5 | 4.0 | 4.0 | 12.0 | 7.5 | 0.8 ±0.05 |
| 16 × 35.5 | 4.0 | 4.0 | 12.0 | 7.5 | 0.8 ±0.05 |
| 16 × 40 | 4.0 | 4.0 | 13.0 | 7.5 | 0.8 ±0.05 |
| 18 × 20 | 4.0 | 4.0 | 13.0 | 7.5 | 0.8 ±0.1 |
| 18 × 25 | 4.0 | 4.0 | 13.0 | 7.5 | 0.8 ±0.1 |
| 18 × 31.5 | 4.0 | 4.0 | 13.0 | 7.5 | 0.8 ±0.1 |
| 18 × 35 | 4.0 | 4.0 | 13.0 | 7.5 | 0.8 ±0.1 |
| 18 × 40 | 4.0 | 4.0 | 13.0 | 7.5 | 0.8 ±0.1 |

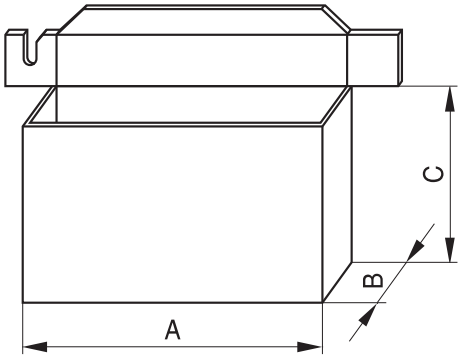
Bent leads for diameter 12.5 mm available upon request.



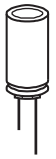


## Packing units and box dimensions

### Ammo pack



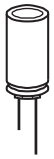

| Case size d × l | Dimensions (mm) | | | Packing units |
|---|---|---|---|---|
| mm | $A_{max}$ | $B_{max}$ | $C_{max}$ | pcs. |
| 8 × 11.5 | 345 | 60 | 240 | 1000 |
| 10 × 12.5 | 345 | 60 | 280 | 750 |
| 10 × 16 | 345 | 65 | 200 | 500 |
| 10 × 20 | 345 | 65 | 200 | 500 |
| 12.5 × 20 | 345 | 65 | 260 | 500 |
| 12.5 × 25 | 345 | 70 | 260 | 500 |
| 16 × 20 | 325 | 65 | 285 | 300 |
| 16 × 25 | 325 | 65 | 285 | 300 |
| 16 × 31.5 | 325 | 80 | 275 | 300 |
| 18 × 20 | 325 | 65 | 285 | 250 |
| 18 × 25 | 325 | 65 | 285 | 250 |
| 18 × 31.5 | 325 | 80 | 275 | 250 |



## Overview of packing units and code numbers

| | | | | | | PAPR | | |
|---|---|---|---|---|---|---|---|---|
| Case size d × l<br>mm | Standard, bulk<br>pcs. | Taped, Ammo pack<br>pcs. | | | Kinked leads, bulk<br>pcs. | Cut leads, bulk<br>pcs. | Crimped leads, blister<br>pcs. | J leads, blister<br>pcs. | Bent 90° leads, blister<br>pcs. |
| 8 × 11.5 | 1000 | 1000 | | | – | – | – | – | |
| 10 × 12.5 | 1000 | 750 | | | – | 1000 | – | 900 | |
| 10 × 16 | 1000 | 500 | | | – | 1000 | – | 675 | |
| 10 × 20 | 500 | 500 | | | 500 | 500 | – | 500 | |
| 12.5 × 20 | 350 | 500 | | | 350 | 350 | – | 300 | 1) |
| 12.5 × 25 | 250 | 500 | | | 500 | 500 | – | 225 | 1) |
| 16 × 20 | 250 | 300 | | | 200 | 200 | 200 | 200 | 420 |
| 16 × 25 | 250 | 300 | | | 200 | 200 | 216 | 216 | 216 |
| 16 × 31.5 | 200 | 300 | | | 250 | 250 | 180 | 180 | 180 |
| 16 × 35.5 | 100 | – | | | 100 | 100 | 150 | 150 | 150 |
| 16 × 40 | 125 | – | | | 100 | 100 | 72 | 72 | 72 |
| 18 × 20 | 175 | 250 | | | 175 | 175 | 200 | 200 | 420 |
| 18 × 25 | 150 | 250 | | | 150 | 150 | 200 | 200 | 200 |
| 18 × 31.5 | 100 | 250 | | | 100 | 100 | 150 | 150 | 150 |
| 18 × 35 | 100 | – | | | 100 | 100 | 150 | 150 | 150 |
| 18 × 40 | 125 | – | | | 100 | 100 | 72 | – | 72 |
| The last three digits of the complete ordering code state the lead configuration | **000** | Code | F (mm) | d (mm) | **001** | **002** | **003** | **004** | **012** |
| | | **006** | 3.5 | 8 | | | | | |
| | | **008** | 5 | 8...12.5 | | | | | |
| | | **009** | 7.5 | 16...18 | | | | | |

1) Available upon request



**B41856**

**Low impedance – 105 °C**

## Cautions and warnings

### Personal safety

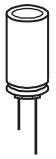
The electrolytes used have been optimized both with a view to the intended application and with regard to health and environmental compatibility. They do not contain any solvents that are detrimental to health, e.g. dimethyl formamide (DMF) or dimethyl acetamide (DMAC). Furthermore, some of the high-voltage electrolytes used are self-extinguishing.

As far as possible, we do not use any dangerous chemicals or compounds to produce operating electrolytes, although in exceptional cases, such materials must be used in order to achieve specific physical and electrical properties because no alternative materials are currently known. We do, however, restrict the amount of dangerous materials used in our products to an absolute minimum.

Materials and chemicals used in our aluminum electrolytic capacitors are continuously adapted in compliance with the TDK Electronics Corporate Environmental Policy and the latest EU regulations and guidelines such as RoHS, REACH/SVHC, GADSL, and ELV.

MDS (Material Data Sheets) are available on our website for all types listed in the data book.
MDS for customer specific capacitors are available upon request.
MSDS (Material Safety Data Sheets) are available for our electrolytes upon request.

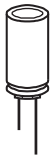
Nevertheless, the following rules should be observed when handling aluminum electrolytic capacitors: No electrolyte should come into contact with eyes or skin. If electrolyte does come into contact with the skin, wash the affected areas immediately with running water. If the eyes are affected, rinse them for 10 minutes with plenty of water. If symptoms persist, seek medical treatment. Avoid inhaling electrolyte vapor or mists. Workplaces and other affected areas should be well ventilated. Clothing that has been contaminated by electrolyte must be changed and rinsed in water.



## Product safety

The table below summarizes the safety instructions that must be observed without fail. A detailed description can be found in the relevant sections of seperate file chapter "General technical information".

| Topic | Safety information | Reference chapter "General technical information" |
|---|---|---|
| Polarity | Make sure that polar capacitors are connected with the right polarity. | 1 "Basic construction of aluminum electrolytic capacitors" |
| Reverse voltage | Voltages of opposite polarity should be prevented by connecting a diode. | 3.1.6 "Reverse voltage" |
| Mounting position of screw-terminal capacitors | Screw terminal capacitors must not be mounted with terminals facing down unless otherwise specified. | 11.1. "Mounting positions of capacitors with screw terminals" |
| Robustness of terminals | The following maximum tightening torques must not be exceeded when connecting screw terminals:<br>M5: 2.5 Nm<br>M6: 4.0 Nm | 11.3 "Mounting torques" |
| Mounting of single-ended capacitors | The internal structure of single-ended capacitors might be damaged if excessive force is applied to the lead wires.<br>Avoid any compressive, tensile or flexural stress.<br>Do not move the capacitor after soldering to PC board.<br>Do not pick up the PC board by the soldered capacitor.<br>Do not insert the capacitor on the PC board with a hole space different to the lead space specified. | 11.4 "Mounting considerations for single-ended capacitors" |
| Soldering | Do not exceed the specified time or temperature limits during soldering. | 11.5 "Soldering" |
| Soldering, cleaning agents | Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors. | 11.6 "Cleaning agents" |
| Upper category temperature | Do not exceed the upper category temperature. | 7.2 "Maximum permissible operating temperature" |
| Passive flammability | Avoid external energy, e.g. fire. | 8.1 "Passive flammability" |



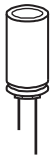
**B41856**

**Low impedance – 105 °C**

| Topic | Safety information | Reference chapter "General technical information" |
|---|---|---|
| Active flammability | Avoid overload of the capacitors. | 8.2 "Active flammability" |
| Maintenance | Make periodic inspections of the capacitors. Before the inspection, make sure that the power supply is turned off and carefully discharge the capacitors. Do not apply excessive mechanical stress to the capacitor terminals when mounting. | 10 "Maintenance" |
| Storage | Do not store capacitors at high temperatures or high humidity. Capacitors should be stored at +5 to +35 °C and a relative humidity of ≤ 75%. | 7.3 "Shelf life and storage conditions" |
| | | Reference chapter "Capacitors with screw terminals" |
| Breakdown strength of insulating sleeves | Do not damage the insulating sleeve, especially when ring clips are used for mounting. | "Screw terminals – accessories" |

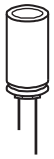
**Display of ordering codes for TDK Electronics products**

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.
Detailed information can be found on the Internet under
www.tdk-electronics.tdk.com/orderingcodes.



## Symbols and terms

| Symbol | English | German |
|---|---|---|
| C | Capacitance | Kapazität |
| $C_R$ | Rated capacitance | Nennkapazität |
| $C_S$ | Series capacitance | Serienkapazität |
| $C_{S,T}$ | Series capacitance at temperature T | Serienkapazität bei Temperatur T |
| $C_f$ | Capacitance at frequency f | Kapazität bei Frequenz f |
| d | Case diameter, nominal dimension | Gehäusedurchmesser, Nennmaß |
| $d_{max}$ | Maximum case diameter | Maximaler Gehäusedurchmesser |
| ESL | Self-inductance | Eigeninduktivität |
| ESR | Equivalent series resistance | Ersatzserienwiderstand |
| $ESR_f$ | Equivalent series resistance at frequency f | Ersatzserienwiderstand bei Frequenz f |
| $ESR_T$ | Equivalent series resistance at temperature T | Ersatzserienwiderstand bei Temperatur T |
| f | Frequency | Frequenz |
| I | Current | Strom |
| $I_{AC}$ | Alternating current (ripple current) | Wechselstrom |
| $I_{AC,RMS}$ | Root-mean-square value of alternating current | Wechselstrom, Effektivwert |
| $I_{AC,f}$ | Ripple current at frequency f | Wechselstrom bei Frequenz f |
| $I_{AC,max}$ | Maximum permissible ripple current | Maximal zulässiger Wechselstrom |
| $I_{AC,R}$ | Rated ripple current | Nennwechselstrom |
| $I_{leak}$ | Leakage current | Reststrom |
| $I_{leak,op}$ | Operating leakage current | Betriebsreststrom |
| l | Case length, nominal dimension | Gehäuselänge, Nennmaß |
| $l_{max}$ | Maximum case length (without terminals and mounting stud) | Maximale Gehäuselänge (ohne Anschlüsse und Gewindebolzen) |
| R | Resistance | Widerstand |
| $R_{ins}$ | Insulation resistance | Isolationswiderstand |
| $R_{symm}$ | Balancing resistance | Symmetrierwiderstand |
| T | Temperature | Temperatur |
| $\Delta T$ | Temperature difference | Temperaturdifferenz |
| $T_A$ | Ambient temperature | Umgebungstemperatur |
| $T_C$ | Case temperature | Gehäusetemperatur |
| $T_B$ | Capacitor base temperature | Temperatur des Gehäusebodens |
| t | Time | Zeit |
| $\Delta t$ | Period | Zeitraum |
| $t_b$ | Service life (operating hours) | Brauchbarkeitsdauer (Betriebszeit) |



**B41856**

**Low impedance – 105 °C**

| Symbol | English | German |
|---|---|---|
| V | Voltage | Spannung |
| $V_F$ | Forming voltage | Formierspannung |
| $V_{op}$ | Operating voltage | Betriebsspannung |
| $V_R$ | Rated voltage, DC voltage | Nennspannung, Gleichspannung |
| $V_S$ | Surge voltage | Spitzenspannung |
| $X_C$ | Capacitive reactance | Kapazitiver Blindwiderstand |
| $X_L$ | Inductive reactance | Induktiver Blindwiderstand |
| Z | Impedance | Scheinwiderstand |
| $Z_T$ | Impedance at temperature T | Scheinwiderstand bei Temperatur T |
| tan $\delta$ | Dissipation factor | Verlustfaktor |
| $\lambda$ | Failure rate | Ausfallrate |
| $\varepsilon_0$ | Absolute permittivity | Elektrische Feldkonstante |
| $\varepsilon_r$ | Relative permittivity | Dielektrizitätszahl |
| $\omega$ | Angular velocity; $2 \cdot \pi \cdot f$ | Kreisfrequenz; $2 \cdot \pi \cdot f$ |

**Note**

All dimensions are given in mm.

## Important notes

The following applies to all products named in this publication:

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