



# Aluminum electrolytic capacitors

## Single-ended capacitors

**Series/Type:** B41897

**Date:** November 2020

## Long-life grade capacitors

### Applications

- Automotive electronics

### Features

- Ultra compact design
- High operating temperature capability up to 150 °C for short periods
- Long useful life
- High ripple current capability
- Low ESR
- RoHS-compatible

### Construction

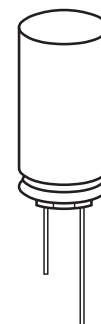
- Radial leads
- Charge-discharge proof, polar
- Coated aluminum case
- Plus pole marking on the case side
- Case with safety vent

### Delivery mode

Terminal configurations and packing:

- Bulk
- Taped, Ammo pack
- Cut
- PAPER (Protection Against Polarity Reversal):  
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 $V_R$	25 ... 75 V DC					
Surge voltage $V_S$	$1.1 \cdot V_R$					
Rated capacitance $C_R$	270 ... 12000 $\mu\text{F}$					
Capacitance tolerance	$\pm 20\% \triangleq M$					
Dissipation factor $\tan \delta$ (20 °C, 120 Hz)	For capacitance higher than 1000 $\mu\text{F}$ add 0.02 for every increase of 1000 $\mu\text{F}$ .					
	$V_R$ (V DC)	25	35	50	63	75
	$\tan \delta$ (max.)	0.14	0.12	0.10	0.10	0.08
Leakage current $I_{\text{leak}}$ (20 °C, 1 min)	$I_{\text{leak}} \leq$					

- 1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life.
- 2) Before the measurement, the capacitor shall be preconditioned by the application of the rated voltage for 1 hour. The voltage shall be applied to the capacitor through a resistor, the value of which shall be approximately 100  $\Omega$ .
- 3) Refer to chapter "General technical information, 2.3 AEC-Q200 standard" for further details.



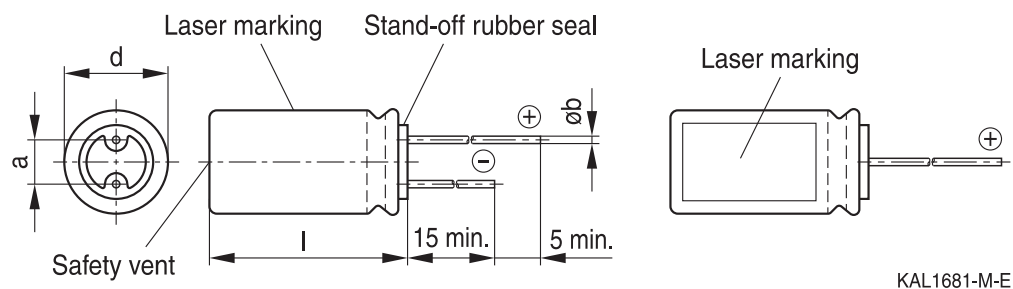
**B41897**

**Low ESR, ultra compact – 135 °C**

**Dimensional drawing**

**With stand-off rubber seal**

Diameters (mm): 12.5, 16, 18



KAL1681-M-E

**Dimensions and weights**

Dimensions (mm)				Approx. weight g
$d +0.5$	$l$	$a \pm 0.5$	$b$	
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
16	35.5 +2.0	7.5	0.80 ±0.05	9.2
16	40 +2.0	7.5	0.80 ±0.05	11.5
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 +2.5	7.5	0.80 ±0.1	16.0


**Overview of available types**

Other voltage and capacitance ratings are available upon request.

$V_R$ (V DC)	25	35	50
	Case dimensions $d \times l$ (mm)		
$C_R$ ( $\mu\text{F}$ )			
620			12.5 × 20
820			12.5 × 25
1000			16 × 20
1300		12.5 × 20	16 × 25 18 × 20
1600			16 × 31.5
1800		12.5 × 25	18 × 25
2000	12.5 × 20	16 × 20	
2200			16 × 35.5
2400		18 × 20	18 × 31.5
2700			16 × 40
3000	12.5 × 25	16 × 25	18 × 35
3300	16 × 20		
3600		16 × 31.5	18 × 40
3900		18 × 25	
4300	18 × 20	16 × 35.5	
4700	16 × 25	18 × 31.5	
5600	16 × 31.5	16 × 40	
6200	18 × 25	18 × 35	
7500	16 × 35.5 18 × 31.5	18 × 40	
9100	16 × 40		
10000	18 × 35		
12000	18 × 40		



**B41897**

**Low ESR, ultra compact – 135 °C**

### Overview of available types

Other voltage and capacitance ratings are available upon request.

$V_R$ (V DC)	63	75
	Case dimensions $d \times l$ (mm)	
$C_R$ ( $\mu$ F)		
270		12.5 × 20
390	12.5 × 20	12.5 × 25
470		16 × 20
560	12.5 × 25	
620		18 × 20
680	16 × 20	16 × 25
750		16 × 31.5
820		18 × 25
910	18 × 20	
1000	16 × 25	16 × 35.5
1100		18 × 31.5
1200	16 × 31.5	
1300	18 × 25	16 × 40 18 × 35
1600	16 × 35.5 18 × 31.5	18 × 40
1800	16 × 40	
2100	18 × 35	
2400	18 × 40	

### Technical data and ordering codes

$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions $d \times l$ mm	$\text{ESR}_{\text{max}}$ 100 kHz -40 °C $\Omega$	$\text{ESR}_{\text{max}}$ 100 kHz 20 °C $\Omega$	$I_{\text{AC,max}}$ 100 kHz 125 °C mA	$I_{\text{AC,R}}$ 100 kHz 135 °C mA	Ordering code (composition see below)
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### Composition of ordering code

\*\*\* = Version

000 = for standard leads, bulk


**B41897**
**Low ESR, ultra compact – 135 °C**
**Technical data and ordering codes**

$C_R$	Case dimensions	$ESR_{max}$ 100 kHz –40 °C	$ESR_{max}$ 100 kHz 20 °C	$I_{AC,max}$ 100 kHz 125 °C	$I_{AC,R}$ 100 kHz 135 °C	Ordering code (composition see below)
120 Hz	$d \times l$	$\Omega$	$\Omega$	mA	mA	
20 °C	mm					
$\mu F$						

 **$V_R = 50$  V DC**

620	12.5 × 20	0.88	0.073	2400	1470	B41897A6627M***
820	12.5 × 25	0.67	0.058	3480	2260	B41897A6827M***
1000	16 × 20	0.55	0.050	2960	1870	B41897A6108M***
1300	16 × 25	0.44	0.042	4040	2500	B41897A6138M***
1300	18 × 20	0.44	0.042	3250	2110	B41897B6138M***
1600	16 × 31.5	0.36	0.035	5130	2960	B41897A6168M***
1800	18 × 25	0.32	0.033	4230	2530	B41897A6188M***
2200	16 × 35.5	0.27	0.029	5480	3160	B41897A6228M***
2400	18 × 31.5	0.25	0.028	5240	3020	B41897A6248M***
2700	16 × 40	0.22	0.025	5930	3420	B41897A6278M***
3000	18 × 35	0.20	0.024	5870	3390	B41897A6308M***
3600	18 × 40	0.16	0.023	6420	3700	B41897A6368M***

 **$V_R = 63$  V DC**

390	12.5 × 20	0.56	0.072	1700	1420	B41897A8397M***
560	12.5 × 25	0.39	0.052	2520	2050	B41897A8567M***
680	16 × 20	0.34	0.053	2300	1910	B41897A8687M***
910	18 × 20	0.26	0.044	2500	2100	B41897A8917M***
1000	16 × 25	0.23	0.038	3100	2680	B41897A8108M***
1200	16 × 31.5	0.20	0.034	3860	3050	B41897A8128M***
1300	18 × 25	0.19	0.033	3300	2810	B41897A8138M***
1600	16 × 35.5	0.15	0.027	4590	3420	B41897A8168M***
1600	18 × 31.5	0.15	0.028	4080	3220	B41897B8168M***
1800	16 × 40	0.14	0.025	5190	3670	B41897A8188M***
2100	18 × 35	0.12	0.022	5220	3690	B41897A8218M***
2400	18 × 40	0.11	0.021	5660	3820	B41897A8248M***

**Composition of ordering code**

\*\*\* = Version

000 = for standard leads, bulk

002 = for cut leads, bulk

004 = for J leads, blister

008 = for taped leads, Ammo pack, lead spacing  $F = 5.0$  mm (for  $\varnothing 12.5$  mm)

009 = for taped leads, Ammo pack, lead spacing  $F = 7.5$  mm (for  $d \times l = 16 \times 20 \dots 16 \times 31.5$  mm and  $18 \times 20 \dots 18 \times 31.5$  mm)

012 = for bent 90° leads, blister (for  $\varnothing 16 \dots 18$  mm)




**Technical data and ordering codes**

$C_R$ 120 Hz 20 °C $\mu\text{F}$	Case dimensions $d \times l$ mm	$\text{ESR}_{\text{max}}$ 100 kHz –40 °C $\Omega$	$\text{ESR}_{\text{max}}$ 100 kHz 20 °C $\Omega$	$I_{\text{AC,max}}$ 100 kHz 125 °C mA	$I_{\text{AC,R}}$ 100 kHz 135 °C mA	Ordering code (composition see below)
<b><math>V_R = 75 \text{ V DC}</math></b>						
270	12.5 × 20	0.78	0.101	1700	1420	B41897A0277M***
390	12.5 × 25	0.55	0.073	2520	2050	B41897A0397M***
470	16 × 20	0.48	0.074	2300	1910	B41897A0477M***
620	18 × 20	0.36	0.062	2500	2100	B41897A0627M***
680	16 × 25	0.32	0.051	3100	2680	B41897A0687M***
750	16 × 31.5	0.29	0.041	3860	3050	B41897A0757M***
820	18 × 25	0.27	0.043	3300	2810	B41897A0827M***
1000	16 × 35.5	0.21	0.032	4590	3420	B41897A0108M***
1100	18 × 31.5	0.21	0.038	4080	3220	B41897A0118M***
1300	16 × 40	0.20	0.035	5190	3670	B41897A0138M***
1300	18 × 35	0.17	0.031	5220	3690	B41897B0138M***
1600	18 × 40	0.16	0.029	5660	3820	B41897A0168M***

**Composition of ordering code**

\*\*\* = Version

000 = for standard leads, bulk

002 = for cut leads, bulk

004 = for J leads, blister

008 = for taped leads, Ammo pack, lead spacing  $F = 5.0 \text{ mm}$  (for  $\varnothing 12.5 \text{ mm}$ )

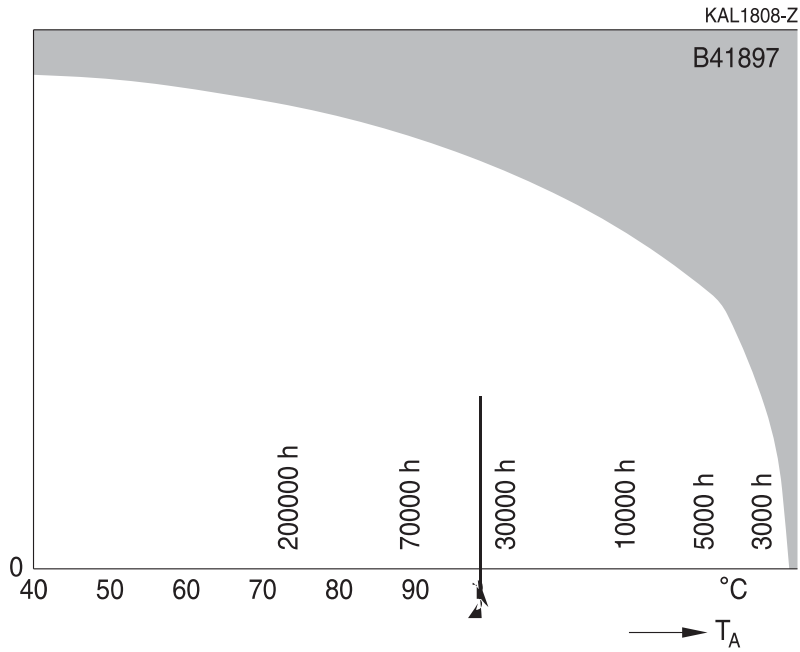
009 = for taped leads, Ammo pack, lead spacing  $F = 7.5 \text{ mm}$  (for  $d \times l = 16 \times 20 \dots 16 \times 31.5 \text{ mm}$  and  $18 \times 20 \dots 18 \times 31.5 \text{ mm}$ )

012 = for bent 90° leads, blister (for  $\varnothing 16 \dots 18 \text{ mm}$ )

**Useful life<sup>1)</sup>**

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

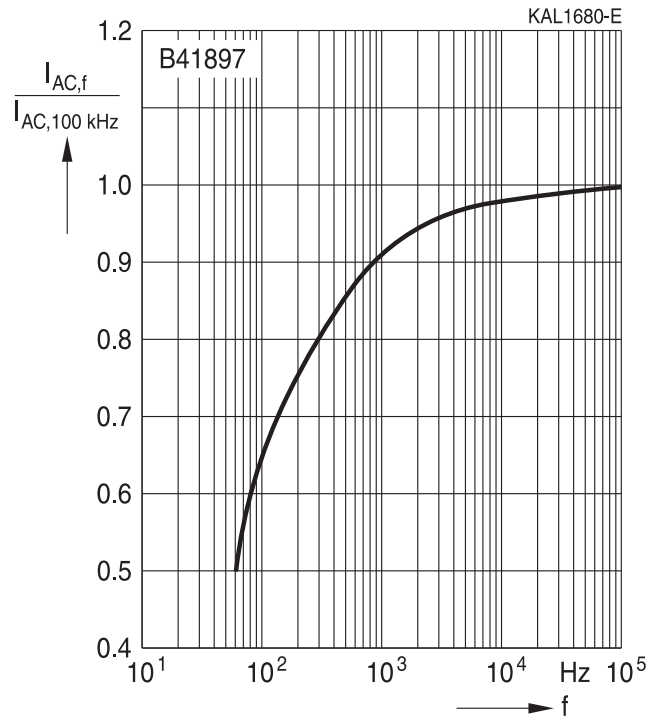
$$V_R \leq 50 \text{ V}$$



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



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



## Taping

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

Lead spacing  $F = 3.5 \text{ mm}$  ( $\varnothing d = 8 \text{ mm}$ )

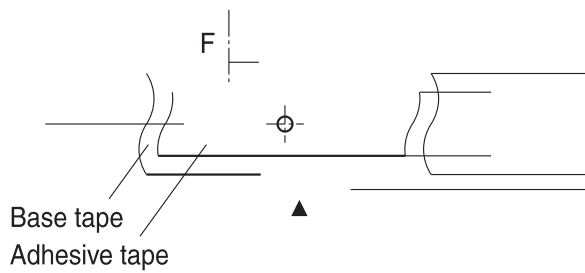
Lead spacing  $F = 5.0 \text{ mm}$  ( $\varnothing d = 8 \dots 12.5 \text{ mm}$ )

Lead spacing  $F = 7.5 \text{ mm}$  ( $\varnothing d = 16 \dots 18 \text{ mm}$ ).

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

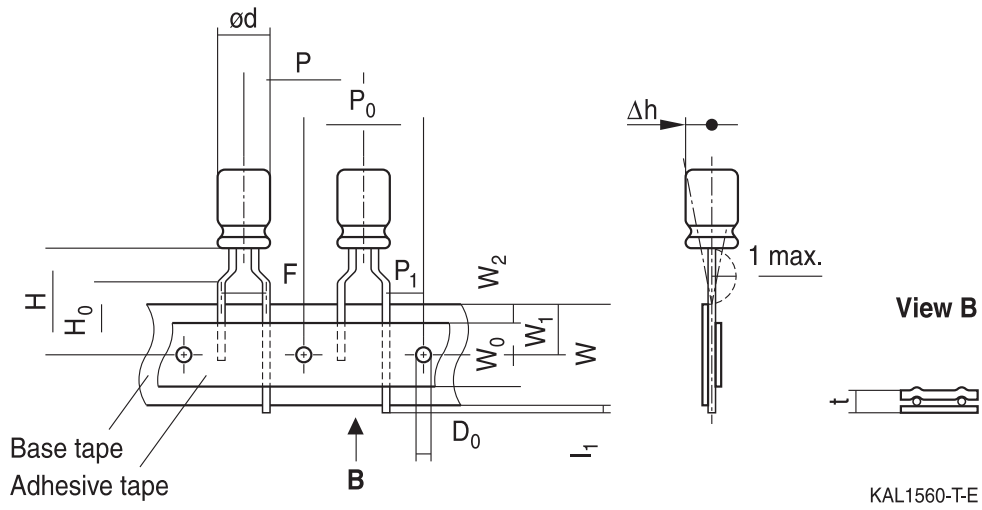
### Lead spacing 3.5 mm ( $\varnothing d = 8 \text{ mm}$ )

Last 3 digits of ordering code: 006



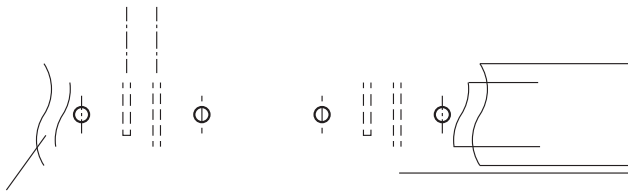
Lead spacing 5.0 mm ( $\varnothing d = 8$  mm)

Last 3 digits of ordering code: 008



**Lead spacing 7.5 mm ( $\varnothing$  d = 16 ...18 mm)**

Last 3 digits of ordering code: 009



A



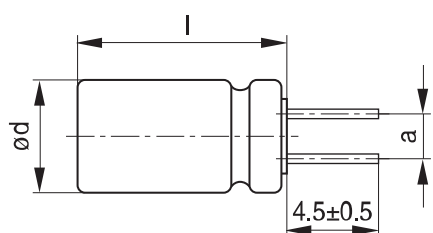
### Cut or kinked leads

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

### Cut leads

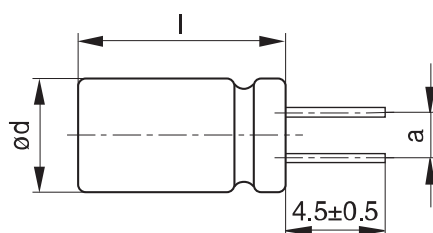
Last 3 digits of ordering code: 002

#### With stand-off rubber seal



KAL1085-I

#### With flat rubber seal



KAL1086-R

Case size d × l (mm)	Dimensions (mm) 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



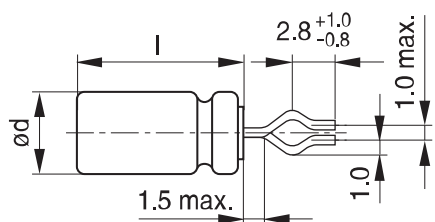
**B41897**

**Low ESR, ultra compact – 135 °C**

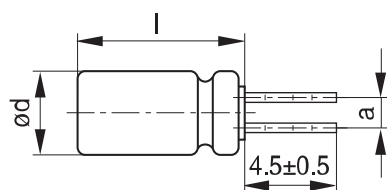
**Kinked leads**

Last 3 digits of ordering code: 001

**With stand-off rubber seal**



KAL1081-K

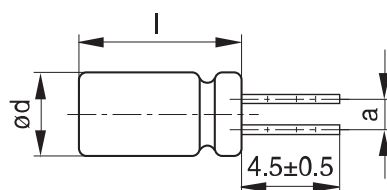


KAL1083-2

**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
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



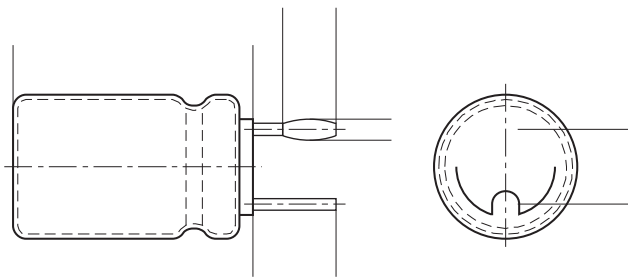
### **PAPR leads (Protection Against Polarity Reversal)**

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**



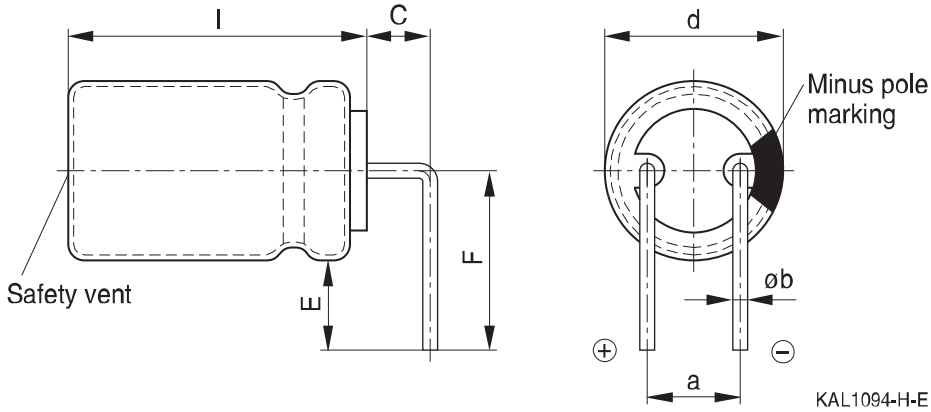
KAL1087-Z-E



The series B41897, B41898 and B41899 have no sleeve nor minus pole marking, the positive pole is marked on the aluminum case side instead.

### Bent 90° leads for horizontal mounting pinning

Last 3 digits of ordering code: 012



The series B41897, B41898 and B41899 have no sleeve nor minus pole marking, the positive pole is marked on the aluminum case side instead.

Case size $d \times l$ (mm)	Dimensions (mm)				
	$C \pm 0.5$	$E \pm 0.5$	$F \pm 0.5$	$a \pm 0.5$	$\varnothing b$
16 × 20	4.0	4.0	12.0	7.5	$0.8 \pm 0.05$
16 × 25	4.0	4.0	12.0	7.5	$0.8 \pm 0.05$
16 × 31.5	4.0	4.0	12.0	7.5	$0.8 \pm 0.05$
16 × 35.5	4.0	4.0	12.0		

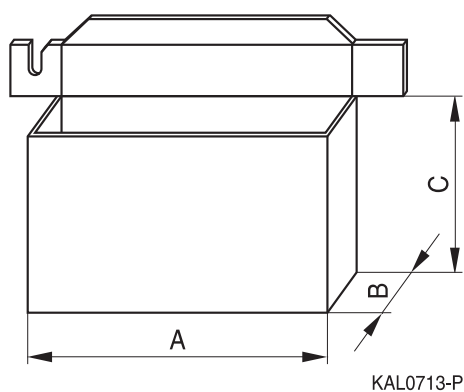


**B41897**

**Low ESR, ultra compact – 135 °C**

## Packing units and box dimensions

### Ammo pack



Case size d × l mm	Dimensions (mm)			Packing units pcs.
	A <sub>max</sub>	B <sub>max</sub>	C <sub>max</sub>	
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**

Case size d × l  mm	Stan- dard, bulk pcs.	Taped, Ammo pack pcs.	Kinked leads, bulk pcs.	Cut leads, bulk pcs.	PAPR				
					Crimped leads, blister pcs.	J leads, blister pcs.	Bent 90° leads, blister 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	<b>000</b>	Code	F (mm)	d (mm)	<b>001</b>	<b>002</b>	<b>003</b>	<b>004</b>	<b>012</b>
		<b>006</b>	3.5	8					
		<b>008</b>	5	8...12.5					
		<b>009</b>	7.5	16...18					

1) Available upon request

## 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 separate 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: M5: 2.5 Nm 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. Avoid any compressive, tensile or flexural stress. Do not move the capacitor after soldering to PC board. Do not pick up the PC board by the soldered capacitor. 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"



**B41897**

**Low ESR, ultra compact – 135 °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](http://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)

Symbol	English	German
V	Voltage	Spannung
V <sub>F</sub>	Forming voltage	Formierspannung
V <sub>op</sub>	Operating voltage	Betriebsspannung
V <sub>R</sub>	Rated voltage, DC voltage	Nennspannung, Gleichspannung
V <sub>S</sub>	Surge voltage	Spitzenspannung
X <sub>C</sub>	Capacitive reactance	Kapazitiver Blindwiderstand
X <sub>L</sub>	Inductive reactance	Induktiver Blindwiderstand
Z	Impedance	Scheinwiderstand
Z <sub>T</sub>	Impedance at temperature T	Scheinwiderstand bei Temperatur T
tan δ	Dissipation factor	Verlustfaktor
λ	Failure rate	Ausfallrate

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## Important notes

The following applies to all products named in this publication:

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## Important notes

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