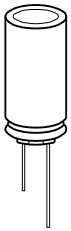
EPCOS

# Aluminum electrolytic capacitors

## Single-ended capacitors

**Series/Type:** **B41888**
Date: December 2006

**Long-life grade capacitors**
**Very low impedance**



**Applications**
- For use in switch-mode power supplies
- For professional industrial electronics, telecommunications and data processing equipment
- Automotive electronics

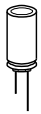
**Features**
- Extended useful life
- Very low impedance at high frequency
- High ripple current capability

**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**

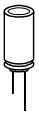
Terminal configurations and packing:
- Bulk
- Taped, Ammo pack
- Cut
- Kinked
- PAPR (protection against polarity reversal): crimped leads, J leads, bent leads

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



**Specifications and characteristics in brief**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rated voltage $V_R$<br>Surge voltage $V_S$ | 10 ... 63 V DC<br>1.15 · $V_R$ | | | | | | |
| Rated capacitance $C_R$<br>Capacitance tolerance | 56 ... 12000 µF<br>±20% ≙ M | | | | | | |
| Dissipation factor tan δ<br>(20 °C, 120 Hz) | For capacitance higher than 1000 µF add 0.02 for every increase of 1000 µF. | | | | | | |
| | $V_R$ (V DC) | 10 | 16 | 25 | 35 | 50 | 63 |
| | tan δ (max.) | 0.18 | 0.16 | 0.14 | 0.12 | 0.10 | 0.09 |
| Leakage current $I_{leak}$<br>(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) | ≤12.5 | 16 | 18 | | | |
| | ESL (nH) | 20 | 26 | 34 | | | |
| Useful life<br>105 °C, $V_R$, $I_{AC,R}$ | > 5000 h for d = 8 mm<br>> 7000 h for d = 10 mm<br>> 10000 h for d ≥ 12.5 mm | | | | | | |
| Requirements | 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, $V_R$ | 5000 h for d = 8 mm<br>7000 h for d = 10 mm<br>10000 h for d ≥ 12.5 mm | | | | | | |
| Post test requirements | ΔC/C ≤ ±30% of initial value<br>tan δ ≤ 2 times initial specified limit<br>$I_{leak}$ ≤ initial specified limit | | | | | | |
| Vibration resistance test | To IEC 60068-2-6, test Fc:<br>Displacement amplitude 0.75 mm, frequency range 10 … 2000 Hz, acceleration max. 20 *g*, duration 3 × 2 h.<br>Capacitor rigidly clamped by the aluminum case. | | | | | | |
| IEC climatic category | To IEC 60068-1:<br>55/105/56 (−55 °C/+105 °C/56 days damp heat test) | | | | | | |
| Sectional specification | AEC-Q200, IEC 60384-4 | | | | | | |

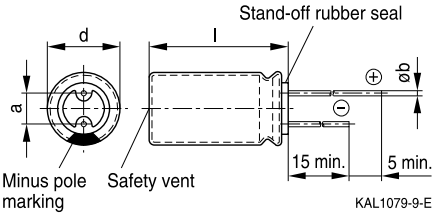


**B41888**

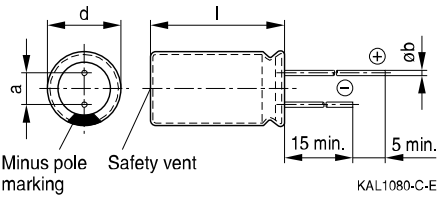
**Extended useful life – 105 °C**

## Dimensional drawings

**With stand-off rubber seal**
Diameters (mm): 8, 10, 12.5, 16, 18

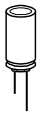



**With flat rubber seal**
Diameter (mm): 8



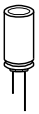

## Dimensions and weights

| 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 |
| 12.5 | 40 +2.0 | 5.0 | 0.80 ±0.05 | 7.4 |
| 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 |
| 18 | 40 +2.0 | 7.5 | 0.80 ±0.1 | 16.0 |



**Overview of available types**

| $V_R$ (V DC) | 10 | 16 | 25 | 35 | 50 | 63 |
|---|---|---|---|---|---|---|
| | Case dimensions d × l (mm) | | | | | |
| $C_R$ (µF) | | | | | | |
| 56 | | | | | | 8 × 11.5 |
| 82 | | | | | | 10 × 12.5 |
| 100 | | | | | 8 × 11.5 | |
| 120 | | | | | | 10 × 16 |
| 150 | | | | 8 × 11.5 | 10 × 12.5 | |
| 180 | | | | | | 10 × 20 |
| 220 | | | 8 × 11.5 | 10 × 12.5 | 10 × 16 | |
| 270 | | | | | 10 × 20 | 12.5 × 20 |
| 330 | | 8 × 11.5 | 10 × 12.5 | 10 × 16 | | 12.5 × 20 |
| 390 | | | | | | 12.5 × 25 |
| 470 | 8 × 11.5 | 10 × 12.5 | 10 × 16 | 10 × 20 | 12.5 × 20 | 16 × 20 |
| 560 | | | | | 12.5 × 25 | |
| 680 | 10 × 12.5 | 10 × 16 | 10 × 20 | 12.5 × 20 | | 12.5 × 40<br>16 × 25<br>18 × 20 |
| 820 | | | | | 16 × 20 | 16 × 31.5<br>18 × 25 |
| 1000 | 10 × 16 | 10 × 20 | 12.5 × 20 | 12.5 × 25 | 12.5 × 40<br>16 × 25<br>18 × 20 | |
| 1200 | 10 × 20 | | | 16 × 20 | 16 × 31.5<br>18 × 25 | 18 × 31.5 |
| 1500 | | 12.5 × 20 | 12.5 × 25 | | | 18 × 35 |
| 1800 | | | 16 × 20 | 12.5 × 40<br>16 × 25<br>18 × 20 | 18 × 31.5 | 18 × 40 |
| 2200 | 12.5 × 20 | 12.5 × 25 | 18 × 20 | 16 × 31.5<br>18 × 25 | 18 × 35 | |
| 2700 | | 16 × 20 | 12.5 × 40<br>16 × 25 | 18 × 31.5 | 18 × 40 | |
| 3300 | 12.5 × 25 | | 16 × 31.5<br>18 × 25 | 18 × 35 | | |
| 3900 | 16 × 20 | 12.5 × 40<br>16 × 25<br>18 × 20 | 18 × 31.5 | 18 × 40 | | |



**B41888**

**Extended useful life − 105 °C**

| $V_R$ (V DC) | 10 | 16 | 25 | 35 | 50 | 63 |
|---|---|---|---|---|---|---|
| | Case dimensions d × l (mm) | | | | | |
| $C_R$ (µF) | | | | | | |
| 4700 | 16 × 25 | 16 × 31.5<br>18 × 25 | 18 × 35 | | | |
| 5600 | 12.5 × 40<br>16 × 25<br>18 × 20 | 18 × 31.5 | 18 × 40 | | | |
| 6800 | 16 × 31.5<br>18 × 25 | | | | | |
| 8200 | 18 × 31.5 | 18 × 35 | | | | |
| 10000 | 18 × 35 | 18 × 40 | | | | |
| 12000 | 18 × 40 | | | | | |

Other voltage and capacitance ratings are available upon request.

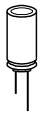
**Technical data and ordering codes**

| $C_R$ 120 Hz 20 °C µF | Case dimensions d × l mm | $ESR_{max}$ 10 kHz −40 °C Ω | $ESR_{max}$ 120 Hz 20 °C Ω | $ESR_{max}$ 10 kHz 20 °C Ω | $Z_{max}$ 100 kHz 20 °C Ω | $I_{AC,R}$ 100 kHz 105 °C mA | $I_{AC,max}$ 100 kHz 85 °C mA | Ordering code (composition see below) |
|---|---|---|---|---|---|---|---|---|
| $V_R$ = 10 V DC | | | | | | | | |
| 470 | 8 × 11.5 | 1.630 | 0.484 | 0.204 | 0.183 | 690 | 966 | B41888C3477M*** |
| 680 | 10 × 12.5 | 0.930 | 0.334 | 0.116 | 0.101 | 900 | 1260 | B41888C3687M*** |
| 1000 | 10 × 16 | 0.516 | 0.227 | 0.064 | 0.059 | 1240 | 1736 | B41888C3108M*** |
| 1200 | 10 × 20 | 0.403 | 0.189 | 0.050 | 0.046 | 1500 | 2100 | B41888C3128M*** |
| 2200 | 12.5 × 20 | 0.307 | 0.115 | 0.038 | 0.035 | 2000 | 2800 | B41888C3228M*** |
| 3300 | 12.5 × 25 | 0.237 | 0.084 | 0.030 | 0.027 | 2459 | 3442 | B41888C3338M*** |
| 3900 | 16 × 20 | 0.233 | 0.071 | 0.029 | 0.026 | 2530 | 3542 | B41888C3398M*** |
| 4700 | 16 × 25 | 0.190 | 0.065 | 0.024 | 0.022 | 2930 | 4102 | B41888C3478M*** |
| 5600 | 12.5 × 40 | 0.149 | 0.059 | 0.019 | 0.017 | 3350 | 4690 | B41888C3568M*** |
| 5600 | 16 × 25 | 0.190 | 0.059 | 0.024 | 0.022 | 2930 | 4102 | B41888D3568M*** |
| 5600 | 18 × 20 | 0.226 | 0.059 | 0.028 | 0.025 | 3000 | 4200 | B41888E3568M*** |
| 6800 | 16 × 31.5 | 0.154 | 0.052 | 0.019 | 0.017 | 3600 | 5040 | B41888C3688M*** |

**Composition of ordering code**

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 8 × 11.5 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



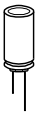
## Technical data and ordering codes

| $C_R$ 120 Hz 20 °C µF | Case dimensions d × l mm | $ESR_{max}$ 10 kHz −40 °C Ω | $ESR_{max}$ 120 Hz 20 °C Ω | $ESR_{max}$ 10 kHz 20 °C Ω | $Z_{max}$ 100 kHz 20 °C Ω | $I_{AC,R}$ 100 kHz 105 °C mA | $I_{AC,max}$ 100 kHz 85 °C mA | Ordering code (composition see below) |
|---|---|---|---|---|---|---|---|---|
| $V_R$ = 10 V DC | | | | | | | | |
| 6800 | 18 × 25 | 0.188 | 0.052 | 0.023 | 0.021 | 3396 | 4755 | B41888D3688M*** |
| 8200 | 18 × 31.5 | 0.143 | 0.049 | 0.018 | 0.016 | 4247 | 5946 | B41888C3828M*** |
| 10000 | 18 × 35 | 0.120 | 0.045 | 0.015 | 0.014 | 4300 | 6020 | B41888C3109M*** |
| 12000 | 18 × 40 | 0.100 | 0.042 | 0.013 | 0.012 | 5327 | 7457 | B41888C3129M*** |
| $V_R$ = 16 V DC | | | | | | | | |
| 330 | 8 × 11.5 | 1.630 | 0.612 | 0.204 | 0.183 | 690 | 966 | B41888C4337M*** |
| 470 | 10 × 12.5 | 0.930 | 0.430 | 0.116 | 0.101 | 900 | 1260 | B41888C4477M*** |
| 680 | 10 × 16 | 0.516 | 0.297 | 0.064 | 0.059 | 1240 | 1736 | B41888C4687M*** |
| 1000 | 10 × 20 | 0.403 | 0.202 | 0.050 | 0.046 | 1500 | 2100 | B41888C4108M*** |
| 1500 | 12.5 × 20 | 0.307 | 0.135 | 0.038 | 0.035 | 2000 | 2800 | B41888C4158M*** |
| 2200 | 12.5 × 25 | 0.237 | 0.103 | 0.030 | 0.027 | 2459 | 3442 | B41888C4228M*** |
| 2700 | 16 × 20 | 0.233 | 0.084 | 0.029 | 0.026 | 2530 | 3542 | B41888C4278M*** |
| 3900 | 12.5 × 40 | 0.149 | 0.065 | 0.019 | 0.017 | 3350 | 4690 | B41888C4398M*** |
| 3900 | 16 × 25 | 0.190 | 0.065 | 0.024 | 0.022 | 2930 | 4102 | B41888D4398M*** |
| 3900 | 18 × 20 | 0.226 | 0.065 | 0.028 | 0.025 | 3000 | 4200 | B41888E4398M*** |
| 4700 | 16 × 31.5 | 0.154 | 0.059 | 0.019 | 0.017 | 3600 | 5040 | B41888C4478M*** |
| 4700 | 18 × 25 | 0.188 | 0.059 | 0.023 | 0.021 | 3200 | 4480 | B41888D4478M*** |
| 5600 | 18 × 31.5 | 0.143 | 0.054 | 0.018 | 0.016 | 4247 | 5946 | B41888C4568M*** |
| 8200 | 18 × 35 | 0.120 | 0.043 | 0.015 | 0.014 | 4300 | 6020 | B41888C4828M*** |
| 10000 | 18 × 40 | 0.100 | 0.040 | 0.013 | 0.012 | 5327 | 7457 | B41888C4109M*** |
| $V_R$ = 25 V DC | | | | | | | | |
| 220 | 8 × 11.5 | 1.630 | 0.804 | 0.204 | 0.183 | 690 | 966 | B41888C5227M*** |
| 330 | 10 × 12.5 | 0.930 | 0.536 | 0.116 | 0.101 | 900 | 1260 | B41888C5337M*** |
| 470 | 10 × 16 | 0.516 | 0.376 | 0.064 | 0.059 | 1240 | 1736 | B41888C5477M*** |
| 680 | 10 × 20 | 0.403 | 0.260 | 0.050 | 0.046 | 1500 | 2100 | B41888C5687M*** |
| 1000 | 12.5 × 20 | 0.307 | 0.177 | 0.038 | 0.035 | 2000 | 2800 | B41888C5108M*** |
| 1500 | 12.5 × 25 | 0.237 | 0.118 | 0.030 | 0.027 | 2459 | 3442 | B41888C5158M*** |
| 1800 | 16 × 20 | 0.233 | 0.098 | 0.029 | 0.026 | 2530 | 3542 | B41888C5188M*** |
| 2200 | 18 × 20 | 0.226 | 0.090 | 0.028 | 0.025 | 3000 | 4200 | B41888C5228M*** |

**Composition of ordering code**

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 8 × 11.5 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



**B41888**

**Extended useful life – 105 °C**

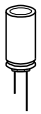
## Technical data and ordering codes

| $C_R$ 120 Hz 20 °C µF | Case dimensions d × l mm | $ESR_{max}$ 10 kHz −40 °C Ω | $ESR_{max}$ 120 Hz 20 °C Ω | $ESR_{max}$ 10 kHz 20 °C Ω | $Z_{max}$ 100 kHz 20 °C Ω | $I_{AC,R}$ 100 kHz 105 °C mA | $I_{AC,max}$ 100 kHz 85 °C mA | Ordering code (composition see below) |
|---|---|---|---|---|---|---|---|---|
| $V_R$ = 25 V DC | | | | | | | | |
| 2700 | 12.5 × 40 | 0.149 | 0.075 | 0.019 | 0.017 | 3350 | 4690 | B41888C5278M*** |
| 2700 | 16 × 25 | 0.190 | 0.075 | 0.024 | 0.022 | 2930 | 4102 | B41888D5278M*** |
| 3300 | 16 × 31.5 | 0.154 | 0.069 | 0.019 | 0.017 | 3600 | 5040 | B41888C5338M*** |
| 3300 | 18 × 25 | 0.188 | 0.069 | 0.023 | 0.021 | 3200 | 4480 | B41888D5338M*** |
| 3900 | 18 × 31.5 | 0.143 | 0.058 | 0.018 | 0.016 | 4247 | 5946 | B41888C5398M*** |
| 4700 | 18 × 35 | 0.120 | 0.054 | 0.015 | 0.014 | 4300 | 6020 | B41888C5478M*** |
| 5600 | 18 × 40 | 0.100 | 0.050 | 0.013 | 0.012 | 5327 | 7457 | B41888C5568M*** |
| $V_R$ = 35 V DC | | | | | | | | |
| 150 | 8 × 11.5 | 1.630 | 1.011 | 0.204 | 0.183 | 690 | 966 | B41888C7157M*** |
| 220 | 10 × 12.5 | 0.930 | 0.689 | 0.116 | 0.101 | 900 | 1260 | B41888C7227M*** |
| 330 | 10 × 16 | 0.516 | 0.459 | 0.064 | 0.059 | 1240 | 1736 | B41888C7337M*** |
| 470 | 10 × 20 | 0.403 | 0.323 | 0.050 | 0.046 | 1500 | 2100 | B41888C7477M*** |
| 680 | 12.5 × 20 | 0.307 | 0.223 | 0.038 | 0.035 | 2000 | 2800 | B41888C7687M*** |
| 1000 | 12.5 × 25 | 0.237 | 0.152 | 0.030 | 0.027 | 2459 | 3442 | B41888C7108M*** |
| 1200 | 16 × 20 | 0.233 | 0.126 | 0.029 | 0.026 | 2530 | 3542 | B41888C7128M*** |
| 1800 | 12.5 × 40 | 0.149 | 0.084 | 0.019 | 0.017 | 3350 | 4690 | B41888C7188M*** |
| 1800 | 16 × 25 | 0.190 | 0.084 | 0.024 | 0.022 | 2930 | 4102 | B41888D7188M*** |
| 1800 | 18 × 20 | 0.226 | 0.084 | 0.028 | 0.025 | 3000 | 4200 | B41888E7188M*** |
| 2200 | 16 × 31.5 | 0.154 | 0.080 | 0.019 | 0.017 | 3600 | 5040 | B41888C7228M*** |
| 2200 | 18 × 25 | 0.188 | 0.080 | 0.023 | 0.021 | 3200 | 4480 | B41888D7228M*** |
| 2700 | 18 × 31.5 | 0.143 | 0.065 | 0.018 | 0.016 | 4247 | 5946 | B41888C7278M*** |
| 3300 | 18 × 35 | 0.120 | 0.060 | 0.015 | 0.014 | 4300 | 6020 | B41888C7338M*** |
| 3900 | 18 × 40 | 0.100 | 0.052 | 0.013 | 0.012 | 5327 | 7457 | B41888C7398M*** |
| $V_R$ = 50 V DC | | | | | | | | |
| 100 | 8 × 11.5 | 4.920 | 1.263 | 0.615 | 0.540 | 500 | 700 | B41888C6107M*** |
| 150 | 10 × 12.5 | 1.820 | 0.842 | 0.228 | 0.203 | 600 | 840 | B41888C6157M*** |
| 220 | 10 × 16 | 1.030 | 0.574 | 0.129 | 0.115 | 1050 | 1470 | B41888C6227M*** |
| 270 | 10 × 20 | 0.672 | 0.468 | 0.084 | 0.075 | 1180 | 1652 | B41888C6277M*** |
| 470 | 12.5 × 20 | 0.518 | 0.269 | 0.065 | 0.060 | 1800 | 2520 | B41888C6477M*** |

**Composition of ordering code**

*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 8 × 11.5 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)



## Technical data and ordering codes

| $C_R$ 120 Hz 20 °C µF | Case dimensions d × l mm | $ESR_{max}$ 10 kHz −40 °C Ω | $ESR_{max}$ 120 Hz 20 °C Ω | $ESR_{max}$ 10 kHz 20 °C Ω | $Z_{max}$ 100 kHz 20 °C Ω | $I_{AC,R}$ 100 kHz 105 °C mA | $I_{AC,max}$ 100 kHz 85 °C mA | Ordering code (composition see below) |
|---|---|---|---|---|---|---|---|---|
| $V_R$ = 50 V DC | | | | | | | | |
| 560 | 12.5 × 25 | 0.344 | 0.226 | 0.043 | 0.040 | 2024 | 2834 | B41888C6567M*** |
| 820 | 16 × 20 | 0.410 | 0.154 | 0.051 | 0.046 | 1957 | 2740 | B41888C6827M*** |
| 1000 | 12.5 × 40 | 0.216 | 0.126 | 0.027 | 0.025 | 2920 | 4088 | B41888C6108M*** |
| 1000 | 16 × 25 | 0.283 | 0.126 | 0.035 | 0.032 | 2700 | 3780 | B41888D6108M*** |
| 1000 | 18 × 20 | 0.283 | 0.126 | 0.035 | 0.032 | 2541 | 3558 | B41888E6108M*** |
| 1200 | 16 × 31.5 | 0.221 | 0.105 | 0.028 | 0.025 | 3010 | 4214 | B41888C6128M*** |
| 1200 | 18 × 25 | 0.275 | 0.105 | 0.034 | 0.031 | 2795 | 3914 | B41888D6128M*** |
| 1800 | 18 × 31.5 | 0.204 | 0.070 | 0.025 | 0.023 | 3542 | 4959 | B41888C6188M*** |
| 2200 | 18 × 35 | 0.177 | 0.069 | 0.022 | 0.020 | 3800 | 5320 | B41888C6228M*** |
| 2700 | 18 × 40 | 0.159 | 0.056 | 0.020 | 0.018 | 4000 | 5600 | B41888C6278M*** |
| $V_R$ = 63 V DC | | | | | | | | |
| 56 | 8 × 11.5 | 5.413 | 2.030 | 0.541 | 0.488 | 283 | 396 | B41888C8566M*** |
| 82 | 10 × 12.5 | 5.766 | 1.386 | 0.577 | 0.500 | 323 | 453 | B41888C8826M*** |
| 120 | 10 × 16 | 3.075 | 0.947 | 0.308 | 0.279 | 474 | 664 | B41888C8127M*** |
| 180 | 10 × 20 | 1.986 | 0.632 | 0.199 | 0.180 | 644 | 901 | B41888C8187M*** |
| 270 | 12.5 × 20 | 1.688 | 0.421 | 0.169 | 0.153 | 800 | 1120 | B41888C8277M*** |
| 330 | 12.5 × 20 | 1.688 | 0.344 | 0.169 | 0.153 | 800 | 1120 | B41888C8337M*** |
| 390 | 12.5 × 25 | 1.236 | 0.291 | 0.124 | 0.112 | 1020 | 1428 | B41888C8397M*** |
| 470 | 16 × 20 | 1.037 | 0.242 | 0.104 | 0.094 | 1161 | 1625 | B41888C8477M*** |
| 680 | 12.5 × 40 | 0.717 | 0.167 | 0.072 | 0.065 | 1629 | 2281 | B41888C8687M*** |
| 680 | 16 × 25 | 0.772 | 0.167 | 0.077 | 0.070 | 1460 | 2045 | B41888D8687M*** |
| 680 | 18 × 20 | 0.960 | 0.167 | 0.096 | 0.087 | 1302 | 1823 | B41888E8687M*** |
| 820 | 16 × 31.5 | 0.541 | 0.139 | 0.054 | 0.049 | 1910 | 2674 | B41888C8827M*** |
| 820 | 18 × 25 | 0.761 | 0.139 | 0.076 | 0.069 | 1584 | 2217 | B41888D8827M*** |
| 1200 | 18 × 31.5 | 0.518 | 0.095 | 0.052 | 0.047 | 2094 | 2932 | B41888C8128M*** |
| 1500 | 18 × 35 | 0.441 | 0.076 | 0.044 | 0.040 | 2366 | 3313 | B41888C8158M*** |
| 1800 | 18 × 40 | 0.375 | 0.063 | 0.038 | 0.034 | 2708 | 3792 | B41888C8188M*** |

**Composition of ordering code**

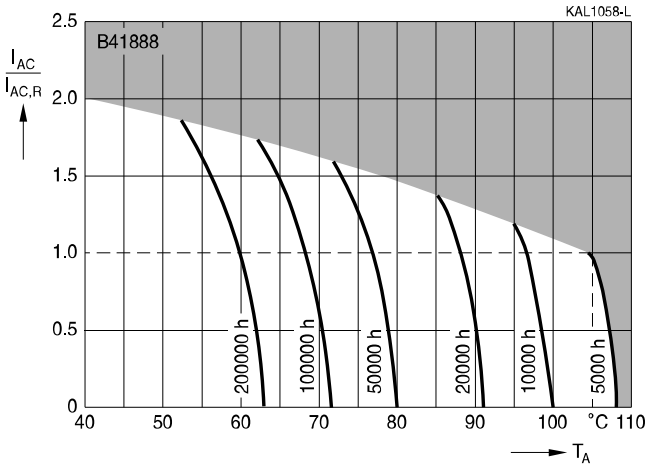
*** = Version

- 000 = for standard leads, bulk
- 001 = for kinked leads, bulk (for ∅ ≥ 10 mm)
- 002 = for cut leads, bulk (for ∅ ≥ 10 mm)
- 003 = for crimped leads, blister (for ∅ ≥ 16 mm)
- 004 = for J leads, blister (from d × l = 10 × 12.5 mm to 18 × 35 mm)
- 008 = for taped leads, Ammo pack, lead spacing F = 5.0 mm (from d × l = 8 × 11.5 mm to 12.5 × 25 mm)
- 009 = for taped leads, Ammo pack, lead spacing F = 7.5 mm (from d × l = 16 × 20 mm to 18 × 31.5 mm)
- 012 = for bent 90° leads, blister (for ∅ 16 and 18 mm)

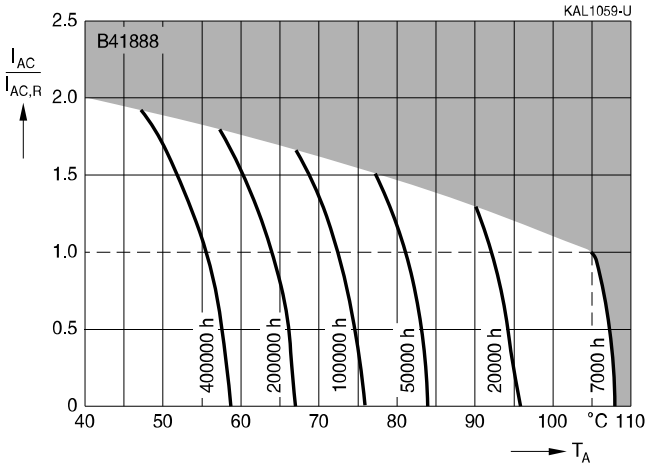
**Useful life**

depending on ambient temperature $T_A$ under ripple current operating conditions[1)]

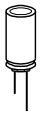
d = 8 mm




d = 10 mm



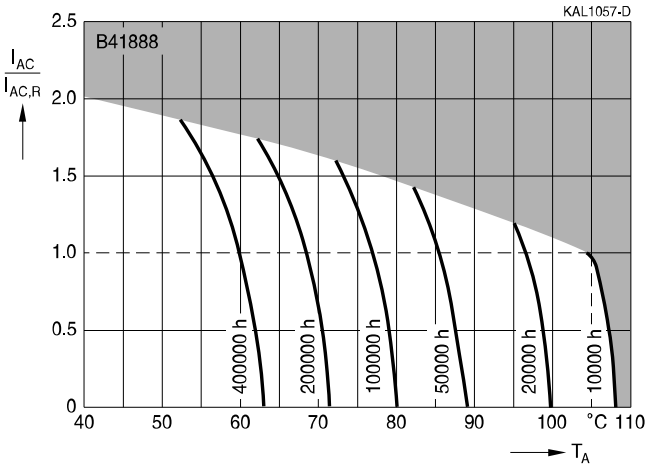

1) Refer to chapter "General technical information, 5.3 Calculation of useful life" for an explanation on how to interpret the useful life graphs.



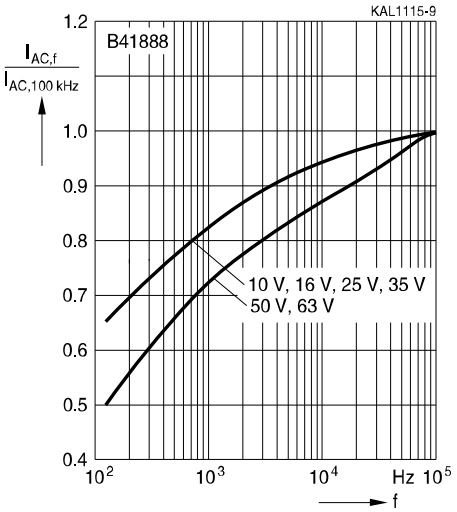
**Useful life**

depending on ambient temperature $T_A$ under ripple current operating conditions[2)]

d = ≥ 12.5 mm




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



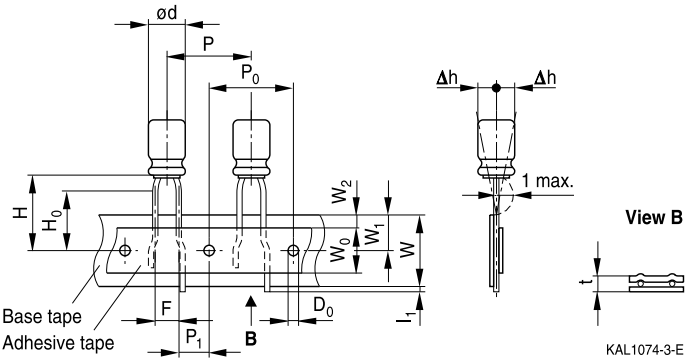

2) Refer to chapter "General technical information, 5.3 Calculation of useful life" for an explanation on how to interpret the useful life graphs.

## Taping, packing and lead configurations

### Taping

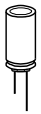
Single-ended capacitors are available taped in Ammo pack from diameter 5 to 18 mm as follows:
Lead spacing F = 2.5 mm (∅ d = 5 … 6.3 mm)
Lead spacing F = 3.5 mm (∅ d = 8 mm)
Lead spacing F = 5.0 mm (∅ d = 5 … 12.5 mm)
Lead spacing F = 7.5 mm (∅ d = 16 ... 18 mm).

**Lead spacing 2.5 mm (∅ d = 5 ... 6.3 mm)**
Last 3 digits of ordering code: 007



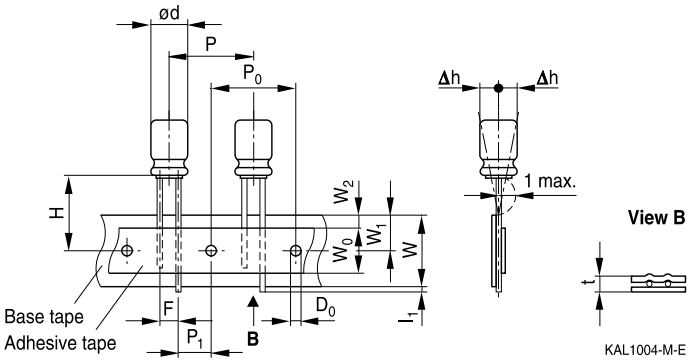

### Dimensions in mm

| ∅ d | F | H | W | $W_0$ | $W_1$ | $W_2$ | $H_0$ | P | $P_0$ | $P_1$ | $I_1$ | t | Δh | $D_0$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5<br>6.3 | 2.5 | 18.5 | 18.0 | 5.5 | 9.0 | 1.5 | 16.0 | 12.7 | 12.7 | 5.1 | 1.0 | 0.7 | 1.0 | 4.0 |
| Tolerance | +0.8<br>−02 | ±0.75 | ±0.5 | min. | ±0.5 | max. | ±0.5 | ±1.0 | ±0.2 | ±0.5 | max. | ±0.2 | max. | ±0.2 |



**Lead spacing 3.5 mm (∅ d = 8 mm)**

Last 3 digits of ordering code: 006

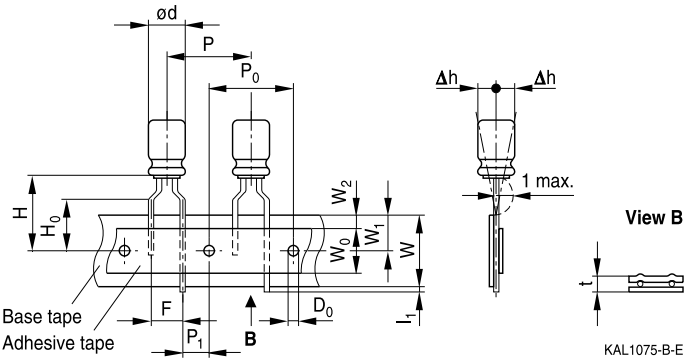



**Dimensions in mm**

| ∅ 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 | 12.5 | 9.0 | 1.5 | 12.7 | 12.7 | 4.6 | 1.0 | 0.7 | 1.0 | 4.0 |
| Tolerance | +0.8 −02 | 1.0 | ±0.5 | min. | ±0.5 | max. | ±1.0 | ±0.2 | ±0.5 | max. | ±0.2 | max. | ±0.2 |

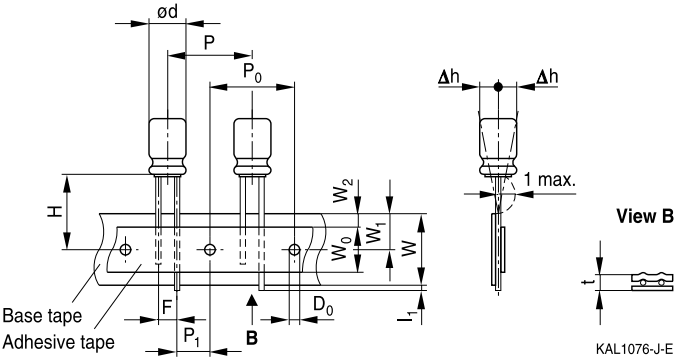
**Lead spacing 5.0 mm (∅ d = 5 ... 8 mm)**

Last 3 digits of ordering code: 008



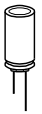

**Lead spacing 5.0 mm (∅ d = 10 ... 12.5 mm)**

Last 3 digits of ordering code: 008



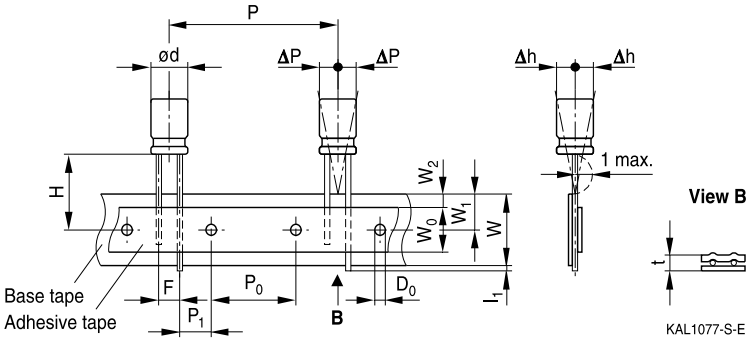

**Dimensions in mm**

| ∅ d | F | H | W | $W_0$ | $W_1$ | $W_2$ | $H_0$ | P | $P_0$ | $P_1$ | $l_1$ | t | Δh | $D_0$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 5.0 | 18.5 | 18.0 | 5.5 | 9.0 | 1.5 | 16.0 | 12.7 | 12.7 | 3.85 | 1.0 | 0.7 | 1.0 | 4.0 |
| 6.3 | | | | | | | | | | | | | | |
| 8 | 5.0 | 20.0 | 18.0 | 12.5 | 9.0 | 1.5 | 16.0 | 12.7 | 12.7 | 3.85 | 1.0 | 0.7 | 1.0 | 4.0 |
| 10 | | 19.0 | | | | | – | 12.7 | 12.7 | 3.85 | | | | |
| 12.5 | | 19.0 | | | | | – | 15.0 | 15.0 | 5.0 | | | | |
| Tolerance | +0.8 −02 | ±0.75 | ±0.5 | min. | ±0.5 | max. | ±0.5 | ±1.0 | ±0.2 | ±0.5 | max. | ±0.2 | max. | ±0.2 |



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

Last 3 digits of ordering code: 009



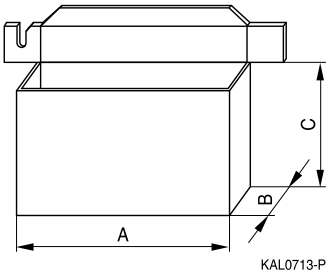

**Dimensions in mm**

| ∅ 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 |
| Toler-ance | ±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 |

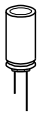
*) Available only for case dimensions 18 × 20, 18 × 25 and 18 × 31.5 mm

## Packing units and box dimensions

### Ammo pack




| Case size d × l | Dimensions (mm) | | | Packing units |
|---|---|---|---|---|
| mm | $A_{max}$ | $B_{max}$ | $C_{max}$ | pcs. |
| 5 × 11 | 345 | 55 | 240 | 2000 |
| 6.3 × 11 | 345 | 55 | 290 | 2000 |
| 8 × 11.5 | 345 | 55 | 240 | 1000 |
| 10 × 12.5 | 345 | 55 | 280 | 750 |
| 10 × 16 | 345 | 60 | 200 | 500 |
| 10 × 20 | 345 | 60 | 200 | 500 |
| 12.5 × 20 | 345 | 65 | 280 | 500 |
| 12.5 × 25 | 345 | 65 | 280 | 500 |
| 12.5 × 25 | 345 | 65 | 280 | 500 |
| 12.5 × 30 | 345 | 65 | 275 | 500 |
| 16 × 20 | 315 | 65 | 275 | 300 |
| 16 × 25 | 315 | 65 | 275 | 300 |
| 16 × 31.5 | 315 | 65 | 275 | 300 |
| 18 × 20 | 315 | 65 | 275 | 250 |
| 18 × 25 | 315 | 65 | 275 | 250 |
| 18 × 31.5 | 315 | 65 | 275 | 250 |



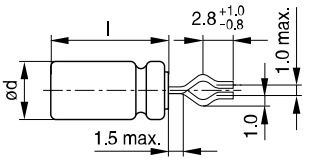
### Kinked or cut leads

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

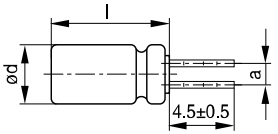
### Kinked leads

Last 3 digits of ordering code: 001

#### With stand-off rubber seal

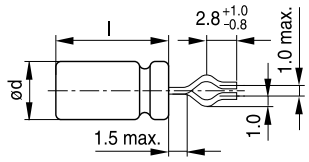



KAL1081-K

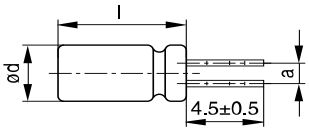



KAL1083-2

#### With flat rubber seal

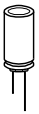



KAL1082-T




KAL1084-A

| Case size d × l (mm) | Dimensions (mm) a ±0.5 |
|---|---|
| 10 × 20 | 5.0 |
| 12.5 × 20 | 5.0 |
| 12.5 × 25 | 5.0 |
| 12.5 × 30 | 5.0 |
| 12.5 × 35 | 5.0 |
| 12.5 × 40 | 5.0 |
| 16 × 20 | 7.5 |
| 16 × 25 | 7.5 |
| 16 × 31.5 | 7.5 |
| 18 × 20 | 7.5 |
| 18 × 25 | 7.5 |
| 18 × 31.5 | 7.5 |
| 18 × 35 | 7.5 |
| 18 × 40 | 7.5 |
| 20 × 20 | 10.0 |
| 20 × 25 | 10.0 |
| 20 × 40 | 10.0 |
| 22 × 30 | 10.0 |
| 22 × 35 | 10.0 |
| 22 × 40 | 10.0 |



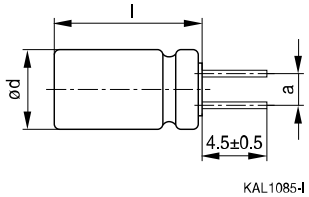
**B41888**

**Extended useful life – 105 °C**

### Cut leads

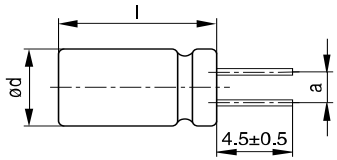
Last 3 digits of ordering code: 002

### With stand-off rubber seal



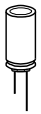

KAL1085-I

### 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 |
| 12.5 × 30 | 5.0 |
| 12.5 × 35 | 5.0 |
| 12.5 × 40 | 5.0 |
| 16 × 20 | 7.5 |
| 16 × 25 | 7.5 |
| 16 × 31.5 | 7.5 |
| 18 × 20 | 7.5 |
| 18 × 25 | 7.5 |
| 18 × 31.5 | 7.5 |
| 18 × 35 | 7.5 |
| 18 × 40 | 7.5 |
| 20 × 20 | 10.0 |
| 20 × 25 | 10.0 |
| 20 × 40 | 10.0 |



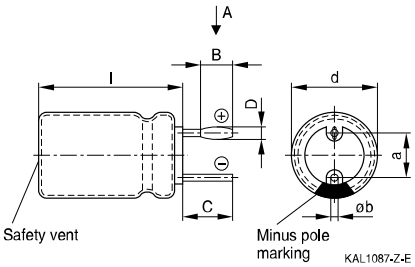
**PAPR leads** (Protection Against Polarity Reversal)

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 20 mm.
There are three configurations available: Crimped leads, J leads, bent 90° leads

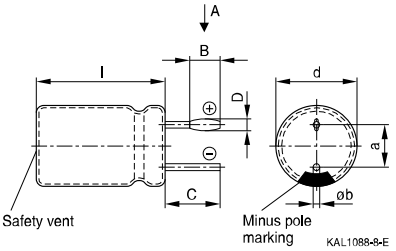
**Crimped leads**

Last 3 digits of ordering code: 003

**With stand-off rubber seal**

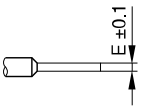



**With flat rubber seal**

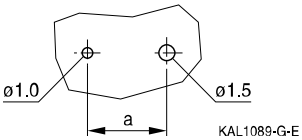



**Suggestion for PCB hole diameter**

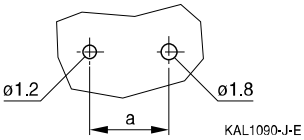
**View A**



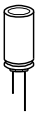

Suggestion for PCB hole diameter, wire ø0.8 mm




Suggestion for PCB hole diameter, wire ø1.0 mm

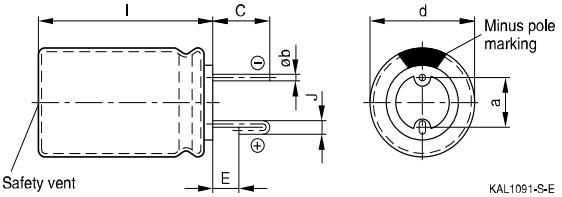



| Case size | Dimensions (mm) | | | | | |
|---|---|---|---|---|---|---|
| d × l (mm) | B ±0.2 | C ±0.5 | D ±0.1 | E ±0.1 | a ±0.5 | ∅b |
| 16 × 20 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.05 |
| 16 × 25 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.05 |
| 16 × 31.5 | 1.5 | 3.0 | 1.3 | 0.3 | 7.5 | 0.8 ±0.05 |
| 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 |
| 20 × 20 | 1.5 | 3.0 | 1.6 | 0.3 | 10.0 | 1.0 ±0.1 |
| 20 × 25 | 1.5 | 3.0 | 1.6 | 0.3 | 10.0 | 1.0 ±0.1 |
| 20 × 40 | 1.5 | 3.0 | 1.6 | 0.3 | 10.0 | 1.0 ±0.1 |



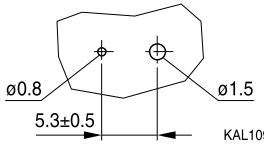
**J leads**

Last 3 digits of ordering code: 004

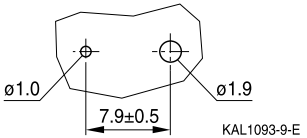



**Suggestion for PCB hole diameter**

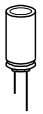
Suggestion for PCB hole diameter, wire ø0.6 mm




Suggestion for PCB hole diameter, wire ø0.8 mm

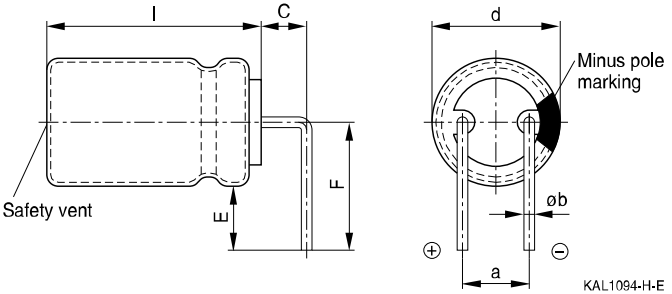



| Case size | Dimensions (mm) | | | | |
|---|---|---|---|---|---|
| d × l (mm) | C ±0.5 | E ±0.5 | J ±0.2 | a ±0.5 | ∅b |
| 10 × 12.5 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 10 × 16 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 10 × 20 | 3.2 | 0.7 | 1.2 | 5.0 | 0.6 ±0.05 |
| 12.5 × 20 | 3.2 | 0.7 | 1.2 | 5.0 | 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 |
| 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 |



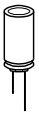
**Bent 90° leads for horizontal mounting pinning**

Last 3 digits of ordering code: 012




| 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 |
| 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.



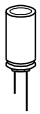
**B41888**

**Extended useful life – 105 °C**

**Overview of packing units and code numbers for case sizes 5 × 11 ... 16 × 31.5**

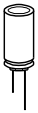
| | | | | | | | PAPR | |
|---|---|---|---|---|---|---|---|---|
| Case size d × l | Stan-dard, bulk | Taped, Ammo pack | | | Kinked leads, bulk | Cut leads, bulk | Crimped leads | J leads | Bent 90° leads, blister |
| mm | pcs. | pcs. | | | pcs. | pcs. | pcs. | pcs. | pcs. |
| 5 × 11 | 2000 | 2000 | | | – | – | – | – | |
| 6.3 × 11 | 2500 | 2000 | | | – | – | – | – | |
| 8 × 11.5 | 1000 | 1000 | | | – | – | – | – | |
| 10 × 12.5 | 1000 | 750 | | | – | 1000 | – | 675 | |
| 10 × 16 | 100 | 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) |
| 12.5 × 30 | 200 | 500 | | | 175 | 175 | – | 180 | 1) |
| 12.5 × 35 | 175 | - | | | 175 | 175 | – | 150 | 1) |
| 12.5 × 40 | 175 | - | | | 175 | 175 | – | 150 | 1) |
| 16 × 20 | 250 | 300 | | | 200 | 200 | 200 | 200 | 120 |
| 16 × 25 | 250 | 300 | | | 200 | 200 | 200 | 200 | 120 |
| 16 × 31.5 | 200 | 300 | | | 250 | 250 | 344 | 344 | 120 |
| 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 | | | | | |
| | | **007** | 2.5 | 5...6.3 | | | | | |
| | | **008** | 5 | 5...12.5 | | | | | |
| | | **009** | 7.5 | 16...18 | | | | | |

1) Available upon request



**Overview of packing units and code numbers for case sizes 18 × 20 ... 25 × 40**

| | | | | | | PAPR | | |
|---|---|---|---|---|---|---|---|---|
| Case size d × l | Standard, bulk | Taped, Ammo pack | | | Kinked leads, bulk | Cut leads, bulk | Crimped leads | J leads | Bent 90° leads, blister |
| mm | pcs. | pcs. | | | pcs. | pcs. | pcs. | pcs. | pcs. |
| 18 × 20 | 175 | 250 | | | 175 | 175 | 200 | 200 | 120 |
| 18 × 25 | 150 | 250 | | | 150 | 150 | 200 | 200 | 120 |
| 18 × 31.5 | 100 | 250 | | | 100 | 100 | 150 | 150 | 120 |
| 18 × 35 | 100 | – | | | 100 | 100 | 150 | 150 | 150 |
| 18 × 40 | 125 | – | | | 100 | 100 | 120 | – | 72 |
| 20 × 20 | 125 | – | | | 125 | 125 | 200 | – | – |
| 20 × 25 | 125 | – | | | 125 | 125 | 200 | – | – |
| 20 × 30 | 100 | – | | | 100 | 100 | 120 | – | – |
| 20 × 35 | 100 | – | | | 100 | 100 | 120 | – | – |
| 20 × 40 | 100 | – | | | 100 | 100 | 120 | – | – |
| 22 × 30 | 80 | – | | | 100 | 100 | – | – | – |
| 22 × 35 | 80 | – | | | 100 | 100 | – | – | – |
| 22 × 40 | 80 | – | | | 100 | 100 | – | – | – |
| 25 × 40 | 40 | – | | | 100 | – | – | – | – |
| The last three digits of the complete ordering code state the lead configuration | **000** | Code | F (mm) | d (mm) | **001** | **002** | **003** | **004** | **012** |
| | | **007** | 2.5 | 4...6.3 | | | | | |
| | | **008** | 5 | 6.3...12.5 | | | | | |
| | | **009** | 7.5 | 16...18 | | | | | |





## Cautions and warnings

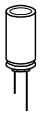
### Personal safety

The electrolytes used by EPCOS have not only been optimized with a view to the intended application, but also 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, part of the high-voltage electrolytes used by EPCOS are self-extinguishing. They contain flame-retarding substances which will quickly extinguish any flame that may have been ignited.

As far as possible, EPCOS does not use any dangerous chemicals or compounds to produce operating electrolytes. However, in exceptional cases, such materials must be used in order to achieve specific physical and electrical properties because no safe substitute materials are currently known. However, the amount of dangerous materials used in our products has been limited to an absolute minimum. Nevertheless, the following rules should be observed when handling Al electrolytic capacitors:

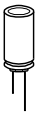
- Any escaping electrolyte should not come into contact with eyes or skin.
- If electrolyte does come into contact with the skin, wash the affected parts immediately with running water. If the eyes are affected, rinse them for 10 minutes with plenty of water. If symptoms persist, seek medical treatment.
- Avoid breathing in 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 summarize the safety instructions that must be observed without fail. A detailed description can be found in the relevant sections of 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 polarity classes should be prevented by connecting a diode. | 3.1.6 "Reverse voltage" |
| Upper category temperature | Do not exceed the upper category temperatur. | 7.2 "Maximum permissible operating temperature" |
| Maintenance | Make periodic inspections of the capacitors.<br>Before the inspection, make sure that the power supply is turned off and carefully discharge the electricity of the capacitors.<br>Do not apply any mechanical stress to the capacitor terminals. | 10 "Maintenance" |
| Mounting position of screw terminal capacitors | Do not mount the capacitor with the terminals (safety vent) upside down. | 11.1. "Mounting positions of capacitors with screw terminals" |
| 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" |
| Robustness of terminals | The following maximum tightening torques must not be exceeded when connecting screw terminals:<br>M5: 2 Nm<br>M6: 2.5 Nm | 11.3 "Mounting torques" |
| Soldering | Do not exceed the specified time or temperature limits during soldering. | 11.5 "Soldering" |



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**Extended useful life – 105 °C**

| Topic | Safety information | Reference<br>Chapter "General technical information" |
|---|---|---|
| Soldering, cleaning agents | Do not allow halogenated hydrocarbons to come into contact with aluminum electrolytic capacitors. | 11.6<br>"Cleaning agents" |
| Passive flammability | Avoid external energy, such as fire or electricity. | 8.1<br>"Passive flammability" |
| Active flammability | Avoid overload of the capacitors. | 8.2<br>"Active flammability" |
| | | Reference<br>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" |

## 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 passive 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 a passive 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 a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed**.
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