Aluminum electrolytic capacitors

Large-size capacitors

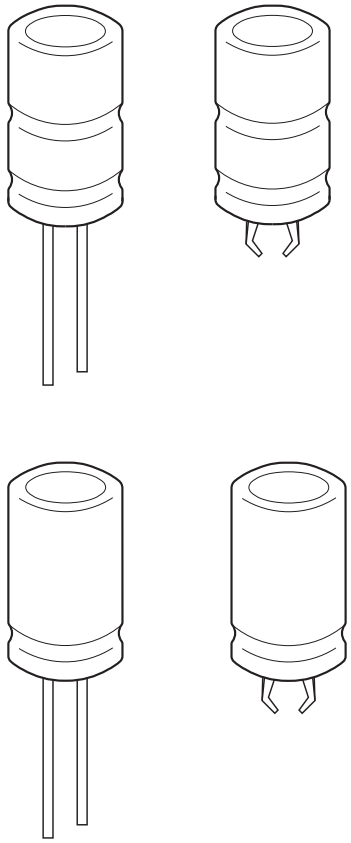
Series/Type: **B41605**

Date: December 2016

© EPCOS AG 2016. Reproduction, publication and dissemination of this publication, enclosures hereto and the information contained therein without EPCOS' prior express consent is prohibited.

EPCOS AG is a TDK Group Company.

Long-life grade capacitors

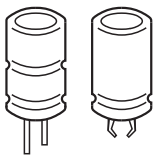


Applications
- High-reliability equipment in automotive power electronics
- Applications with highest ripple current load at high frequencies

Features
- High reliability and long useful life, up to 5000 h at 125 °C
- Very high ripple current capability optimized for high frequencies
- Compact design
- High vibration stability
- SIKOREL design – storage for up to 15 years at a temperature of up to 35 °C
- RoHS-compatible

Construction
- Charge/discharge-proof, polar
- Aluminum case, fully insulated with PET
- Up to 40 *g* vibration stability version with middle corrugation
- Snap-in solder version with pins to hold component in place on PC-board
- Minus pole not insulated from case
- Overload protection (safety vent)
- Without insulation sleeve upon request

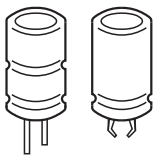
Terminals
- Version with wired terminals, weldable and solderable
- Snap-in with 3 terminals, protection against polarity reversal



Specifications and characteristics in brief

Rated voltage V_R Surge voltage V_S	25 ... 63 V DC 1.15 · V_R		
Rated capacitance C_R Capacitance tolerance	2000 ... 27000 µF ±20% ≙ M		
Leakage current I_{leak} (5 min, 20 °C)	$I_{leak} \leq 0.006\ \mu A \cdot \left(\frac{C_R}{\mu F} \cdot \frac{V_R}{V}\right) + 4\ \mu A$		
Self-inductance ESL	10 nH		
Useful life[1)] 125 °C; V_R; $I_{AC,R}$ 85 °C; V_R; 2.3 · $I_{AC,R}$ 40 °C; V_R; 2.0 · $I_{AC,R}$	 > 5000 h > 20000 h > 500000 h	Requirements: |ΔC/C| ESR I_{leak}	 ≤ 30% of initial value ≤ 3 times initial specified limit[2)] ≤ initial specified limit
Voltage endurance test 125 °C; V_R	 2000 h	Post test requirements: |ΔC/C| ESR I_{leak}	 ≤ 10% of initial value ≤ 1.3 times initial specified limit[2)] ≤ initial specified limit
Vibration resistance test	To IEC 60068-2-6, test Fc:		
	40 *g* vibration stability version with middle corrugation		Standard vibration version without middle corrugation
	Frequency range 10 Hz ... 2 kHz, displacement amplitude max. 3 mm, acceleration max. 40 *g*, duration 3 × 2 h. Capacitor mounted by its body which is rigidly clamped to the work surface.		Frequency range 10 Hz ... 2 kHz, displacement amplitude max. 0.75 mm, acceleration max. 10 *g*, duration 3 × 2 h. Capacitor mounted by its body which is rigidly clamped to the work surface.
IEC climatic category	To IEC 60068-1: 55/125/56 (−55 °C/+ 125 °C/56 days damp heat test)		
Detail specification Sectional specification	Similar to CECC 30301-809 IEC 60384-4		

1) Refer to chapter "General technical information, 5 Useful life" on how to interpret useful life.
2) ESR_{max} at 100 Hz, 20 °C

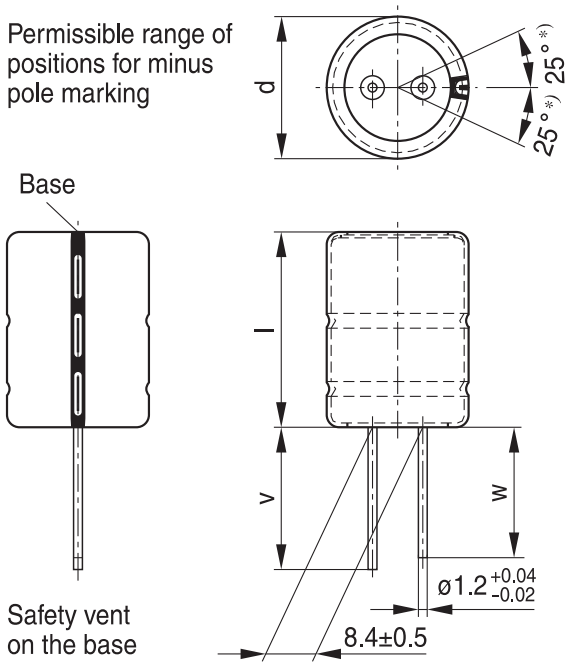


B41605

Compact − 125 °C

Dimensional drawings

Large-size capacitor, up to 40 *g* vibration stability version (with middle corrugation) with wired terminals

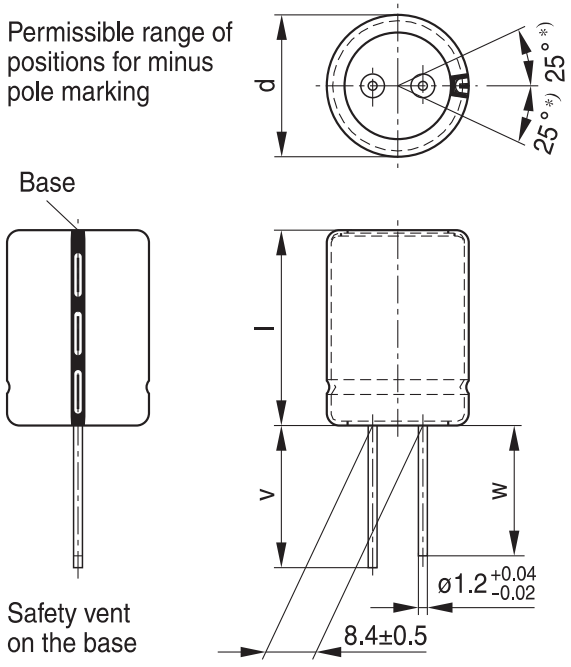


KAL1313-5-E

Dimensions and weights

Dimensions		Wire length		Approx.	Packing
d +1 mm	l ±2 mm	v −2 mm	w −2 mm	weight g	units pcs.
22	40	25	23	21	56
25	40	25	23	28	56
25	50	25	23	35	56
30	50	15	13	50	36
35	50	15	13	68	30

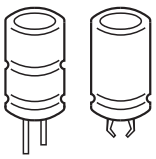
Large-size capacitor, standard vibration version with wired terminals



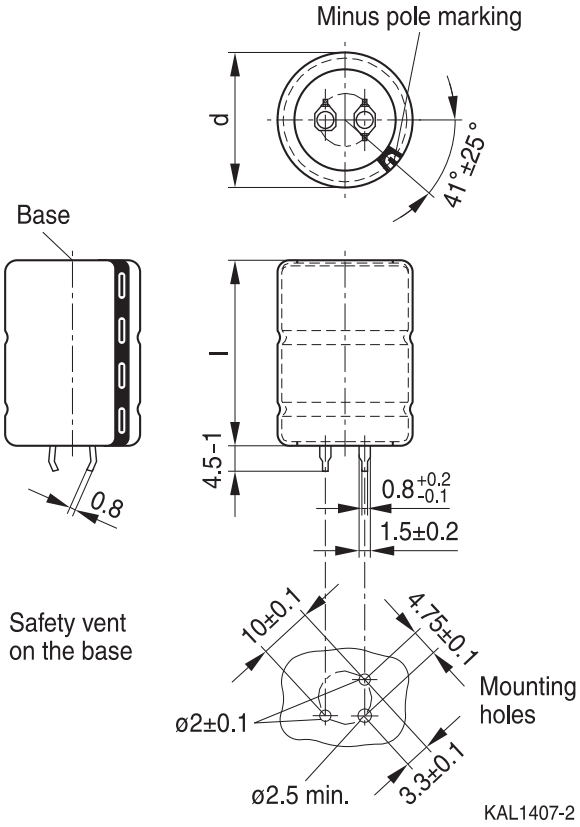
KAL1314-D-E

Dimensions and weights

Dimensions		Wire length		Approx.	Packing
d +1 mm	l ±2 mm	v −2 mm	w −2 mm	weight g	units pcs.
22	40	25	23	21	56
25	40	25	23	28	56
25	50	25	23	35	56
30	50	15	13	50	36
35	50	15	13	68	30



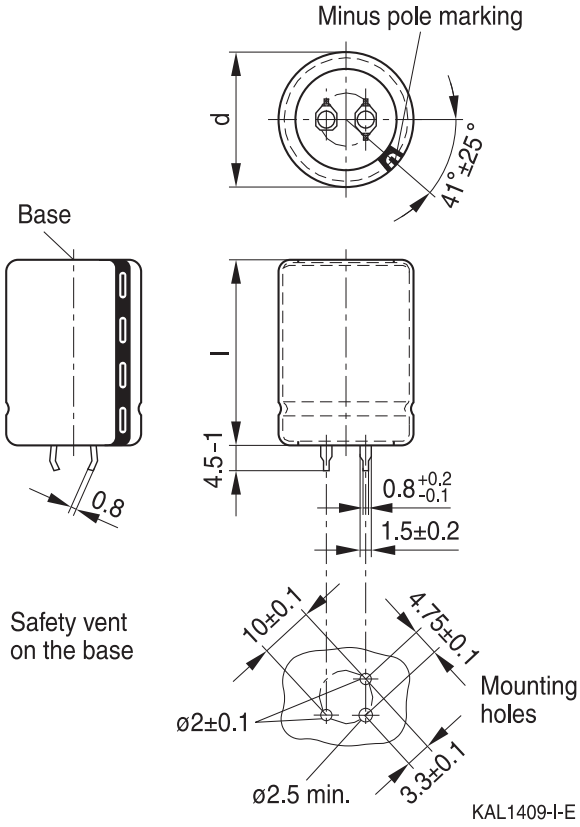
Large-size capacitor, snap-in version high vibration stability (with middle corrugation)



Dimensions, weights and packing units

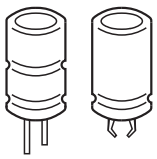
Dimensions		Approx. weight	Packing units
d +1 mm	l ±2 mm	g	pcs.
22	40	21	160
25	40	28	130
25	50	35	130
30	50	50	80
35	50	68	60

Large-size capacitor, snap-in version standard vibration stability



Dimensions, weights and packing units

Dimensions		Approx. weight	Packing units
d +1 mm	l ±2 mm	g	pcs.
22	40	21	160
25	40	28	130
25	50	35	130
30	50	50	80
35	50	68	60



Packing example of large-size capacitors, snap-in version

For ecological reasons the packing is pure cardboard.

Ordering codes for terminal styles and insulation features

Identification in 3rd block of ordering code

Large-size capacitors		
Terminal version	Insulation version	
	PET	
3 terminals 4.5 mm	M002	M003
Wired terminals	M008	M009

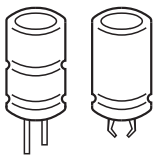
Ordering examples:

B41605B5129M002 } large-size capacitor, snap-in version with 3 terminals and PET insulation

B41605B5129M003 } large-size capacitor, snap-in version with 3 terminals, middle corrugation (high vibration stability up to 40 *g*) and PET insulation

B41605B5129M008 } large-size capacitor, with wired terminals and PET insulation

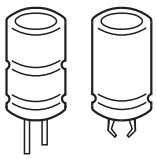
B41605B5129M009 } large-size capacitor, with wired terminals, middle corrugation (high vibration stability up to 40 *g*) and PET insulation



Overview of available types

The capacitance and voltage ratings listed below are available in different case sizes upon request. Other voltage and capacitance ratings are also available upon request.

V_R (V DC)	25	40	55	63
	Case dimensions d × l (mm)			
C_R (µF)				
2000				22 × 40
2500			22 × 40	
2700				25 × 40
3300			25 × 40	
3900		22 × 40		25 × 50
4700			25 × 50	
5100		25 × 40		
5600				30 × 50
6800	22 × 40	25 × 50	30 × 50	
8100				35 × 50
9000	25 × 40			
10000		30 × 50	35 × 50	
12000	25 × 50			
15000		35 × 50		
18000	30 × 50			
27000	35 × 50			



B41605

Compact – 125 °C

Technical data and ordering codes

C_R 100 Hz 20 °C µF	Case dimensions d × l mm	ESR_{max} 100 Hz 20 °C mΩ	ESR_{max} 100 Hz −40 °C mΩ	ESR_{max} 10 kHz 20 °C mΩ	$I_{AC,max}$ 10 kHz 125 °C A	$I_{AC,R}$ 10 kHz 125 °C A	Ordering code (composition see below)
V_R = 25 V DC							
6800	22 × 40	22	115	19	9.5	6.5	B41605C5688M00*
9000	25 × 40	18	80	15	10.5	7.1	B41605B5908M00*
12000	25 × 50	13	55	12	13.2	9.0	B41605B5129M00*
18000	30 × 50	11	45	11	14.3	9.8	B41605C5189M00*
27000	35 × 50	10	32	11	14.6	10.0	B41605C5279M00*
V_R = 40 V DC							
3900	22 × 40	26	115	19	9.5	6.5	B41605B7398M00*
5100	25 × 40	21	80	15	10.5	7.1	B41605B7518M00*
6800	25 × 50	16	60	11	13.2	9.0	B41605B7688M00*
10000	30 × 50	13	45	11	14.4	9.9	B41605C7109M00*
15000	35 × 50	11	32	11	14.7	10.1	B41605C7159M00*
V_R = 55 V DC							
2500	22 × 40	31	115	19	9.5	6.4	B41605B0258M00*
3300	25 × 40	24	80	15	10.5	7.1	B41605B0338M00*
4700	25 × 50	18	60	12	13.2	9.0	B41605B0478M00*
6800	30 × 50	15	45	11	14.3	9.8	B41605C0688M00*
10000	35 × 50	13	35	11	14.6	10.0	B41605C0109M00*
V_R = 63 V DC							
2000	22 × 40	35	115	19	9.5	6.4	B41605B8208M00*
2700	25 × 40	26	85	15	10.4	7.0	B41605C8278M00*
3900	25 × 50	20	65	12	13.2	9.0	B41605B8398M00*
5600	30 × 50	16	45	11	14.3	9.8	B41605D8568M00*
8100	35 × 50	13	35	11	14.6	10.0	B41605C8818M00*

Composition of ordering code

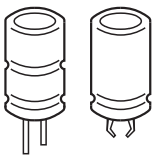
* = Terminal style

2 = for snap-in version with 3 terminals

3 = for snap-in version with 3 terminals and middle corrugation

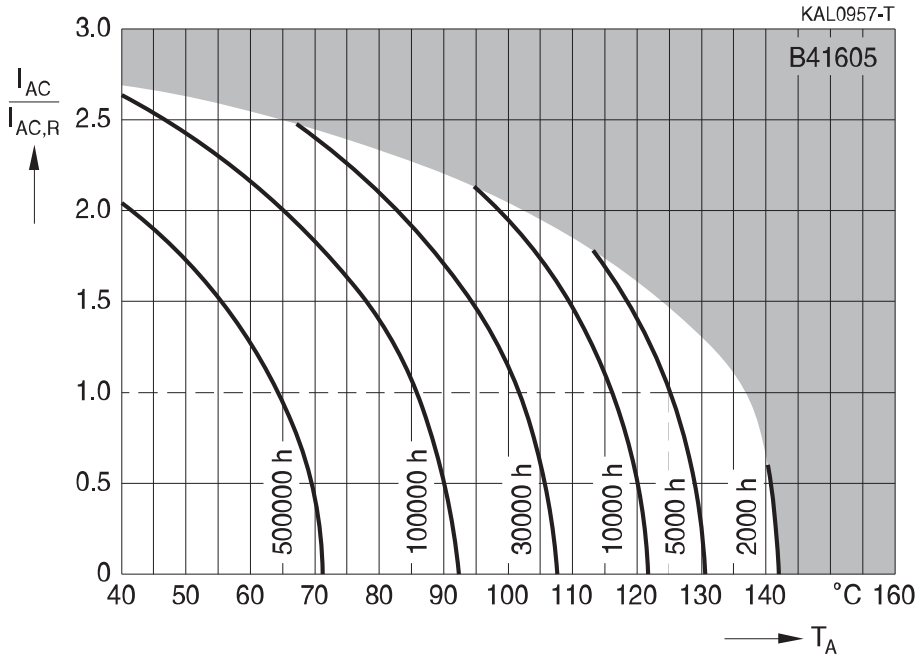
8 = for version with wired terminals

9 = for version with wired terminals and middle corrugation



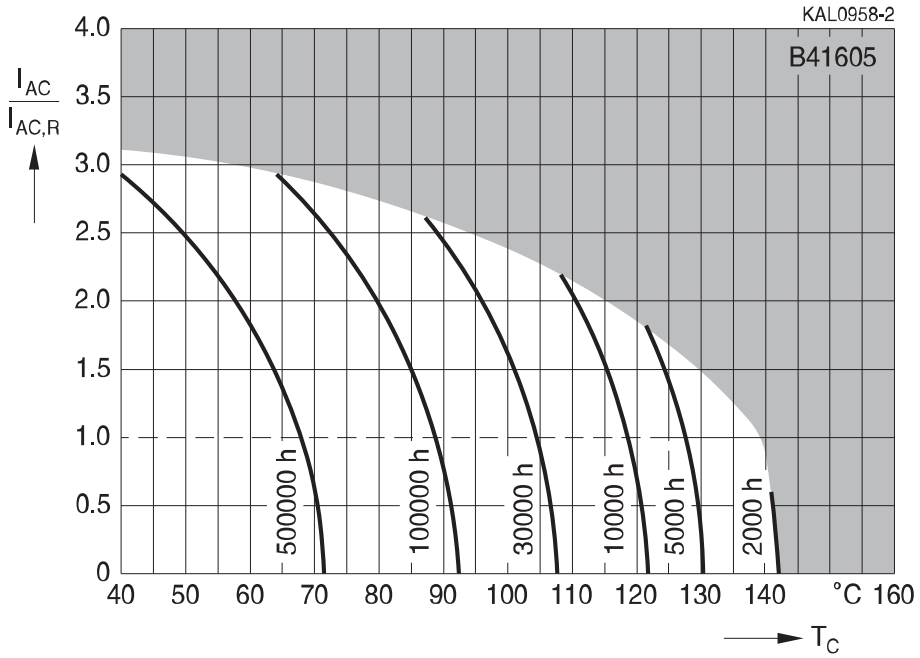
Useful life[1)]

depending on ambient temperature T_A under ripple current operating conditions at V_R

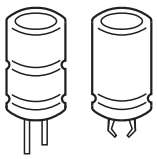


Useful life[1)]

depending on case temperature T_C under ripple current operating conditions at V_R



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

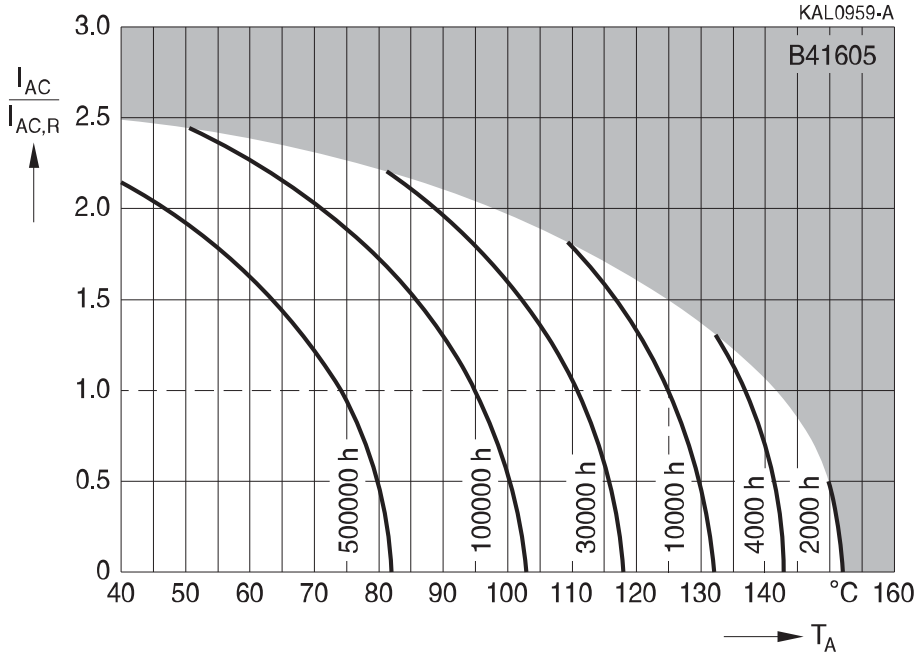


Useful life[1)]

depending on ambient temperature T_A under ripple current operating conditions at V_{op}

V_R = 25 V: $V_{op} \leq$ 20 V V_R = 55 V: $V_{op} \leq$ 48 V

V_R = 40 V: $V_{op} \leq$ 35 V V_R = 63 V: $V_{op} \leq$ 55 V

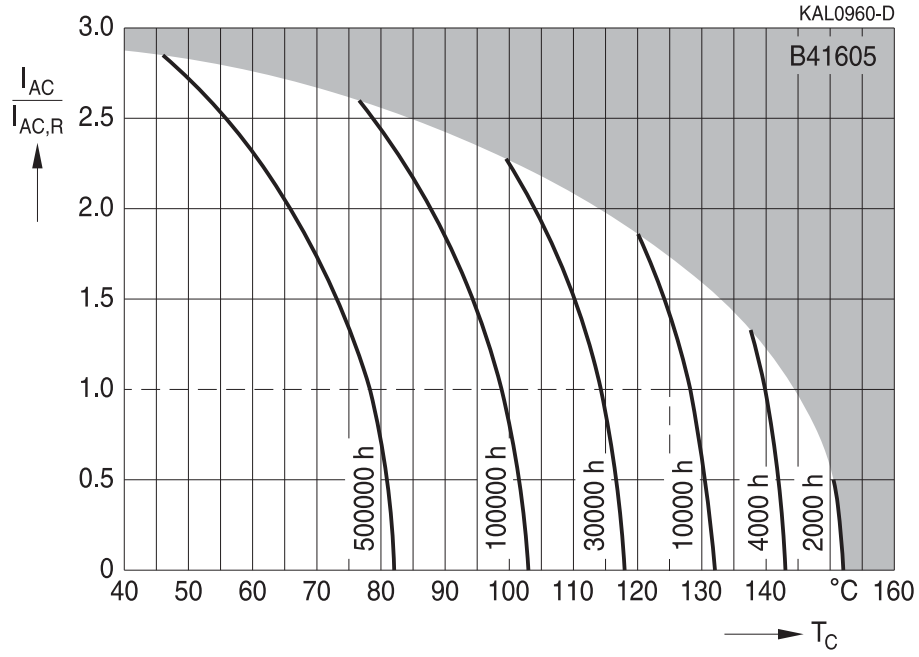


Useful life[1)]

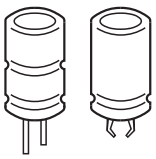
depending on case temperature T_C under ripple current operating conditions at V_{op}

V_R = 25 V: $V_{op} \leq$ 20 V V_R = 55 V: $V_{op} \leq$ 48 V

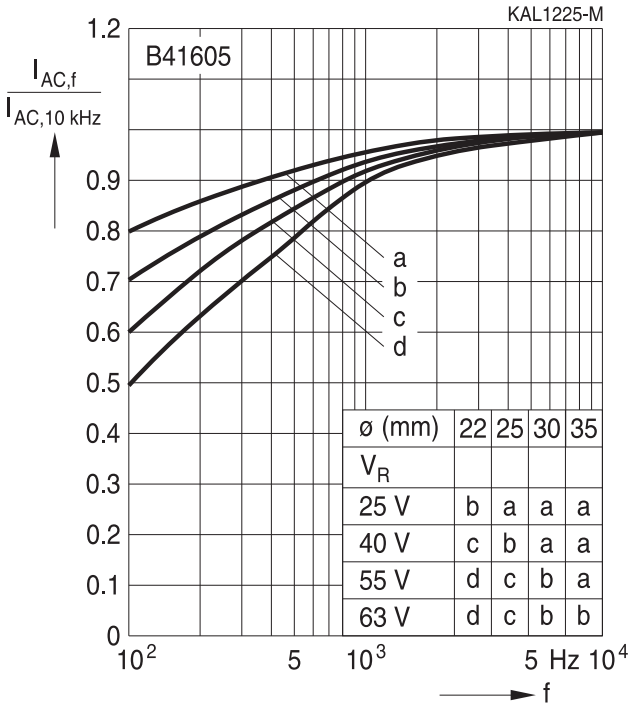
V_R = 40 V: $V_{op} \leq$ 35 V V_R = 63 V: $V_{op} \leq$ 55 V



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



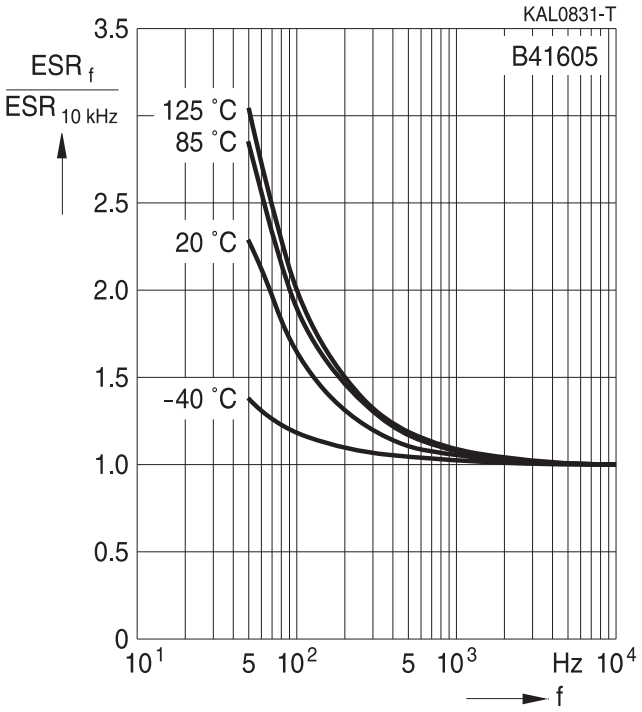
Frequency factor of permissible ripple current I_{AC} versus frequency f



ø (mm)	22	25	30	35
V_R				
25 V	b	a	a	a
40 V	c	b	a	a
55 V	d	c	b	a
63 V	d	c	b	b

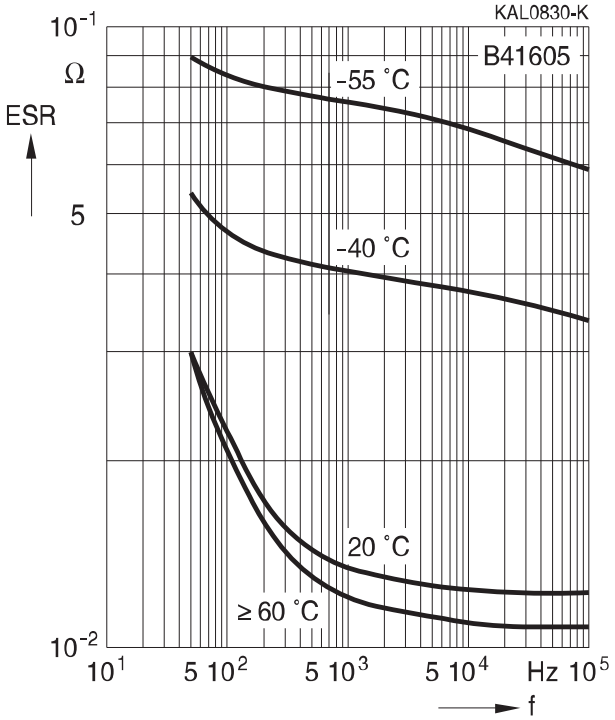
Frequency characteristics of ESR

Typical behavior



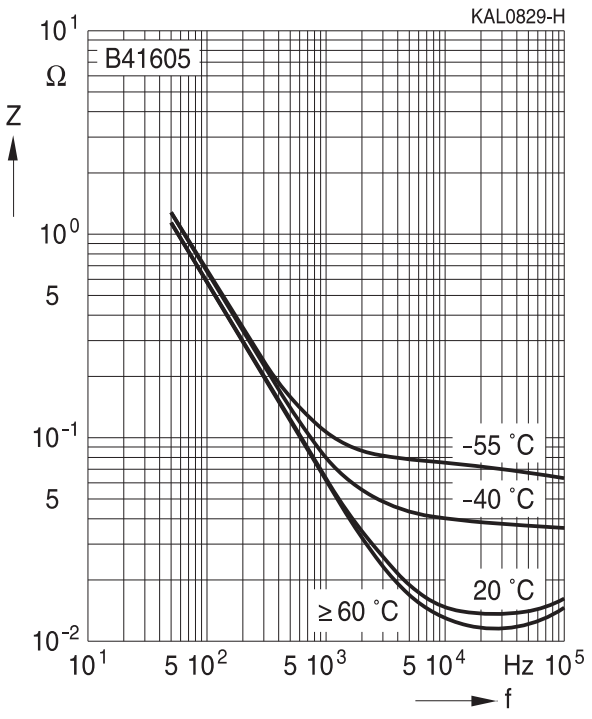
Equivalent series resistance ESR versus frequency f

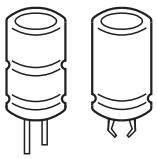
Typical behavior for 3300 µF/55 V



Impedance Z versus frequency f

Typical behavior for 3300 µF/55 V





B41605

Compact – 125 °C

Cautions and warnings

Personal safety

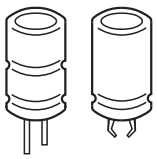
The electrolytes used by EPCOS have been optimized both with a view to the intended application and with regard to health and environmental compatibility. They do not contain any solvents that are detrimental to health, e.g. dimethyl formamide (DMF) or dimethyl acetamide (DMAC).
Furthermore, some of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

As far as possible, EPCOS does 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 EPCOS aluminum electrolytic capacitors are continuously adapted in compliance with the EPCOS 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 the EPCOS 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 all of our electrolytes upon request.

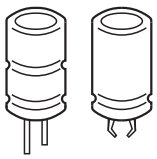
Nevertheless, the following rules should be observed when handling aluminum electrolytic capacitors: No electrolyte should come into contact with eyes or skin. If electrolyte does come into contact with the skin, wash the affected areas immediately with running water. If the eyes are affected, rinse 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 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"



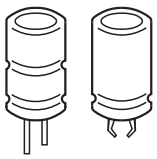
B41605

Compact – 125 °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"

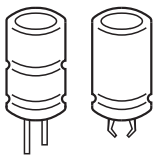
Display of ordering codes for EPCOS products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of EPCOS, 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.epcos.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
ΔT	Temperature difference	Temperaturdifferenz
T_A	Ambient temperature	Umgebungstemperatur
T_C	Case temperature	Gehäusetemperatur
T_B	Capacitor base temperature	Temperatur des Gehäusebodens
t	Time	Zeit
Δt	Period	Zeitraum
t_b	Service life (operating hours)	Brauchbarkeitsdauer (Betriebszeit)



B41605

Compact – 125 °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 δ	Dissipation factor	Verlustfaktor
λ	Failure rate	Ausfallrate
ε_0	Absolute permittivity	Elektrische Feldkonstante
ε_r	Relative permittivity	Dielektrizitätszahl
ω	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:

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 we are 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 a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified.** In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.tdk-electronics.tdk.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

   We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply.**
7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard.** The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements (“CSR”) TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System.** For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.

Important notes

8. The trade names EPCOS, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, ExoCore, FilterCap, FormFit, LeaXield, MiniBlue, MiniCell, MKD, MKK, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.tdk-electronics.tdk.com/trademarks.

Release 2018-10

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Aluminum Electrolytic Capacitors - Snap In ***category:***

Click to view products by EPCOS ***manufacturer:***

Other Similar products are found below :

159LBA016M2DC 2151-4-7320 2170-4-7320 380LX333M025K452 MAL205952101E3 450-20-0021 450-20-0020 EET-XB2W221LA 419-2066-400 MAL219866151E3 EKMS551VSN820MP35S 338LBA035M2BC 380LX680M500J012 381LX101M450H022 382LX123M080A082 382LX152M500B102VS 382LX272M400B102VS 382LX273M080B082VS 382LXE1366 383LX102M400A082 383LX222M200A052 383LX223M035A052 383LX561M400A052 383LX821M400A062 MAL215747391E3 MAL219836331E3 MAL219836151E3 477LBA200M2BF B41231A5279M000 B41231A8129M000 B41231A9568M000 B41231B5229M000 B41252A4109M000 B41252A5229M000 B41252A6129M000 B41252B3159M000 B41252B9108M000 B41252C5159M000 B43540B2108M000 382LX183M063A082 382LX223M050A052 383LX183M063A082 478LBA035M2BD 107LBA450M2BE 108LBB080M2BC 109LBA035M2DD 109LBB050M2DE ELH478M080VS3AA B41231A7159M000 B41231B9478M000