



FTCAP
FISCHER & TAUSCHE
CAPACITORS

Electrolytic Capacitors



Film Capacitors

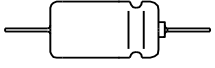
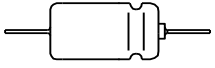
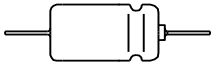
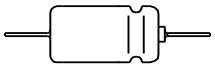
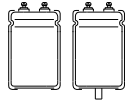
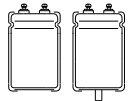
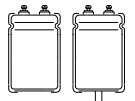
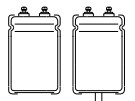
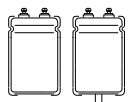


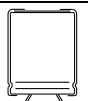











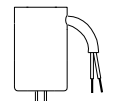
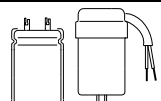
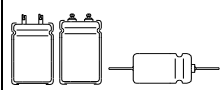
FISCHER & TAUSCHE

FORSCHUNG, ENTWICKLUNG UND
PRODUKTION AUS EINER HAND

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GENERAL INFORMATION

F&T Kondensatoren GmbH has been a manufacturer of capacitors since 1948. Many years of experience, continuous research & development and the latest state of the art production machinery guarantees products of the highest quality.

ALUMINIUM ELECTROLYTIC CAPACITORS

-polarized capacitors

- general industrial
- inverter
- telecommunications
- switch mode power supplies
- photovoltaic
- wind power plants
- medical
- smoothing and filtering
- welding and photo flash applications

-non polarized capacitors

- audio - video applications
- charging capacitors for photo flash capacitor banks
- single phase motor starting

1. Construction of Aluminium Electrolytic Capacitors

High gain etched anode foil with the thick oxide layer, which is produced by the forming-process, is shown at the top of figure 2. The cathode foil with a much thinner oxide layer is arranged at the bottom. Layers of papers are separating both foils. The electrolyte fills up the pores of the aluminium foils and thus builds either the one electrode of the anode or cathode capacitance. The dielectric consists of the oxide layers of the anode foil respectively the cathode foil. This construction builds two capacitances: the anode and the cathode capacitances. Because of the thicker oxide layer the anode capacitance is normally much smaller than the cathode capacitance.

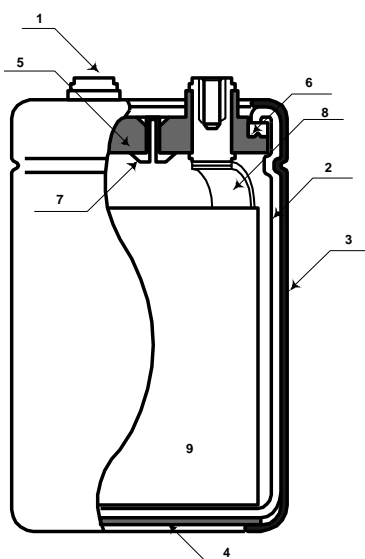


Fig. 1

Fig. 1 shows the construction of a typical electrolytic capacitor

- 1 terminal
- 2 aluminium can
- 3 insulation
- 4 bottom insulation
- 5 deck
- 6 sealing
- 7 safety vent
- 8 tab foil
- 9 winding

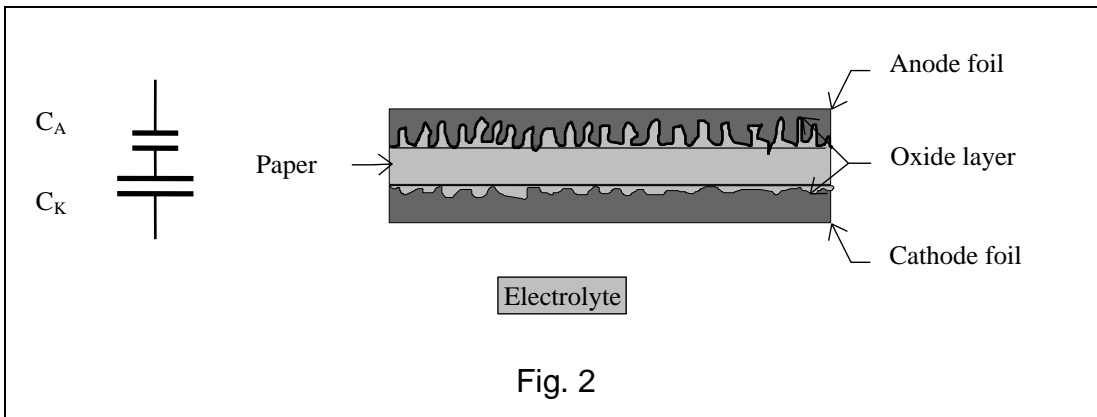


Fig.2 shows a cross section of the winding.

If two capacitors are connected in series, the total capacitance results from the relationship

$$C_G = C_A * C_K / (C_A + C_K).$$

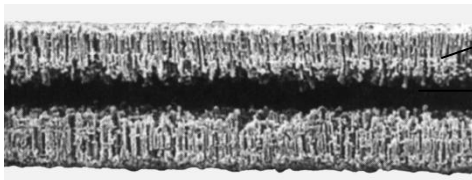
If $C_A \ll C_K$ it follows $C_G \approx C_A$. (aspired normal case)

This means the anode capacitance determines the capacitance of the whole capacitor (the cathode foil decreases the capacitance only somewhat). To accomplish that, highly etched cathode foils are necessary.

Nonpolarized electrolytic capacitors use the same foil for anode and cathode ($C_A = C_K$) Therefore the capacitance of these capacitors are given by $C_G = 0,5 * C_A$.

It is obvious that a nonpolarized electrolytic capacitor needs two times the space of a polarized capacitor.

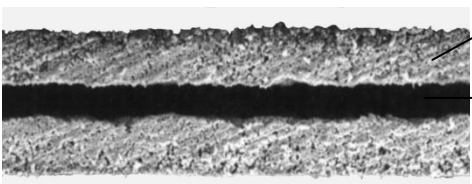
2. Different types of foil



etched and formed surface

solid aluminium core

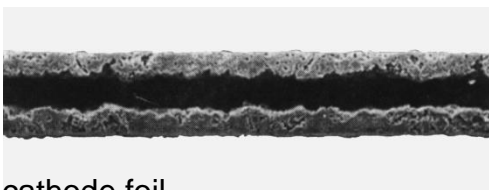
high - voltage anode foil



etched and formed surface

solid aluminium core

low - voltage anode foil



etched surface

solid aluminium core

cathode foil

3. Parameter

3.1 Rated voltage

The rated voltage (U_R) is the voltage the capacitor is designed for. This voltage may be applied continuously to the capacitor over the full temperature range.

3.2 Surge voltage

The Surge voltage may be applied to the capacitors only for a short time.

$$U_R \leq 315 \text{ V} : U_S = 1,15 * U_R \quad (5 \text{ times } 1 \text{ min per hour})$$

$$U_R > 315 \text{ V} : U_S = 1,1 * U_R \quad (5 \text{ times } 1 \text{ min per hour})$$

3.3 Ripple voltage

In many applications the voltage applied to capacitors is a combination of direct and alternating voltage. Pay attention to the following points:

- The superposition of AC and DC must not exceed the rated voltage.
- Reverse voltage is not allowed.
- The applied ripple current must not exceed the rated ripple current.

3.4 Maximum reverse voltage

The Aluminium Electrolytic Capacitor is a polar component. Diodes with a max. conducting state voltage of 0.8 V could be used to prevent reverse polarity voltage. Single shorttime reverse polarity of $V < 1.5 \text{ V}$ for $t < 1 \text{ s}$ is tolerated.

3.5 Rated capacitance

The rated capacitance is usually determined at 100 Hz and 20 °C . In general the rated capacitance is marked on the capacitor in μF .

3.6 DC and AC capacitance

The capacitance determined by AC measurements is smaller than the capacitance determined by charge / discharge measurements.

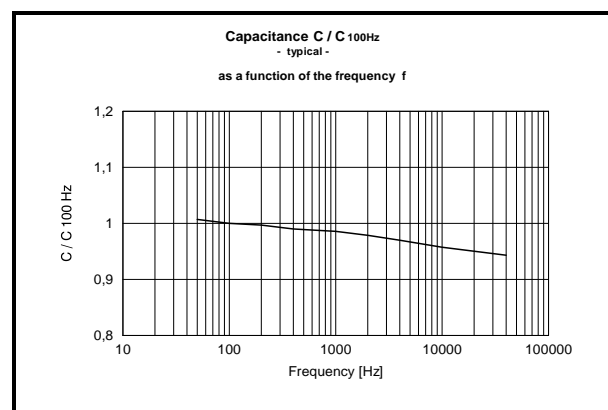
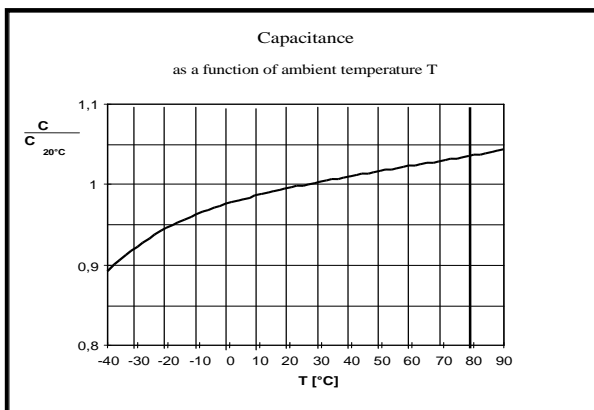
In most applications the capacitor is applied to an alternating voltage so in general the capacitance is measured with the AC method.

3.7 Capacitance vs temperature and frequency

The capacitance varies with temperature and frequency

- The capacitance increase with increasing temperature
- The capacitance decrease with increasing frequency

The following diagrams exhibit typical courses of these dependences



3.8 ESR

The equivalent series resistance represents the losses of a capacitor (the resistance of the foil, electrolyte, terminals). The ESR depends on frequency and temperature.

3.9 ESL

The equivalent series inductance represents the inductive part of the capacitor (leads, foil). The ESL depends mainly on the frequency.

3.10 Dissipation factor $\tan \delta$ (DF)

The dissipation factor is defined as the power loss of the capacitor divided by the reactive power of the capacitor.

$$\tan \delta = ESR \cdot \omega \cdot C_s$$

In general the DF is measured at 100 Hz and 20 °C.

Equivalent circuit of an electrolytic capacitor
- simplified -



3.11 Impedance Z

The impedance of the capacitor is given by the ESR, ESL and the capacitance.

The impedance depends on the temperature and the frequency. The Impedance is normally measured at 10 kHz.

4. Mounting

Position for screw terminal capacitors

Upright position is recommended to prevent electrolyte leakage in case of vent opening.

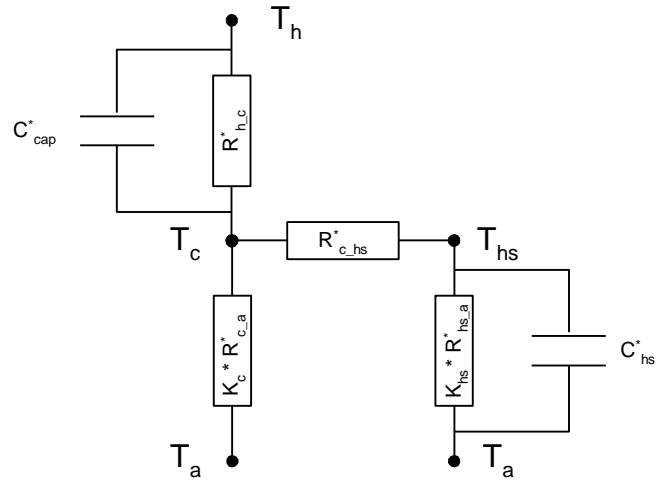
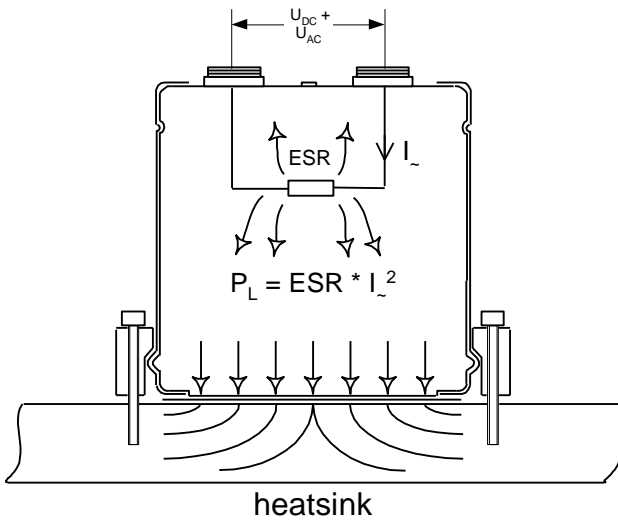
Horizontal mounting is also possible but the vent must face upwards.

Terminals / Mounting stud

These maximum torque values should not be exceeded:

Screw thread	Maximum torque in Nm
M4	2,0
M5	2,0
M6	2,5
M8	4,0
M12	10,0

5. Thermal Model



- ESR = Equivalent series resistance
- I_L = Ripple current load
- P_L = Internal losses
- $U_{DC} + U_{AC}$ = Applied voltage
- T_h = Hotspot temperature
- T_c = Case temperature
- T_a = Ambient temperature
- T_{hs} = Heatsink temperature

- C_{cap}^* = Thermal capacity of the cap
- C_{hs}^* = Thermal capacity of the heatsink
- $R_{h_c}^*$ = Thermal resistance hotspot - case
- $R_{c_{hs}}^*$ = Thermal resistance case - heatsink
- $R_{c_a}^*$ = Thermal resistance case - ambient
- $R_{hs_a}^*$ = Thermal resistance heatsink - ambient
- K_c = Factor for forced cooling of the cap
- K_{hs} = Factor for forced cooling of the heatsink

Internal Losses

$$P_L = ESR * I_L^2$$

Thermal resistance hotspot - ambient

$$R_{h_a}^* = R_{h_c}^* + \frac{K_c * R_{c_a}^* * (K_{c_{hs}}^* + K_{hs} * R_{hs_a}^*)}{K_c * R_{c_a}^* + R_{c_{hs}}^* + K_{hs} * R_{hs_a}^*}$$

Hotspot temperature over time

(current step function)

$$T_{h(t)} = T_{h(to)} + \Delta P_L * R_{h_a}^* * (1 - e^{-\frac{t}{\tau h}})$$

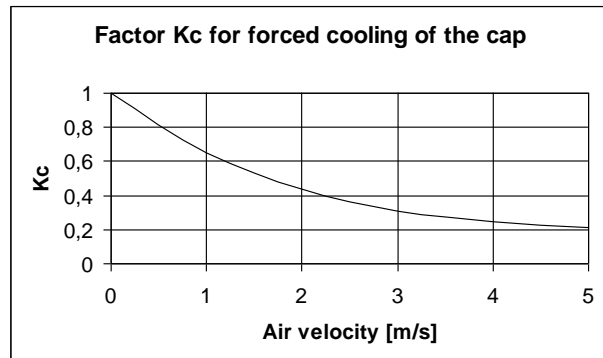
with

$$\tau h = R_{h_a}^* * (C_{cap}^* + C_{hs}^*)$$

if $R_{c_{hs}}^* \approx 0$

ΔP_L = Transient losses

Factor Kc for forced cooling of the cap



Values for serie GW

$$R_{c_{hs}}^* < 0,1^\circ / W$$

C_{cap}^* depends on the cap

Can 50 * 69	Can 75 * 69	Can 90 * 69	Can 90 * 98
$R_{h_c}^* = 0,6^\circ / W$	$R_{h_c}^* = 0,6^\circ / W$	$R_{h_c}^* = 0,6^\circ / W$	$R_{h_c}^* = 0,7^\circ / W$
$R_{c_a}^* = 5,3^\circ / W$	$R_{c_a}^* = 3,3^\circ / W$	$R_{c_a}^* = 2,6^\circ / W$	$R_{c_a}^* = 2,2^\circ / W$

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6. Quality

6.1 Certification

Quality is the main reason of our success. Without ignoring the importance of price of course, customers choose and remain with FTCap to satisfy their needs for top quality capacitors. It is therefore our pledge to continue producing and delivering top quality capacitors as efficiently as possible.

In addition to our commitment to quality, we are also committed to a healthy environment. That is why each and every one of our employees, from top management down to the workshop, accepts his or her environmental responsibilities and strives to work as effectively and efficiently as possible.

Intermediate testing is carried out through the entire production process in addition to the 100% final testing of each capacitor before shipment. All of our employees know that quality is the top priority for our customers. Workers participate in the process of continued improvement, quite often by anticipating. The result is uninterrupted flow production.

FTCap is certified according to DIN ISO 9001 : 2000. The company certificate is available on the ftcap website www.ftcap.de.

7. Safety Precautions

7.1 Charged Capacitors

Electrolytic capacitors may store high amounts of energy (especially photo flash and high voltage capacitors).

To avoid electrical shocks and sparks always discharge electrolytic capacitors before handling.

For higher voltage it is recommended to shorten the terminals during handling.

7.2 Misapplication

Explosions of electrolytic capacitors may occur if the capacitor is exposed to

- reverse voltage above specified limit
- voltage above specified limit
- ripple currents above specified limit
- ambient temperatures above specified limit
- high mechanical impact

7.3 Operating electrolytes

Principally operating electrolytes used in FTCap products doesn't contain dangerous substances. However, in rare exceptional cases it is necessary to use certain substances to achieve certain physical chemical or electrical properties. In these cases the concentration is reduced to an absolute minimum.

Generally the following safety hints should be respected using operating electrolytes:

Avoid skin and eye contact.

With electrolyte moistened skin parts are to be cleaned immediately with sufficient flowing water.

Eyes must be rinsed at least 15 min under flowing cold water. Visit physician immediately with complaints.

Inhale from electrolyte steam or nebulas has to be avoided. Work area must be well ventilated.

Cloths witch came into contact with electrolyte should be washed or cleaned.

7.4 ROHS

All FTCap products are full compliant with the RoHS Directive 2005/618/EC.

Our products are declared as „**RoHS compliant**“

and on the packaging label as "**According to RoHS**"

7.5 Disposal

Aluminium Electrolytic Capacitors can be disposed or recycled. The disposal rules are governed by the national and local authorities and had to be taken into consideration. The European Waste Code No. is 160214



Axial terminals

Low mounting height

High CV product

Long life 5000 h @ 85 °C

RoHS compliant
REACH compliant

Features

- All contacts welded
- High CV product
- Welded axial leads
- High reliability

Applications

- HiFi
- Industrial
- Tube amplifier

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		4,7... 82.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 500 V
Surge voltage U_S		$U_R \leq 315 V: U_S = 1,15 U_R$ $U_R > 315 V: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 85 °C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	5000 h @ 85 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/085/56
Voltage proof of the external insulation		$D \leq 25 mm: \geq 1000 V AC$ $D > 25 mm: \geq 2500 V AC$
Sectional specification		IEC 60384-4
\emptyset leads		Up to 25 mm \emptyset : 0,8 mm ; more than 25 mm \emptyset : 1,0 mm



Electrical data and ordering code for series A

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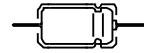
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR		Order code A...	
			100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]		
16	2200	10x30	203	0,6	22201610030	
	3300	12x30	135	0,8	33201612030	
	4700	14x30	95	1,0	47201614030	
	4700	14x37	95	1,1	47201614037	
	5600	16x30	80	1,2	56201616030	
	8200	16x39	54	1,7	82201616039	
	8200	18x30	54	1,6	82201618030	
	10000	18x39	45	2,0	10301618039	
	12000	21x36	37	2,3	12301621036	
	18000	25x38	25	3,1	18301625038	
	33000	25x49	14	4,6	33301625049	
	47000	30x50	9	6,0	47301630050	
	56000	35x50	8	7,2	56301635050	
	82000	35x66	6	9,6	82301635066	
25	1200	10x30	372	0,4	12202510030	
	1800	12x30	248	0,6	18202512030	
	2700	14x30	165	0,8	27202514030	
	3300	14x37	135	0,9	33202514037	
	3300	16x30	135	0,9	33202516030	
	4700	16x39	95	1,3	47202516039	
	4700	18x30	95	1,2	47202518030	
	5600	18x39	80	1,5	56202518039	
	6800	21x36	66	1,7	68202521036	
	10000	25x38	45	2,3	10302525038	
	18000	25x49	25	3,4	18302525049	
	27000	30x50	17	4,6	27302530050	
	33000	35x50	14	5,5	33302535050	
	47000	35x66	10	7,2	47302535066	
40	560	10x30	682	0,3	56104010030	
	1000	12x30	382	0,5	10204012030	
	1500	14x30	255	0,6	15204014030	
	1800	14x37	212	0,8	18204014037	
	1800	16x30	212	0,8	18204016030	
	2200	16x39	174	0,9	22204016039	
	2200	18x30	174	0,9	22204018030	
	3300	18x39	116	1,2	33204018039	
	3900	21x36	98	1,4	39204021036	
	5600	25x38	68	1,9	56204025038	
	10000	25x49	38	2,7	10304025049	
	15000	30x50	25	3,7	15304030050	
	22000	35x50	17	4,9	22304035050	
	27000	35x66	14	6,0	27304035066	
63	330	10x30	869	0,3	33106310030	
	470	12x30	610	0,4	47106312030	
	680	14x30	422	0,5	68106314030	
	820	14x37	350	0,6	82106314037	
63	1000	16x30	287	0,6	10206316030	
	1200	16x39	239	0,8	12206316039	
	1200	18x30	239	0,8	12206318030	
	1500	18x39	191	0,9	15206318039	
	2200	21x36	130	1,2	22206321036	
	3300	25x38	87	1,6	33206325038	
	5600	25x49	51	2,4	56206325049	
	8200	30x50	35	3,1	82206330050	
	10000	30x50	29	3,6	10306330050	
	12000	35x50	24	4,2	12306335050	
	15000	35x66	19	5,2	15306335066	
	80	220	10x30	1448	0,2	22108010030
		330	12x30	965	0,3	33108012030
		470	14x30	678	0,4	47108014030
680		14x37	468	0,5	68108014037	
680		16x30	468	0,5	68108016030	
1000		16x39	318	0,7	10208016039	
1000		18x30	318	0,7	10208018030	
1200		18x39	265	0,8	12208018039	
1500		21x36	212	1,0	15208021036	
2200		25x38	145	1,3	22208025038	
3900		25x49	82	1,9	39208025049	
5600		30x50	57	2,5	56208030050	
8200		35x50	39	3,3	82208035050	
12000		35x66	27	4,4	12308035066	
100	150	10x30	1062	0,3	15110010030	
	220	12x30	724	0,4	22110012030	
	330	14x30	483	0,5	33110014030	
	390	14x37	408	0,5	39110014037	
	470	16x30	339	0,6	47110016030	
	560	16x39	284	0,7	56110016039	
	560	18x30	284	0,7	56110018030	
	680	18x39	234	0,9	68110018039	
	1000	21x36	159	1,1	10210021036	
	1500	25x38	106	1,5	15210025038	
	2200	25x49	72	2,0	22210025049	
	3300	30x50	48	2,7	33210030050	
	4700	35x50	34	3,5	47210035050	
	6800	35x66	23	4,7	68210035066	
160	56	10x30	1990	0,2	56016010030	
	100	12x30	1115	0,3	10116012030	
	120	14x30	929	0,3	12116014030	
	150	14x37	743	0,4	15116014037	
	150	16x30	743	0,4	15116016030	
	220	16x39	507	0,5	22116016039	
220	18x30	507	0,5	22116018030		



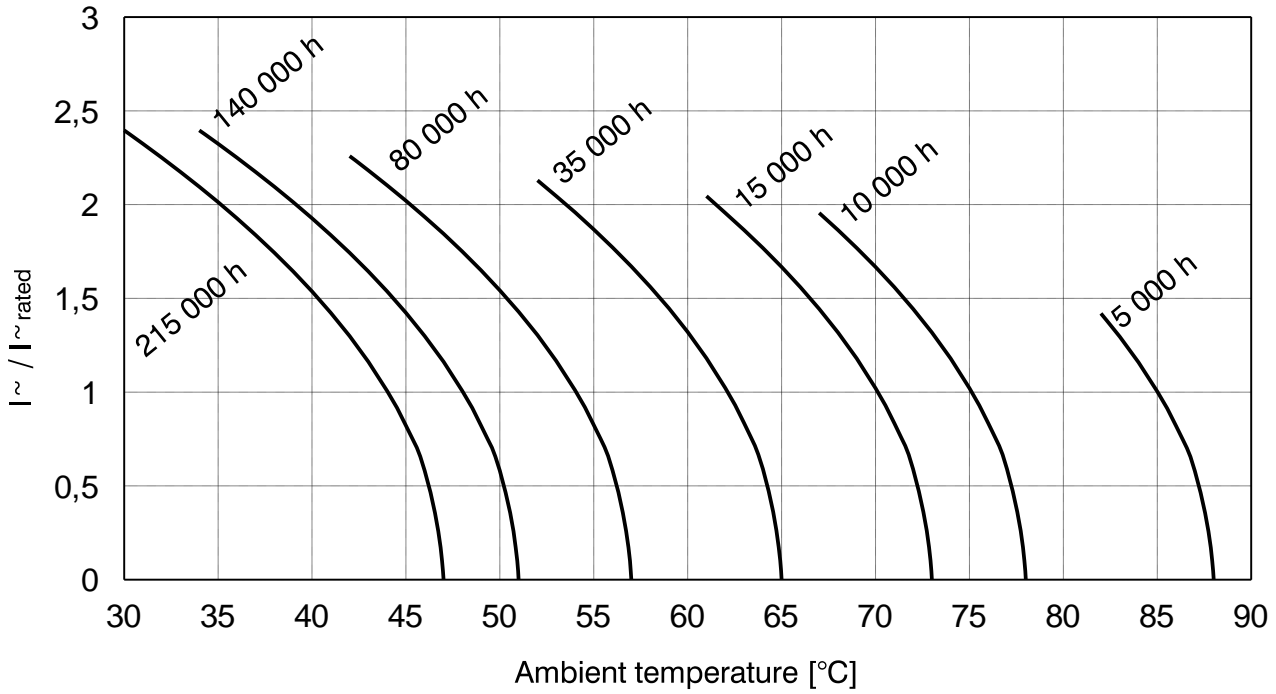
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR		Order code A...
			100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	
160	270	18x39	413	0,6	27116018039
	330	21x36	338	0,8	33116021036
	560	25x38	199	1,1	56116025038
	1000	25x49	111	1,6	10216025049
	1500	30x50	74	2,1	15216030050
	1800	35x50	62	2,6	18216035050
	2700	35x66	41	3,5	27216035066
250	33	10x30	2895	0,2	33025010030
	56	12x30	1706	0,2	56025012030
	82	14x30	1165	0,3	82025014030
	100	14x37	955	0,4	10125014037
	100	16x30	955	0,4	10125016030
	150	16x39	637	0,5	15125016039
	150	18x30	637	0,5	15125018030
	180	18x39	531	0,6	18125018039
	220	21x36	434	0,7	22125021036
	390	25x38	245	1,0	39125025038
	680	25x49	141	1,4	68125025049
	820	30x50	117	1,7	82125030050
	1200	35x50	80	2,3	12225035050
1800	35x66	53	3,1	18225035066	
350	22	10x30	4343	0,1	22035010030
	33	12x30	2895	0,2	33035012030
	47	14x30	2033	0,2	47035014030
	56	14x37	1706	0,3	56035014037
	56	16x30	1706	0,3	56035016030
	68	16x39	1405	0,3	68035016039
	68	18x30	1405	0,3	68035018030
	100	18x39	955	0,4	10135018039
	120	21x36	796	0,5	12135021036
	220	25x38	434	0,7	22135025038
	330	25x49	290	1,0	33135025049
	470	30x50	203	1,3	47135030050
	680	35x50	141	1,7	68135035050
820	35x66	117	2,1	82135035066	
400	18	10x30	7077	0,1	18040010030
	27	12x30	4718	0,1	27040012030
	39	14x30	3266	0,2	39040014030
	47	14x37	2710	0,2	47040014037

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR		Order code A...
			100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	
400	47	16x30	2710	0,2	47040016030
	56	16x39	2275	0,3	56040016039
	56	18x30	2275	0,2	56040018030
	68	18x39	1873	0,3	68040018039
	100	21x36	1274	0,4	10140021036
	150	25x38	849	0,5	15140025038
	220	25x49	579	0,7	22140025049
	330	30x50	386	0,9	33140030050
	470	35x50	271	1,2	47140035050
	680	35x66	187	1,7	68140035066
450	10	10x30	11146	0,1	10045010030
	15	12x30	7431	0,1	15045012030
	22	14x30	5067	0,1	22045014030
	33	14x37	3378	0,2	33045014037
	39	16x30	2858	0,2	39045016030
	47	16x39	2372	0,3	47045016039
	47	18x30	2372	0,2	47045018030
	56	18x39	1990	0,3	56045018039
	100	21x36	1115	0,4	10145021036
	150	25x38	743	0,6	15145025038
	220	25x49	507	0,8	22145025049
	330	30x50	338	1,0	33145030050
	470	35x50	237	1,3	47145035050
560	35x66	199	1,6	56145035066	
500	4,7	10x30	23716	0,1	4,750010030
	6,8	10x30	14043	0,1	6,850010030
	10	12x30	11146	0,1	10050012030
	12	14x30	9289	0,1	12050014030
	15	14x37	7431	0,1	15050014037
	15	16x30	7431	0,1	15050016030
	22	16x39	5067	0,2	22050016039
	22	18x30	5067	0,2	22050018030
	33	18x39	3378	0,2	33050018039
	47	21x36	2372	0,3	47050021036
	82	25x38	1359	0,4	82050025038
	120	25x49	929	0,6	12150025049
	180	30x50	619	0,7	18150030050
	220	35x50	507	0,9	22150035050
330	35x66	338	1,2	33150035066	

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Useful life
 as a function of ambient temperature and actual ripple current



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Axial terminals

Low mounting height

High CV product

Long life 3000 h @ 105 °C

RoHS compliant
REACH compliant

Features

- All contacts welded
- High ripple current
- Welded axial leads
- High reliability

Applications

- HiFi
- Industrial
- Telecommunications

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		10 ... 82.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315 V: U_S = 1,15 U_R$ $U_R > 315 V: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 105 °C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	3000 h @ 105 °C ; $U_R; I_R$ -	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 105 °C , U_R	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/105/56
Voltage proof of the external insulation		$D \leq 25 mm: \geq 1000 V AC$ $D > 25 mm: \geq 2500 V AC$
Sectional specification		IEC 60384-4
\emptyset leads		Up to 25 mm \emptyset : 0,8 mm ; more than 25 mm \emptyset : 1,0 mm



Electrical data and ordering code for series AH

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Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code AH...
16	2200	10x30	203	0,6	22201610030
	3300	12x30	135	0,8	33201612030
	4700	14x30	95	1,0	47201614030
	4700	14x37	95	1,1	47201614037
	5600	16x30	80	1,2	56201616030
	8200	16x39	54	1,7	82201616039
	8200	18x30	54	1,6	82201618030
	10000	18x39	45	2,0	10301618039
	12000	21x36	37	2,3	12301621036
	18000	25x38	25	3,1	18301625038
	33000	25x49	14	4,6	33301625049
	47000	30x50	9	6,0	47301630050
	56000	35x50	8	7,2	56301635050
	82000	35x66	6	9,6	82301635066
25	1200	10x30	372	0,4	12202510030
	1800	12x30	248	0,6	18202512030
	2700	14x30	165	0,8	27202514030
	3300	14x37	135	0,9	33202514037
	3300	16x30	135	0,9	33202516030
	4700	16x39	95	1,3	47202516039
	4700	18x30	95	1,2	47202518030
	5600	18x39	80	1,5	56202518039
	6800	21x36	66	1,7	68202521036
	10000	25x38	45	2,3	10302525038
	18000	25x49	25	3,4	18302525049
	27000	30x50	17	4,6	27302530050
	33000	35x50	14	5,5	33302535050
	47000	35x66	10	7,2	47302535066
40	560	10x30	682	0,3	56104010030
	1000	12x30	382	0,5	10204012030
	1500	14x30	255	0,6	15204014030
	1800	14x37	212	0,8	18204014037
	1800	16x30	212	0,8	18204016030
	2200	16x39	174	0,9	22204016039
	2200	18x30	174	0,9	22204018030
	3300	18x39	116	1,2	33204018039
	3900	21x36	98	1,4	39204021036
	5600	25x38	68	1,9	56204025038
	10000	25x49	38	2,7	10304025049
	15000	30x50	25	3,7	15304030050
	22000	35x50	17	4,9	22304035050
	27000	35x66	14	6,0	27304035066
63	330	10x30	869	0,3	33106310030
	470	12x30	610	0,4	47106312030
	680	14x30	422	0,5	68106314030
	820	14x37	350	0,6	82106314037

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code AH...	
63	1000	16x30	287	0,6	10206316030	
	1200	16x39	239	0,8	12206316039	
	1200	18x30	239	0,8	12206318030	
	1500	18x39	191	0,9	15206318039	
	2200	21x36	130	1,2	22206321036	
	3300	25x38	87	1,6	33206325038	
	5600	25x49	51	2,4	56206325049	
	8200	30x50	35	3,1	82206330050	
	10000	30x50	29	3,6	10306330050	
	12000	35x50	24	4,2	12306335050	
	15000	35x66	19	5,2	15306335066	
	80	220	10x30	1448	0,2	22108010030
		330	12x30	965	0,3	33108012030
		470	14x30	678	0,4	47108014030
680		14x37	468	0,5	68108014037	
680		16x30	468	0,5	68108016030	
1000		16x39	318	0,7	10208016039	
1000		18x30	318	0,7	10208018030	
1200		18x39	265	0,8	12208018039	
1500		21x36	212	1,0	15208021036	
2200		25x38	145	1,3	22208025038	
3900		25x49	82	1,9	39208025049	
5600		30x50	57	2,5	56208030050	
8200	35x50	39	3,3	82208035050		
12000	35x66	27	4,4	12308035066		
100	150	10x30	1062	0,3	15110010030	
	220	12x30	724	0,4	22110012030	
	330	14x30	483	0,5	33110014030	
	390	14x37	408	0,5	39110014037	
	470	16x30	339	0,6	47110016030	
	560	16x39	284	0,7	56110016039	
	560	18x30	284	0,7	56110018030	
	680	18x39	234	0,9	68110018039	
	1000	21x36	159	1,1	10210021036	
	1500	25x38	106	1,5	15210025038	
	2200	25x49	72	2,0	22210025049	
	3300	30x50	48	2,7	33210030050	
4700	35x50	34	3,5	47210035050		
6800	35x66	23	4,7	68210035066		
160	56	10x30	1990	0,2	56016010030	
	100	12x30	1115	0,3	10116012030	
	120	14x30	929	0,3	12116014030	
	150	14x37	743	0,4	15116014037	
	150	16x30	743	0,4	15116016030	
	220	16x39	507	0,5	22116016039	
220	18x30	507	0,5	22116018030		



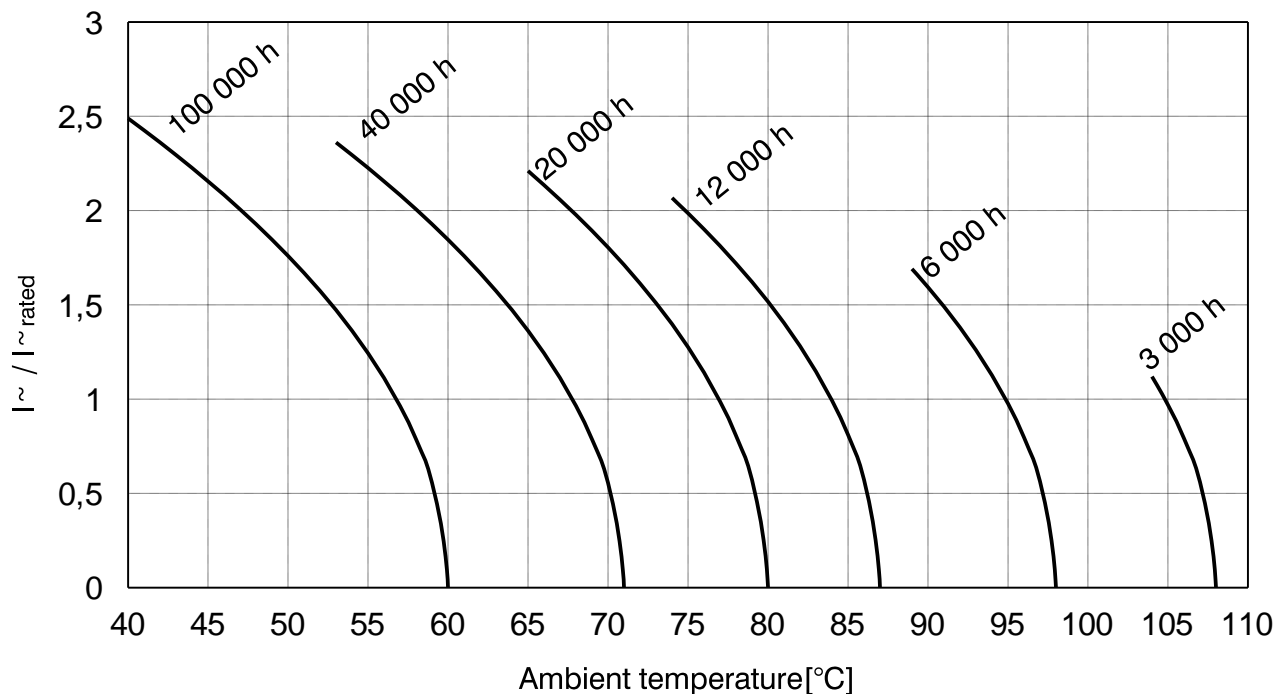
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code AH...
160	270	18x39	413	0,6	27116018039
	330	21x36	338	0,8	33116021036
	560	25x38	199	1,1	56116025038
	1000	25x49	111	1,6	10216025049
	1500	30x50	74	2,1	15216030050
	1800	35x50	62	2,6	18216035050
	2700	35x66	41	3,5	27216035066
250	33	10x30	2895	0,2	33025010030
	56	12x30	1706	0,2	56025012030
	82	14x30	1165	0,3	82025014030
	100	14x37	955	0,4	10125014037
	100	16x30	955	0,4	10125016030
	150	16x39	637	0,5	15125016039
	150	18x30	637	0,5	15125018030
	180	18x39	531	0,6	18125018039
	220	21x36	434	0,7	22125021036
	390	25x38	245	1,0	39125025038
	680	25x49	141	1,4	68125025049
	820	30x50	117	1,7	82125030050
	1200	35x50	80	2,3	12225035050
	1800	35x66	53	3,1	18225035066
350	22	10x30	4343	0,1	22035010030
	33	12x30	2895	0,2	33035012030
	47	14x30	2033	0,2	47035014030
	56	14x37	1706	0,3	56035014037
	56	16x30	1706	0,3	56035016030
	68	16x39	1405	0,3	68035016039
	68	18x30	1405	0,3	68035018030
	100	18x39	955	0,4	10135018039
	120	21x36	796	0,5	12135021036
	120	21x36	796	0,5	12135021036
	220	25x38	434	0,7	22135025038

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code AH...
350	330	25x49	290	1,0	33135025049
	470	30x50	203	1,3	47135030050
	680	35x50	141	1,7	68135035050
	820	35x66	117	2,1	82135035066
	400	18	10x30	7077	0,1
27		12x30	4718	0,1	27040012030
39		14x30	3266	0,2	39040014030
47		14x37	2710	0,2	47040014037
47		16x30	2710	0,2	47040016030
56		16x39	2275	0,3	56040016039
56		18x30	2275	0,2	56040018030
68		18x39	1873	0,3	68040018039
100		21x36	1274	0,4	10140021036
150		25x38	849	0,5	15140025038
220		25x49	579	0,7	22140025049
330		30x50	386	0,9	33140030050
470		35x50	271	1,2	47140035050
680		35x66	187	1,7	68140035066
450	10	10x30	11146	0,1	10045010030
	15	12x30	7431	0,1	15045012030
	22	14x30	5067	0,1	22045014030
	33	14x37	3378	0,2	33045014037
	39	16x30	2858	0,2	39045016030
	47	16x39	2372	0,3	47045016039
	47	18x30	2372	0,2	47045018030
	56	18x39	1990	0,3	56045018039
	100	21x36	1115	0,4	10145021036
	150	25x38	743	0,6	15145025038
	220	25x49	507	0,8	22145025049
	330	30x50	338	1,0	33145030050
	470	35x50	237	1,3	47145035050
	560	35x66	199	1,6	56145035066

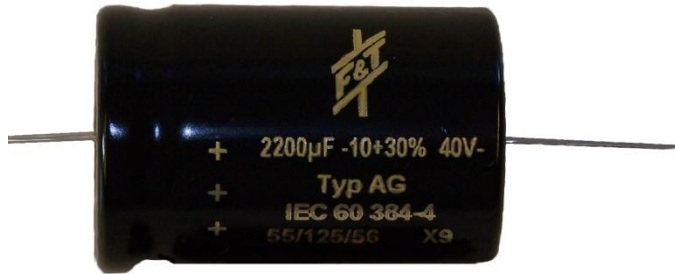
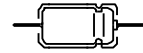
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Useful life
 as a function of ambient temperature and actual ripple current



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Axial terminals

Low mounting height

High CV product

Long life 2000 h @ 125 °C

Low temperature -55°C

RoHS compliant
REACH compliant

Features

- All contacts welded
- High temp 125°C
- Long useful life

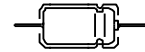
Applications

- Automotive
- Inverter/drives
- Laser
- Industrial

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		150... 82.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 63 V
Surge voltage U_S		$U_S = 1,15 U_R$
Max. reverse voltage		2 V
Category temperature range		- 55°C ... + 125 °C
Leakage current I_L after 5 min @ U_R		$\leq 0,004 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	2000 h @ 125 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	1000 h @ 125 °C , U_R	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		55/125/56
Voltage proof of the external insulation		$D \leq 25$ mm : ≥ 1000 V AC $D > 25$ mm : ≥ 2500 V AC
Sectional specification		IEC 60384-4
\emptyset leads		Up to 25 mm \emptyset : 0,8 mm ; more than 25 mm \emptyset : 1,0 mm



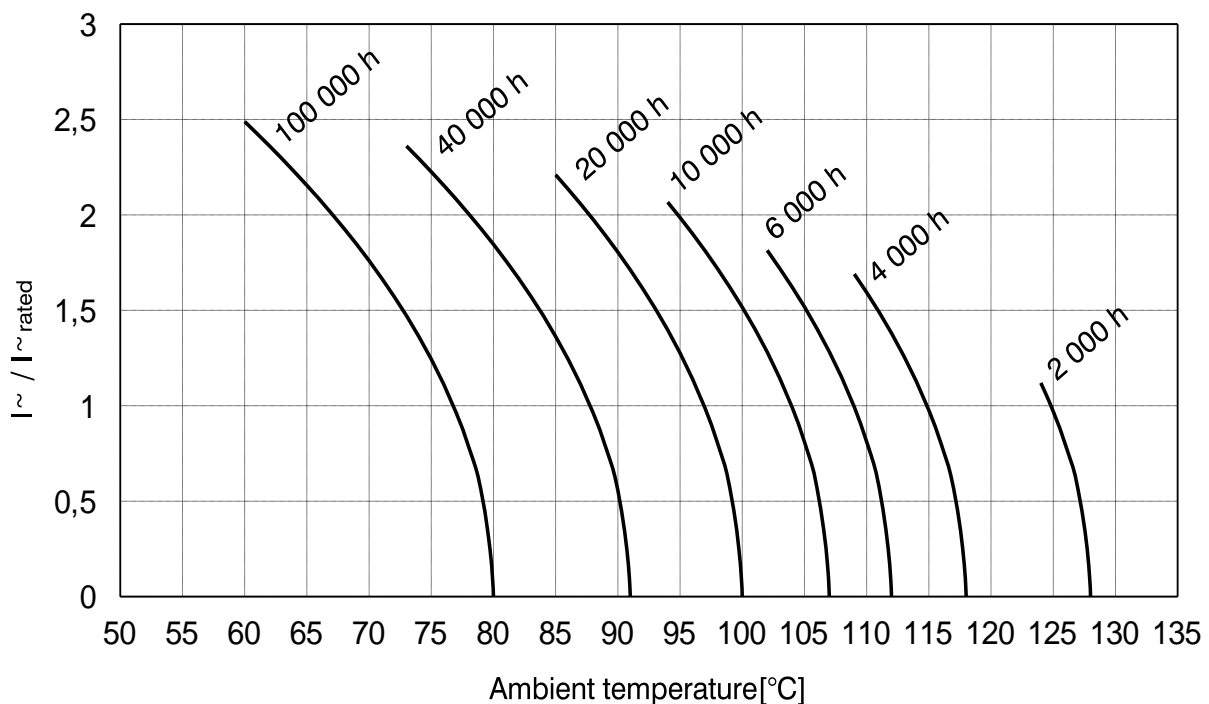
Electrical data and ordering code for series AG

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Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current IR~	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 125°C [A]	AG...
16	1000	10x30	223	0,6	10201610030
	1200	12x30	186	0,7	12201612030
	1500	14x30	149	0,8	15201614030
	2200	14x37	101	1,1	22201614037
	2200	16x30	101	1,1	22201616030
	3300	16x39	68	1,5	33201616039
	3300	18x30	68	1,4	33201618030
	3900	18x39	57	1,7	39201618039
	4700	21x36	47	2,0	47201621036
	8200	25x38	27	2,9	82201625038
25	470	10x30	474	0,4	47102510030
	680	12x30	328	0,5	68102512030
	1200	14x30	186	0,7	12202514030
	1500	14x37	149	0,9	15202514037
	1500	16x30	149	0,9	15202516030
	1800	16x39	124	1,1	18202516039
	1800	18x30	124	1,1	18202518030
	2200	18x39	101	1,3	22202518039
	3300	21x36	68	1,7	33202521036
	4700	25x38	47	2,2	47202525038

Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current IR~	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 125°C [A]	AG...
40	270	10x30	708	0,3	27104010030
	470	12x30	407	0,5	47104012030
	560	14x30	341	0,5	56104014030
	680	14x37	281	0,7	68104014037
	680	16x30	281	0,7	68104016030
	1000	16x39	191	0,9	10204016039
	1000	18x30	191	0,9	10204018030
	1200	18x39	159	1,0	12204018039
	1500	21x36	127	1,2	15204021036
	2200	25x38	87	1,6	22204025038
63	150	10x30	1062	0,3	15106310030
	220	12x30	724	0,4	22106312030
	330	14x30	483	0,5	33106314030
	470	14x37	339	0,6	47106314037
	470	16x30	339	0,6	47106316030
	560	16x39	284	0,7	56106316039
	560	18x30	284	0,7	56106318030
	820	18x39	194	0,9	82106318039
	1000	21x36	159	1,1	10206321036
	1500	25x38	106	1,5	15206325038

Useful life
 as a function of ambient temperature and actual ripple current





Axial terminals

Bipolar construction

For crossover networks

RoHS compliant
REACH compliant

Features

- All contacts welded
- Bipolar

Applications

- HiFi
- Consumer

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		1... 100 μF @ 1 kHz
Capacitance tolerance		$\pm 20\%$; $\pm 10\%$ on request
U_R bipolar (rated voltage DC)		63 V dc @ 23 V ac 100 V dc @ 35 V ac
Max. peak voltage (AC)		May not exceed rated voltage (DC)
Category temperature range		- 40°C ... + 85 °C
Useful life	> 5000 h @ 85 °C > 1000 h @105 °C	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	100 000 h @40 °C	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/085/56
Voltage proof of the external insulation		$D \leq 25$ mm: ≥ 1000 V AC $D > 25$ mm: ≥ 2500 V AC
\emptyset leads		Up to 25 mm \emptyset : 0,8 mm ; more than 25 mm \emptyset : 1,0 mm



Electrical data and ordering code for series ATBI

Rated voltage U_R [V]	Rated capacitance (other values available on request) C_R [μF]	Case size $D \times L$ [mm]	Order code ATBI...
23 Vac @ 50 Hz	1,0	10x20	1,002310020
	2,2	10x20	2,202310020
	3,3	10x20	3,302310020
	4,7	10x20	4,702310020
	6,8	10x20	6,802310020
	10	10x30	10002310030
	15	10x30	15002310030
	22	12x30	22002312030
	33	12x30	33002312030
	47	14x37	47002314037
	68	16x39	68002316039
	100	18x39	10102318039
	220	25x38	22102325038
	330	25x38	33102325038
	470	25x38	47102325038
	560	25x38	56102325038
680	25x38	68102325038	
880	25x49	80102325049	
1000	25x49	10202325049	
35 Vac @ 50 Hz	1,0	10x20	1,003510020
	2,2	10x30	2,203510030
	3,3	10x30	3,303510030
	4,7	10x30	4,703510030
	6,8	10x30	6,803510030
	10	10x30	10003510030
	15	10x30	15003510030
	22	12x30	22003512030
	33	12x30	33003512030
	47	14x37	47003514037
	68	16x39	68003516039
	100	18x39	10103518039
	220	25x38	2203525038



Axial terminals

Bipolar construction

Plain foil

For crossover networks

RoHS compliant
REACH compliant

Features

- All contacts welded
- Bipolar

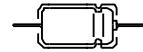
Applications

- HiFi
- Consumer

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

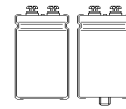
General specifications

Items		Characteristics
Rated capacitance range C_R		1 ... 200 μF @ 1 kHz
Capacitance tolerance		$\pm 10\%$; $\pm 5\%$ on request
U_R bipolar (rated voltage DC)		35 V dc @ 23 V ac 50 V dc @ 35 V ac 70V dc @ 50 V ac
Max. peak voltage (AC)		May not exceed rated voltage (DC)
Category temperature range		- 40 °C ... + 85 °C
Useful life	> 5000 h @ 85 °C	Requirements $\Delta C/C \leq 30\%$ of initial value ESR $\leq 300\%$ of specified limit $I_L \leq$ specified limit
	> 1000 h @105 °C	
Endurance test	100 000 h @40 °C	Requirements $\Delta C/C \leq 20\%$ of initial value ESR $\leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/085/56
Voltage proof of the external insulation		$D \leq 25\text{ mm}$: $\geq 1000\text{ V AC}$ $D > 25\text{ mm}$: $\geq 2500\text{ V AC}$
\varnothing leads		Up to 25 mm \varnothing : 0,8 mm ; more than 25 mm \varnothing : 1,0 mm



Electrical data and ordering code for series A

Rated voltage U_R [V]	Rated capacitance (other values available on request) C_R [μ F]	Case size D x L [mm]	Order code ATBIG...
23 Vac @ 50 Hz	1,0	10x20	1,002310020
	2,2	10x30	2,202310030
	3,3	10x30	3,302310030
	4,7	10x30	4,702310030
	6,8	10x30	6,802310030
	10	10x30	10002310030
	15	14x37	15002314037
	22	14x37	22002314037
	33	18x39	33002318039
	47	21x36	47002321036
	68	25x36	68002325036
	100	25x36	10102325036
	120	25x49	12102325049
	150	25x49	15102325049
200	30x49	20102330049	
35 Vac @ 50 Hz	1,0	10x20	1,003510020
	2,2	10x30	2,203510030
	3,3	10x30	3,303510030
	4,7	12x30	4,703512030
	6,8	12x30	6,803512030
	10	14x37	10003514037
	15	16x39	15003516039
	22	18x39	22003518039
	33	25x36	33003525036
	47	25x36	47003525036
	68	25x49	68003525049
	100	30x49	10103530049
	120	30x49	12103530049
	150	35x66	15103535066
200	35x66	20103535066	
50 Vac @ 50 Hz	1	10x25	1,105010025
	2,2	10x30	2,205010030
	3,3	10x30	3,305010030
	4,7	12x30	4,705012030
	6,8	14x30	6,805014030
	10	14x37	10005014037
	15	18x39	15005018039
	22	25x36	22005018039
	33	25x36	33005025036
	47	25x49	47005025049
	68	30x49	68005030049
	100	35x49	10105035049



Screw terminals
High CV product
Long life 8000 h @ 85°C

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High capacitance
- High CV product
- Low inductance ESL

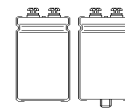
Applications

- Computer
- Inverter/drives
- Traction
- Welding

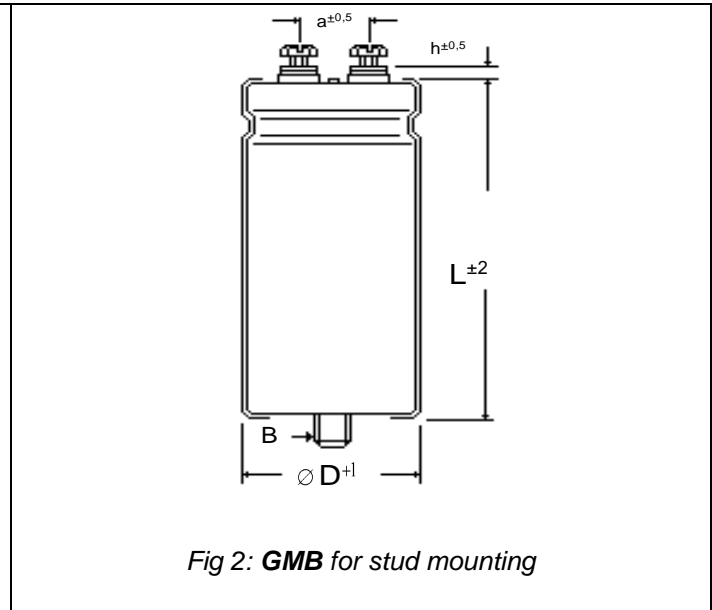
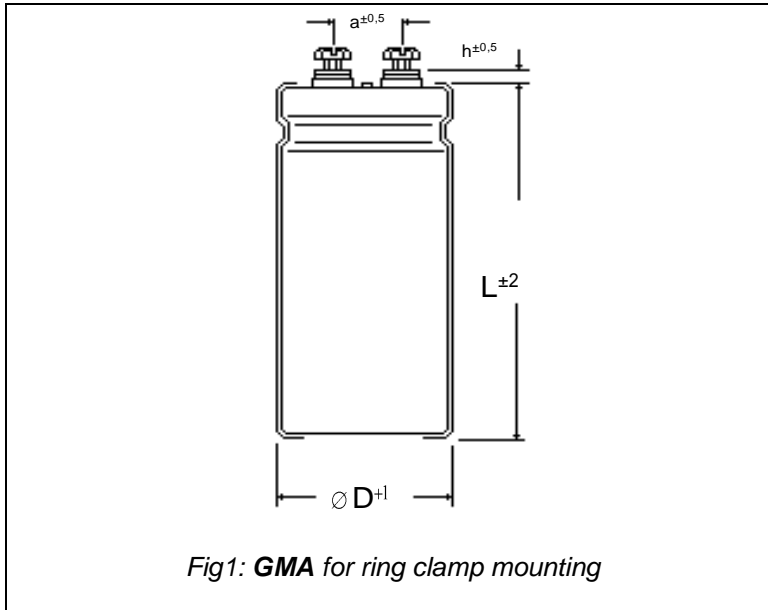
Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		390 ... 3.300.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		25 ... 500 V
Surge voltage U_S		$U_R \leq 315 \text{ V}: U_S = 1,15 U_R$ $U_R > 315 \text{ V}: U_S = 1,10 U_R$
Max. reverse voltage / ESL		2 V / 20 nH
Category temperature range		- 40°C ... + 85°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	8000 h @ 85 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30 \%$ of initial value $ESR \leq 300 \%$ of specified limit $I_L \leq$ specified limit
Endurance test	4000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20 \%$ of initial value $ESR \leq 130 \%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/085/56
Voltage proof of the external insulation		$\geq 2500 \text{ V AC}$
Sectional specification		IEC 60384-4



Drawings for series GMA and GMB

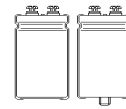


Dimensions and mechanical data

dimensions, case with insulation sleeve				connecting terminals		mounting stud, GMB only	
D [mm]	case length L available in 5 mm [mm]	h [mm]	a [mm]	thread	max. torque [Nm]	B	max. torque [Nm]
35	40 ... 120	6	13	M 5	2,0	M 8 x 12	4,0
40	40 ... 120	5	18	M 5	2,0	M 8 x 12	4,0
50	40 ... 120	5	22	M 5	2,0	M 12 x 16	10,0
65	40 ... 180	5	28,5	M 5	2,0	M 12 x 16	10,0
75	40 ... 230	5	31,7	M 5, M 6	2,0 ; 2,5	M 12 x 16	10,0
90	40 ... 230	5	31,7	M 6	2,5	M 12 x 16	10,0

Accessories

	<p>GMA : connecting screws M 5 or M 6 GMB : connecting screws M 5 or M 6 + mounting nut M 8 or M 12</p>
Remarks	<p>Further mounting accessories like clamps, nylon cup nuts and insulation disks on request, see "accessory equipment"</p>

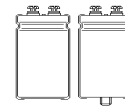


Electrical data and ordering codes series GM

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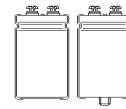
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					Plain base: GMA...	
16	82000	35x55	6	9,0	82301635055	
	120000	35x70	4	12,0	12401635070	
	120000	40x55	4	11,1	12401640055	
	150000	35x80	3	14,2	15401635080	
	150000	40x70	3	13,7	15401640070	
	180000	35x100	3	17,0	18401635100	
	180000	40x80	3	15,8	18401640080	
	180000	45x70	3	15,0	18401645070	
	220000	40x100	2	19,1	22401640100	
	220000	50x70	2	17,7	22401650070	
	270000	45x100	2	21,1	27401645100	
	270000	50x80	2	20,6	27401650080	
	390000	50x100	1	27,0	39401650100	
	470000	65x80	1	35,6	47401665080	
	560000	65x100	1	42,1	56401665100	
	820000	65x130	1	56,5	82401665130	
	820000	75x100	1	44,1	82401675100	
	1000000	75x115	1	46,5	10501675115	
	1200000	75x145	1	50,8	12501675145	
	1500000	75x165	1	53,5	15501675165	
	1800000	90x148	1	57,3	18501690148	
	2200000	75x225	1	61,0	22501675225	
	2200000	90x170	1	60,4	22501690170	
	2700000	90x220	1	67,1	27501690220	
	3300000	90x230	1	68,3	33501690230	
	25	33000	35x55	14	5,9	33302535055
		47000	35x70	9	7,8	47302535070
		47000	40x55	9	7,2	47302540055
56000		35x80	8	9,0	56302535080	
68000		40x70	7	9,5	68302540070	
82000		35x100	5	11,9	82301635100	
68000		40x80	7	10,0	68302540080	
82000		45x70	5	10,5	82302545070	
68000		40x100	7	11,0	68302540100	
100000		50x70	4	12,3	10402550070	
120000		45x100	4	14,6	12402545100	
120000		50x80	4	14,2	12402550080	
150000		50x100	3	17,3	15402550100	
180000		65x80	3	22,4	18402565080	
270000		65x100	2	29,8	27402565100	
330000		75x100	1	28,5	33402575100	
330000		65x130	1	36,4	33402565130	
390000		75x115	1	32,6	39402575115	
560000		75x145	1	42,7	56402575145	
560000		75x165	1	45,0	56402575165	
820000		90x148	1	58,2	82402590148	
820000		75x225	1	62,0	82402575225	

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					Plain base: GMA...	
25	820000	90x170	1	61,5	82402590170	
	1200000	90x220	1	82,6	12502590220	
	1500000	90x230	1	94,0	15502590230	
40	18000	35x55	21	4,7	18304035055	
	22000	40x55	17	5,3	22304040055	
	27000	35x70	14	6,4	27304035070	
	33000	35x80	12	7,4	33304035080	
	33000	40x70	12	7,2	33304040070	
	39000	35x100	10	8,9	39304035100	
	39000	40x80	10	8,2	39304040080	
	39000	45x70	10	7,8	39304045070	
	56000	50x70	7	10,0	56304050070	
	56000	40x100	7	10,8	56304040100	
	68000	50x80	6	11,6	68304050080	
	68000	45x100	6	11,8	68304045100	
	82000	50x100	5	13,8	82304050100	
	100000	65x80	4	18,3	10404065080	
	150000	65x100	3	24,4	15404065100	
	180000	75x100	2	23,1	18404075100	
	180000	65x130	2	29,6	18404065130	
	220000	75x115	2	26,9	22404075115	
	270000	75x145	1	32,6	27404075145	
	330000	75x165	1	38,0	33404075165	
	470000	90x148	1	48,5	47404090148	
	470000	75x225	1	51,6	47404075225	
	560000	90x170	1	55,8	56404090170	
	680000	90x220	1	68,3	68404090220	
	680000	90x230	1	69,6	68404090230	
	63	8200	35x55	35	3,7	82206335055
		12000	40x55	24	4,6	12306340055
		15000	35x70	19	5,5	15306335070
18000		35x80	16	6,3	18306335080	
18000		40x70	16	6,1	18306340070	
18000		35x100	16	6,9	18306335100	
22000		40x80	13	7,1	22306340080	
22000		45x70	13	6,8	22306345070	
27000		50x70	11	8,0	27306350070	
27000		40x100	11	8,6	27306340100	
33000		50x80	9	9,3	33306350080	
33000		45x100	9	9,5	33306345100	
39000		50x100	7	11,0	39306350100	
47000		65x80	6	14,5	47306365080	
68000		65x100	4	19,0	68306365100	
82000		75x100	3	18,0	82306375100	
100000		65x130	3	25,5	10406365130	
120000		75x115	2	22,9	12406375115	
150000		75x145	2	28,1	15406375145	



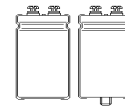
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: GMA...
					Stud mounting: GMB...
63	180000	75x165	2	32,4	18406375165
	220000	90x148	1	38,3	22406390148
	220000	75x225	1	40,8	22406375225
	270000	90x170	1	44,8	27406390170
	330000	90x220	1	54,9	33406390220
	390000	90x230	1	60,9	39406390230
80	6800	35x55	47	3,2	68208035055
	8200	40x55	39	3,8	82208040055
	10000	35x70	32	4,2	10308035070
	12000	35x80	27	4,6	12308035080
	12000	40x70	27	4,7	12308040070
	15000	35x100	21	6,0	15308035100
	15000	40x80	21	5,6	15308040080
	15000	45x70	21	5,3	15308045070
	18000	40x100	18	6,2	18308040100
	18000	50x70	18	6,2	18308050070
	22000	45x100	14	7,9	22308045100
	22000	50x80	14	7,2	22308050080
	27000	50x100	12	8,7	27308050100
	39000	65x80	8	12,6	39308065080
	47000	65x100	7	15,0	47308065100
	68000	65x130	5	15,7	68308065130
	68000	75x100	5	19,7	68308075100
	82000	75x115	4	18,0	82308075115
	100000	75x145	3	21,7	10408075145
	120000	75x165	3	25,1	12408075165
	150000	90x148	2	30,0	15408090148
	180000	75x225	2	35,0	18408075225
	180000	90x170	2	34,7	18408090170
	220000	90x220	1	42,6	22408090220
270000	90x230	1	48,0	27408090230	
100	3300	35x55	48	3,1	33210035055
	4700	35x70	34	4,1	47210035070
	4700	40x55	34	3,8	47210040055
	5600	35x80	28	4,7	56210035080
	5600	40x70	28	4,6	56210040070
	6800	35x100	23	5,7	68210035100
	6800	40x80	23	5,3	68210040080
	8200	45x70	19	5,5	82210045070
	10000	50x70	16	6,5	10310050070
	10000	40x100	16	7,1	10310040100
	12000	45x100	13	7,7	12310045100
	12000	50x80	13	7,5	12310050080
	15000	50x100	11	9,2	15310050100
	18000	65x80	9	12,1	18310065080
	22000	65x100	7	14,5	22310065100
	27000	75x100	6	13,9	27310075100
	33000	65x130	5	19,6	33310065130
	39000	75x115	4	17,6	39310075115

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					Plain base: GMA...	
					Stud mounting: GMB...	
100	47000	75x145	3	21,1	47310075145	
	56000	75x165	3	24,2	56310075165	
	68000	90x148	2	28,6	68310090148	
	82000	75x225	2	33,4	82310075225	
	82000	90x170	2	33,1	82310090170	
	120000	90x220	1	44,5	12410090220	
	120000	90x230	1	45,3	12410090230	
	160	1800	35x55	62	2,8	18216035055
2200		35x70	51	3,4	22216035070	
2200		40x55	51	3,1	22216040055	
2700		35x80	41	3,9	27216035080	
3300		40x70	34	4,2	33216040070	
3900		35x100	29	5,2	39216035100	
3900		40x80	29	4,8	39216040080	
3900		45x70	29	4,6	39216045070	
4700		40x100	24	5,4	47216040100	
4700		50x70	24	5,7	47216050070	
5600		50x80	20	6,1	56201605080	
6800		45x100	16	6,9	68216045100	
8200		50x100	14	8,1	82216050100	
8200		65x80	14	9,7	82216065080	
12000		65x100	9	12,8	12316065100	
18000		65x130	6	13,7	18316065130	
18000		75x100	6	17,1	18316075100	
18000		75x115	6	14,3	18316075115	
27000		75x145	4	19,1	27316075145	
27000		75x165	4	20,1	27316075165	
39000		90x148	3	25,9	39316090148	
47000		75x225	2	30,2	47316075225	
47000		90x170	2	30,0	47316090170	
56000		90x220	2	36,3	56316090220	
68000		90x230	2	40,7	68316090230	
250		1200	35x55	80	2,4	12225035055
		1500	35x70	64	3,0	15225035070
		1500	40x55	64	2,8	15225040055
	1800	35x80	53	3,5	18225035080	
	1800	40x70	53	3,3	18225040070	
	2200	40x80	43	4,1	22225040080	
	2700	35x100	35	4,4	27225035100	
	2700	45x70	35	4,1	27225045070	
	3300	40x100	29	4,9	33225040100	
	3300	50x70	29	5,2	33225050070	
	3900	50x80	24	5,5	39225050080	
	3900	45x100	24	5,7	39225045100	
	5600	50x100	17	7,2	56225050100	
	5600	65x80	17	8,7	56225065080	
	8200	65x100	12	11,4	82225065100	
	12000	65x130	8	12,1	12325065130	
	12000	75x100	8	15,1	12325075100	



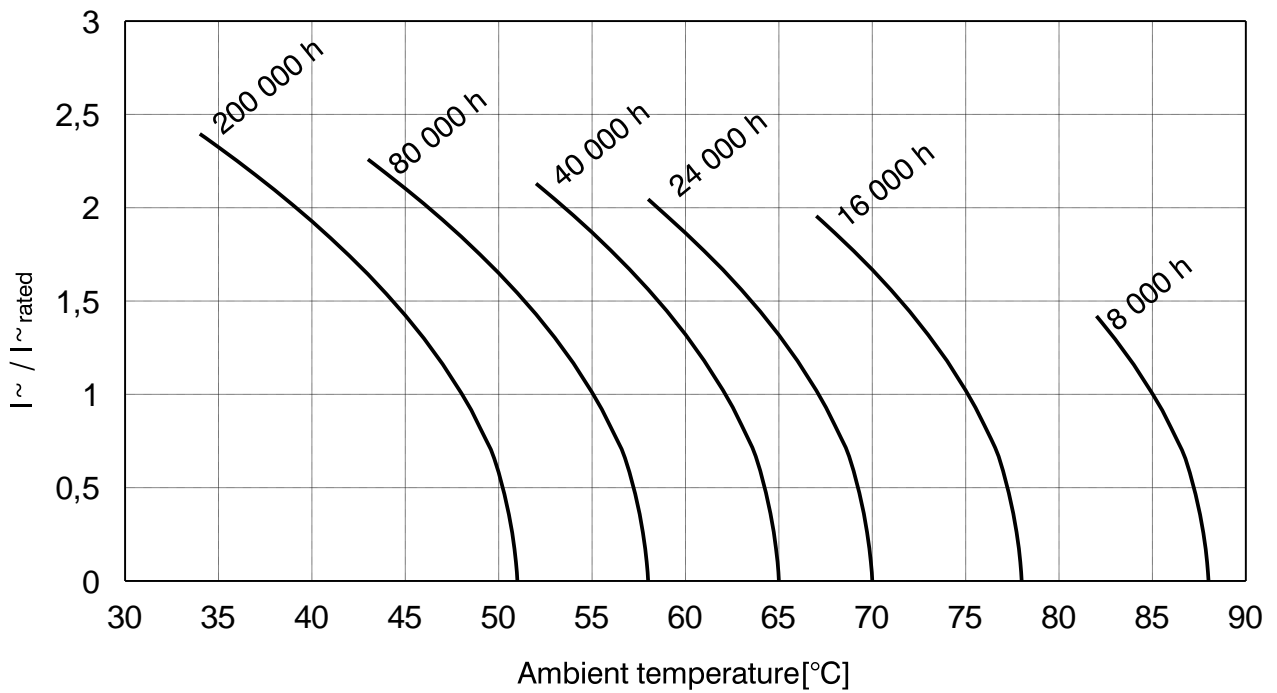
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR- 100 Hz, 85°C [A]	Order code
					Plain base: GMA...
					Stud mounting: GMB...
250	15000	75x115	6	14,1	15325075115
	18000	75x145	5	16,8	18325075145
	18000	75x165	5	17,7	18325075165
	27000	90x148	4	23,2	27325090148
	27000	75x225	4	24,7	27325075225
	27000	90x170	4	24,5	27325090170
	39000	90x220	2	32,7	39325090220
	39000	90x230	2	33,3	39325090230
350	680	35x55	141	1,8	68135035055
	1000	35x70	96	2,3	10235035070
	1000	40x55	96	2,4	10235040055
	1200	35x80	80	2,8	12235035080
	1200	40x70	80	2,7	12235040070
	1500	35x100	64	3,0	15235035100
	1500	40x80	64	3,4	15235040080
	1500	45x70	64	3,3	15235045070
	1800	40x100	53	3,6	18235040100
	1800	50x70	53	3,8	18235050070
	2200	50x80	43	4,2	22235050080
	2200	45x100	43	4,3	22235045100
	2700	50x100	35	5,0	27235050100
	3900	65x80	24	7,2	39235065080
	4700	65x100	20	8,6	47235065100
	5600	75x100	17	8,2	56235075100
	6800	65x130	14	11,5	68235065130
	6800	75x115	14	9,5	68235075115
	8200	75x145	12	11,4	82235075145
	10000	75x165	10	13,2	10335075165
12000	90x148	8	15,5	12335090148	
15000	75x225	6	18,4	15335075225	
15000	90x170	6	18,3	15335090170	
18000	90x220	5	22,2	18335090220	
18000	90x230	5	22,6	18335090230	
400	560	35x55	227	1,4	56140035055
	680	40x55	187	1,7	68140040055
	820	35x70	155	1,8	82140035070
	1000	35x80	127	2,2	10240035080
	1000	40x70	127	2,2	10240040070
	1200	35x100	106	2,5	12240035100
	1200	40x80	106	2,7	12240040080
	1200	45x70	106	2,4	12240045070
	1500	40x100	85	2,8	15240040100
	1500	50x70	85	3,0	15240050070
	1800	50x80	71	3,3	18240050080
	1800	45x100	71	3,3	18240045100
	2200	50x100	58	3,9	22240050100
	3300	65x80	39	5,8	33240065080
	3900	65x100	33	6,8	39240065100
	5600	65x130	23	7,1	56240065130

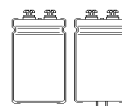
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR- 100 Hz, 85°C [A]	Order code
					Plain base: GMA...
					Stud mounting: GMB...
400	5600	75x100	23	8,9	56240075100
	6800	75x115	19	8,2	68240075115
	8200	75x145	16	9,8	82240075145
	10000	75x165	13	11,4	10340075165
	12000	90x148	11	13,4	12340090148
	15000	75x225	8	16,0	15340075225
	15000	90x170	8	15,8	15340090170
	18000	90x220	7	19,2	18340090220
	18000	90x230	7	19,6	18340090230
	450	470	35x55	237	1,4
560		35x70	199	1,7	56145035070
560		40x55	199	1,7	56145040055
680		35x80	164	2,0	68145035080
820		40x70	136	2,1	82145040070
820		35x100	136	2,2	82145035100
1000		40x80	111	2,4	10245040080
1000		45x70	111	2,3	10245045070
1200		40x100	93	2,9	12245040100
1200		50x70	93	2,7	12245050070
1500		50x80	74	3,2	15245050080
1500		45x100	74	3,3	15245045100
1800		50x100	62	3,8	18245050100
2200		65x80	51	5,0	22245065080
2700		65x100	41	6,1	27245065100
3900		65x130	29	8,1	39245065130
3900		75x100	29	6,3	39245075100
4700		75x115	24	7,3	47245075115
5600		75x145	20	8,7	56245075145
6800		75x165	16	10,1	68245075165
8200	90x148	14	11,9	82245090148	
10000	75x225	11	13,9	10345075225	
12000	90x170	9	15,1	12345090170	
15000	90x220	7	18,8	15345090220	
15000	90x230	7	19,1	15345090230	
500	390	35x55	286	1,3	39150035055
	470	40x55	237	1,5	47150040055
	560	35x70	199	1,7	56150035070
	680	35x80	164	2,0	68150035080
	680	40x70	164	1,9	68150040070
	820	35x100	136	2,2	82150035100
	820	40x80	136	2,2	82150040080
	820	45x70	136	2,1	82150045070
	1000	50x70	111	2,7	10250050070
	1200	40x100	93	2,7	12250040100
	1200	50x80	93	2,8	12250050080
	1200	45x100	93	2,9	12250045100
	1800	50x100	62	3,8	18250050100
	2200	65x80	51	5,0	22250065080
	2700	65x100	41	6,1	27250065100



Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR- 100 Hz, 85°C [A]	Order code
					Plain base: GMA...
500	3300	75x100	34	7,3	33250075100
	3900	65x130	29	6,4	39250065130
	4700	75x115	24	7,3	47250075115
	5600	75x145	20	8,7	56250075145
	6800	75x165	16	10,1	68250075165
	8200	90x148	14	11,9	82250090148
	10000	75x225	11	13,9	10350075225
	10000	90x170	11	13,8	10350090170
	15000	90x220	7	18,8	15350090220
	15000	90x230	7	19,1	15350090230

Useful life
as a function of ambient temperature and actual ripple current





Screw terminals
High CV product
Long life 12000 h @ 85°C

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High capacitance
- High CV product
- Long useful life

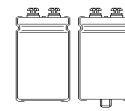
Applications

- Computer
- Industrial
- Inverter/drives
- Laser

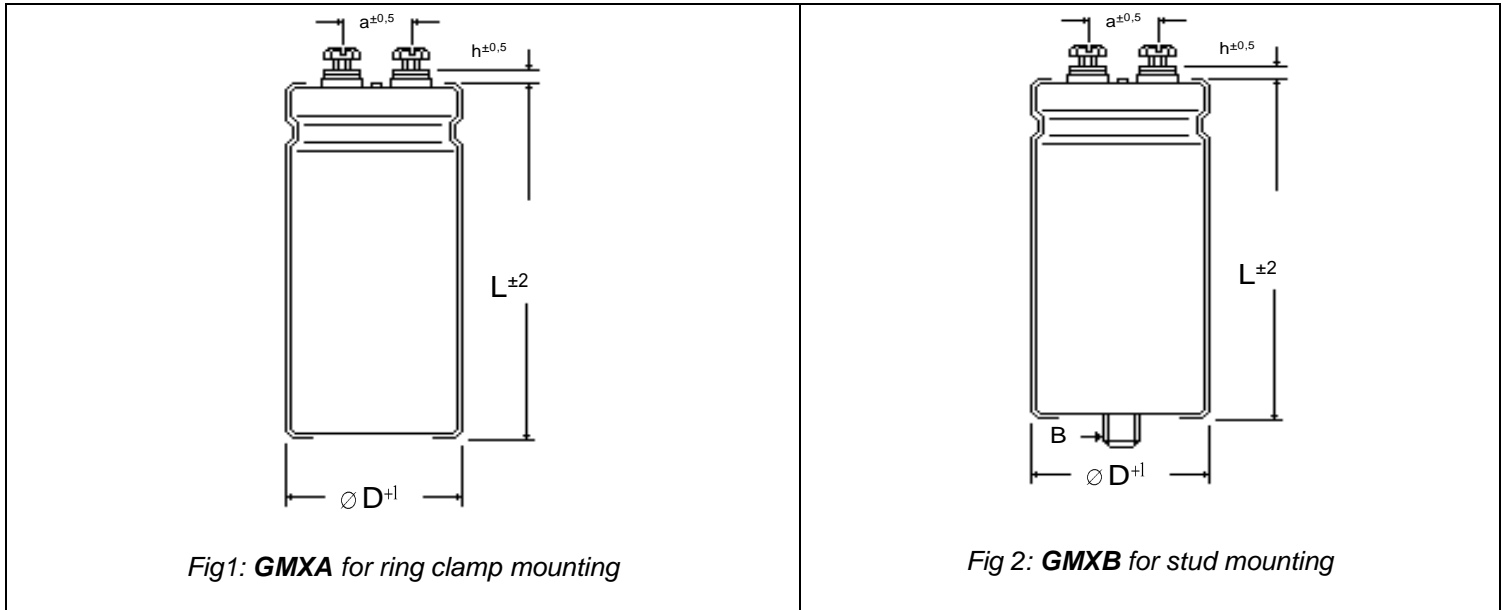
Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		390 ... 3.300.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315 \text{ V}: U_S = 1,15 U_R$ $U_R > 315 \text{ V}: U_S = 1,10 U_R$
Max. reverse voltage / ESL		2 V / 20 nH
Category temperature range		- 40°C ... + 85°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	12000 h @ 85 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30 \%$ of initial value $\text{ESR} \leq 300 \%$ of specified limit $I_L \leq \text{specified limit}$
Endurance test	4000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20 \%$ of initial value $\text{ESR} \leq 130 \%$ of specified limit $I_L \leq \text{specified limit}$
Climatic category IEC 60068		40/085/56
Voltage proof of the external insulation		$\geq 2500 \text{ V AC}$
Sectional specification		IEC 60384-4



Drawings for series GMXA and GMXB

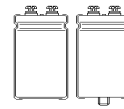


Dimensions and mechanical data

D [mm]	Dimensions, case with insulation sleeve			Connecting terminals		Mounting stud, GMXB only	
	Case length L available in 5 mm [mm]	h [mm]	a [mm]	Thread	Max. torque [Nm]	B	Max. torque [Nm]
35	40 ... 120	6	13	M 5	2,0	M 8 x 12	4,0
40	40 ... 120	5	18	M 5	2,0	M 8 x 12	4,0
50	40 ... 120	5	22	M 5	2,0	M 12 x 16	10,0
65	40 ... 180	5	28,5	M 5	2,0	M 12 x 16	10,0
75	40 ... 230	5	31,7	M 5, M 6	2,0 ; 2,5	M 12 x 16	10,0
90	40 ... 230	5	31,7	M 6	2,5	M 12 x 16	10,0

Accessories

	<p>GMXA : connecting screws M 5 or M 6 GMXB : connecting screws M 5 or M 6 + mounting nut M 8 or M 12</p>
Remarks	<p>Further mounting accessories like clamps, nylon cup nuts and insulation disks on request, see "accessory equipment"</p>

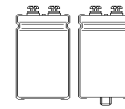


Electrical data and ordering codes series GMX

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[BACK TO START](#)

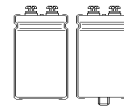
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code		
					Plain base: GMXA...		
					Stud mounting: GMXB...		
16	82000	35x55	6	9,0	82301635055		
	120000	35x70	4	12,0	12401635070		
	120000	40x55	4	11,1	12401640055		
	150000	35x80	3	14,2	15401635080		
	150000	40x70	3	13,7	15401640070		
	180000	35x100	3	17,0	18401635100		
	180000	40x80	3	15,8	18401640080		
	180000	45x70	3	15,0	18401645070		
	220000	40x100	3	19,1	22401640100		
	220000	50x70	3	17,7	22401650070		
	270000	45x100	3	21,1	27401645100		
	270000	50x80	3	20,6	27401650080		
	390000	50x100	3	27,0	39401650100		
	470000	65x80	3	35,6	47401665080		
	560000	65x100	2	42,1	56401665100		
	820000	65x130	2	56,5	82401665130		
	820000	75x100	1	44,1	82401675100		
	1000000	75x115	1	51,3	10501675115		
	1200000	75x145	1	61,5	12501675145		
	1500000	75x165	1	72,4	15501675165		
	1800000	90x148	1	84,8	18501690148		
	2200000	75x225	1	99,8	22501675225		
	2200000	90x170	1	99,0	22501690170		
	2700000	90x220	1	121,7	27501690220		
	3300000	90x230	1	137,1	33501690230		
	25	22000	35x55	20	4,8	22302535055	
		33000	35x70	14	6,5	33302535070	
		33000	40x55	14	6,1	33302540055	
39000		35x80	11	7,5	39302535080		
47000		40x70	9	7,9	47302540070		
56000		35x100	8	9,8	56302535100		
56000		40x80	8	9,1	56302540080		
56000		45x70	8	8,6	56302545070		
68000		40x100	7	11,0	68302540100		
68000		50x70	7	10,2	68302550070		
68000		45x100	7	11,0	68302545100		
82000		50x80	5	11,7	82302550080		
120000		50x100	4	15,5	12402550100		
120000		65x80	4	18,3	12402565080		
180000		65x100	3	24,3	18402565100		
220000		75x100	2	23,2	22402575100		
270000		65x130	2	33,0	27402565130		
270000		75x115	2	27,1	27402575115		
390000		75x145	1	35,7	39402575145		
470000		75x165	1	41,2	47402575165		
560000		90x148	1	48,1	56402590148		
680000		75x225	1	56,5	68402575225		

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code		
					Plain base: GMXA...		
					Stud mounting: GMXB...		
25	680000	90x170	1	56,0	68402590170		
	820000	90x220	1	68,2	82402590220		
	1000000	90x230	1	76,8	10502590230		
40	15000	35x55	25	4,3	15304035055		
	18000	40x55	21	4,8	18304040055		
	22000	35x70	17	5,7	22304035070		
	27000	35x80	14	6,7	27304035080		
	27000	40x70	14	6,5	27304040070		
	33000	35x100	12	8,1	33304035100		
	33000	40x80	12	7,5	33304040080		
	33000	45x70	12	7,2	33304045070		
	39000	50x70	10	8,3	39304050070		
	47000	40x100	8	9,9	47304040100		
	47000	50x80	8	9,6	47304050080		
	56000	45x100	7	10,7	56304045100		
	68000	50x100	6	12,6	68304050100		
	82000	65x80	5	16,6	82304065080		
	120000	65x100	3	21,8	12404065100		
	150000	75x100	3	21,1	15404075100		
	150000	65x130	3	27,0	15404065130		
	180000	75x115	2	24,3	18404075115		
	220000	75x145	2	29,4	22404075145		
	270000	75x165	1	34,3	27404075165		
	330000	90x148	1	40,6	33404090148		
	390000	75x225	1	47,0	39404075225		
	390000	90x170	1	46,6	39404090170		
	560000	90x220	1	62,0	56404090220		
	560000	90x230	1	63,1	56404090230		
	63	6800	35x55	42	3,4	68206335055	
		8200	40x55	35	3,8	82206340055	
		10000	35x70	29	4,5	10306335070	
12000		35x80	24	5,2	12306335080		
12000		40x70	24	5,0	12306340070		
15000		35x100	19	6,3	15306335100		
15000		40x80	19	5,9	15306340080		
15000		45x70	19	5,6	15306345070		
18000		50x70	16	6,5	18306350070		
18000		40x100	16	7,1	18306340100		
22000		50x80	13	7,6	22306350080		
22000		45x100	13	7,8	22306345100		
27000		50x100	11	9,2	27306350100		
39000		65x80	7	13,2	39306365080		
47000		65x100	6	15,8	47306365100		
68000		75x100	4	16,4	68306375100		
68000		65x130	4	21,0	68306365130		
82000		75x115	3	19,0	82306375115		
100000		75x145	3	22,9	10406375145		



Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					Plain base: GMXA...	
					Stud mounting: GMXB...	
63	120000	75x165	2	26,4	12406375165	
	150000	90x148	2	31,6	15406390148	
	180000	75x225	2	36,9	18406375225	
	180000	90x170	2	36,6	18406390170	
	220000	90x220	1	44,9	22406390220	
	270000	90x230	1	50,6	27406390230	
80	3900	35x55	82	2,4	39208035055	
	5600	35x70	57	3,2	56208035070	
	6800	35x80	47	3,7	68208035080	
	6800	40x70	47	3,6	68208040070	
	8200	40x55	39	3,6	82208040055	
	8200	35x100	39	4,4	82208035100	
	8200	40x80	39	4,1	82208040080	
	10000	45x70	32	4,3	10308045070	
	12000	50x70	27	5,1	12308050070	
	12000	45x100	27	5,4	12308045100	
	15000	40x100	21	6,1	15308040100	
	15000	50x80	21	5,9	15308050080	
	18000	50x100	18	7,1	18308050100	
	22000	65x80	14	9,4	22308065080	
	27000	65x100	12	11,3	27308065100	
	39000	75x100	8	11,8	39308075100	
	39000	65x130	8	15,1	39308065130	
	47000	75x115	7	13,6	47308075115	
	68000	75x145	5	17,9	68308075145	
	68000	75x165	5	18,9	68308075165	
	100000	90x148	3	24,5	10408090148	
	120000	75x225	3	28,6	12408075225	
	120000	90x170	3	28,3	12408090170	
	150000	90x220	2	35,1	15408090220	
150000	90x230	2	35,8	15408090230		
100	3300	35x55	48	3,1	33210035055	
	4700	35x70	34	4,1	47210035070	
	4700	40x55	34	3,8	47210040055	
	5600	35x80	28	4,7	56210035080	
	5600	40x70	28	4,6	56210040070	
	6800	35x100	23	5,7	68210035100	
	6800	40x80	23	5,3	68210040080	
	8200	45x70	19	5,5	82210045070	
	10000	50x70	16	6,5	10310050070	
	10000	40x100	16	7,1	10310040100	
	12000	45x100	13	7,7	12310045100	
	12000	50x80	13	7,5	12310050080	
	15000	50x100	11	9,2	15310050100	
	18000	65x80	9	12,1	18310065080	
	22000	65x100	7	14,5	22310065100	
	27000	75x100	6	13,9	27310075100	
	33000	65x130	5	19,6	33310065130	
	39000	75x115	4	17,6	39310075115	

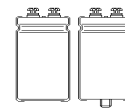
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code		
					Plain base: GMXA...		
					Stud mounting: GMXB...		
100	47000	75x145	3	21,1	47310075145		
	56000	75x165	3	24,2	56310075165		
	68000	90x148	2	28,6	68310090148		
	82000	75x225	2	33,4	82310075225		
	82000	90x170	2	33,1	82310090170		
	120000	90x220	1	44,5	12410090220		
	120000	90x230	1	45,3	12410090230		
	160	1800	35x55	62	2,8	18216035055	
2200		35x70	51	3,4	22216035070		
2200		40x55	51	3,1	22216040055		
2700		35x80	41	3,9	27216035080		
2700		40x70	41	3,8	27216040070		
3900		35x100	29	5,2	39216035100		
3900		40x80	29	4,8	39216040080		
3900		45x70	29	4,6	39216045070		
4700		50x70	24	5,4	47216050070		
4700		40x100	24	5,8	47216040100		
5600		45x100	20	6,3	56216045100		
5600		50x80	20	6,1	56216050080		
6800		50x100	16	7,4	68216050100		
8200		65x80	14	9,7	82216065080		
12000		65x100	9	12,8	12316065100		
15000		75x100	7	12,4	15316075100		
18000		65x130	6	17,3	18316065130		
18000		75x115	6	14,3	18316075115		
27000		75x145	4	19,1	27316075145		
27000		75x165	4	20,1	27316075165		
39000		75x225	3	27,5	39316075225		
39000		90x148	3	25,9	39316090148		
47000		90x170	2	30,0	47316090170		
56000		90x220	2	36,3	56316090220		
56000		90x230	2	37,0	56316090230		
250		1000	35x55	96	2,2	10225035055	
		1500	35x70	64	3,0	15225035070	
		1500	40x55	64	2,8	15225040055	
	1800	35x80	53	3,5	18225035080		
	1800	40x70	53	3,3	18225040070		
	2200	35x100	43	4,2	22225035100		
	2200	40x80	43	3,9	22225040080		
	2200	45x70	43	3,7	22225045070		
	2700	50x70	35	4,4	27225050070		
	3300	40x100	29	5,2	33225040100		
	3900	45x100	24	5,7	39225045100		
	3900	50x80	24	5,5	39225050080		
	4700	50x100	20	6,6	47225050100		
	5600	65x80	17	8,7	56225065080		
	8200	65x100	12	11,4	82225065100		
	10000	75x100	10	10,9	10325075100		
	12000	65x130	8	15,3	12325065130		



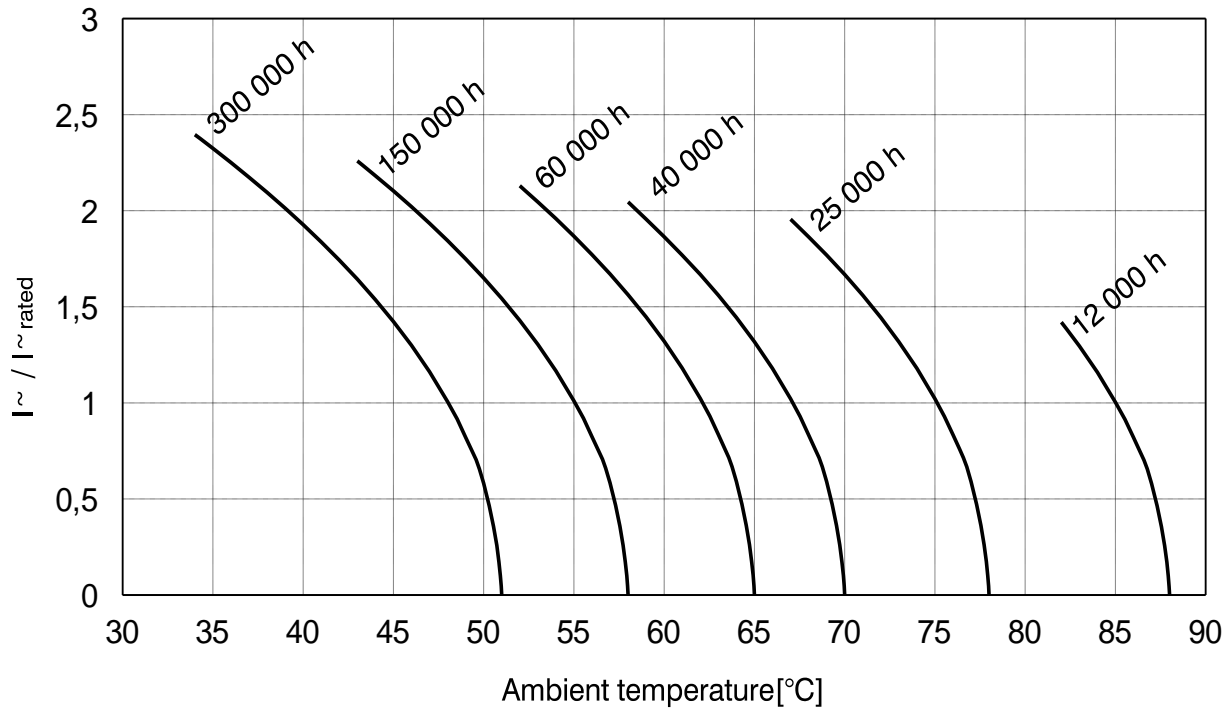
Rated voltage U _R [V]	Rated cap. C _R [µF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: GMXA...
					Stud mounting: GMXB...
250	12000	75x115	8	12,6	12325075115
	18000	75x145	5	16,8	18325075145
	18000	75x165	5	17,7	18325075165
	27000	75x225	4	24,7	27325075225
	27000	90x148	4	23,2	27325090148
	27000	90x170	4	24,5	27325090170
	39000	90x220	2	32,7	39325090220
	39000	90x230	2	33,3	39325090230
350	560	35x55	171	1,7	56135035055
	680	40x55	141	1,9	68135040055
	820	35x70	117	2,2	82135035070
	1000	35x80	96	2,6	10235035080
	1200	40x70	80	2,7	12235040070
	1200	45x70	80	2,7	12235045070
	1500	35x100	64	3,5	15235035100
	1500	40x80	64	3,2	15235040080
	1800	50x70	53	3,6	18235050070
	1800	40x100	53	3,9	18235040100
	1800	50x80	53	3,8	18235050080
	2200	45x100	43	4,3	22235045100
	2700	50x100	35	5,0	27235050100
	3300	65x80	29	6,7	33235065080
	3900	65x100	24	7,9	39235065100
	4700	75x100	20	7,5	47235075100
	5600	65x130	17	10,4	56235065130
	5600	75x115	17	8,6	56235075115
	8200	75x145	12	11,4	82235075145
	8200	75x165	12	12,0	82235075165
12000	75x225	8	16,5	12335075225	
12000	90x148	8	15,5	12335090148	
15000	90x170	6	18,3	15335090170	
18000	90x220	5	22,2	18335090220	
18000	90x230	5	22,6	18335090230	
400	390	35x55	327	1,2	39140035055
	560	35x70	227	1,6	56140035070
	560	40x55	227	1,5	56140040055
	680	35x80	187	1,8	68140035080
	820	40x70	155	2,0	82140040070
	820	40x80	155	2,1	82140040080
	1000	35x100	127	2,5	10240035100
	1000	45x70	127	2,2	10240045070
	1200	50x70	106	2,5	12240050070
	1200	40x100	106	2,7	12240040100

Rated voltage U _R [V]	Rated cap. C _R [µF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					Plain base: GMXA...	
					Stud mounting: GMXB...	
400	1500	45x100	85	3,0	15240045100	
	1500	50x80	85	3,0	15240050080	
	1800	50x100	71	3,6	18240050100	
	2200	65x80	58	4,7	22240065080	
	2700	65x100	47	5,7	27240065100	
	3300	65x100	40	5,8	33240065100	
	3900	75x100	33	5,9	39240075100	
	3900	65x130	33	7,5	39240065130	
	4700	75x115	27	6,8	47240075115	
	6800	75x145	19	9,0	68240075145	
	6800	75x165	19	9,4	68240075165	
	10000	90x148	13	12,2	10340090148	
	12000	75x225	11	14,3	12340075225	
	12000	90x170	11	14,2	12340090170	
	15000	90x220	8	17,6	15340090220	
	18000	90x230	7	19,6	18340090230	
	450	390	35x55	286	1,3	39145035055
		470	35x70	237	1,6	47145035070
560		35x80	199	1,8	56145035080	
560		35x100	199	2,0	56145035100	
680		40x55	164	1,7	68145040055	
820		40x70	136	2,1	82145040070	
820		40x80	136	2,2	82145040080	
1000		45x70	111	2,3	10245045070	
1000		40x100	111	2,7	10245040100	
1200		50x70	93	2,7	12245050070	
1200		45x100	93	2,9	12245045100	
1200		50x80	93	2,8	12245050080	
1800		50x100	62	3,8	18245050100	
1800		65x80	62	4,6	18245065080	
2700		65x100	41	6,1	27245065100	
3300		65x130	34	7,4	33245065130	
3900		75x100	29	6,3	39245075100	
3900		75x115	29	6,6	39245075115	
4700		75x145	26	7,6	47245075145	
5600		75x145	20	8,7	56245075145	
6800		75x165	16	10,1	68245075165	
8200		75x225	14	12,6	82245075225	
10000		90x148	11	13,1	10345090148	
10000		90x170	11	13,8	10345090170	
15000		90x220	7	18,8	15345090220	
15000		90x230	7	19,1	15345090230	
12000		90x220	7	17,9	12345090220	

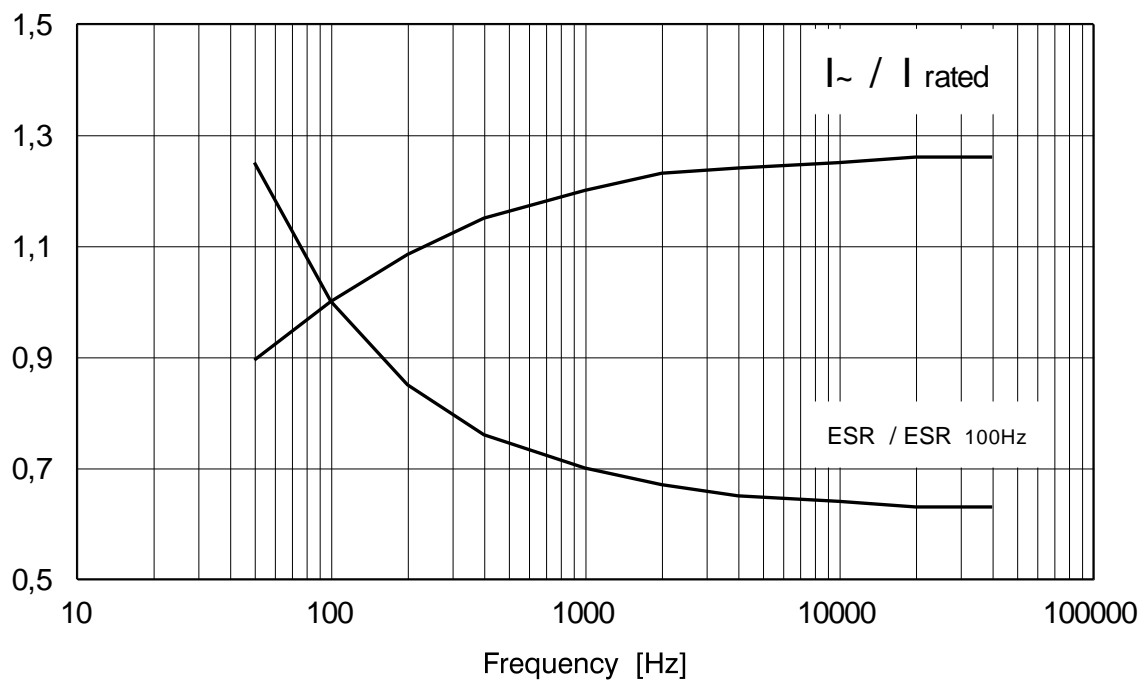
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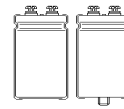
Useful life
 as a function of ambient temperature and actual ripple current



Ripple current and ESR
 As a function of frequency f



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Screw terminals
High CV product
Long life 8000 h @ 105°

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High performance
- High ripple current
- Long useful life

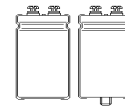
Applications

- Industrial
- Inverter/drives
- Telecommunications
- Laser

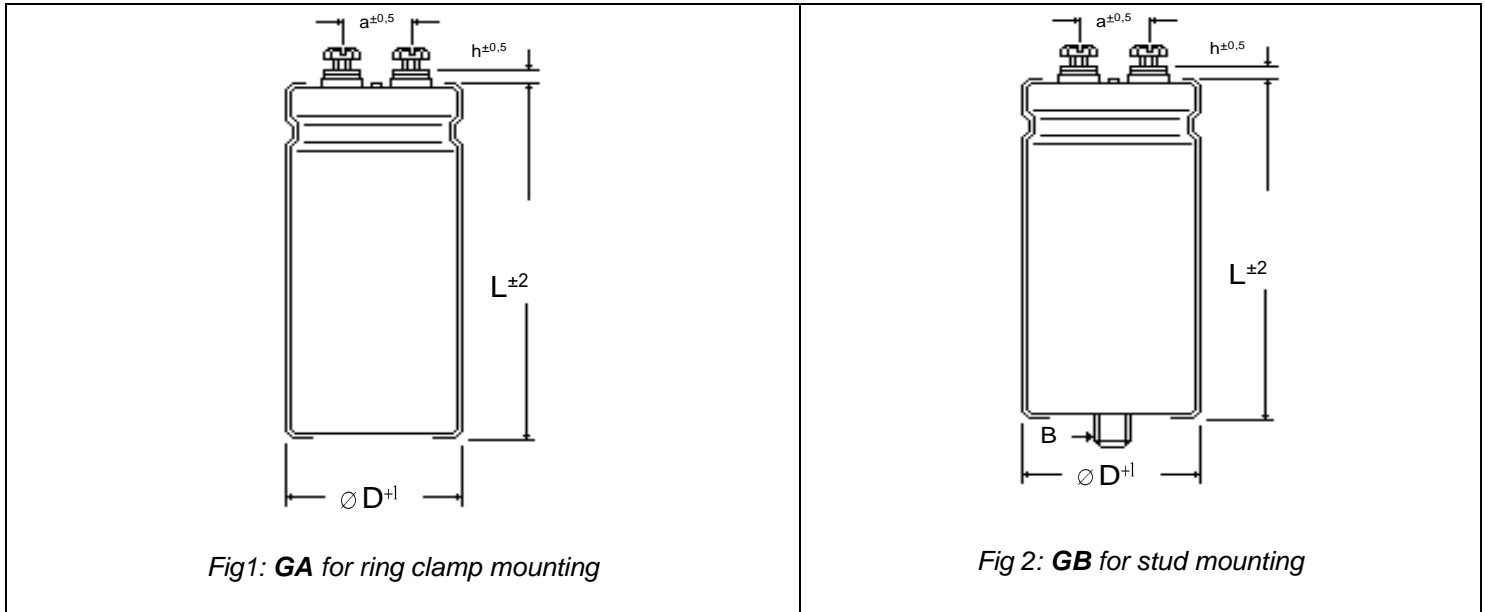
Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		390 ... 3.300.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315 V: U_S = 1,15 U_R$ $U_R > 315 V: U_S = 1,10 U_R$
Max. reverse voltage / ESL		2 V / 20 nH
Category temperature range		- 40°C ... + 105°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	8000 h @ 105 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	4000 h @ 105 °C , U_R	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/105/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4



Drawings for series GA and GB

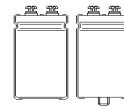


Dimensions and mechanical data

Dimensions, case with insulation sleeve				Connecting terminals		Mounting stud, GB only	
D [mm]	Case length l available in 5 mm [mm]	h [mm]	a [mm]	Thread	Max. torque [Nm]	B	Max. torque [Nm]
35	40 ... 120	6	13	M 5	2,0	M 8 x 12	4,0
40	40 ... 120	5	18	M 5	2,0	M 8 x 12	4,0
50	40 ... 120	5	22	M 5	2,0	M 12 x 16	10,0
65	40 ... 180	5	28,5	M 5	2,0	M 12 x 16	10,0
75	40 ... 230	5	31,7	M 5, M 6	2,0 ; 2,5	M 12 x 16	10,0
90	40 ... 230	5	31,7	M 6	2,5	M 12 x 16	10,0

Accessories

	<p>GA : connecting screws M 5 or M 6</p> <p>GB : connecting screws M 5 or M 6 + mounting nut M 8 or M 12</p>
Remarks	<p>Further mounting accessories like clamps, nylon cup nuts and insulation disks on request, see "accessory equipment"</p>

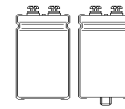


Electrical data and ordering codes series G

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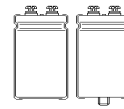
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code	
					Plain base: GA...	
					Stud mounting: GB...	
16	82000	35x55	6	9,0	82301635055	
	120000	35x70	4	12,0	12401635070	
	120000	40x55	4	11,1	12401640055	
	150000	35x80	3	14,2	15401635080	
	150000	40x70	3	13,7	15401640070	
	180000	35x100	3	17,0	18401635100	
	180000	40x80	3	15,8	18401640080	
	180000	45x70	3	15,0	18401645070	
	220000	40x100	3	19,1	22401640100	
	220000	50x70	3	17,7	22401650070	
	270000	45x100	3	21,1	27401645100	
	270000	50x80	3	20,6	27401650080	
	390000	50x100	3	27,0	39401650100	
	470000	65x80	3	35,6	47401665080	
	560000	65x100	2	42,1	56401665100	
	820000	65x130	2	56,5	82401665130	
	820000	75x100	1	44,1	82401675100	
	1000000	75x115	1	51,3	10501675115	
	1200000	75x145	1	61,5	12501675145	
	1500000	75x165	1	72,4	15501675165	
1800000	90x148	1	84,8	18501690148		
2200000	75x225	1	99,8	22501675225		
2200000	90x170	1	99,0	22501690170		
2700000	90x220	1	121,7	27501690220		
3300000	90x230	1	137,1	33501690230		
25	22000	35x55	20	4,8	22302535055	
	33000	35x70	14	6,5	33302535070	
	33000	40x55	14	6,1	33302540055	
	39000	35x80	11	7,5	39302535080	
	47000	40x70	9	7,9	47302540070	
	56000	35x100	8	9,8	56302535100	
	56000	40x80	8	9,1	56302540080	
	56000	45x70	8	8,6	56302545070	
	68000	40x100	7	11,0	68302540100	
	68000	50x70	7	10,2	68302550070	
	68000	45x100	7	11,0	68302545100	
	82000	50x80	5	11,7	82302550080	
	120000	50x100	4	15,5	12402550100	
	120000	65x80	4	18,3	12402565080	
	180000	65x100	3	24,3	18402565100	
	220000	75x100	2	23,2	22402575100	
	270000	65x130	2	33,0	27402565130	
	270000	75x115	2	27,1	27402575115	
	390000	75x145	1	35,7	39402575145	
	470000	75x165	1	41,2	47402575165	
560000	90x148	1	48,1	56402590148		
680000	75x225	1	56,5	68402575225		

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code	
					Plain base: GA...	
					Stud mounting: GB...	
25	680000	90x170	1	56,0	68402590170	
	820000	90x220	1	68,2	82402590220	
	1000000	90x230	1	76,8	10502590230	
40	15000	35x55	25	4,3	15304035055	
	18000	40x55	21	4,8	18304040055	
	22000	35x70	17	5,7	22304035070	
	27000	35x80	14	6,7	27304035080	
	27000	40x70	14	6,5	27304040070	
	33000	35x100	12	8,1	33304035100	
	33000	40x80	12	7,5	33304040080	
	33000	45x70	12	7,2	33304045070	
	39000	50x70	10	8,3	39304050070	
	47000	40x100	8	9,9	47304040100	
	47000	50x80	8	9,6	47304050080	
	56000	45x100	7	10,7	56304045100	
	68000	50x100	6	12,6	68304050100	
	82000	65x80	5	16,6	82304065080	
	120000	65x100	3	21,8	12404065100	
	150000	75x100	3	21,1	15404075100	
	150000	65x130	3	27,0	15404065130	
	180000	75x115	2	24,3	18404075115	
	220000	75x145	2	29,4	22404075145	
	270000	75x165	1	34,3	27404075165	
330000	90x148	1	40,6	33404090148		
390000	75x225	1	47,0	39404075225		
390000	90x170	1	46,6	39404090170		
560000	90x220	1	62,0	56404090220		
560000	90x230	1	63,1	56404090230		
63	6800	35x55	42	3,4	68206335055	
	8200	40x55	35	3,8	82206340055	
	10000	35x70	29	4,5	10306335070	
	12000	35x80	24	5,2	12306335080	
	12000	40x70	24	5,0	12306340070	
	15000	35x100	19	6,3	15306335100	
	15000	40x80	19	5,9	15306340080	
	15000	45x70	19	5,6	15306345070	
	18000	50x70	16	6,5	18306350070	
	18000	40x100	16	7,1	18306340100	
	22000	50x80	13	7,6	22306350080	
	22000	45x100	13	7,8	22306345100	
	27000	50x100	11	9,2	27306350100	
	39000	65x80	7	13,2	39306365080	
	47000	65x100	6	15,8	47306365100	
	68000	75x100	4	16,4	68306375100	
	68000	65x130	4	21,0	68306365130	
	82000	75x115	3	19,0	82306375115	
	100000	75x145	3	22,9	10406375145	



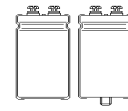
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code
					Plain base: GA...
					Stud mounting: GB...
63	120000	75x165	2	26,4	12406375165
	150000	90x148	2	31,6	15406390148
	180000	75x225	2	36,9	18406375225
	180000	90x170	2	36,6	18406390170
	220000	90x220	1	44,9	22406390220
	270000	90x230	1	50,6	27406390230
80	3900	35x55	82	2,4	39208035055
	5600	35x70	57	3,2	56208035070
	6800	35x80	47	3,7	68208035080
	6800	40x70	47	3,6	68208040070
	8200	40x55	39	3,6	82208040055
	8200	35x100	39	4,4	82208035100
	8200	40x80	39	4,1	82208040080
	10000	45x70	32	4,3	10308045070
	12000	50x70	27	5,1	12308050070
	12000	45x100	27	5,4	12308045100
	15000	40x100	21	6,1	15308040100
	15000	50x80	21	5,9	15308050080
	18000	50x100	18	7,1	18308050100
	22000	65x80	14	9,4	22308065080
	27000	65x100	12	11,3	27308065100
	39000	75x100	8	11,8	39308075100
	39000	65x130	8	15,1	39308065130
	47000	75x115	7	13,6	47308075115
	68000	75x145	5	17,9	68308075145
	68000	75x165	5	18,9	68308075165
100000	90x148	3	24,5	10408090148	
120000	75x225	3	28,6	12408075225	
120000	90x170	3	28,3	12408090170	
150000	90x220	2	35,1	15408090220	
150000	90x230	2	35,8	15408090230	
100	3300	35x55	48	3,1	33210035055
	4700	35x70	34	4,1	47210035070
	4700	40x55	34	3,8	47210040055
	5600	35x80	28	4,7	56210035080
	5600	40x70	28	4,6	56210040070
	6800	35x100	23	5,7	68210035100
	6800	40x80	23	5,3	68210040080
	8200	45x70	19	5,5	82210045070
	10000	50x70	16	6,5	10310050070
	10000	40x100	16	7,1	10310040100
	12000	45x100	13	7,7	12310045100
	12000	50x80	13	7,5	12310050080
	15000	50x100	11	9,2	15310050100
	18000	65x80	9	12,1	18310065080
	22000	65x100	7	14,5	22310065100
	27000	75x100	6	13,9	27310075100
	33000	65x130	5	19,6	33310065130
	39000	75x115	4	17,6	39310075115

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code
					Plain base: GA...
					Stud mounting: GB...
100	47000	75x145	3	21,1	47310075145
	56000	75x165	3	24,2	56310075165
	68000	90x148	2	28,6	68310090148
	82000	75x225	2	33,4	82310075225
	82000	90x170	2	33,1	82310090170
	120000	90x220	1	44,5	12410090220
	120000	90x230	1	45,3	12410090230
	160	1800	35x55	62	2,8
2200		35x70	51	3,4	22216035070
2200		40x55	51	3,1	22216040055
2700		35x80	41	3,9	27216035080
2700		40x70	41	3,8	27216040070
3900		35x100	29	5,2	39216035100
3900		40x80	29	4,8	39216040080
3900		45x70	29	4,6	39216045070
4700		50x70	24	5,4	47216050070
4700		40x100	24	5,8	47216040100
5600		45x100	20	6,3	56216045100
5600		50x80	20	6,1	56216050080
6800		50x100	16	7,4	68216050100
8200		65x80	14	9,7	82216065080
12000		65x100	9	12,8	12316065100
15000		75x100	7	12,4	15316075100
18000		65x130	6	17,3	18316065130
18000		75x115	6	14,3	18316075115
27000		75x145	4	19,1	27316075145
27000		75x165	4	20,1	27316075165
39000		75x225	3	27,5	39316075225
39000		90x148	3	25,9	39316090148
47000		90x170	2	30,0	47316090170
56000		90x220	2	36,3	56316090220
56000	90x230	2	37,0	56316090230	
250	1000	35x55	96	2,2	10225035055
	1500	35x70	64	3,0	15225035070
	1500	40x55	64	2,8	15225040055
	1800	35x80	53	3,5	18225035080
	1800	40x70	53	3,3	18225040070
	2200	35x100	43	4,2	22225035100
	2200	40x80	43	3,9	22225040080
	2200	45x70	43	3,7	22225045070
	2700	50x70	35	4,4	27225050070
	3300	40x100	29	5,2	33225040100
	3900	45x100	24	5,7	39225045100
	3900	50x80	24	5,5	39225050080
	4700	50x100	20	6,6	47225050100
	5600	65x80	17	8,7	56225065080
	8200	65x100	12	11,4	82225065100
	10000	75x100	10	10,9	10325075100
	12000	65x130	8	15,3	12325065130

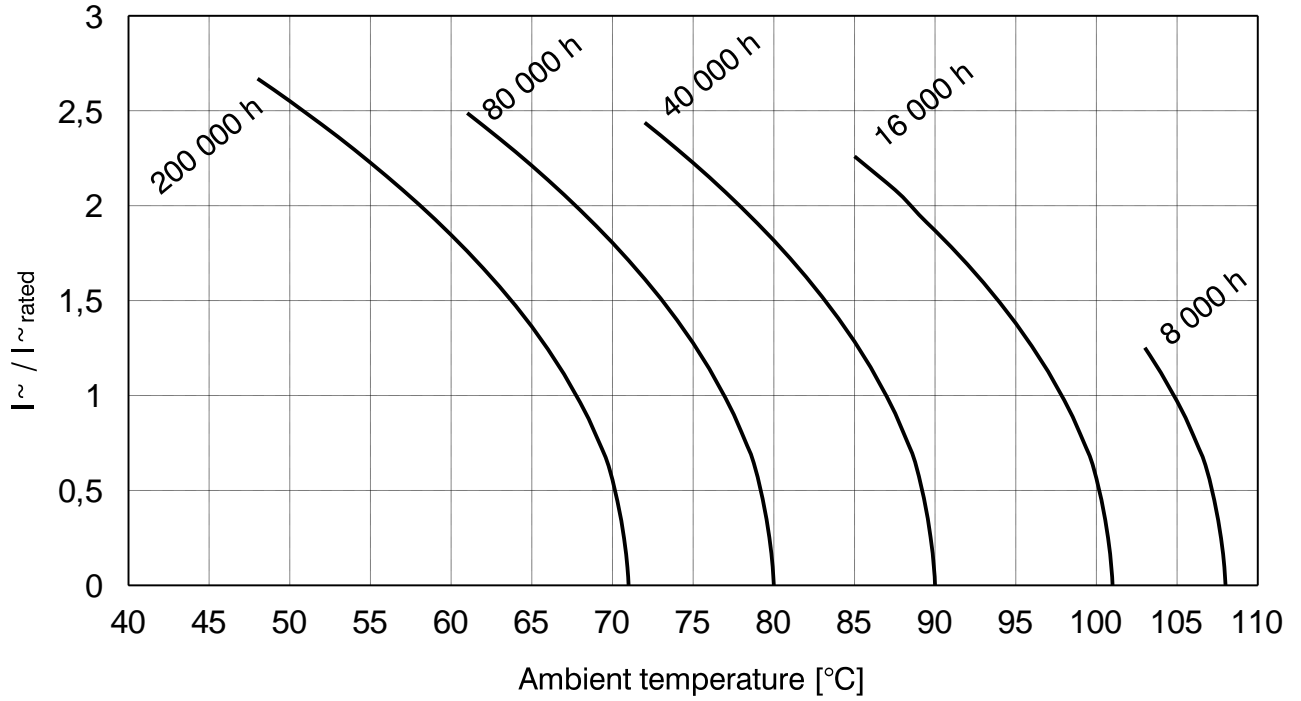


Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code	
					Plain base: GA...	
					Stud mounting: GB...	
250	12000	75x115	8	12,6	12325075115	
	18000	75x145	5	16,8	18325075145	
	18000	75x165	5	17,7	18325075165	
	27000	75x225	4	24,7	27325075225	
	27000	90x148	4	23,2	27325090148	
	27000	90x170	4	24,5	27325090170	
	39000	90x220	2	32,7	39325090220	
	39000	90x230	2	33,3	39325090230	
350	560	35x55	171	1,7	56135035055	
	680	40x55	141	1,9	68135040055	
	820	35x70	117	2,2	82135035070	
	1000	35x80	96	2,6	10235035080	
	1200	40x70	80	2,7	12235040070	
	1200	45x70	80	2,7	12235045070	
	1500	35x100	64	3,5	15235035100	
	1500	40x80	64	3,2	15235040080	
	1800	50x70	53	3,6	18235050070	
	1800	40x100	53	3,9	18235040100	
	1800	50x80	53	3,8	18235050080	
	2200	45x100	43	4,3	22235045100	
	2700	50x100	35	5,0	27235050100	
	3300	65x80	29	6,7	33235065080	
	3900	65x100	24	7,9	39235065100	
	4700	75x100	20	7,5	47235075100	
	5600	65x130	17	10,4	56235065130	
	5600	75x115	17	8,6	56235075115	
	8200	75x145	12	11,4	82235075145	
	8200	75x165	12	12,0	82235075165	
12000	75x225	8	16,5	12335075225		
12000	90x148	8	15,5	12335090148		
15000	90x170	6	18,3	15335090170		
18000	90x220	5	22,2	18335090220		
18000	90x230	5	22,6	18335090230		
400	390	35x55	327	1,2	39140035055	
	560	35x70	227	1,6	56140035070	
	560	40x55	227	1,5	56140040055	
	680	35x80	187	1,8	68140035080	
	820	40x70	155	2,0	82140040070	
	820	40x80	155	2,1	82140040080	
	1000	35x100	127	2,5	10240035100	
	1000	45x70	127	2,2	10240045070	
	1200	50x70	106	2,5	12240050070	
	1200	40x100	106	2,7	12240040100	

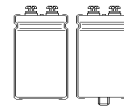
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code	
					Plain base: GA...	
					Stud mounting: GB...	
400	1500	45x100	85	3,0	15240045100	
	1500	50x80	85	3,0	15240050080	
	1800	50x100	71	3,6	18240050100	
	2200	65x80	58	4,7	22240065080	
	2700	65x100	47	5,7	27240065100	
	3300	65x100	40	5,8	33240065100	
	3900	75x100	33	5,9	39240075100	
	3900	65x130	33	7,5	39240065130	
	4700	75x115	27	6,8	47240075115	
	6800	75x145	19	9,0	68240075145	
	6800	75x165	19	9,4	68240075165	
	10000	90x148	13	12,2	10340090148	
	12000	75x225	11	14,3	12340075225	
	12000	90x170	11	14,2	12340090170	
	15000	90x220	8	17,6	15340090220	
	18000	90x230	7	19,6	18340090230	
450	390	35x55	286	1,3	39145035055	
	470	35x70	237	1,6	47145035070	
	560	35x80	199	1,8	56145035080	
	560	35x100	199	2,0	56145035100	
	680	40x60	164	1,8	68145040060	
	820	40x70	136	2,1	82145040070	
	820	40x80	136	2,2	82145040080	
	1000	45x70	111	2,3	10245045070	
	1000	40x100	111	2,7	10245040100	
	1200	50x70	93	2,7	12245050070	
	1200	45x100	93	2,9	12245045100	
	1200	50x80	93	2,8	12245050080	
	1800	50x100	62	3,8	18245050100	
	1800	65x80	62	4,6	18245065080	
	2700	65x100	41	6,1	27245065100	
	3300	65x130	34	7,4	33245065130	
	3900	75x100	29	6,3	39245075100	
	3900	75x115	29	6,6	39245075115	
	4700	75x145	25	7,6	47245075145	
	5600	75x145	20	8,7	56245075145	
	6800	75x165	16	10,1	68245075165	
	8200	75x225	14	12,6	82245075225	
	10000	90x148	11	13,1	10345090148	
	10000	90x170	11	13,8	10345090170	
15000	90x220	7	18,8	15345090220		
15000	90x230	7	19,1	15345090230		
15000	90x230	7	19,1	15345090230		



Useful life
 as a function of ambient temperature and actual ripple current



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Screw terminals

Very long lifetime

High CV product

High-temp 125°C

Low inductance ESL

Low temperature – 55°C

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High temp 125°C
- Long useful life
- Low inductance ESL

Applications

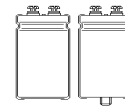
- Computer
- Industrial
- Inverter/drives
- Welding

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		3.900 ... 330.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 63 V
Surge voltage U_S		$U_S = 1,15 U_R$
Max. reverse voltage / ESL		2 V / 13 nH
Category temperature range		- 55°C ... + 125°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	2000 h @ 125 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	1000 h @ 125 °C , U_R	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		55/125/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4

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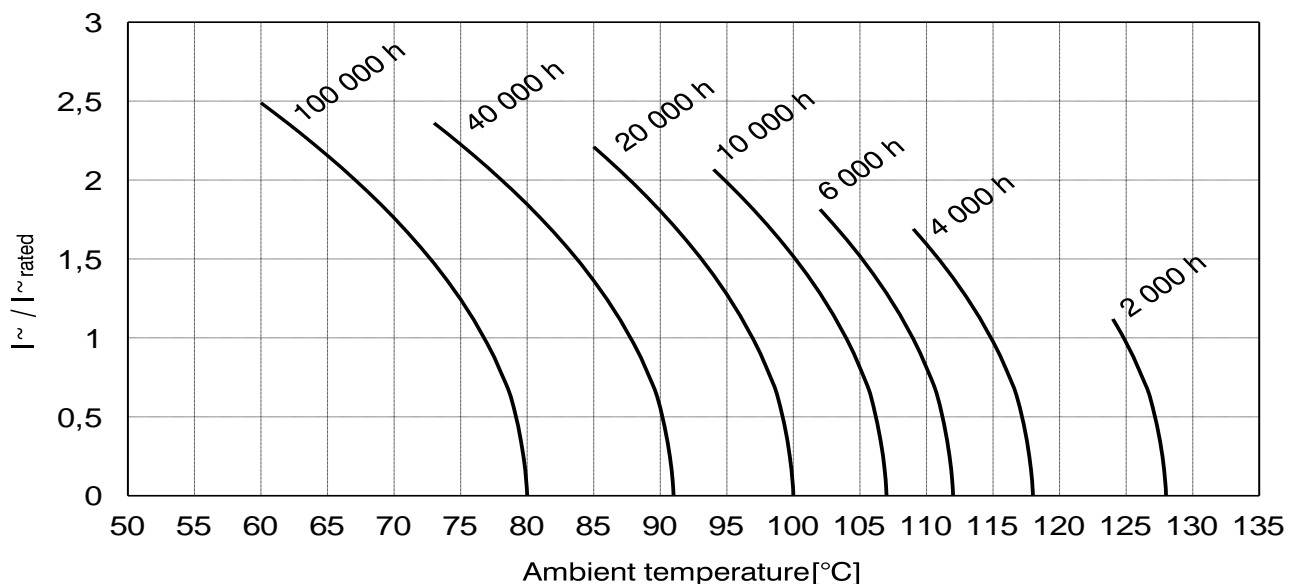
Electrical data and ordering code for series GG / For drawing see GA / GB

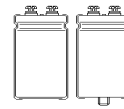
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Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 125°C [A]	Order code
					Plain base: GGA... Stud mounting: GGB...
16	27000	35x55	17	5,4	27301635055
	39000	40x55	11	6,6	39301640055
	47000	35x70	9	7,8	47301635070
	56000	35x80	8	9,0	56301635080
	56000	40x70	8	8,6	56301640070
	68000	35x100	7	10,8	68301635100
	68000	40x80	7	10,0	68301640080
	68000	45x70	7	9,5	68301645070
	68000	45x100	7	11,0	68301645100
	82000	50x70	5	11,2	82301650070
	100000	50x80	4	13,0	10401650080
	120000	40x100	4	14,6	12401640100
	150000	50x100	3	17,3	15401650100
25	18000	35x55	25	4,4	18302535055
	22000	35x70	20	5,3	22302535070
	22000	40x55	20	4,9	22302540055
	27000	35x80	17	6,2	27302535080
	33000	40x70	14	6,6	33302540070
	39000	35x100	11	8,2	39302535100
	39000	40x80	11	7,6	39302540080
	39000	45x70	11	7,2	39302545070
	47000	40x100	9	9,1	47302540100
	47000	50x70	9	8,5	47302550070
	56000	45x100	8	9,9	56302545100
	56000	50x80	8	9,7	56302550080
	82000	50x100	5	12,8	82302550100

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 125°C [A]	Order code
					Plain base: GGA... Stud mounting: GGB...
40	8200	35x55	47	3,2	82204035055
	12000	40x55	32	3,9	12304040055
	12000	35x70	32	4,2	12304035070
	15000	35x80	25	5,0	15304035080
	15000	40x70	25	4,8	15304040070
	18000	35x100	21	6,0	18304035100
	18000	40x80	21	5,6	18304040080
	18000	45x70	21	5,3	18304045070
	22000	50x70	17	6,3	22304050070
	27000	40x100	14	7,5	27304040100
	27000	50x80	14	7,3	27304050080
	33000	45x100	12	8,2	33304045100
	39000	50x100	10	9,5	39304050100
63	3900	35x55	73	2,5	39206335055
	4700	40x55	61	2,8	47206340055
	5600	35x70	51	3,3	56206335070
	6800	35x80	42	3,9	68206335080
	6800	40x70	42	3,8	68206340070
	8200	35x100	35	4,7	82206335100
	8200	40x80	35	4,3	82206340080
	8200	45x70	35	4,1	82206345070
	10000	50x70	29	4,9	10306350070
	12000	40x100	24	5,8	12306340100
	12000	50x80	24	5,6	12306350080
	12000	45x100	24	5,7	12306345100
	18000	50x100	16	7,5	18306350100

Useful life
as a function of ambient temperature and actual ripple current





Non flammable electrolyte

Screw terminals

High CV product

Long life 8000 h @ 85°C

**RoHS compliant
REACH compliant**

Features

- All internal contact welded
- Self distinguishing electrolyte
- High capacitance
- High reliability

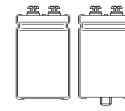
Applications

- Industrial
- Inverter/drives
- Professional photoflash
- Welding

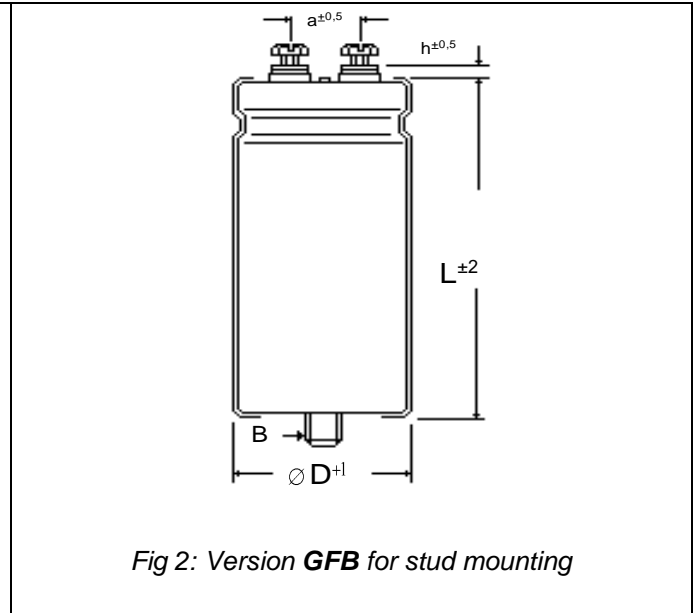
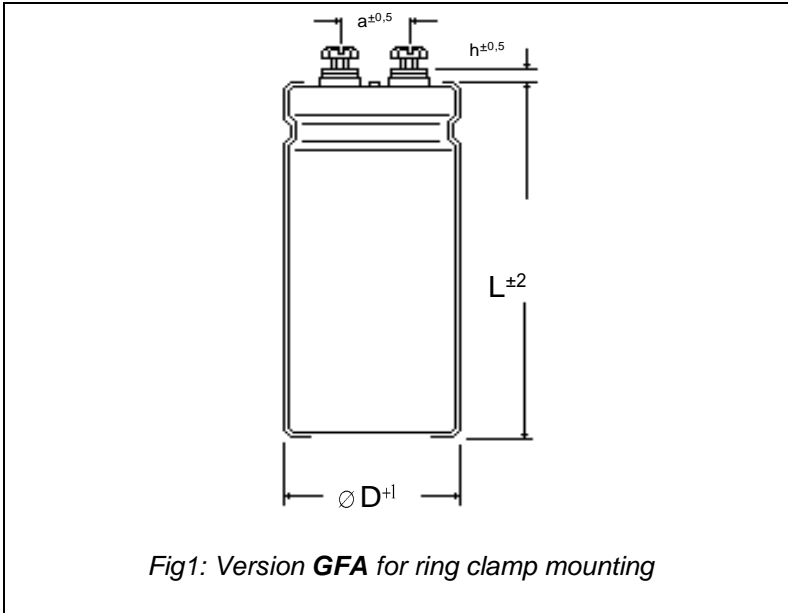
**Different case sizes, voltages and
capacitance combinations
are available on request.
Also in small lots.**

General specifications

Items		Characteristics
Rated capacitance range C_R		390 ... 18.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		350 ... 450 V
Surge voltage U_S		$U_S = 1,10 U_R$
Max. reverse voltage / ESL		2 V / 20 nH
Category temperature range		- 25°C ... + 85°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	8000 h @ 85 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ /specified limit
Endurance test	2000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		25/085/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4



Drawings for series GFA and GFB

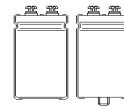


Dimensions and mechanical data

Dimensions, case with insulation sleeve			Connecting terminals		Mounting stud, GFB only	
D [mm]	h [mm]	a [mm]	Thread	Max. torque [Nm]	B	Max. torque [Nm]
35	6	13	M 5	2,0	M 8 x 12	4,0
40	5	18	M 5	2,0	M 8 x 12	4,0
50	5	22	M 5	2,0	M 12 x 16	10,0
65	5	28,5	M 5	2,0	M 12 x 16	10,0
75	5	31,7	M 5, M 6	2,0 ; 2,5	M 12 x 16	10,0
90	5	31,7	M 6	2,5	M 12 x 16	10,0

Accessories

	<p>GFA : connecting screws M 5 or M 6 GFB : connecting screws M 5 or M 6 + mounting nut M 8 or M 12</p>
Remarks	<p>Further mounting accessories like clamps, nylon cup nuts and insulation disks on request, see "accessory equipment"</p>

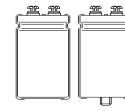


Electrical data and ordering code GF series

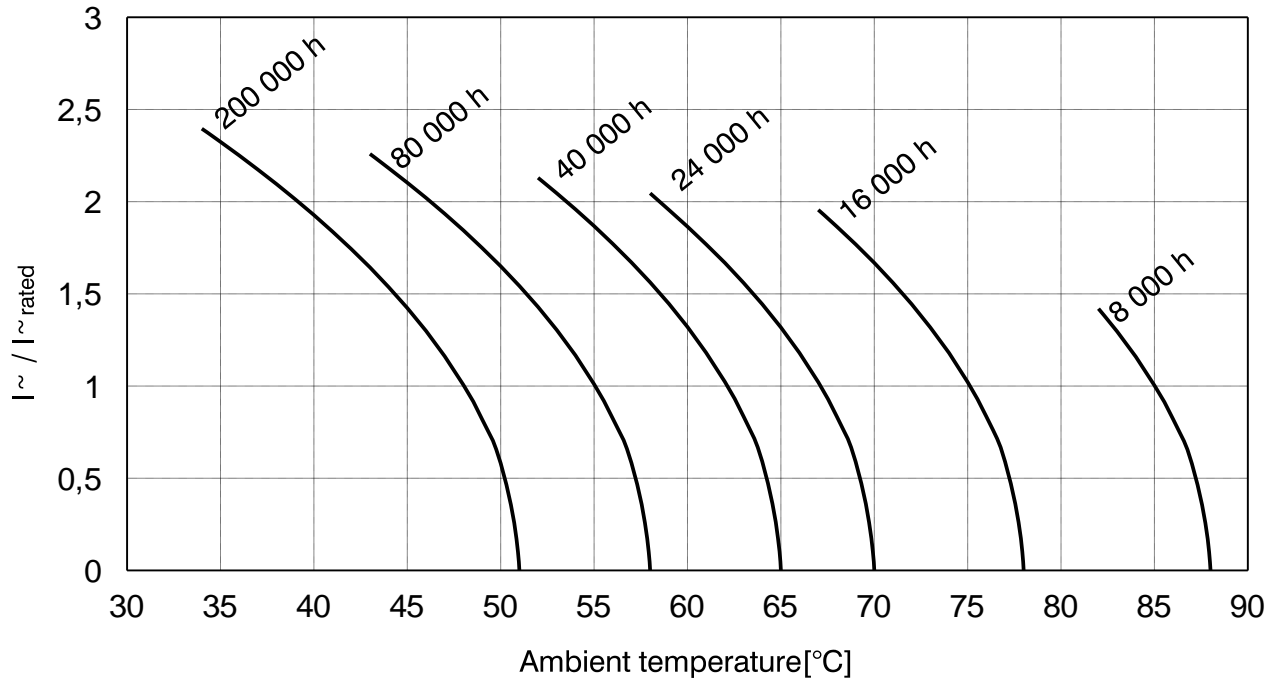
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Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: GFA...
350	560	35x55	199	1,8	56135035055
	680	40x55	164	2,1	68135040055
	1200	45x70	93	3,0	12235045070
	1500	35x100	74	3,7	15235035100
	1800	40x100	62	4,3	18235040100
	1800	50x70	62	4,0	18235050070
	2200	45x100	51	4,7	22235045100
	2700	50x100	41	5,6	27235050100
	3300	65x80	34	6,4	33235065080
	4700	75x100	24	8,3	47235075100
	5600	65x130	20	10,0	56235065130
	8200	75x145	14	12,6	82235075145
	12000	75x225	9	18,3	12335075225
	12000	90x148	9	17,1	12335090148
18000	90x230	6	25,1	18335090230	
400	390	35x55	286	1,5	39140035055
	560	40x55	199	1,9	56140040055
	1000	45x70	111	2,8	10240045070
	1000	35x100	111	3,0	10240035100
	1200	40x100	93	3,5	12240040100
	1200	50x70	93	3,2	12240050070
	1500	45x100	74	3,9	15240045100
	1800	50x100	62	4,5	18240050100

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: GFA...
400	2200	65x80	51	5,2	22240065080
	3900	75x100	29	7,5	39240075100
	3900	65x130	29	8,3	39240065130
	6800	75x145	16	11,5	68240075145
	10000	90x148	11	15,6	10340090148
	12000	75x225	9	18,3	12340075225
	18000	90x230	6	25,1	18340090230
	450	390	35x55	286	1,5
560		35x100	199	0,9	56145035000
680		40x55	164	2,1	68145040055
820		40x60	136	2,4	82145040060
1000		45x70	111	3,2	10245045100
1200		40x100	93	3,5	12245040100
1200		50x70	93	3,2	12245050070
1200		45x100	93	3,5	12245045100
1800		50x100	62	4,5	18245050100
1800		65x80	62	4,7	18245065080
3900		75x100	29	7,5	39245075100
3300		65x130	34	7,7	33245065130
5600		75x145	20	10,4	56245075145
8200		75x225	14	15,1	82245075225
10000		90x148	11	15,6	10345090148
15000	90x230	7	22,9	15345090230	



Useful life
 as a function of ambient temperature and actual ripple current



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Screw terminals

High performance

Ultra low inductance

Heat sink mounting !

Very high ripple current

RoHS compliant
REACH compliant

Features

- All contacts welded
- High ripple current
- Thermal conducting pad
- Best suited for heatsink mounting

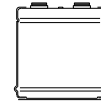
Applications

- Inverter/drives
- Traction
- Industrial
- Welding

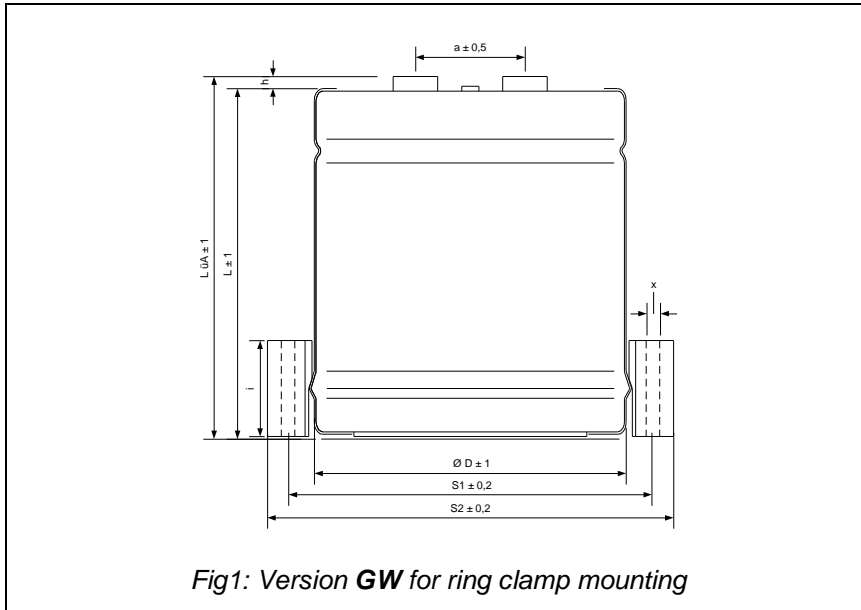
**Different case sizes, voltages
 and
 capacitance combinations
 are available on request.
 Also in small lots.**

General specification

Item	Characteristics	
Rated capacitance range C_R	1000 ... 220000 μ F	
Capacitance tolerance	$\pm 20\%$	
Rated voltage range U_R	40 ... 450 V	
Surge voltage U_S	$U_R \leq 315$ V: $U_S = 1,15 U_R$ $U_R > 315$ V: $U_S = 1,10 U_R$	
Max. reverse voltage / ESL	2 V / 13 nH	
Category temperature range	- 40°C ... + 105°C	
Leakage current I_L after 5 min @ U_R	$\leq 0,008 * C_R [\mu$ F] * U_R [V] + 6 μ A [μ A]	
Useful life	5000 h @ 105 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30$ % of initial value $ESR \leq 300$ % of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 105 °C , U_R	Requirements $\Delta C/C \leq 20$ % of initial value $ESR \leq 130$ % of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068	40/105/56	
Voltage proof of the external insulation	≥ 2500 V AC	
Sectional specification	IEC 60384-4	



Drawings for series GW



Dimensions and mechanical data

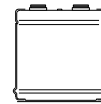
Connecting terminals

D [mm]	h [mm]	a [mm]	x [mm]	i [mm]	Thread	Max. torque [Nm]
50	5	22	4,5	20	M 5	2,0
75	5	31,7	4,5	20	M 5, M 6	2,0 ; 2,5
90	5	31,7	4,5	20	M 6	2,5

Accessories

GW : Connecting screws M 5 or M 6, further mounting accessories like clamps, nylon cup nuts and insulation disks on request

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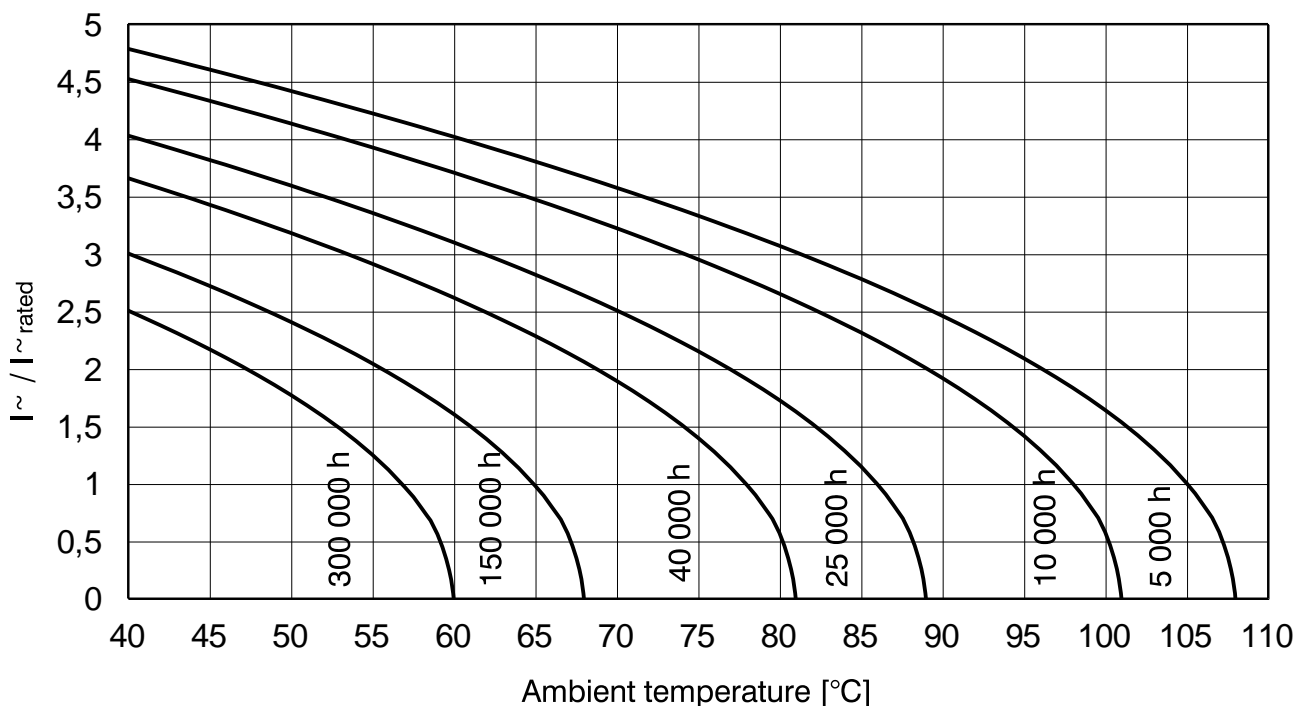


Electrical data and ordering codes series GW

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current $I_{R\sim}$ 100 Hz, 105°C [A]	Order code GW...
40	56000	50x80	7	12,3	56304050080
	100000	75x69	5	16,2	10404075069
	180000	75x100	3	22,9	18404075100
	150000	90x69	4	20,8	15404090069
	220000	90x98	3	28,3	22404090098
63	27000	50x80	8	11,4	27306350080
	47000	75x69	5	16,3	47306375069
	82000	75x100	4	20,4	82306375100
	82000	90x69	4	20,4	82306390069
	120000	90x98	3	25,2	12406390098
100	12000	50x80	13	9,0	12310050080
	22000	75x69	7	13,2	22310075069
	39000	75x100	4	19,9	39310075100
	39000	90x69	4	19,9	39310090069
	47000	90x98	3	26,7	47310090098
	56000	90x98	3	26,7	56310090098
160	4700	50x80	27	6,3	47216050080
	8200	75x69	16	9,0	82216075069
	15000	75x100	8	13,8	15316075100
	15000	90x69	8	13,8	15316090069
	22000	90x98	6	18,7	22316090098

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current $I_{R\sim}$ 100 Hz, 105°C [A]	Order code GW...
250	3300	50x80	34	8,0	33225050080
	5600	75x69	20	11,2	56225075069
	8200	90x69	14	15,4	82225090069
	10000	75x100	11	17,1	10325075100
	15000	90x98	7	23,3	15325090098
350	1500	50x80	74	5,4	15235050080
	2700	75x69	41	7,8	27235075069
	3900	90x69	29	10,6	39235090069
	4700	75x100	24	11,7	47235075100
	6800	90x98	16	15,7	68235090098
400	1000	50x80	111	4,4	10240050080
	1800	75x69	62	6,4	18240075069
	3300	75x100	34	9,8	33240075100
	3300	90x69	34	9,8	33240090069
	4700	90x98	24	13,1	47240090098
450	1000	50x80	111	4,4	10245050080
	1500	75x69	74	5,8	15245075069
	2200	90x69	51	8,0	22245090069
	3300	75x100	34	9,8	33245075100
	3300	90x98	34	10,9	33245090098
	4700	90x98	20	14,2	47245090098

Useful life
as a function of ambient temperature and actual ripple current



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Standard series

SI: snap in, 2 pins

SI4P: snap in, 4 pins

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High CV product
- High reliability
- Long useful life

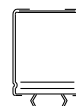
Applications

- HiFi
- Computer
- Inverter/drives

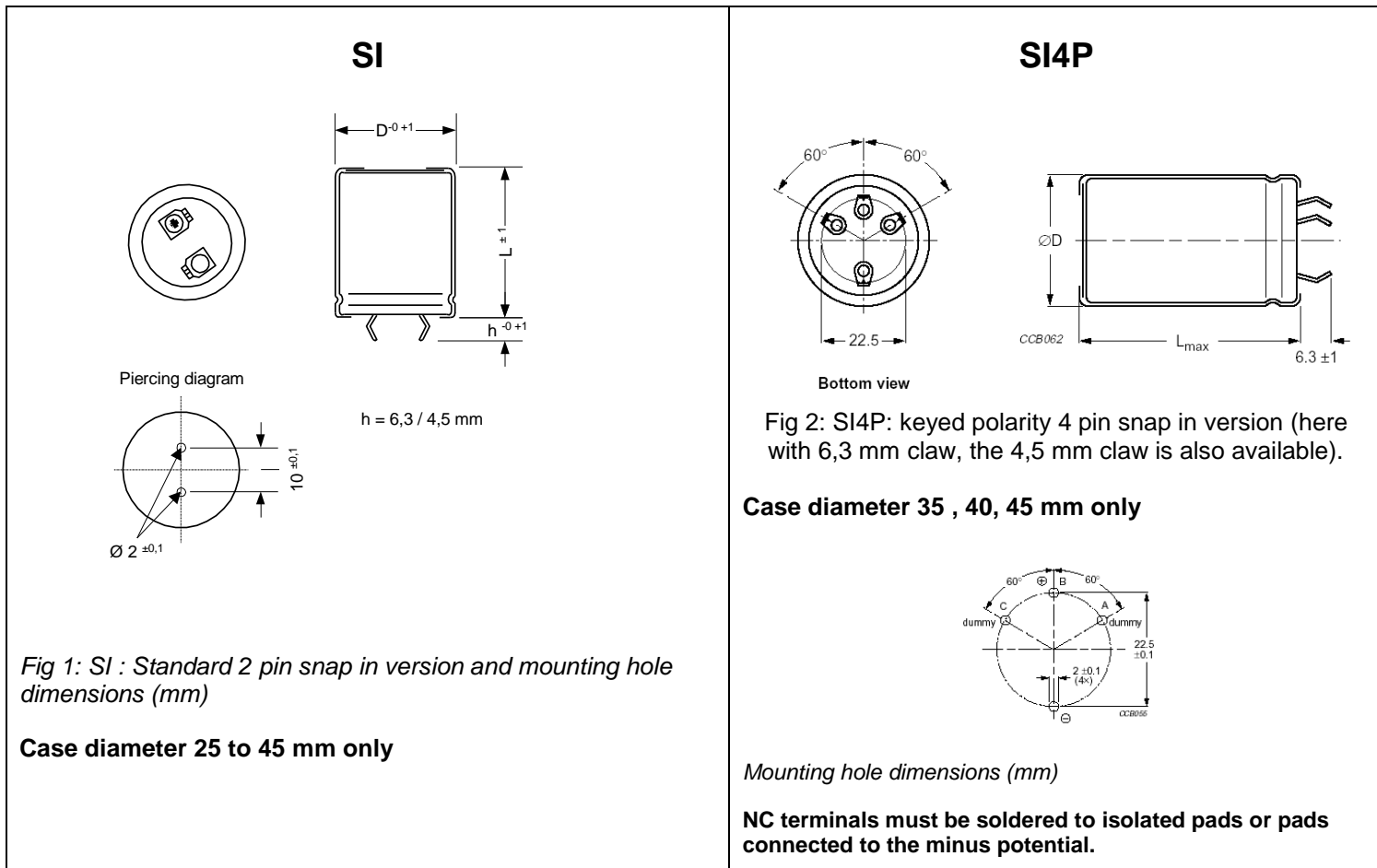
Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

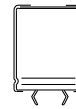
Items		Characteristics
Rated capacitance range C_R		56 ... 330.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 500 V
Surge voltage U_S		$U_R \leq 315 \text{ V}: U_S = 1,15 U_R$ $U_R > 315 \text{ V}: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 85°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	5000 h @ 85 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30 \%$ of initial value $ESR \leq 300 \%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20$ of initial value $ESR \leq 130 \%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/85/56
Voltage proof of the external insulation		$\geq 2500 \text{ V AC}$
Sectional specification		IEC 60384-4



Drawings for series SI and SI4P



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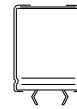


Electrical data and ordering code for series SI/SI4P

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Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					2 pins: SI...
16	15000	22x25	32	2,6	15301622025
	18000	22x30	27	3,0	18301622030
	22000	22x35	22	3,5	22301622035
	22000	25x30	22	3,6	22301625030
	27000	22x40	18	4,1	27301622040
	27000	25x35	18	4,2	27301625035
	39000	25x40	12	5,3	39301625040
	33000	30x30	14	4,8	33301630030
	39000	25x45	12	5,6	39301625045
	47000	25x50	10	6,4	47301625050
	39000	30x35	12	5,5	39301630035
	47000	35x30	10	6,4	47301635030
	56000	30x40	9	7,0	56301630040
	56000	35x35	9	7,4	56301635035
	56000	30x45	9	7,3	56301630045
	68000	30x50	7	8,4	68301630050
	68000	35x40	7	8,5	68301635040
	82000	35x45	6	9,7	82301635045
	100000	30x70	5	11,6	10401630070
	82000	35x50	6	10,1	82301635050
	120000	40x50	4	12,9	12401640050
	150000	35x80	3	16,4	15401635080
	120000	40x50	4	12,9	12401640050
	150000	40x60	3	15,4	15401640060
	180000	35x100	3	19,7	18401635100
	220000	40x80	2	20,8	22401640080
	180000	45x60	3	16,9	18401645060
	270000	45x80	2	23,1	27401645080
270000	40x100	2	25,3	27401640100	
330000	45x100	1	27,9	33451645100	
25	5600	22x25	80	1,6	56202522025
	6800	22x30	66	1,9	68202522030
	10000	22x35	45	2,5	10302522035
	10000	25x30	45	2,5	10302525030
	12000	22x40	37	2,8	12302522040
	12000	25x35	37	2,9	12302525035
	15000	25x40	30	3,4	15302525040
	15000	30x30	30	3,4	15302530030
	18000	25x45	25	3,9	18302525045
	18000	30x35	25	3,9	18302530035
	18000	25x50	25	4,1	18302525050
	22000	30x40	20	4,5	22302530040
	18000	35x30	25	4,1	18302535030
	27000	30x45	17	5,1	27302530045
	27000	30x50	17	5,4	27302530050

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					2 pins: SI...
25	22000	35x35	21	4,7	22302535035
	27000	35x40	17	5,4	27302535040
	33000	35x45	14	6,3	33302535045
	39000	30x70	12	7,4	39302530070
	39000	35x50	12	7,1	39302535050
	47000	35x60	10	8,3	47302535060
	56000	40x50	8	8,9	56302540050
	56000	35x80	8	10,2	56302535080
	68000	40x60	7	10,5	68302540060
	82000	35x100	6	13,5	82302535100
	82000	45x60	6	11,6	82302545060
	120000	40x80	4	15,6	12402540080
	120000	40x100	4	17,1	12402540100
	120000	45x80	4	15,6	12402545080
	150000	45x100	3	19,1	15402545100
40	3300	22x25	116	1,4	33204022025
	3900	22x30	98	1,6	39204022030
	5600	22x35	68	2,0	56204022035
	5600	25x30	68	2,0	56204025030
	5600	22x40	68	2,1	56204022040
	6800	25x35	56	2,4	68204025035
	8200	25x40	47	2,7	82204025040
	8200	30x30	47	2,7	82204030030
	10000	25x45	38	3,2	10304025045
	10000	30x35	38	3,1	10304030035
	10000	25x50	38	3,3	10304025050
	12000	30x40	32	3,6	12304030040
	10000	35x30	38	3,3	10304035030
	15000	30x45	25	4,2	15304030045
	12000	35x35	32	3,8	12304035035
	15000	30x50	25	4,4	15304030050
	15000	35x40	25	4,5	15304035040
	18000	35x45	21	5,1	18304035045
	22000	35x50	17	5,8	22304035050
	22000	30x70	17	6,1	22304030070
	27000	35x60	14	6,9	27304035060
	27000	40x50	14	6,8	27304040050
	33000	35x80	12	8,6	33304035080
	33000	40x60	12	8,1	33304040060
47000	35x100	8	11,3	47304035100	
47000	40x80	8	10,8	47304040080	
39000	45x60	10	8,8	39304045060	
56000	40x100	7	12,9	56304040100	
56000	45x80	7	11,7	56304045080	
82000	45x100	5	15,5	82304045100	



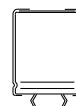
Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					2 pins: SI...
63	1500	22x25	191	1,1	15206322025
	2200	22x30	130	1,4	22206322030
	2700	22x35	106	1,6	27206322035
	2700	25x30	106	1,6	27206325030
	3300	22x40	87	1,9	33206322040
	3300	25x35	87	1,9	33206325035
	3900	25x40	73	2,2	39206325040
	3900	30x30	73	2,1	39206330030
	4700	25x45	61	2,5	47206325045
	4700	30x35	61	2,5	47206330035
	5600	25x50	51	0,0	56206325050
	5600	30x40	51	2,8	56206330040
	5600	35x30	51	2,9	56206335030
	6800	30x45	42	3,3	68206330045
	6800	35x35	42	3,3	68206335035
	8200	30x50	35	3,7	82206330050
	8200	35x45	35	4,0	82206335045
	12000	30x70	24	5,2	12306330070
	12000	35x60	24	5,3	12306335060
	15000	40x50	19	5,9	15306340050
	18000	35x80	16	7,3	18306335080
	18000	40x60	16	6,9	18306340060
	22000	45x60	13	7,6	22306345060
	22000	35x100	13	8,9	22306335100
22000	40x80	13	8,5	22306340080	
27000	40x100	11	10,3	27306340100	
27000	45x80	11	9,4	27306345080	
39000	45x100	7	12,4	39306345100	
80	1200	22x25	265	0,9	12208022025
	1500	22x30	212	1,1	15208022030
	1800	22x35	177	1,2	18208022035
	1800	25x30	177	1,3	18208025030
	2200	22x40	145	1,4	22208022040
	1800	25x35	177	1,3	18208025035
	2700	25x40	118	1,7	27208025040
	2700	30x30	118	1,7	27208030030
	3300	25x45	97	2,0	33208025045
	3900	25x50	82	2,3	39208025050
	3300	30x35	97	2,0	33208030035
	3900	35x30	82	2,3	39208035030
	3900	30x40	82	2,3	39208030040
	4700	30x45	68	2,6	47208030045
	4700	35x35	68	2,6	47208035035
	5600	30x50	57	2,9	56208030050
	5600	35x40	57	3,0	56208035040
	6800	35x45	47	3,4	68208035045
	6800	35x50	47	3,6	68208035050
	8200	30x70	39	4,1	82208030070
10000	35x60	32	4,6	10308035060	
10000	40x50	32	4,6	10308040050	

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					2 pins: SI...	
80	12000	35x80	27	5,7	12308035080	
	12000	40x60	27	5,3	12308040060	
	18000	35x100	18	7,6	18308035100	
	15000	45x60	21	6,0	15308045060	
	18000	40x80	18	7,3	18308040080	
	22000	45x80	14	8,1	22308045080	
	22000	40x100	14	8,8	22308040100	
	27000	45x100	12	9,8	27308045100	
	100	680	22x25	234	1,0	68110022025
		820	22x30	194	1,1	82110022030
1200		22x35	133	1,4	12210022035	
1200		25x30	133	1,5	12210025030	
1500		22x40	106	1,7	15210022040	
1500		25x35	106	1,7	15210025035	
1800		25x40	88	2,0	18210025040	
1800		30x30	88	2,0	18210030030	
2200		25x45	72	2,3	22210025045	
2200		25x50	72	2,4	22210025050	
2200		35x30	72	2,4	22210035030	
2700		30x40	59	2,7	27210030040	
2700		30x45	59	2,8	27210030045	
2700		35x35	59	2,8	27210035035	
3300		30x50	48	3,2	33210030050	
3300		35x40	48	3,2	33210035040	
3900		35x45	41	3,7	39210035045	
5600		30x70	28	4,7	56210030070	
4700		35x50	34	4,2	47210035050	
5600		35x60	28	4,9	56210035060	
5600	40x50	28	4,8	56210040050		
6800	35x80	23	6,1	68210035080		
6800	40x60	23	5,7	68210040060		
10000	35x100	16	8,1	10310035100		
12000	40x80	13	8,4	12310040080		
10000	45x60	16	6,9	10310045060		
12000	45x80	13	8,4	12310045080		
15000	40x100	11	10,3	15310040100		
18000	45x100	9	11,3	18310045100		
160	270	22x25	413	0,7	27116022025	
	390	22x30	286	0,9	39116022030	
	470	22x35	237	1,1	47116022035	
	470	25x30	237	1,1	47116025030	
	560	22x40	199	1,2	56116022040	
	560	25x35	199	1,3	56116025035	
	680	25x40	164	1,5	68116025040	
	680	30x30	164	1,4	68116030030	
	820	25x45	136	1,7	82116025045	
	820	30x35	136	1,7	82116030035	
	1000	25x50	111	1,9	10216025050	
	1000	30x40	111	1,9	10216030040	
1000	35x30	111	1,9	10216035030		



Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					2 pins: SI...
160	1200	30x45	93	2,2	12216030045
	1200	35x35	93	2,2	12216035035
	1500	30x50	74	2,6	15216030050
	1500	35x40	74	2,6	15216035040
	1800	35x45	62	3,0	18216035045
	1800	35x50	62	3,1	18216035050
	2200	30x70	51	3,6	22216030070
	2200	35x60	51	3,7	22216035060
	2700	40x50	41	4,0	27216040050
	3300	35x80	34	5,0	33216035080
	3300	40x60	34	4,7	33216040060
	3900	35x100	29	6,0	39216035100
	3900	45x60	29	5,2	39216045060
	4700	40x80	24	6,3	47216040080
	5600	40x100	20	7,5	56216040100
	5600	45x80	20	6,9	56216045080
6800	45x100	16	8,3	68216045100	
200	270	22x25	354	0,8	27120022025
	390	22x30	245	1,0	39120022030
	470	22x35	203	1,2	47120022035
	470	25x30	203	1,2	47120025030
	560	22x40	171	1,3	56120022040
	560	25x35	171	1,4	56120025035
	680	25x40	141	1,6	68120025040
	680	30x30	141	1,6	68120030030
	820	25x45	117	1,8	82120025045
	820	30x35	117	1,8	82120030035
	1000	35x30	96	2,1	10220035030
	1000	25x50	96	2,1	10220025050
	1000	30x40	96	2,1	10220030040
	1200	30x45	80	2,4	12220030045
	1500	30x50	64	2,8	15220030050
	1200	35x35	80	2,4	12220035035
	1500	35x40	64	2,8	15220035040
	1800	35x45	53	3,2	18220035045
	1800	35x50	53	3,3	18220035050
	2200	30x70	43	3,8	22220030070
	2200	35x60	43	4,0	22220035060
	3300	35x80	29	5,4	33220035080
	2700	40x50	35	4,3	27220040050
	3300	40x60	29	5,1	33220040060
	3900	35x100	24	6,5	39220035100
	4700	40x80	20	6,8	47220040080
	3900	45x60	24	5,6	39220045060
	5600	40x100	17	8,1	56220040100
	5600	45x80	17	7,4	56220045080
	6800	45x100	14	9,0	68220045100

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					2 pins: SI...	
350	100	22x25	955	0,5	10135022025	
	150	22x30	637	0,6	15135022030	
	180	22x35	531	0,7	18135022035	
	180	22x40	531	0,8	18135022040	
	180	25x30	531	0,7	18135025030	
	220	25x35	434	0,9	22135025035	
	270	25x40	354	1,0	27135025040	
	270	30x30	354	1,0	27135030030	
	330	25x45	290	1,2	33135025045	
	330	30x35	290	1,1	33135030035	
	390	35x30	245	1,3	39135035030	
	390	25x50	245	1,3	39135025050	
	390	30x40	245	1,3	39135030040	
	470	30x45	203	1,5	47135030045	
	470	35x35	203	1,5	47135035035	
	560	30x50	171	1,7	56135030050	
	560	35x40	171	1,7	56135035040	
	560	35x45	171	1,8	56135035045	
	680	35x50	141	2,1	68135035050	
	820	30x70	117	2,3	82135030070	
	820	35x60	117	2,4	82135035060	
	1000	40x50	96	2,6	10235040050	
	1200	35x80	80	3,3	12235035080	
	1200	40x60	80	3,1	12235040060	
	1500	35x100	64	4,0	15235035100	
	1500	45x60	64	3,4	15235045060	
	1800	40x80	53	4,2	18235040080	
	1800	40x100	53	4,6	18235040100	
	2200	45x80	43	4,7	22235045080	
	2700	45x100	35	5,6	27235045100	
	400	100	22x25	1274	0,4	10140022025
		120	22x30	1062	0,5	12140022030
180		22x35	708	0,6	18140022035	
180		25x30	708	0,6	18140025030	
180		22x40	708	0,7	18140022040	
220		25x35	579	0,7	22140025035	
270		25x40	472	0,9	27140025040	
270		30x30	472	0,8	27140030030	
330		25x45	386	1,0	33140025045	
330		25x50	386	1,0	33140025050	
330		30x35	386	1,0	33140030035	
390		35x30	327	1,1	39140035030	
390		30x40	327	1,1	39140030040	
470		35x35	271	1,3	47140035035	
470		30x45	271	1,3	47140030045	
560		30x50	227	1,5	56140030050	
560	35x40	227	1,5	56140035040		

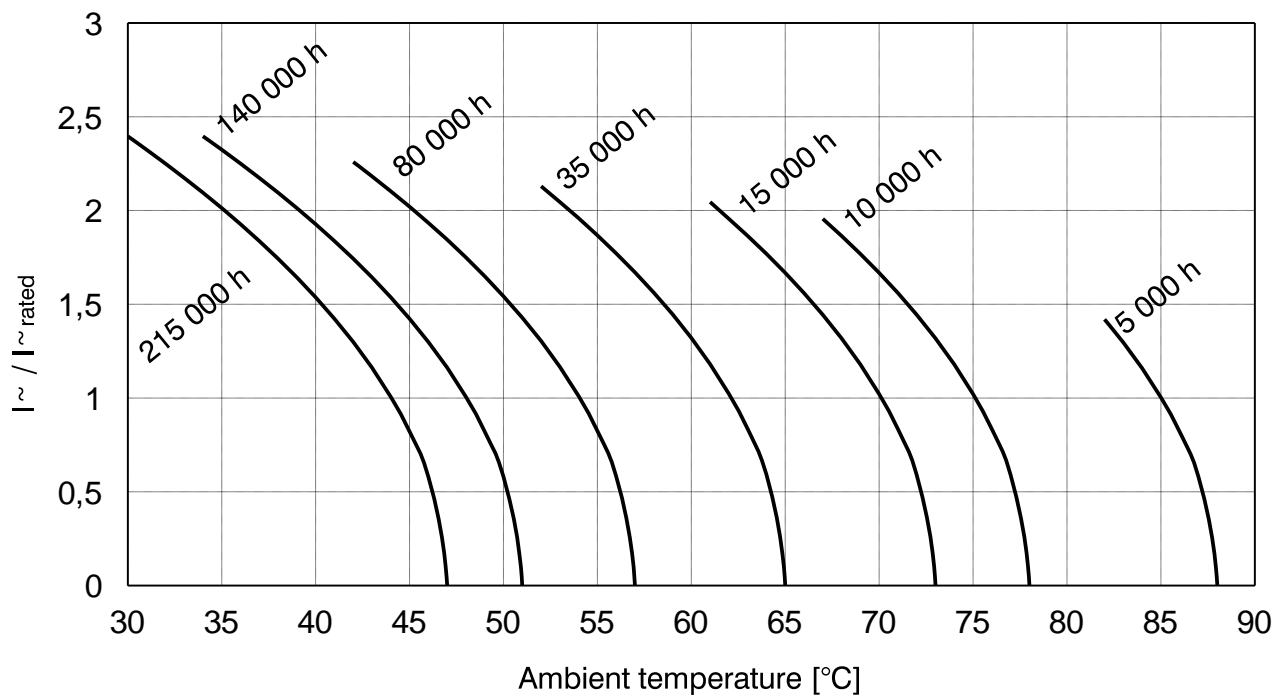


Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					2 pins: SI...
400	560	35x45	227	1,6	56140035045
	680	30x70	187	1,8	68140030070
	820	35x50	155	2,0	82140035050
	820	35x60	155	2,1	82140035060
	820	40x50	155	2,1	82140040050
	1200	35x80	106	2,8	12240035080
	1200	40x60	106	2,7	12240040060
	1500	35x100	85	3,5	15240035100
	1500	40x80	85	3,3	15240040080
	1800	45x60	71	3,3	18240045060
	1800	40x100	71	4,0	18240040100
1800	45x80	71	3,6	18240045080	
2700	45x100	47	4,9	27240045100	
450	68	22x25	1639	0,4	68045022025
	100	22x30	1115	0,5	10145022030
	120	22x35	929	0,5	12145022035
	150	22x40	743	0,6	15145022040
	120	25x30	929	0,6	12145025030
	150	25x35	743	0,7	15145025035
	180	25x40	619	0,8	18145025040
	220	25x45	507	0,9	22145025045
	180	30x30	619	0,7	18145030030
	220	30x35	507	0,9	22145030035
	220	25x50	507	0,9	22145025050
	270	30x40	413	1,0	27145030040
	220	35x30	507	0,9	22145035030
	270	30x45	413	1,0	27145030045
	270	35x35	413	1,1	27145035035
	330	30x50	338	1,2	33145030050
	390	35x40	286	1,3	39145035040
	390	35x45	286	1,4	39145035045
	560	30x70	199	1,8	56145030070
	470	35x50	237	1,6	47145035050
	560	35x60	199	1,9	56145035060
	560	40x50	199	1,8	56145040050
	820	35x80	136	2,5	82145035080
	1200	40x60	93	2,8	12245040060

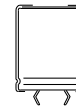
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					2 pins: SI...
450	1000	35x100	111	3,0	10245035100
	1000	45x60	111	2,6	10245045060
	1200	40x80	93	3,3	12245040080
	1500	40x100	74	4,0	15245040100
	1200	45x80	93	3,2	12245045080
	1800	45x100	62	4,3	18245045100
	500	56	22x25	1706	0,4
82		22x30	1165	0,5	82050022030
100		22x35	955	0,5	10150022035
100		22x40	955	0,6	10150022040
120		25x30	796	0,6	12150025030
120		25x35	796	0,6	12150025035
150		25x40	637	0,7	15150025040
180		25x45	531	0,9	18150025045
150		30x30	637	0,7	15150030030
180		30x35	531	0,8	18150030035
220		25x50	434	1,0	22150025050
220		30x40	434	1,0	22150030040
180		35x30	531	0,9	18150035030
270		30x45	354	1,1	27150030045
270		35x35	354	1,1	27150035035
270		30x50	354	1,2	27150030050
270		35x40	354	1,2	27150035040
390		35x45	245	1,5	39150035045
470		30x70	203	1,8	47150030070
390		35x50	245	1,6	39150035050
560		35x60	171	2,0	56150035060
560		40x50	171	2,0	56150040050
680		35x80	141	2,5	68150035080
680		40x60	141	2,3	68150040060
820		35x100	117	3,0	82150035100
820		45x60	117	2,6	82150045060
1200		40x80	80	3,4	12250040080
820		40x100	117	3,1	82150040100
1200		45x80	80	3,4	12250045080
1500		45x100	64	4,2	15250045100

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Useful life
as a function of ambient temperature and actual ripple current



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Ultra compact design

Long life time

SIH: snap in, 2 pins

SI4PH: snap in, 4 pins

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High CV product
- High reliability
- Ultra compact

Applications

- HiFi
- Computer
- Industrial
- Tube amplifier

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		68 ... 150.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315 V: U_S = 1,15 U_R$ $U_R > 315 V: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 105°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	5000 h @ 105 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 105 °C , U_R	Requirements $\Delta C/C \leq 20$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/105/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4

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Drawings for series SIH and SI4PH

SIH	SI4PH
<p style="text-align: center;">SIH</p> <p style="text-align: center;">Piercing diagram</p> <p style="text-align: center;">$h = 6,3 / 4,5 \text{ mm}$</p>	<p style="text-align: center;">SI4PH</p> <p style="text-align: center;">Bottom view</p>
<p><i>Fig 1: SIG : Standard 2 pin snap in version and mounting hole dimensions (mm)</i></p> <p>Case diameter 25 to 45 mm only</p>	<p><i>Fig 2: SI4PG: keyed polarity 4 pin snap in version (here with 6,3 mm claw, the 4,5 mm claw is also available).</i></p> <p>Case diameter 35 , 40, 45 mm only</p> <p><i>Mounting hole dimensions (mm)</i></p> <p>NC terminals must be soldered to isolated pads or pads connected to the minus potential.</p>

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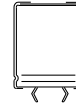


Electrical data and ordering code for series SIH

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Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 105°C [mA]	Order code
					2 pins: SIH...
					4 pins: SI4PH...
16	5600	22x25	85	1,6	56201622025
	6800	22x30	70	1,9	68201622030
	10000	22x35	48	2,4	10301622035
	10000	25x30	48	2,4	10301625030
	12000	22x40	40	2,7	12301622040
	12000	25x35	40	2,8	12301625035
	15000	25x40	32	3,3	15301625040
	15000	30x30	32	3,3	15301630030
	18000	25x45	27	3,8	18301625045
	18000	25x50	27	4,0	18301625050
	18000	30x35	27	3,8	18301630035
	18000	35x30	27	4,0	18301635030
	22000	30x40	22	4,4	22301630040
	22000	35x35	22	4,6	22301635035
	27000	30x45	18	5,1	27301630045
	27000	30x50	18	5,3	27301630050
	27000	35x40	18	5,3	27301635040
	33000	35x45	14	6,2	33301635045
	39000	30x70	12	7,2	39301630070
	39000	35x50	12	7,0	39301635050
	47000	40x50	10	8,1	47301640050
	56000	35x80	9	10,0	56301635080
	56000	40x50	9	8,8	56301640050
	68000	40x60	7	10,4	68301640060
	82000	35x100	6	13,3	82301635100
	82000	40x80	6	12,7	82301640080
	82000	45x60	6	11,4	82301645060
	100000	45x80	5	14,0	10401645080
120000	40x100	4	16,9	12401640100	
150000	45x100	3	18,8	15401645100	
25	3900	22x25	114	1,4	39202522025
	5600	22x30	80	1,7	56202522030
	6800	22x35	66	2,0	68202522035
	6800	25x30	66	2,1	68202525030
	8200	22x40	54	2,3	82202522040
	8200	25x35	54	2,4	82202525035
	10000	25x40	45	2,8	10302525040
	10000	30x30	45	2,8	10302530030
	12000	25x45	37	3,2	12302525045
	12000	30x35	37	3,2	12302530035
	15000	25x50	30	3,7	15302525050
	15000	30x40	30	3,7	15302530040
	15000	35x30	30	3,7	15302535030
	18000	30x45	26	4,2	18302530045
	18000	30x50	26	4,4	18302530050
	18000	35x35	26	4,2	18302535035
	22000	35x40	21	4,9	22302535040
	22000	35x45	21	5,1	22302535045

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 105°C [mA]	Order code	
					2 pins: SIH...	
					4 pins: SI4PH...	
25	27000	30x70	17	6,1	27302530070	
	27000	35x50	17	5,9	27302535050	
	33000	35x60	14	7,0	33302535060	
	39000	40x50	12	7,5	39302540050	
	47000	35x80	10	9,3	47302535080	
	47000	40x60	10	8,8	47302540060	
	56000	35x100	8	11,2	56302535100	
	56000	45x60	8	9,6	56302545060	
	68000	40x80	7	11,8	68302540080	
	68000	40x100	7	12,9	68302540100	
	82000	45x80	6	12,9	82302545080	
	100000	45x100	5	15,6	10402545100	
	40	1500	22x25	255	0,9	15204022025
		2200	22x30	174	1,2	22204022030
2700		22x35	142	1,4	27204022035	
2700		25x30	142	1,4	27204025030	
3300		22x40	116	1,6	33204022040	
3300		25x35	116	1,7	33204025035	
3900		25x40	98	1,9	39204025040	
3900		30x30	98	1,9	39204030030	
4700		25x45	81	2,2	47204025045	
4700		30x35	81	2,2	47204030035	
5600		25x50	68	2,5	56204025050	
5600		30x40	68	2,5	56204030040	
5600		35x30	68	2,5	56204035030	
6800		30x45	56	2,8	68204030045	
6800		35x35	56	2,9	68204035035	
8200		30x50	47	3,2	82204030050	
8200		35x40	47	3,3	82204035040	
8200		35x45	47	3,4	82204035045	
10000		35x50	38	3,9	10304035050	
12000		30x70	32	4,5	12304030070	
12000		35x60	32	4,6	12304035060	
15000		40x50	25	5,1	15304040050	
18000	35x80	21	6,4	18304035080		
18000	40x60	21	6,0	18304040060		
22000	35x100	17	7,7	22304035100		
22000	40x80	17	7,4	22304040080		
22000	45x60	17	6,6	22304045060		
27000	40x100	14	8,9	27304040100		
27000	45x80	14	8,2	27304045080		
39000	45x100	10	10,7	39304045100		
63	1200	22x25	239	0,9	12206322025	
	1500	22x30	191	1,1	15206322030	
	1800	22x35	159	1,3	18206322035	
	1800	25x30	159	1,3	18206325030	
	2200	22x40	130	1,5	22206322040	
	2200	25x35	130	1,6	22206325035	



Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code
					2 pins: SIH...
63	2700	25x40	106	1,8	27206325040
	2700	30x30	106	1,8	27206330030
	3300	25x45	87	2,1	33206325045
	3300	30x35	87	2,1	33206330035
	3900	25x50	73	2,4	39206325050
	3900	30x40	73	2,4	39206330040
	3900	35x30	73	2,4	39206335030
	4700	30x45	61	2,7	47206330045
	4700	35x35	61	2,8	47206335035
	5600	30x50	51	3,1	56206330050
	6800	35x45	42	3,6	68206335045
	8200	30x70	35	4,3	82206330070
	10000	35x60	29	4,9	10306335060
	10000	40x50	29	4,8	10306340050
	12000	35x80	24	6,0	12306335080
	12000	40x60	24	5,6	12306340060
	15000	45x60	19	6,3	15306345060
	18000	35x100	16	8,1	18306335100
	18000	40x80	16	7,7	18306340080
	22000	40x100	13	9,3	22306340100
22000	45x80	13	8,5	22306345080	
27000	45x100	11	10,3	27306345100	
80	680	22x25	468	0,7	68108022025
	820	22x30	388	0,8	82108022030
	1200	22x35	265	1,0	12208022035
	1200	25x30	265	1,0	12208025030
	1500	22x40	212	1,2	15208022040
	1500	25x35	212	1,2	15208025035
	1800	25x40	177	1,4	18208025040
	1800	30x30	177	1,4	18208030030
	2200	25x45	145	1,6	22208025045
	2200	25x50	145	1,7	22208025050
	2200	30x35	145	1,6	22208030035
	2200	35x30	145	1,7	22208035030
	2700	30x40	118	1,9	27208030040
	2700	30x45	118	2,0	27208030045
	2700	35x35	118	2,0	27208035035
	3300	30x50	97	2,3	33208030050
	3300	35x40	97	2,3	33208035040
	3900	35x45	82	2,6	39208035045
	4700	35x50	68	3,0	47208035050
	5600	30x70	57	3,4	56208030070
	5600	35x60	57	3,5	56208035060
	5600	40x50	57	3,4	56208040050
	6800	35x80	47	4,3	68208035080
	6800	40x60	47	4,0	68208040060
	10000	35x100	32	5,7	10308035100
	10000	45x60	32	4,9	10308045060
	12000	40x80	27	6,0	12308040080
	12000	45x80	27	6,0	12308045080

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code
					2 pins: SIH...
80	15000	40x100	21	7,3	15308040100
	18000	45x100	18	8,0	18308045100
100	560	22x25	284	0,9	56110022025
	1000	22x35	159	1,3	10210022035
	1000	25x30	159	1,3	10210025030
	1200	22x40	133	1,5	12210022040
	1200	25x35	133	1,5	12210025035
	1500	25x40	106	1,8	15210025040
	1500	30x30	106	1,8	15210030030
	1800	25x45	88	2,1	18210025045
	1800	25x50	88	2,2	18210025050
	1800	35x30	88	2,2	18210035030
	2200	30x40	72	2,4	22210030040
	2200	30x45	72	2,5	22210030045
	2200	35x35	72	2,5	22210035035
	2700	30x50	59	2,9	27210030050
	2700	35x40	59	2,9	27210035040
	3300	35x45	48	3,4	33210035045
	3900	30x70	41	4,0	39210030070
	3900	35x50	41	3,8	39210035050
	4700	35x60	34	4,5	47210035060
	4700	40x50	34	4,4	47210040050
	5600	35x80	28	5,5	56210035080
	5600	40x60	28	5,1	56210040060
	8200	35x100	19	7,3	82210035100
	8200	40x80	19	7,0	82210040080
	8200	45x60	19	6,2	82210045060
	10000	45x80	16	7,7	10310045080
	12000	40x100	13	9,2	12310040100
	15000	45x100	11	10,3	15310045100
160	270	22x25	413	0,7	27116022025
	390	22x30	286	0,9	39116022030
	470	22x35	237	1,1	47116022035
	470	25x30	237	1,1	47116025030
	560	22x40	199	1,2	56116022040
	560	25x35	199	1,3	56116025035
	680	25x40	164	1,5	68116025040
	680	30x30	164	1,4	68116030030
	820	25x45	136	1,6	82116025045
	820	30x35	136	1,7	82116030035
	1000	25x50	111	1,9	10216025050
	1000	30x40	111	1,9	10216030040
	1000	35x30	111	1,9	10216035030
	1200	30x45	93	2,2	12216030045
	1200	35x35	93	2,2	12216035035
	1500	30x50	74	2,6	15216030050
	1500	35x40	74	2,6	15216035040
	1800	35x45	62	3,0	18216035045
	1800	35x50	62	3,1	18216035050
	2200	30x70	51	3,6	22216030070



Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code
					2 pins: SIH...
160	2200	35x60	51	3,7	22216035060
	2700	40x50	41	4,0	27216040050
	3300	35x80	34	5,0	33216035080
	3300	40x60	34	4,7	33216040060
	3900	35x100	29	6,2	39216035100
	3900	45x60	29	5,2	39216045060
	4700	40x80	24	6,3	47216040080
	5600	40x100	20	7,5	56216040100
	5600	45x80	20	6,9	56216045080
	6800	45x100	16	8,3	68216045100
250	180	22x25	531	0,6	18125022025
	220	22x30	434	0,7	22125022030
	270	22x35	354	0,9	27125022035
	330	25x30	290	1,0	33125025030
	390	22x40	245	1,1	39125022040
	390	25x35	245	1,1	39125025035
	470	25x40	203	1,3	47125025040
	470	30x30	203	1,3	47125030030
	560	25x45	171	1,5	56125025045
	560	30x35	171	1,5	56125030035
	560	35x30	171	1,6	56125035030
	680	25x50	141	1,7	68125025050
	680	30x40	141	1,7	68125030040
	820	30x45	117	2,0	82125030045
	820	30x50	117	2,1	82125030050
	820	35x35	117	2,0	82125035035
	1000	35x40	96	2,3	10225035040
	1200	35x45	80	2,6	12225035045
	1200	35x50	80	2,7	12225035050
	1500	30x70	64	3,2	15225030070
	1500	35x60	64	3,3	15225035060
	1800	35x80	53	4,0	18225035080
	1800	40x50	53	3,5	18225040050
	1800	40x60	53	3,8	18225040060
	2700	35x100	35	5,4	27225035100
	2700	40x80	35	5,2	27225040080
2700	45x60	35	4,6	27225045060	
3300	40x100	29	6,3	33225040100	
3300	45x80	29	5,7	33225045080	
4700	45x100	20	7,4	47225045100	
350	100	22x25	955	0,5	10135022025
	120	22x30	796	0,6	12135022030
	180	22x35	531	0,7	18135022035
	180	22x40	531	0,8	18135022040
	180	25x30	531	0,7	18135025030
	220	25x35	434	0,9	22135025035
	270	25x40	354	1,0	27135025040
	270	30x30	354	1,0	27135030030
	330	25x45	290	1,2	33135025045
	330	30x35	290	1,1	33135030035

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code
					2 pins: SIH...
350	330	35x30	290	1,2	33135035030
	390	25x50	245	1,3	39135025050
	390	30x40	245	1,3	39135030040
	470	30x45	203	1,5	47135030045
	470	35x35	203	1,5	47135035035
	560	30x50	171	1,7	56135030050
	560	35x40	171	1,7	56135035040
	560	35x45	171	1,8	56135035045
	680	35x50	141	2,1	68135035050
	820	30x70	117	2,3	82135030070
	820	35x60	117	2,4	82135035060
	820	40x50	117	2,4	82135040050
	1200	35x80	80	3,3	12235035080
	1200	40x60	80	3,1	12235040060
	1500	35x100	64	4,0	15235035100
	1500	45x60	64	3,4	15235045060
	1800	40x80	53	4,2	18235040080
	1800	40x100	53	4,6	18235040100
1800	45x80	53	4,2	18235045080	
2700	45x100	35	5,6	27235045100	
400	82	22x25	1554	0,4	82040022025
	120	22x30	1062	0,5	12140022030
	150	22x35	849	0,6	15140022035
	150	25x30	849	0,6	15140025030
	180	22x40	708	0,7	18140022040
	180	25x35	708	0,7	18140025035
	220	25x40	579	0,8	22140025040
	220	30x30	579	0,8	22140030030
	270	25x45	472	0,9	27140025045
	270	25x50	472	0,9	27140025050
	270	30x35	472	0,9	27140030035
	270	35x30	472	0,9	27140035030
	330	30x40	386	1,0	33140030040
	330	35x35	386	1,1	33140035035
	390	30x45	327	1,2	39140030045
	390	30x50	327	1,2	39140030050
	390	35x40	327	1,2	39140035040
	470	35x45	271	1,4	47140035045
	560	30x70	227	1,7	56140030070
	560	35x50	227	1,6	56140035050
	680	35x60	187	1,9	68140035060
	680	40x50	187	1,9	68140040050
	820	35x80	155	2,3	82140035080
	820	40x60	155	2,2	82140040060
	1200	35x100	106	3,1	12240035100
	1200	40x80	106	3,0	12240040080
1200	45x60	106	2,7	12240045060	
1500	40x100	85	3,6	15240040100	
1500	45x80	85	3,3	15240045080	
2200	45x100	58	4,4	22240045100	

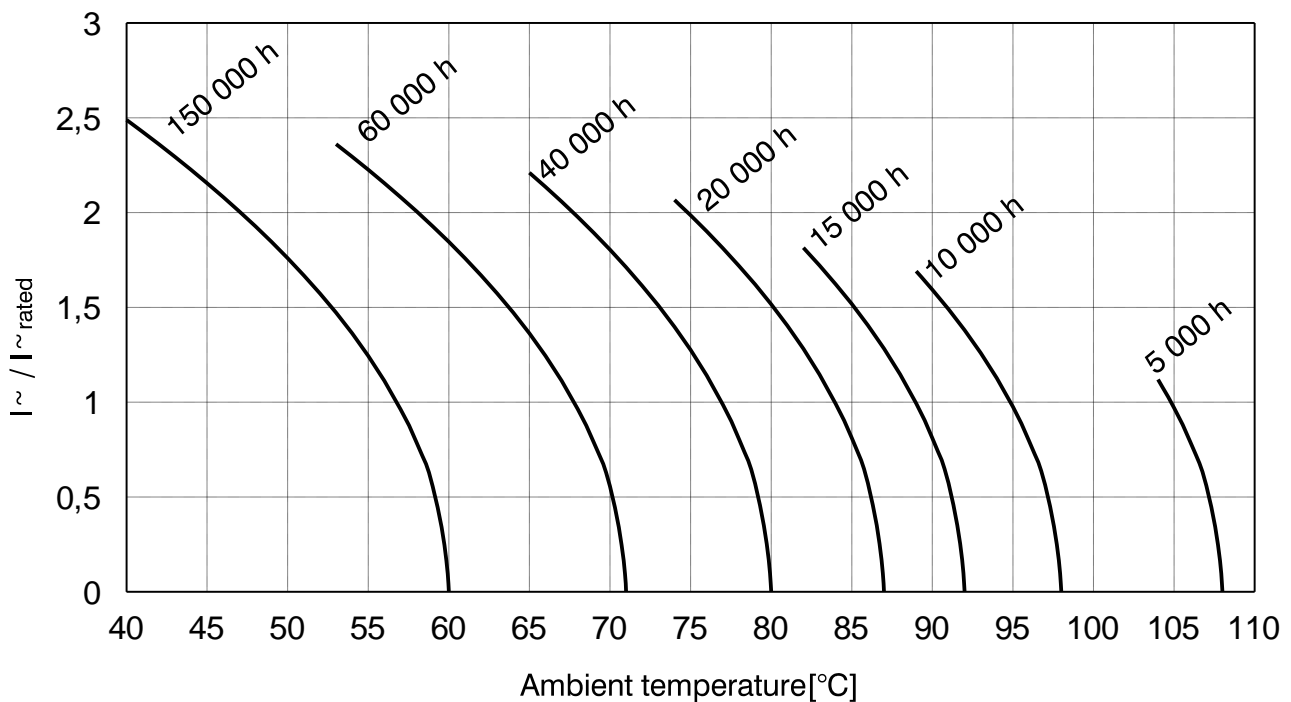


Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current $I_{R\sim}$ 100 Hz, 105°C [A]	Order code
					2 pins: SIH...
450	68	22x25	1639	0,4	68045022025
	82	22x30	1359	0,4	82045022030
	100	22x35	1115	0,5	10145022035
	120	22x40	929	0,6	12145022040
	120	25x30	929	0,6	12145025030
	150	25x35	743	0,7	15145025035
	150	25x40	743	0,7	15145025040
	180	25x45	619	0,8	18145025045
	180	30x30	619	0,7	18145030030
	180	30x35	619	0,8	18145030035
	220	25x50	507	0,9	22145025050
	220	30x40	507	0,9	22145030040
	220	35x30	507	0,9	22145035030
	270	30x45	413	1,0	27145030045
	270	35x35	413	1,1	27145035035

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current $I_{R\sim}$ 100 Hz, 105°C [A]	Order code
					2 pins: SIH...
450	330	30x50	338	1,2	33145030050
	330	35x40	338	1,2	33145035040
	390	35x45	286	1,4	39145035045
	470	30x70	237	1,6	47145030070
	470	35x50	237	1,6	47145035050
	560	35x60	199	1,9	56145035060
	560	40x50	199	1,8	56145040050
	680	35x80	164	2,3	68145035080
	680	40x60	164	2,1	68145040060
	820	35x100	136	2,8	82145035100
	820	45x60	136	2,4	82145045060
	1000	40x80	111	2,9	10245040080
	1200	40x100	93	3,5	12245040100
	1200	45x80	93	3,2	12245045080
	1500	45x100	74	3,9	15245045100

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Useful life
as a function of ambient temperature and actual ripple current





High reliability

Long lifetime at 125°C

SIG: snap in, 2 pins

SI4PG: snap in, 4 pins

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High temp 125°C
- High CV product
- High performance
- Low temperature

Applications

- Automotive
- Consumer
- Industrial
- Tube amplifier

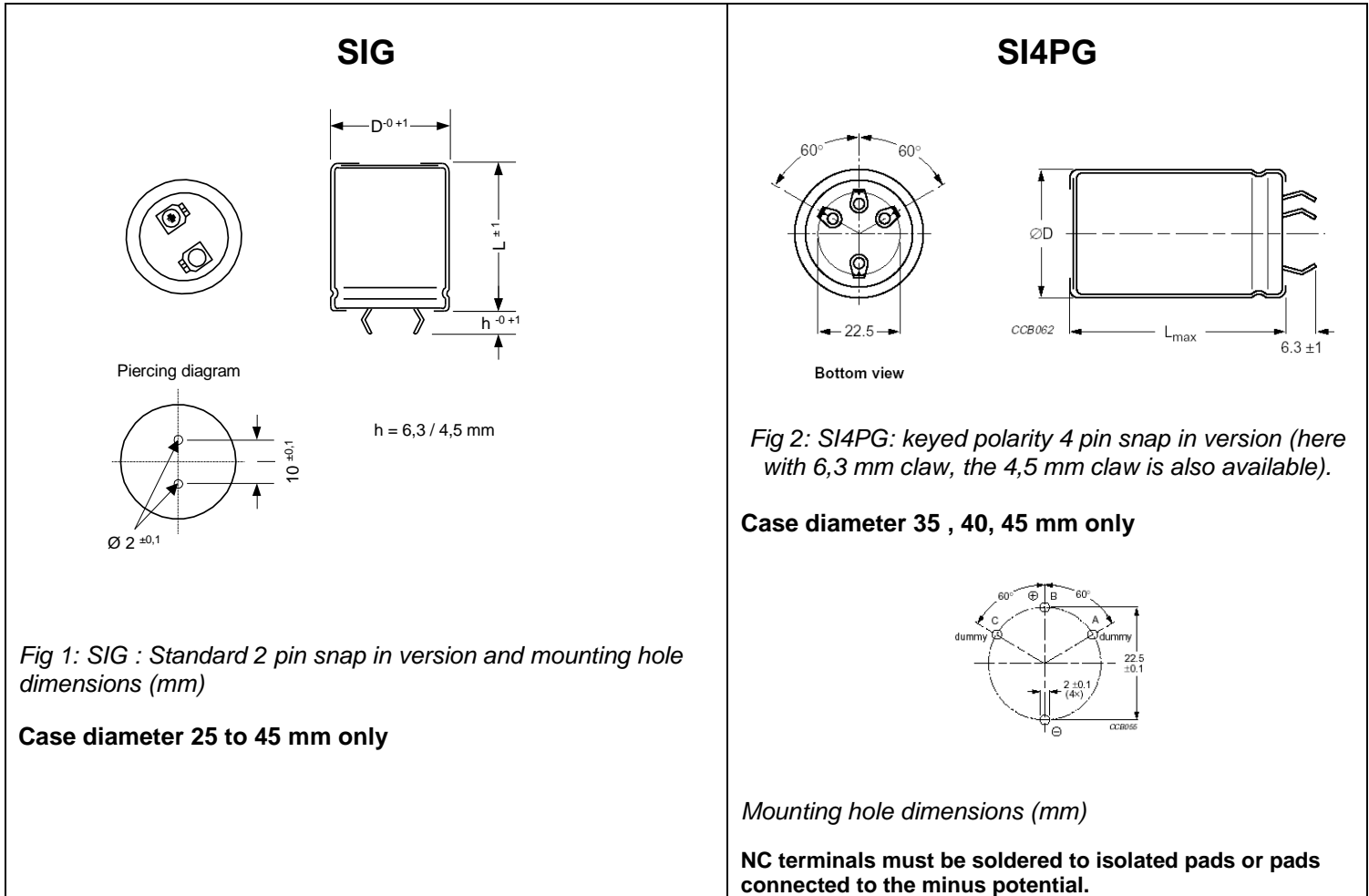
Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

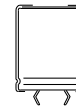
Items		Characteristics
Rated capacitance range C_R		1.200 ... 130.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 63 V
Surge voltage U_S		$U_S = 1,15 U_R$
Max. reverse voltage		2 V
Category temperature range		- 55°C ... + 125°C
Leakage current I_L after 5 min @ U_R		$\leq 0,006 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	2000 h @ 125 °C ; U_R ; I_{R-}	$\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	1000 h @ 125 °C , U_R	$\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		55/125/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4



Drawings for series SIG and SIG4P



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Electrical data and ordering codes series SIG

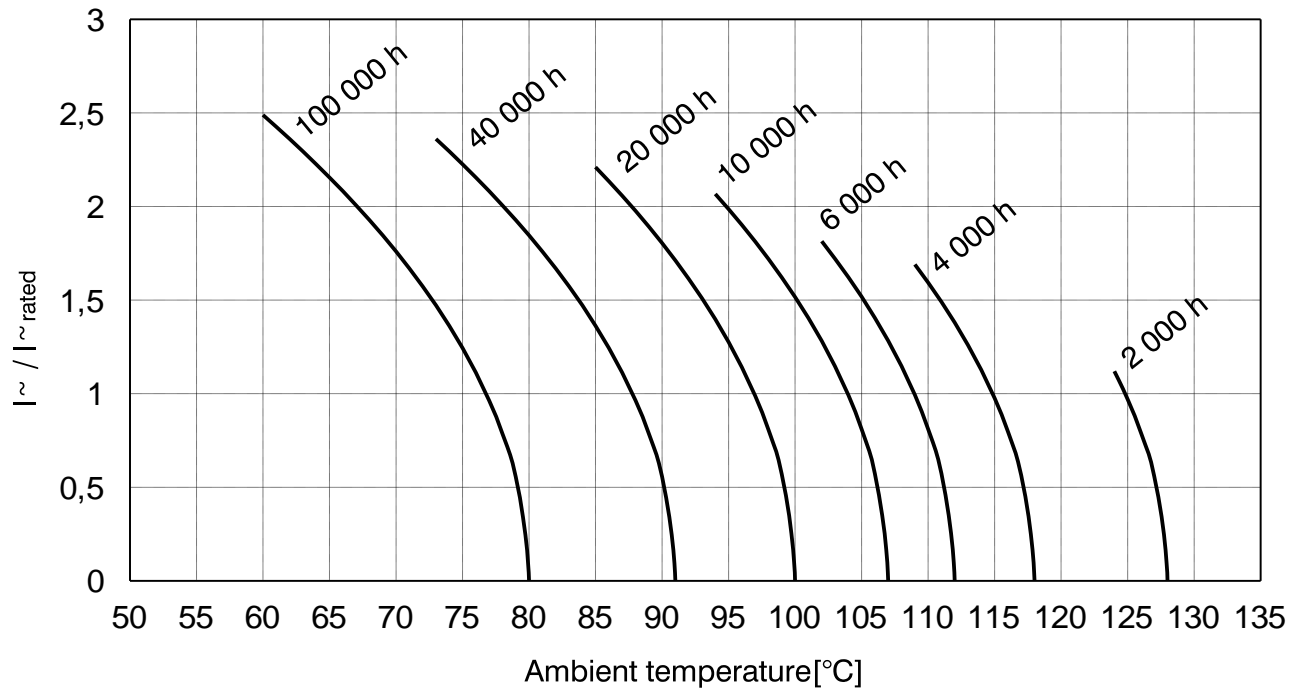
Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 125°C [A]	Order code
					2 pins: SIG... 4 pins: SI4PG...
16	10000	25x30	40	2,7	10301625030
	15000	30x30	27	3,6	15301630030
	18000	25x50	22	4,3	18301625050
	18000	35x30	22	4,3	18301635030
	27000	30x50	15	5,8	27301630050
	39000	30x70	10	7,9	39301630070
	39000	35x50	10	7,6	39301635050
	47000	40x50	8	8,8	47301640050
	82000	35x80	5	14,6	82301635080
	82000	40x80	5	13,9	82301640080
	100000	45x80	4	15,4	10401645080
	120000	40x100	4	16,9	12401640100
	130000	45x100	4	17,5	13401645100
25	6800	25x30	47	2,5	68202525030
	10000	30x30	32	3,3	10302530030
	15000	25x50	21	4,4	15302525050
	15000	35x30	21	4,4	15302535030
	18000	30x50	18	5,3	18302530050
	27000	30x70	12	7,4	27302530070
	27000	35x50	12	7,1	27302535050
	39000	40x50	8	9,0	39302540050
	47000	35x80	7	11,3	47302535080
	56000	45x80	6	12,9	56302545080
	68000	40x80	5	14,2	68302540080
	68000	40x100	5	15,5	68302540100
	100000	45x100	3	18,8	10402545100

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 125°C [A]	Order code
					2 pins: SIG... 4 pins: SI4PG...
40	2700	25x30	71	2,0	27204025030
	3900	30x30	49	2,7	39204030030
	4700	25x50	41	3,2	47204025050
	6800	35x30	28	4,0	68204035030
	8200	30x50	23	4,7	82204030050
	10000	35x50	19	5,7	10304035050
	12000	30x70	16	6,5	12304030070
	15000	40x50	13	7,4	15304040050
	18000	35x80	11	9,3	18304035080
	22000	40x80	9	10,8	22304040080
	27000	45x80	7	13,2	27304045080
	27000	40x100	7	13,1	27304040100
	39000	45x100	5	16,8	39304045100
63	1800	25x30	80	1,9	18206325030
	2700	30x30	53	2,6	27206330030
	3900	25x50	37	3,4	39206325050
	3900	35x30	37	3,5	39206335030
	5600	30x50	26	4,5	56206330050
	6800	35x50	21	5,5	68206335050
	8200	30x70	17	6,2	82206330070
	10000	40x50	14	7,0	10306340050
	12000	35x80	12	8,7	12306335080
	18000	40x80	8	11,2	18306340080
	22000	45x80	7	13,8	22306345080
	22000	40x100	7	13,6	22306340100
	27000	45x100	5	16,2	27306345100

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Useful life
 as a function of ambient temperature and actual ripple current





DIN series

PCB solder pins

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High CV product
- High reliability
- Long useful life

Applications

- HiFi
- Consumer
- Industrial
- Inverter/drives

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		56 ... 330.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 500 V
Surge voltage U_S		$U_R \leq 315 \text{ V}: U_S = 1,15 U_R$ $U_R > 315 \text{ V}: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 85°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	5000 h @ 85 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30 \%$ of initial value $\text{ESR} \leq 300 \%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20$ of initial value $\text{ESR} \leq 130 \%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/85/56
Voltage proof of the external insulation		$\geq 2500 \text{ V AC}$
Sectional specification		IEC 60384-4

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Drawings and mounting pin layout of the series GS capacitors

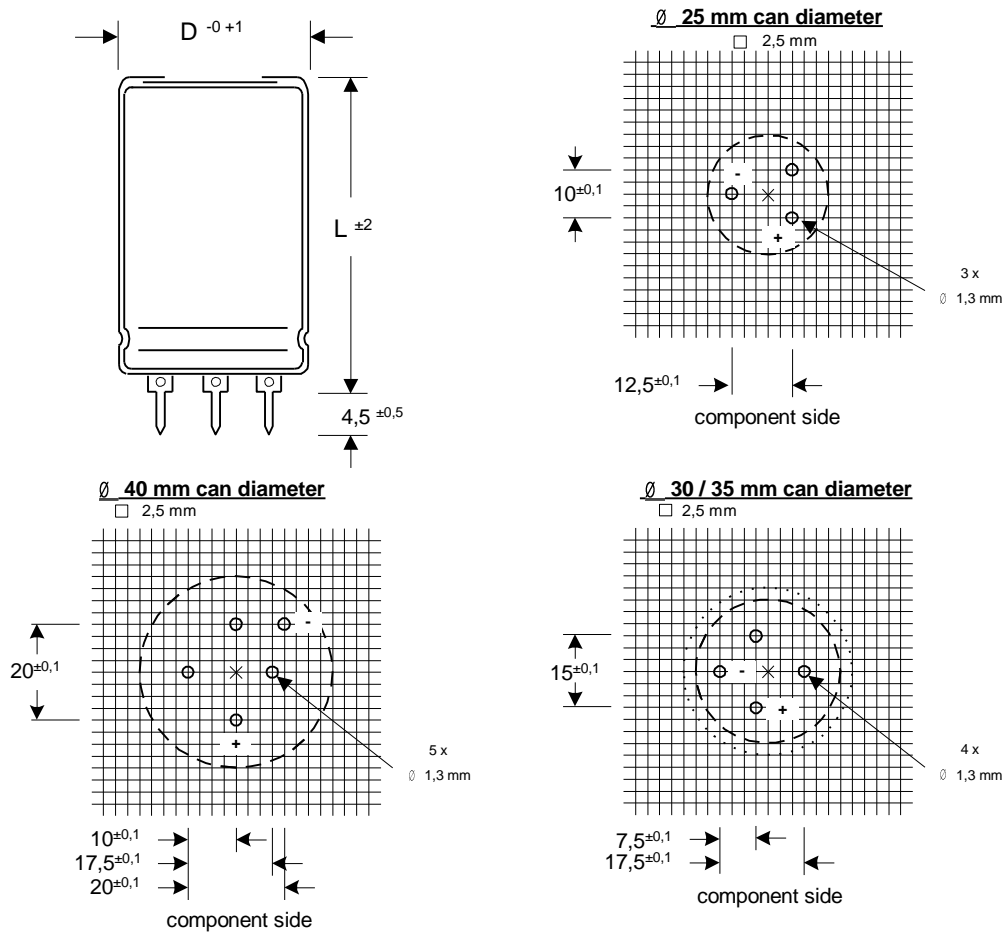


Fig 1: Dimensions of the series GS and mounting hole layouts for $D = 25 \dots 40$ mm

NC terminals must be soldered to isolated pads or pads connected to the minus potential.

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Electrical data and ordering code for series GS

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Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	GS...
16	22000	25x30	22	3,6	22301625030
	27000	25x35	18	4,2	27301625035
	39000	25x40	12	5,3	39301625040
	33000	30x30	14	4,8	33301630030
	39000	25x45	12	5,6	39301625045
	47000	25x50	10	6,4	47301625050
	39000	30x35	12	5,5	39301630035
	47000	35x30	10	6,4	47301635030
	56000	30x40	9	7,0	56301630040
	56000	35x35	9	7,4	56301635035
	56000	30x45	9	7,3	56301630045
	68000	30x50	7	8,4	68301630050
	68000	35x40	7	8,5	68301635040
	82000	35x45	6	9,7	82301635045
	100000	30x70	5	11,6	10401630070
	82000	35x50	6	10,1	82301635050
	120000	40x50	4	12,9	12401640050
	150000	35x80	3	16,4	15401635080
	120000	40x50	4	12,9	12401640050
	150000	40x60	3	15,4	15401640060
180000	35x100	3	19,7	18401635100	
220000	40x80	2	20,8	22401640080	
180000	45x60	3	16,9	18401645060	
270000	45x80	2	23,1	27401645080	
270000	40x100	2	25,3	27401640100	
330000	45x100	1	27,9	33451645100	
25	10000	25x30	45	2,5	10302525030
	12000	25x35	37	2,9	12302525035
	15000	25x40	30	3,4	15302525040
	15000	30x30	30	3,4	15302530030
	18000	25x45	25	3,9	18302525045
	18000	30x35	25	3,9	18302530035
	18000	25x50	25	4,1	18302525050
	22000	30x40	20	4,5	22302530040
	18000	35x30	25	4,1	18302535030
	27000	30x45	17	5,1	27302530045
	27000	30x50	17	5,4	27302530050
	22000	35x35	21	4,7	22302535035
	27000	35x40	17	5,4	27302535040
	33000	35x45	14	6,3	33302535045
	39000	30x70	12	7,4	39302530070
	39000	35x50	12	7,1	39302535050
	47000	35x60	10	8,3	47302535060
	56000	40x50	8	8,9	56302540050
	56000	35x80	8	10,2	56302535080
	68000	40x60	7	10,5	68302540060
	82000	35x100	6	13,5	82302535100
	82000	45x60	6	11,6	82302545060

Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	GS...
25	120000	40x80	4	15,6	12402540080
	120000	40x100	4	17,1	12402540100
	120000	45x80	4	15,6	12402545080
	150000	45x100	3	19,1	15402545100
	5600	25x30	68	2,0	56204025030
6800	25x35	56	2,4	68204025035	
8200	25x40	47	2,7	82204025040	
8200	30x30	47	2,7	82204030030	
10000	25x45	38	3,2	10304025045	
10000	30x35	38	3,1	10304030035	
10000	25x50	38	3,3	10304025050	
12000	30x40	32	3,6	12304030040	
10000	35x30	38	3,3	10304035030	
15000	30x45	25	4,2	15304030045	
12000	35x35	32	3,8	12304035035	
15000	30x50	25	4,4	15304030050	
15000	35x40	25	4,5	15304035040	
18000	35x45	21	5,1	18304035045	
22000	35x50	17	5,8	22304035050	
22000	30x70	17	6,1	22304030070	
27000	35x60	14	6,9	27304035060	
27000	40x50	14	6,8	27304040050	
33000	35x80	12	8,6	33304035080	
33000	40x60	12	8,1	33304040060	
47000	35x100	8	11,3	47304035100	
47000	40x80	8	10,8	47304040080	
39000	45x60	10	8,8	39304045060	
56000	40x100	7	12,9	56304040100	
56000	45x80	7	11,7	56304045080	
82000	45x100	5	15,5	82304045100	
63	2700	25x30	106	1,6	27206325030
	3300	25x35	87	1,9	33206325035
	3900	25x40	73	2,2	39206325040
	3900	30x30	73	2,1	39206330030
	4700	25x45	61	2,5	47206325045
	4700	30x35	61	2,5	47206330035
	5600	25x50	51	0,0	56206325050
	5600	30x40	51	2,8	56206330040
	5600	35x30	51	2,9	56206335030
	6800	30x45	42	3,3	68206330045
	6800	35x35	42	3,3	68206335035
	8200	30x50	35	3,7	82206330050
	8200	35x45	35	4,0	82206335045
	12000	30x70	24	5,2	12306330070
	12000	35x60	24	5,3	12306335060
	15000	40x50	19	5,9	15306340050
	18000	35x80	16	7,3	18306335080



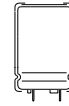
Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 85°C [A]	Order code GS...
63	22000	45x60	13	7,6	22306345060
	22000	35x100	13	8,9	22306335100
	22000	40x80	13	8,5	22306340080
	27000	40x100	11	10,3	27306340100
	27000	45x80	11	9,4	27306345080
	39000	45x100	7	12,4	39306345100
80	1800	25x30	177	1,3	18208025030
	1800	25x35	177	1,3	18208025035
	2700	25x40	118	1,7	27208025040
	2700	30x30	118	1,7	27208030030
	3300	25x45	97	2,0	33208025045
	3900	25x50	82	2,3	39208025050
	3300	30x35	97	2,0	33208030035
	3900	35x30	82	2,3	39208035030
	3900	30x40	82	2,3	39208030040
	4700	30x45	68	2,6	47208030045
	4700	35x35	68	2,6	47208035035
	5600	30x50	57	2,9	56208030050
	5600	35x40	57	3,0	56208035040
	6800	35x45	47	3,4	68208035045
	6800	35x50	47	3,6	68208035050
	8200	30x70	39	4,1	82208030070
	10000	35x60	32	4,6	10308035060
	10000	40x50	32	4,6	10308040050
	12000	35x80	27	5,7	12308035080
	12000	40x60	27	5,3	12308040060
	18000	35x100	18	7,6	18308035100
	15000	45x60	21	6,0	15308045060
	18000	40x80	18	7,3	18308040080
	22000	45x80	14	8,1	22308045080
22000	40x100	14	8,8	22308040100	
27000	45x100	12	9,8	27308045100	
100	1200	25x30	133	1,5	12210025030
	1500	25x35	106	1,7	15210025035
	1800	25x40	88	2,0	18210025040
	1800	30x30	88	2,0	18210030030
	2200	25x45	72	2,3	22210025045
	2200	25x50	72	2,4	22210025050
	2200	35x30	72	2,4	22210035030
	2700	30x40	59	2,7	27210030040
	2700	30x45	59	2,8	27210030045
	2700	35x35	59	2,8	27210035035
	3300	30x50	48	3,2	33210030050
	3300	35x40	48	3,2	33210035040
	3900	35x45	41	3,7	39210035045
	5600	30x70	28	4,7	56210030070
	4700	35x50	34	4,2	47210035050
	5600	35x60	28	4,9	56210035060
	5600	40x50	28	4,8	56210040050
	6800	35x80	23	6,1	68210035080

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 85°C [A]	Order code GS...
100	6800	40x60	23	5,7	68210040060
	10000	35x100	16	8,1	10310035100
	12000	40x80	13	8,4	12310040080
	10000	45x60	16	6,9	10310045060
	12000	45x80	13	8,4	12310045080
	15000	40x100	11	10,3	15310040100
	18000	45x100	9	11,3	18310045100
160	470	25x30	237	1,1	47116025030
	560	25x35	199	1,3	56116025035
	680	25x40	164	1,5	68116025040
	680	30x30	164	1,4	68116030030
	820	25x45	136	1,7	82116025045
	820	30x35	136	1,7	82116030035
	1000	25x50	111	1,9	10216025050
	1000	30x40	111	1,9	10216030040
	1000	35x30	111	1,9	10216035030
	1200	30x45	93	2,2	12216030045
	1200	35x35	93	2,2	12216035035
	1500	30x50	74	2,6	15216030050
	1500	35x40	74	2,6	15216035040
	1800	35x45	62	3,0	18216035045
	1800	35x50	62	3,1	18216035050
	2200	30x70	51	3,6	22216030070
	2200	35x60	51	3,7	22216035060
	2700	40x50	41	4,0	27216040050
	3300	35x80	34	5,0	33216035080
	3300	40x60	34	4,7	33216040060
	3900	35x100	29	6,0	39216035100
	3900	45x60	29	5,2	39216045060
	4700	40x80	24	6,3	47216040080
	5600	40x100	20	7,5	56216040100
5600	45x80	20	6,9	56216045080	
6800	45x100	16	8,3	68216045100	
200	470	25x30	203	1,2	47120025030
	560	25x35	171	1,4	56120025035
	680	25x40	141	1,6	68120025040
	680	30x30	141	1,6	68120030030
	820	25x45	117	1,8	82120025045
	820	30x35	117	1,8	82120030035
	1000	35x30	96	2,1	10220035030
	1000	25x50	96	2,1	10220025050
	1000	30x40	96	2,1	10220030040
	1200	30x45	80	2,4	12220030045
	1500	30x50	64	2,8	15220030050
	1200	35x35	80	2,4	12220035035
	1500	35x40	64	2,8	15220035040
	1800	35x45	53	3,2	18220035045
	1800	35x50	53	3,3	18220035050
	2200	30x70	43	3,8	22220030070
	2200	35x60	43	4,0	22220035060



Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	GS...
200	3300	35x80	29	5,4	33220035080
	2700	40x50	35	4,3	27220040050
	3300	40x60	29	5,1	33220040060
	3900	35x100	24	6,5	39220035100
	4700	40x80	20	6,8	47220040080
	3900	45x60	24	5,6	39220045060
	5600	40x100	17	8,1	56220040100
	5600	45x80	17	7,4	56220045080
	6800	45x100	14	9,0	68220045100
350	180	25x30	531	0,7	18135025030
	220	25x35	434	0,9	22135025035
	270	25x40	354	1,0	27135025040
	270	30x30	354	1,0	27135030030
	330	25x45	290	1,2	33135025045
	330	30x35	290	1,1	33135030035
	390	35x30	245	1,3	39135035030
	390	25x50	245	1,3	39135025050
	390	30x40	245	1,3	39135030040
	470	30x45	203	1,5	47135030045
	470	35x35	203	1,5	47135035035
	560	30x50	171	1,7	56135030050
	560	35x40	171	1,7	56135035040
	560	35x45	171	1,8	56135035045
	680	35x50	141	2,1	68135035050
	820	30x70	117	2,3	82135030070
	820	35x60	117	2,4	82135035060
	1000	40x50	96	2,6	10235040050
	1200	35x80	80	3,3	12235035080
	1200	40x60	80	3,1	12235040060
1500	35x100	64	4,0	15235035100	
1500	45x60	64	3,4	15235045060	
1800	40x80	53	4,2	18235040080	
1800	40x100	53	4,6	18235040100	
2200	45x80	43	4,7	22235045080	
2700	45x100	35	5,6	27235045100	
400	180	25x30	708	0,6	18140025030
	220	25x35	579	0,7	22140025035
	270	25x40	472	0,9	27140025040
	270	30x30	472	0,8	27140030030
	330	25x45	386	1,0	33140025045
	330	25x50	386	1,0	33140025050
	330	30x35	386	1,0	33140030035
	390	35x30	327	1,1	39140035030
	390	30x40	327	1,1	39140030040
	470	35x35	271	1,3	47140035035
	470	30x45	271	1,3	47140030045
	560	30x50	227	1,5	56140030050
	560	35x40	227	1,5	56140035040
	560	35x45	227	1,6	56140035045
	680	30x70	187	1,8	68140030070

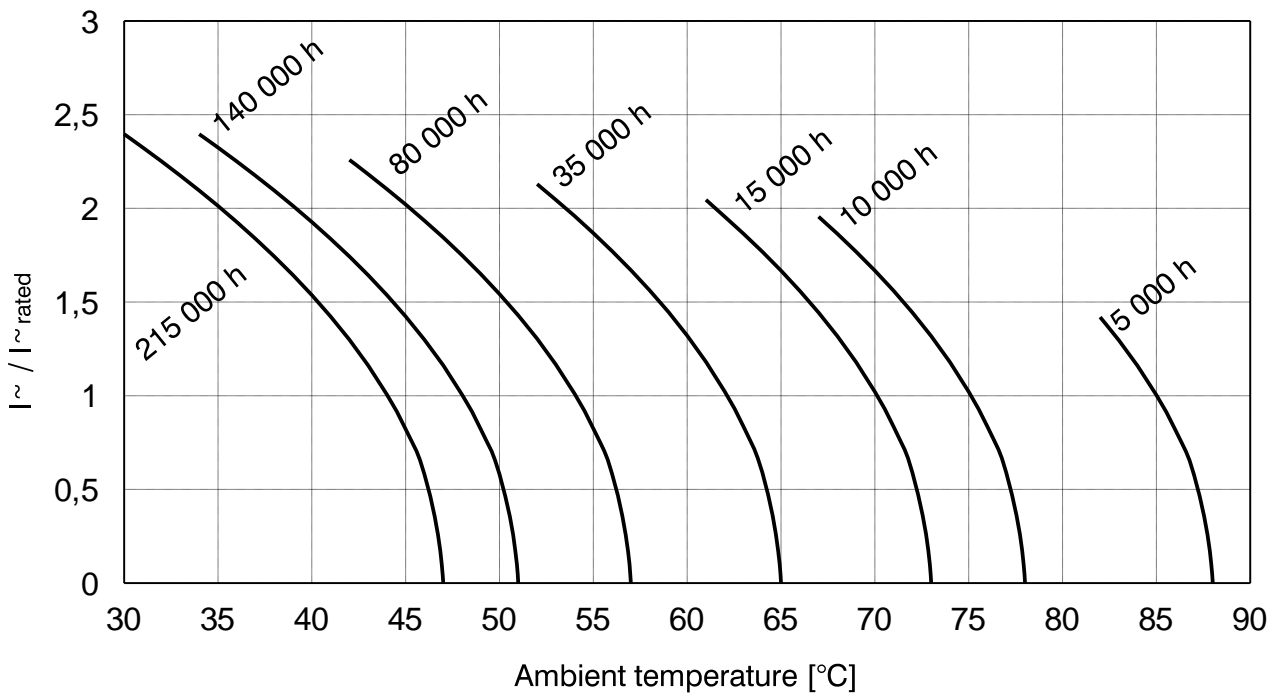
Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	GS...
400	820	35x50	155	2,0	82140035050
	820	35x60	155	2,1	82140035060
	820	40x50	155	2,1	82140040050
	1200	35x80	106	2,8	12240035080
	1200	40x60	106	2,7	12240040060
	1500	35x100	85	3,5	15240035100
	1500	40x80	85	3,3	15240040080
	1800	45x60	71	3,3	18240045060
	1800	40x100	71	4,0	18240040100
	1800	45x80	71	3,6	18240045080
	2700	45x100	47	4,9	27240045100
2200	45x100	58	4,7	22240045100	
450	120	25x30	929	0,6	12145025030
	150	25x35	743	0,7	15145025035
	180	25x40	619	0,8	18145025040
	220	25x45	507	0,9	22145025045
	180	30x30	619	0,7	18145030030
	220	30x35	507	0,9	22145030035
	220	25x50	507	0,9	22145025050
	270	30x40	413	1,0	27145030040
	220	35x30	507	0,9	22145035030
	270	30x45	413	1,0	27145030045
	270	35x35	413	1,1	27145035035
	330	30x50	338	1,2	33145030050
	390	35x40	286	1,3	39145035040
	390	35x45	286	1,4	39145035045
	560	30x70	199	1,8	56145030070
	470	35x50	237	1,6	47145035050
	560	35x60	199	1,9	56145035060
	560	40x50	199	1,8	56145040050
	820	35x80	136	2,5	82145035080
	1200	40x60	93	2,8	12245040060
1000	35x100	111	3,0	10245035100	
1000	45x60	111	2,6	10245045060	
1200	40x80	93	3,3	12245040080	
1500	40x100	74	4,0	15245040100	
1200	45x80	93	3,2	12245045080	
1800	45x100	62	4,3	18245045100	
500	120	25x30	796	0,6	12150025030
	120	25x35	796	0,6	12150025035
	150	25x40	637	0,7	15150025040
	180	25x45	531	0,9	18150025045
	150	30x30	637	0,7	15150030030
	180	30x35	531	0,8	18150030035
	220	25x50	434	1,0	22150025050
	220	30x40	434	1,0	22150030040
	180	35x30	531	0,9	18150035030
	270	30x45	354	1,1	27150030045
	270	35x35	354	1,1	27150035035
	270	30x50	354	1,2	27150030050



Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R [V]	C_R [μ F]	D x L [mm]	100 Hz, 20°C [m Ω]	100 Hz, 85°C [A]	GS...
500	270	35x40	354	1,2	27150035040
	390	35x45	245	1,5	39150035045
	470	30x70	203	1,8	47150030070
	390	35x50	245	1,6	39150035050
	560	35x60	171	2,0	56150035060
	560	40x50	171	2,0	56150040050
	680	35x80	141	2,5	68150035080

Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R [V]	C_R [μ F]	D x L [mm]	100 Hz, 20°C [m Ω]	100 Hz, 85°C [A]	GS...
500	680	40x60	141	2,3	68150040060
	820	35x100	117	3,0	82150035100
	820	45x60	117	2,6	82150045060
	1200	40x80	80	3,4	12250040080
	820	40x100	117	3,1	82150040100
	1200	45x80	80	3,4	12250045080
	1500	45x100	64	4,2	15250045100

Useful life
as a function of ambient temperature and actual ripple current



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DIN series

Ultra compact design

Long life time

PCB solder pins

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High CV product
- High reliability
- Ultra compact

Applications

- HiFi
- Computer
- Industrial
- Tube amplifier

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

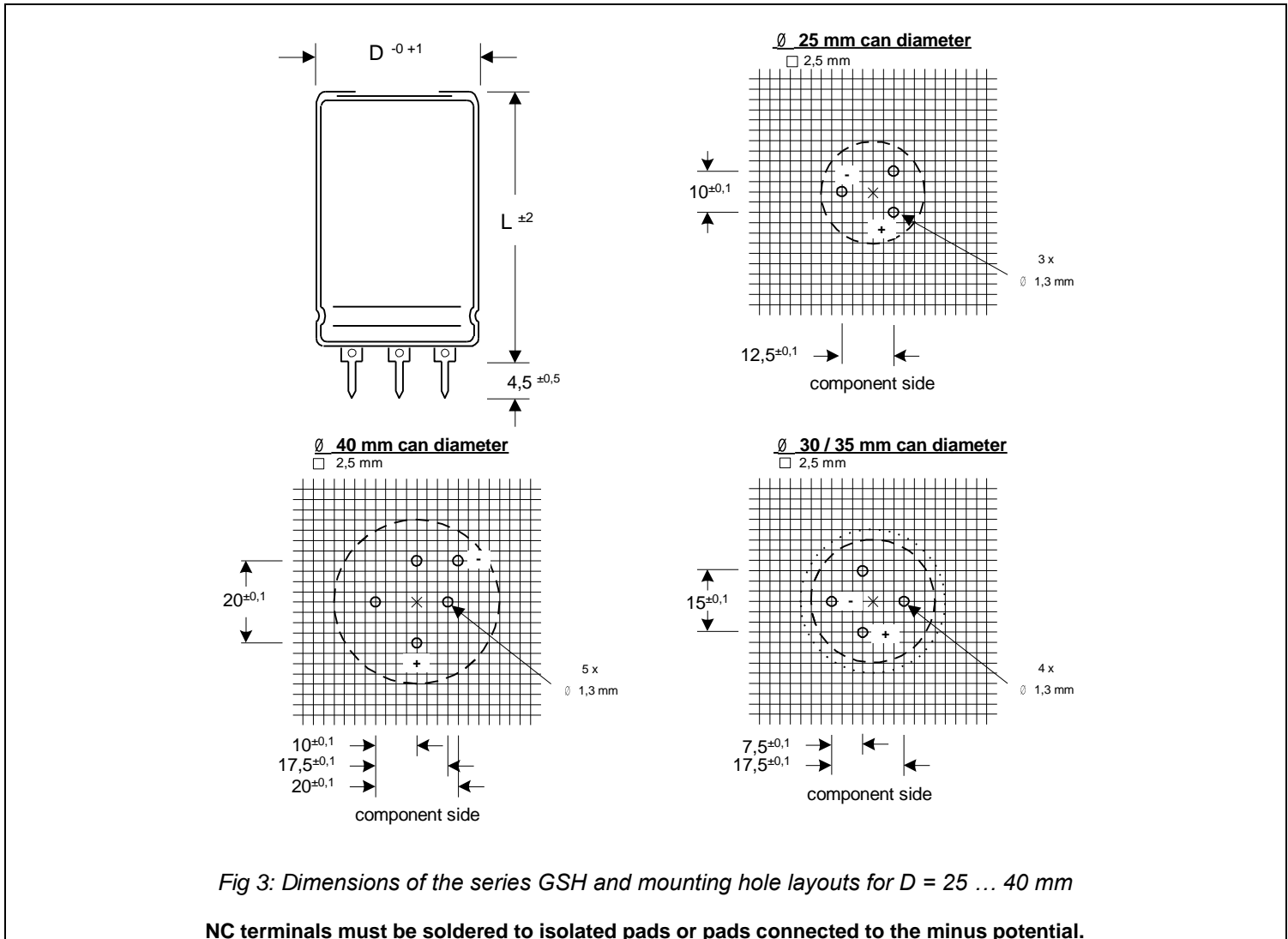
General specifications

Items		Characteristics
Rated capacitance range C_R		68 ... 150.000 μ F
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315$ V: $U_S = 1,15 U_R$ $U_R > 315$ V: $U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 105°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	5000 h @ 105 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30$ % of initial value $ESR \leq 300$ % of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 105 °C , U_R	Requirements $\Delta C/C \leq 20$ % of initial value $ESR \leq 130$ % of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/105/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4

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Drawings and mounting pin layout of the series GSH capacitors



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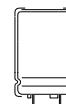


Electrical data and ordering code for series GSH

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Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current IR~	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C	100 Hz, 105°C	GSH...
16	10000	25x30	48	2,4	10301625030
	12000	25x35	40	2,8	12301625035
	15000	25x40	32	3,3	15301625040
	15000	30x30	32	3,3	15301630030
	18000	25x45	27	3,8	18301625045
	18000	25x50	27	4,0	18301625050
	18000	30x35	27	3,8	18301630035
	18000	35x30	27	4,0	18301635030
	22000	30x40	22	4,4	22301630040
	22000	35x35	22	4,6	22301635035
	27000	30x45	18	5,1	27301630045
	27000	30x50	18	5,3	27301630050
	27000	35x40	18	5,3	27301635040
	33000	35x45	14	6,2	33301635045
	39000	30x70	12	7,2	39301630070
	39000	35x50	12	7,0	39301635050
	47000	40x50	10	8,1	47301640050
	56000	35x80	9	10,0	56301635080
	56000	40x50	9	8,8	56301640050
	68000	40x60	7	10,4	68301640060
82000	35x100	6	13,3	82301635100	
82000	40x80	6	12,7	82301640080	
82000	45x60	6	11,4	82301645060	
100000	45x80	5	14,0	10401645080	
120000	40x100	4	16,9	12401640100	
150000	45x100	3	18,8	15401645100	
25	6800	25x30	66	2,1	68202525030
	8200	25x35	54	2,4	82202525035
	10000	25x40	45	2,8	10302525040
	10000	30x30	45	2,8	10302530030
	12000	25x45	37	3,2	12302525045
	12000	30x35	37	3,2	12302530035
	15000	25x50	30	3,7	15302525050
	15000	30x40	30	3,7	15302530040
	15000	35x30	30	3,7	15302535030
	18000	30x45	26	4,2	18302530045
	18000	30x50	26	4,4	18302530050
	18000	35x35	26	4,2	18302535035
	22000	35x40	21	4,9	22302535040
	22000	35x45	21	5,1	22302535045
	27000	30x70	17	6,1	27302530070
	27000	35x50	17	5,9	27302535050
	33000	35x60	14	7,0	33302535060
	39000	40x50	12	7,5	39302540050
	47000	35x80	10	9,3	47302535080
	47000	40x60	10	8,8	47302540060
	56000	35x100	8	11,2	56302535100
	56000	45x60	8	9,6	56302545060

Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current IR~	Order code
U _R [V]	C _R [μF]	D x L [mm]	100 Hz, 20°C	100 Hz, 105°C	GSH...
25	68000	40x80	7	11,8	68302540080
	68000	40x100	7	12,9	68302540100
	82000	45x80	6	12,9	82302545080
	100000	45x100	5	15,6	10402545100
	2700	25x30	142	1,4	27204025030
40	3300	25x35	116	1,7	33204025035
	3900	25x40	98	1,9	39204025040
	3900	30x30	98	1,9	39204030030
	4700	25x45	81	2,2	47204025045
	4700	30x35	81	2,2	47204030035
	5600	25x50	68	2,5	56204025050
	5600	30x40	68	2,5	56204030040
	5600	35x30	68	2,5	56204035030
	6800	30x45	56	2,8	68204030045
	6800	35x35	56	2,9	68204035035
	8200	30x50	47	3,2	82204030050
	8200	35x40	47	3,3	82204035040
	8200	35x45	47	3,4	82204035045
	10000	35x50	38	3,9	10304035050
	12000	30x70	32	4,5	12304030070
	12000	35x60	32	4,6	12304035060
	15000	40x50	25	5,1	15304040050
	18000	35x80	21	6,4	18304035080
	18000	40x60	21	6,0	18304040060
	22000	35x100	17	7,7	22304035100
	22000	40x80	17	7,4	22304040080
	22000	45x60	17	6,6	22304045060
	27000	40x100	14	8,9	27304040100
	27000	45x80	14	8,2	27304045080
	39000	45x100	10	10,7	39304045100
	63	1800	25x30	159	1,3
2200		25x35	130	1,6	22206325035
2700		25x40	106	1,8	27206325040
2700		30x30	106	1,8	27206330030
3300		25x45	87	2,1	33206325045
3300		30x35	87	2,1	33206330035
3900		25x50	73	2,4	39206325050
3900		30x40	73	2,4	39206330040
3900		35x30	73	2,4	39206335030
4700		30x45	61	2,7	47206330045
4700		35x35	61	2,8	47206335035
5600		30x50	51	3,1	56206330050
6800		35x45	42	3,6	68206335045
8200		30x70	35	4,3	82206330070
10000		35x60	29	4,9	10306335060
10000	40x50	29	4,8	10306340050	
12000	35x80	24	6,0	12306335080	
12000	40x60	24	5,6	12306340060	



Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 105°C [mA]	Order code GSH...	
63	15000	45x60	19	6,3	15306345060	
	18000	35x100	16	8,1	18306335100	
	18000	40x80	16	7,7	18306340080	
	22000	40x100	13	9,3	22306340100	
	22000	45x80	13	8,5	22306345080	
	27000	45x100	11	10,3	27306345100	
80	1200	25x30	265	1,0	12208025030	
	1500	25x35	212	1,2	15208025035	
	1800	25x40	177	1,4	18208025040	
	1800	30x30	177	1,4	18208030030	
	2200	25x45	145	1,6	22208025045	
	2200	25x50	145	1,7	22208025050	
	2200	30x35	145	1,6	22208030035	
	2200	35x30	145	1,7	22208035030	
	2700	30x40	118	1,9	27208030040	
	2700	30x45	118	2,0	27208030045	
	2700	35x35	118	2,0	27208035035	
	3300	30x50	97	2,3	33208030050	
	3300	35x40	97	2,3	33208035040	
	3900	35x45	82	2,6	39208035045	
	4700	35x50	68	3,0	47208035050	
	5600	30x70	57	3,4	56208030070	
	5600	35x60	57	3,5	56208035060	
	5600	40x50	57	3,4	56208040050	
	6800	35x80	47	4,3	68208035080	
	6800	40x60	47	4,0	68208040060	
	10000	35x100	32	5,7	10308035100	
	10000	45x60	32	4,9	10308045060	
	12000	40x80	27	6,0	12308040080	
	12000	45x80	27	6,0	12308045080	
	15000	40x100	21	7,3	15308040100	
	18000	45x100	18	8,0	18308045100	
	100	1000	25x30	159	1,3	10210025030
		1200	25x35	133	1,5	12210025035
1500		25x40	106	1,8	15210025040	
1500		30x30	106	1,8	15210030030	
1800		25x45	88	2,1	18210025045	
1800		25x50	88	2,2	18210025050	
1800		35x30	88	2,2	18210035030	
2200		30x40	72	2,4	22210030040	
2200		30x45	72	2,5	22210030045	
2200		35x35	72	2,5	22210035035	
2700		30x50	59	2,9	27210030050	
2700		35x40	59	2,9	27210035040	
3300		35x45	48	3,4	33210035045	
3900		30x70	41	4,0	39210030070	
3900		35x50	41	3,8	39210035050	
4700		35x60	34	4,5	47210035060	
4700		40x50	34	4,4	47210040050	
5600		35x80	28	5,5	56210035080	

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	Ripple current IR~ 100 Hz, 105°C [mA]	Order code GSH...	
100	5600	40x60	28	5,1	56210040060	
	8200	35x100	19	7,3	82210035100	
	8200	40x80	19	7,0	82210040080	
	8200	45x60	19	6,2	82210045060	
	10000	45x80	16	7,7	10310045080	
	12000	40x100	13	9,2	12310040100	
	15000	45x100	11	10,3	15310045100	
	160	470	25x30	237	1,1	47116025030
560		25x35	199	1,3	56116025035	
680		25x40	164	1,5	68116025040	
680		30x30	164	1,4	68116030030	
820		25x45	136	1,6	82116025045	
820		30x35	136	1,7	82116030035	
1000		25x50	111	1,9	10216025050	
1000		30x40	111	1,9	10216030040	
1000		35x30	111	1,9	10216035030	
1200		30x45	93	2,2	12216030045	
1200		35x35	93	2,2	12216035035	
1500		30x50	74	2,6	15216030050	
1500		35x40	74	2,6	15216035040	
1800		35x45	62	3,0	18216035045	
1800		35x50	62	3,1	18216035050	
2200		30x70	51	3,6	22216030070	
2200		35x60	51	3,7	22216035060	
2700		40x50	41	4,0	27216040050	
3300		35x80	34	5,0	33216035080	
3300		40x60	34	4,7	33216040060	
3900		35x100	29	6,2	39216035100	
3900		45x60	29	5,2	39216045060	
4700		40x80	24	6,3	47216040080	
5600		40x100	20	7,5	56216040100	
5600		45x80	20	6,9	56216045080	
6800		45x100	16	8,3	68216045100	
250		330	25x30	290	1,0	33125025030
		390	25x35	245	1,1	39125025035
	470	25x40	203	1,3	47125025040	
	470	30x30	203	1,3	47125030030	
	560	25x45	171	1,5	56125025045	
	560	30x35	171	1,5	56125030035	
	560	35x30	171	1,6	56125035030	
	680	25x50	141	1,7	68125025050	
	680	30x40	141	1,7	68125030040	
	820	30x45	117	2,0	82125030045	
	820	30x50	117	2,1	82125030050	
	820	35x35	117	2,0	82125035035	
	1000	35x40	96	2,3	10225035040	
	1200	35x45	80	2,6	12225035045	
	1200	35x50	80	2,7	12225035050	
	1500	30x70	64	3,2	15225030070	
	1500	35x60	64	3,3	15225035060	

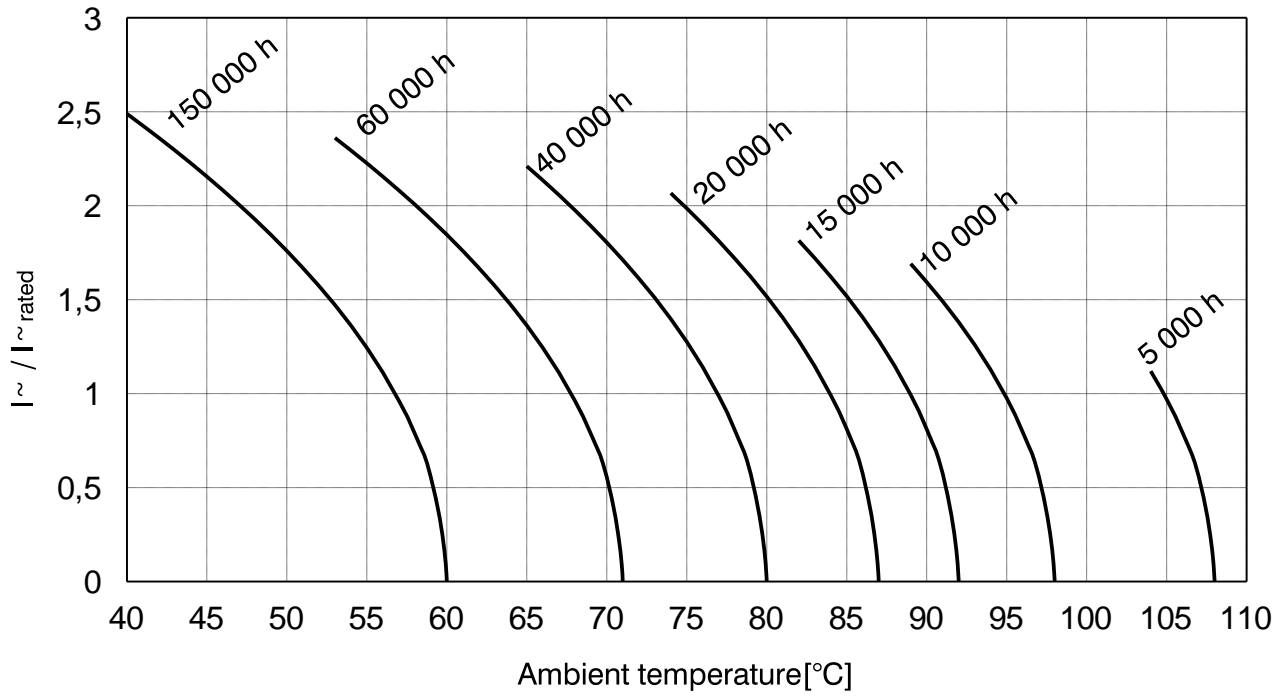


Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R [V]	C_R [μF]	D x L [mm]	100 Hz, 20°C	IR~ 100 Hz, 105°C	GSH...
250	1800	35x80	53	4,0	18225035080
	1800	40x50	53	3,5	18225040050
	1800	40x60	53	3,8	18225040060
	2700	35x100	35	5,4	27225035100
	2700	40x80	35	5,2	27225040080
	2700	45x60	35	4,6	27225045060
	3300	40x100	29	6,3	33225040100
	3300	45x80	29	5,7	33225045080
	4700	45x100	20	7,4	47225045100
350	180	25x30	531	0,7	18135025030
	220	25x35	434	0,9	22135025035
	270	25x40	354	1,0	27135025040
	270	30x30	354	1,0	27135030030
	330	25x45	290	1,2	33135025045
	330	30x35	290	1,1	33135030035
	330	35x30	290	1,2	33135035030
	390	25x50	245	1,3	39135025050
	390	30x40	245	1,3	39135030040
	470	30x45	203	1,5	47135030045
	470	35x35	203	1,5	47135035035
	560	30x50	171	1,7	56135030050
	560	35x40	171	1,7	56135035040
	560	35x45	171	1,8	56135035045
	680	35x50	141	2,1	68135035050
	820	30x70	117	2,3	82135030070
	820	35x60	117	2,4	82135035060
	820	40x50	117	2,4	82135040050
	1200	35x80	80	3,3	12235035080
	1200	40x60	80	3,1	12235040060
	1500	35x100	64	4,0	15235035100
	1500	45x60	64	3,4	15235045060
	1800	40x80	53	4,2	18235040080
	1800	40x100	53	4,6	18235040100
	1800	45x80	53	4,2	18235045080
	2700	45x100	35	5,6	27235045100
	400	150	25x30	849	0,6
180		25x35	708	0,7	18140025035
220		25x40	579	0,8	22140025040
220		30x30	579	0,8	22140030030
270		25x45	472	0,9	27140025045
270		25x50	472	0,9	27140025050
270		30x35	472	0,9	27140030035
270		35x30	472	0,9	27140035030

Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R [V]	C_R [μF]	D x L [mm]	100 Hz, 20°C	IR~ 100 Hz, 105°C	GSH...
400	330	30x40	386	1,0	33140030040
	330	35x35	386	1,1	33140035035
	390	30x45	327	1,2	39140030045
	390	30x50	327	1,2	39140030050
	470	35x45	271	1,4	47140035045
	560	30x70	227	1,7	56140030070
	560	35x50	227	1,6	56140035050
	680	35x60	187	1,9	68140035060
	680	40x50	187	1,9	68140040050
	820	35x80	155	2,3	82140035080
	820	40x60	155	2,2	82140040060
	1200	35x100	106	3,1	12240035100
	1200	40x80	106	3,0	12240040080
	1200	45x60	106	2,7	12240045060
	1500	40x100	85	3,6	15240040100
1500	45x80	85	3,3	15240045080	
2200	45x100	58	4,4	22240045100	
450	120	25x30	929	0,6	12145025030
	150	25x35	743	0,7	15145025035
	150	25x40	743	0,7	15145025040
	180	25x45	619	0,8	18145025045
	180	30x30	619	0,7	18145030030
	180	30x35	619	0,8	18145030035
	220	25x50	507	0,9	22145025050
	220	30x40	507	0,9	22145030040
	220	35x30	507	0,9	22145035030
	270	30x45	413	1,0	27145030045
	270	35x35	413	1,1	27145035035
	330	30x50	338	1,2	33145030050
	330	35x40	338	1,2	33145035040
	390	35x45	286	1,4	39145035045
	470	30x70	237	1,6	47145030070
	470	35x50	237	1,6	47145035050
	560	35x60	199	1,9	56145035060
	560	40x50	199	1,8	56145040050
	680	35x80	164	2,3	68145035080
	680	40x60	164	2,1	68145040060
	820	35x100	136	2,8	82145035100
	820	45x60	136	2,4	82145045060
	1000	40x80	111	2,9	10245040080
	1200	40x100	93	3,5	12245040100
1200	45x80	93	3,2	12245045080	
1500	45x100	74	3,9	15245045100	



Useful life
 as a function of ambient temperature and actual ripple current





DIN series

High reliability

Long lifetime at 125°C

PCB solder pins

RoHS compliant
REACH compliant

Features

- All internal contact welded
- High temp 125°C
- High CV product
- High performance
- Low temperature – 55°C

Applications

- HiFi
- Automotive
- Consumer
- Traction

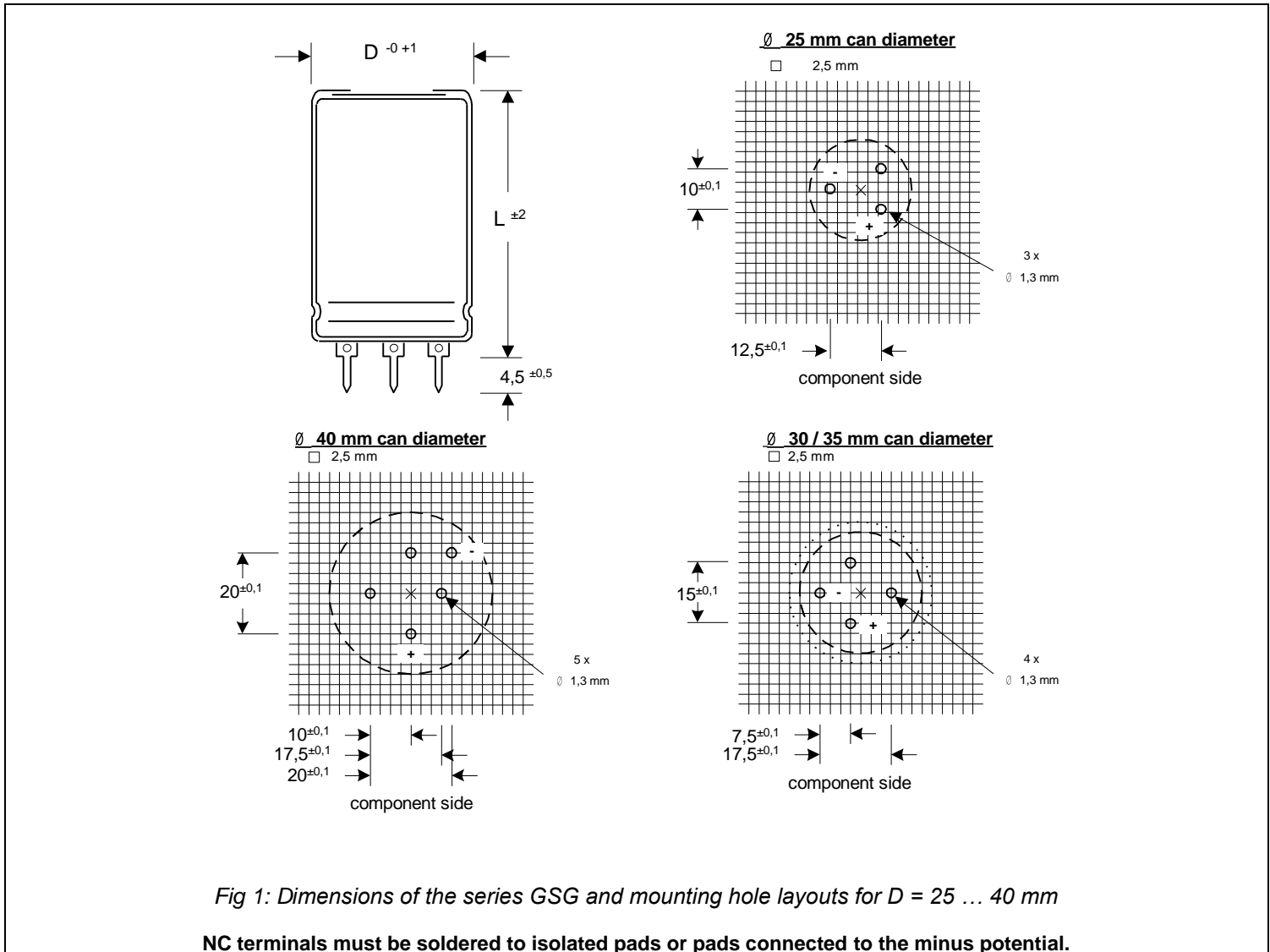
Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		1.200 ... 130.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 63 V
Surge voltage U_S		$U_S = 1,15 U_R$
Max. reverse voltage		2 V
Category temperature range		- 55°C ... + 125°C
Leakage current I_L after 5 min @ U_R		$\leq 0,006 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	2000 h @ 125 °C ; U_R ; I_{R-}	$\Delta C/C \leq 30\%$ of initial value $\text{ESR} \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	1000 h @ 125 °C , U_R	$\Delta C/C \leq 20\%$ of initial value $\text{ESR} \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		55/125/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4



Drawings and mounting pin layout of the series GSG capacitors



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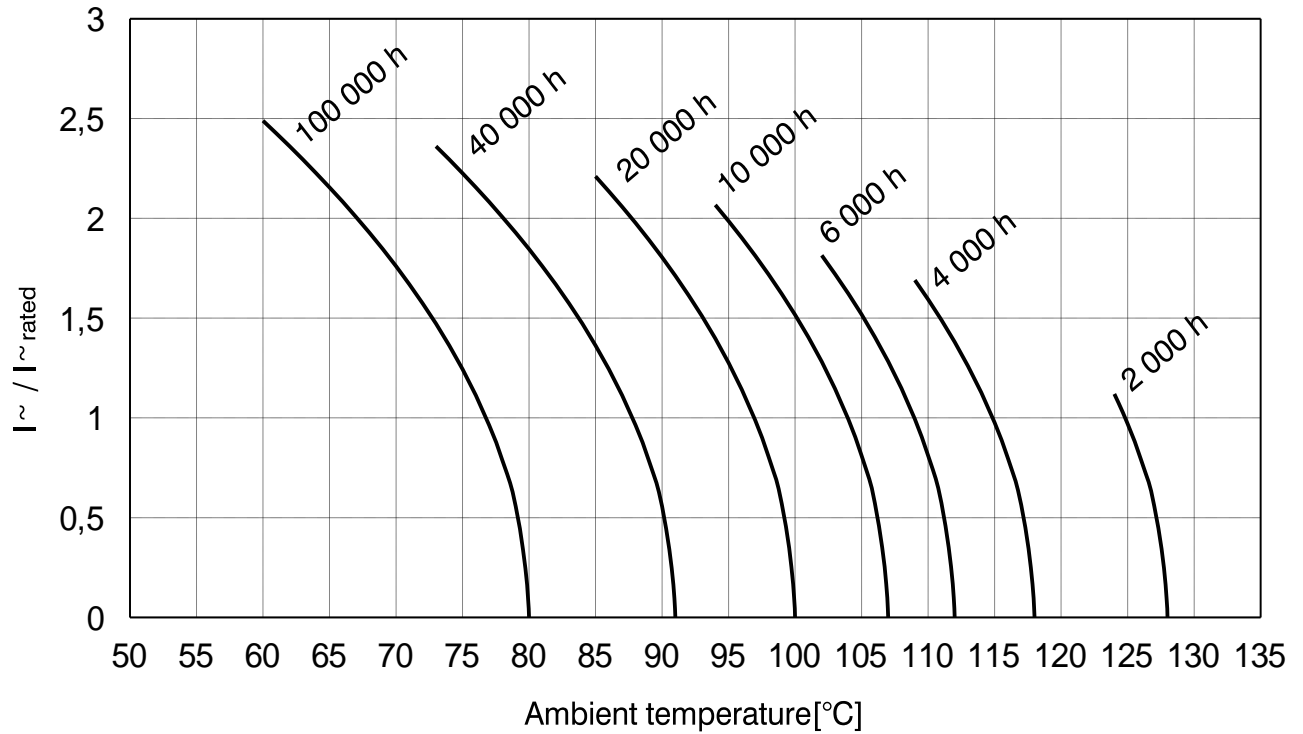
Electrical data and ordering codes series GSG

Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R	C_R	D x L	100 Hz,	IR~	GSG...
[V]	[μ F]	[mm]	20°C	100 Hz,	
			[Ω]	125°C	
				[mA]	
16	10000	25x30	40	2,7	10301625030
	15000	30x30	27	3,6	15301630030
	18000	25x50	22	4,3	18301625050
	18000	35x30	22	4,3	18301635030
	27000	30x50	15	5,8	27301630050
	39000	30x70	10	7,9	39301630070
	39000	35x50	10	7,6	39301635050
	47000	40x50	8	8,8	47301640050
	82000	35x80	5	14,6	82316350100
	82000	40x80	5	13,9	82301640080
	100000	45x80	4	15,4	10401645080
	120000	40x100	4	16,9	12401640100
	130000	45x100	4	17,5	13401645100
25	6800	25x30	47	2,5	68202525030
	10000	30x30	32	3,3	10302530030
	15000	25x50	21	4,4	15302525050
	15000	35x30	21	4,4	15302535030
	18000	30x50	18	5,3	18302530050
	27000	30x70	12	7,4	27302530070
	27000	35x50	12	7,1	27302535050
	39000	40x50	8	9,0	39302540050
	47000	35x80	7	11,3	47302535080
	56000	45x80	6	12,9	56302545080
	68000	40x80	5	14,2	68302540080
	68000	40x100	5	15,5	68302540100
	100000	45x100	3	18,8	10402545100

Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R	C_R	D x L	100 Hz,	IR~	GSG...
[V]	[μ F]	[mm]	20°C	100 Hz,	
			[Ω]	125°C	
				[mA]	
40	2700	25x30	71	2,0	27204025030
	3900	30x30	49	2,7	39204030030
	4700	25x50	41	3,2	47204025050
	6800	35x30	28	4,0	68204035030
	8200	30x50	23	4,7	82204030050
	10000	35x50	19	5,7	10304035050
	12000	30x70	16	6,5	12304030070
	15000	40x50	13	7,4	15304040050
	18000	35x80	11	9,3	18304035080
	22000	40x80	9	10,8	22304040080
	27000	45x80	7	13,2	27304045080
	27000	40x100	7	13,1	27304040100
	39000	45x100	5	16,8	39304045100
63	1800	25x30	80	1,9	18206325030
	2700	30x30	53	2,6	27206330030
	3900	25x50	37	3,4	39206325050
	3900	35x30	37	3,5	39206335030
	5600	30x50	26	4,5	56206330050
	6800	35x50	21	5,5	68206335050
	8200	30x70	17	6,2	82206330070
	10000	40x50	14	7,0	10306340050
	12000	35x80	12	8,7	12306335080
	18000	40x80	8	11,2	18306340080
	22000	45x80	7	13,8	22306345080
	22000	40x100	7	13,6	22306340100
	27000	45x100	5	16,2	27306345100

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Useful life
as a function of ambient temperature and actual ripple current





Standard series

Photoflash

Solder lug pins

RoHS compliant
REACH compliant

Features

- All contacts welded
- Soldering lug terminals
- High capacitance
- Long useful life

Applications

- HiFi
- Consumer
- Industrial
- Telecommunications

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		56 ... 330.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 500 V
Surge voltage U_S		$U_R \leq 315 V: U_S = 1,15 U_R$ $U_R > 315 V: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 85°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	5000 h @ 85 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30\%$ of initial value $ESR \leq 300\%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20\%$ of initial value $ESR \leq 130\%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/85/56
Voltage proof of the external insulation		$\geq 2500 V AC$
Sectional specification		IEC 60384-4



Drawings for series *LFHA* and *LFHB*

LFA

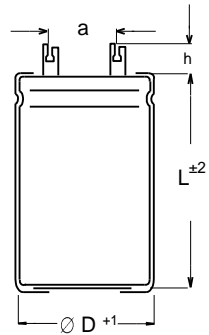


Fig 1: Version **LFA** for clamp mounting

LFB

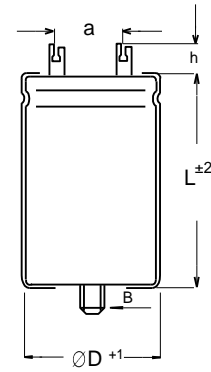


Fig 2: Version **LFB** for stud mounting

D	h	a	B
[mm]	[mm]	[mm]	
25	10	10	M 8 x 12
30	10	10	M 8 x 12
35	10	10	M 8 x 12
40	10	20	M 8 x 12
50	10	20	M 12 x 16

	Thread	Max. tightening torque
Mounting	M 8	4 Nm
Mounting	M 12	10 Nm

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Electrical data and ordering code for series LF

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Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: LFA...
16	22000	25x30	22	3,6	22301625030
	27000	25x35	18	4,2	27301625035
	39000	25x40	12	5,3	39301625040
	33000	30x30	14	4,8	33301630030
	39000	25x45	12	5,6	39301625045
	47000	25x50	10	6,4	47301625050
	39000	30x35	12	5,5	39301630035
	47000	35x30	10	6,4	47301635030
	56000	30x40	9	7,0	56301630040
	56000	35x35	9	7,4	56301635035
	56000	30x45	9	7,3	56301630045
	68000	30x50	7	8,4	68301630050
	68000	35x40	7	8,5	68301635040
	82000	35x45	6	9,7	82301635045
	100000	30x70	5	11,6	10401630070
	82000	35x50	6	10,1	82301635050
	120000	40x50	4	12,9	12401640050
	150000	35x80	3	16,4	15401635080
	120000	40x50	4	12,9	12401640050
	150000	40x60	3	15,4	15401640060
	180000	35x10	3	19,7	18401635100
	220000	40x80	2	20,8	22401640080
	180000	45x60	3	16,9	18401645060
270000	45x80	2	23,1	27401645080	
270000	40x10	2	25,3	27401640100	
330000	45x10	1	27,9	33401645100	
25	10000	25x30	45	2,5	10302525030
	12000	25x35	37	2,9	12302525035
	15000	25x40	30	3,4	15302525040
	15000	30x30	30	3,4	15302530030
	18000	25x45	25	3,9	18302525045
	18000	30x35	25	3,9	18302530035
	18000	25x50	25	4,1	18302525050
	22000	30x40	20	4,5	22302530040
	18000	35x30	25	4,1	18302535030
	27000	30x45	17	5,1	27302530045
	27000	30x50	17	5,4	27302530050
	22000	35x35	21	4,7	22302535035
	27000	35x40	17	5,4	27302535040
	33000	35x45	14	6,3	33302535045
	39000	30x70	12	7,4	39302530070
	39000	35x50	12	7,1	39302535050
	47000	35x60	10	8,3	47302535060
	56000	40x50	8	8,9	56302540050
	56000	35x80	8	10,2	56302535080
	68000	40x60	7	10,5	68302540060

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: LFA...
25	82000	35x10	6	13,5	82302535100
	82000	45x60	6	11,6	82302545060
	120000	40x80	4	15,6	12402540080
	120000	40x10	4	17,1	12402540100
	120000	45x80	4	15,6	12402545080
	150000	45x10	3	19,1	15402545100
	40	5600	25x30	68	2,0
6800		25x35	56	2,4	68204025035
8200		25x40	47	2,7	82204025040
8200		30x30	47	2,7	82204030030
10000		25x45	38	3,2	10304025045
10000		30x35	38	3,1	10304030035
10000		25x50	38	3,3	10304025050
12000		30x40	32	3,6	12304030040
10000		35x30	38	3,3	10304035030
15000		30x45	25	4,2	15304030045
12000		35x35	32	3,8	12304035035
15000		30x50	25	4,4	15304030050
15000		35x40	25	4,5	15304035040
18000		35x45	21	5,1	18304035045
22000		35x50	17	5,8	22304035050
22000		30x70	17	6,1	22304030070
27000		35x60	14	6,9	27304035060
27000		40x50	14	6,8	27304040050
33000		35x80	12	8,6	33304035080
33000		40x60	12	8,1	33304040060
47000		35x10	8	11,3	47304035100
47000		40x80	8	10,8	47304040080
39000		45x60	10	8,8	39304045060
56000	40x10	7	12,9	56304040100	
56000	45x80	7	11,7	56304045080	
82000	45x10	5	15,5	82304045100	
63	2700	25x30	106	1,6	27206325030
	3300	25x35	87	1,9	33206325035
	3900	25x40	73	2,2	39206325040
	3900	30x30	73	2,1	39206330030
	4700	25x45	61	2,5	47206325045
	4700	30x35	61	2,5	47206330035
	5600	25x50	51	0,0	56206325050
	5600	30x40	51	2,8	56206330040
	5600	35x30	51	2,9	56206335030
	6800	30x45	42	3,3	68206330045
	6800	35x35	42	3,3	68206335035
	8200	30x50	35	3,7	82206330050
	8200	35x45	35	4,0	82206335045
	12000	30x70	24	5,2	12306330070



Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: LFA...
					Stud mounting: LFB...
63	12000	35x60	24	5,3	12306335060
	15000	40x50	19	5,9	15306340050
	18000	35x80	16	7,3	18306335080
	18000	40x60	16	6,9	18306340060
	22000	45x60	13	7,6	22306345060
	22000	35x10	13	8,9	22306335100
	22000	40x80	13	8,5	22306340080
	27000	40x10	11	10,3	27306340100
	27000	45x80	11	9,4	27306345080
	39000	45x10	7	12,4	39306345100
80	1800	25x30	177	1,3	18208025030
	1800	25x35	177	1,3	18208025035
	2700	25x40	118	1,7	27208025040
	2700	30x30	118	1,7	27208030030
	3300	25x45	97	2,0	33208025045
	3900	25x50	82	2,3	39208025050
	3300	30x35	97	2,0	33208030035
	3900	35x30	82	2,3	39208035030
	3900	30x40	82	2,3	39208030040
	4700	30x45	68	2,6	47208030045
	4700	35x35	68	2,6	47208035035
	5600	30x50	57	2,9	56208030050
	5600	35x40	57	3,0	56208035040
	6800	35x45	47	3,4	68208035045
	6800	35x50	47	3,6	68208035050
	8200	30x70	39	4,1	82208030070
	10000	35x60	32	4,6	10308035060
	10000	40x50	32	4,6	10308040050
	12000	35x80	27	5,7	12308035080
	12000	40x60	27	5,3	12308040060
	18000	35x10	18	7,6	18308035100
	15000	45x60	21	6,0	15308045060
	18000	40x80	18	7,3	18308040080
	22000	45x80	14	8,1	22308045080
22000	40x10	14	8,8	22308040100	
27000	45x10	12	9,8	27308045100	
100	1200	25x30	133	1,5	12210025030
	1500	25x35	106	1,7	15210025035
	1800	25x40	88	2,0	18210025040
	1800	30x30	88	2,0	18210030030
	2200	25x45	72	2,3	22210025045
	2200	25x50	72	2,4	22210025050
	2200	35x30	72	2,4	22210035030
	2700	30x40	59	2,7	27210030040
	2700	30x45	59	2,8	27210030045
	2700	35x35	59	2,8	27210035035
	3300	30x50	48	3,2	33210030050
	3300	35x40	48	3,2	33210035040

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code	
					Plain base: LFA...	
					Stud mounting: LFB...	
	3900	35x45	41	3,7	39210035045	
	5600	30x70	28	4,7	56210030070	
100	4700	35x50	34	4,2	47210035050	
	5600	35x60	28	4,9	56210035060	
	5600	40x50	28	4,8	56210040050	
	6800	35x80	23	6,1	68210035080	
	6800	40x60	23	5,7	68210040060	
	10000	35x10	16	8,1	10310035100	
	12000	40x80	13	8,4	12310040080	
	10000	45x60	16	6,9	10310045060	
	12000	45x80	13	8,4	12310045080	
	15000	40x10	11	10,3	15310040100	
	18000	45x10	9	11,3	18310045100	
	160	470	25x30	237	1,1	47116025030
		560	25x35	199	1,3	56116025035
680		25x40	164	1,5	68116025040	
680		30x30	164	1,4	68116030030	
820		25x45	136	1,7	82116025045	
820		30x35	136	1,7	82116030035	
1000		25x50	111	1,9	10216025050	
1000		30x40	111	1,9	10216030040	
1000		35x30	111	1,9	10216035030	
1200		30x45	93	2,2	12216030045	
1200		35x35	93	2,2	12216035035	
1500		30x50	74	2,6	15216030050	
1500		35x40	74	2,6	15216035040	
1800		35x45	62	3,0	18216035045	
1800		35x50	62	3,1	18216035050	
2200		30x70	51	3,6	22216030070	
2200		35x60	51	3,7	22216035060	
2700		40x50	41	4,0	27216040050	
3300		35x80	34	5,0	33216035080	
3300		40x60	34	4,7	33216040060	
3900		35x10	29	6,0	39216035100	
3900		45x60	29	5,2	39216045060	
4700		40x80	24	6,3	47216040080	
5600		40x10	20	7,5	56216040100	
5600	45x80	20	6,9	56216045080		
6800	45x10	16	8,3	68216045100		
200	470	25x30	203	1,2	47120025030	
	560	25x35	171	1,4	56120025035	
	680	25x40	141	1,6	68120025040	
	680	30x30	141	1,6	68120030030	
	820	25x45	117	1,8	82120025045	
	820	30x35	117	1,8	82120030035	
	1000	35x30	96	2,1	10220035030	
	1000	25x50	96	2,1	10220025050	
	1000	30x40	96	2,1	10220030040	
	1200	30x45	80	2,4	12220030045	
	1500	30x50	64	2,8	15220030050	
	1200	35x35	80	2,4	12220035035	



	1500	35x40	64	2,8	15220035040
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: LFA...
					Stud mounting: LFB...
200	1800	35x45	53	3,2	18220035045
	1800	35x50	53	3,3	18220035050
	2200	30x70	43	3,8	22220030070
	2200	35x60	43	4,0	22220035060
	3300	35x80	29	5,4	33220035080
	2700	40x50	35	4,3	27220040050
	3300	40x60	29	5,1	33220040060
	3900	35x10	24	6,5	39220035100
	4700	40x80	20	6,8	47220040080
	3900	45x60	24	5,6	39220045060
	5600	40x10	17	8,1	56220040100
	5600	45x80	17	7,4	56220045080
	6800	45x10	14	9,0	68220045100
350	180	25x30	531	0,7	18135025030
	220	25x35	434	0,9	22135025035
	270	25x40	354	1,0	27135025040
	270	30x30	354	1,0	27135030030
	330	25x45	290	1,2	33135025045
	330	30x35	290	1,1	33135030035
	390	35x30	245	1,3	39135035030
	390	25x50	245	1,3	39135025050
	390	30x40	245	1,3	39135030040
	470	30x45	203	1,5	47135030045
	470	35x35	203	1,5	47135035035
	560	30x50	171	1,7	56135030050
	560	35x40	171	1,7	56135035040
	560	35x45	171	1,8	56135035045
	680	35x50	141	2,1	68135035050
	820	30x70	117	2,3	82135030070
	820	35x60	117	2,4	82135035060
	1000	40x50	96	2,6	10235040050
	1200	35x80	80	3,3	12235035080
	1200	40x60	80	3,1	12235040060
1500	35x10	64	4,0	15235035100	
1500	45x60	64	3,4	15235045060	
1800	40x80	53	4,2	18235040080	
1800	40x10	53	4,6	18235040100	
2200	45x80	43	4,7	22235045080	
2700	45x10	35	5,6	27235045100	
400	180	25x30	708	0,6	18140025030
	180	22x40	708	0,7	18140022040
	220	25x35	579	0,7	22140025035
	270	25x40	472	0,9	27140025040
	270	30x30	472	0,8	27140030030
	330	25x45	386	1,0	33140025045
	330	25x50	386	1,0	33140025050
	330	30x35	386	1,0	33140030035
	390	35x30	327	1,1	39140035030
	390	30x40	327	1,1	39140030040

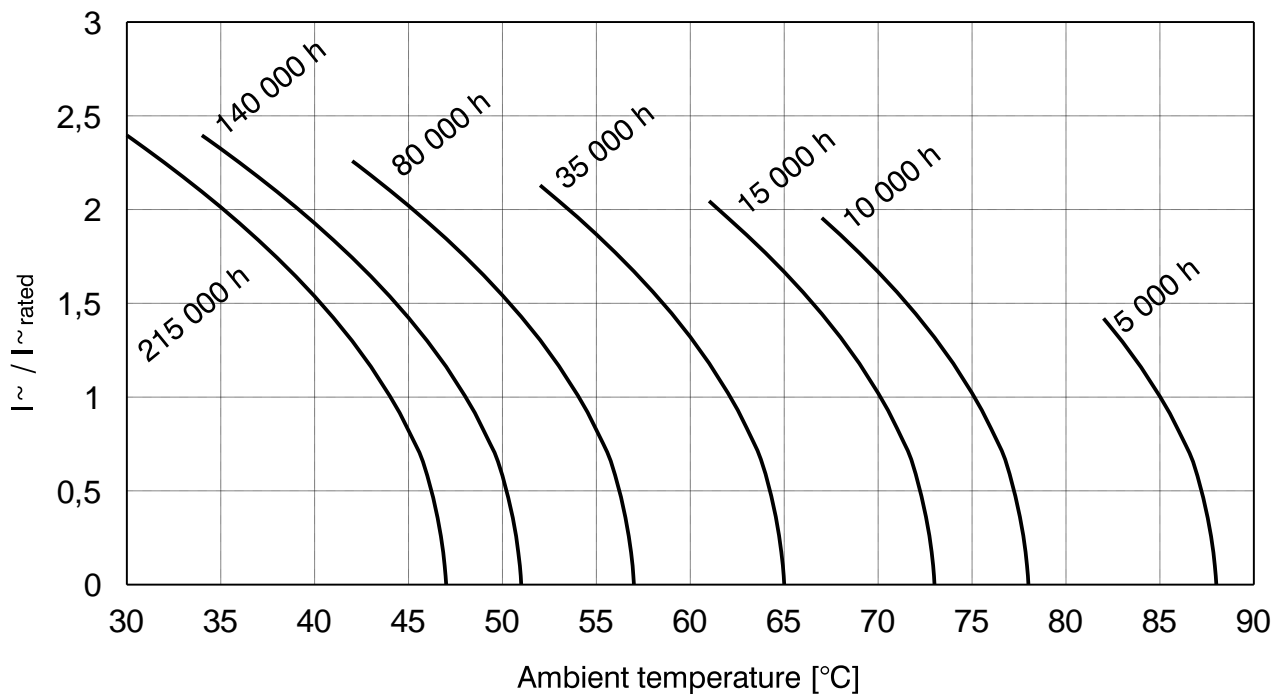
	470	35x35	271	1,3	47140035035
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 85°C [A]	Order code
					Plain base: LFA...
					Stud mounting: LFB...
400	470	30x45	271	1,3	47140030045
	560	30x50	227	1,5	56140030050
	560	35x40	227	1,5	56140035040
	560	35x45	227	1,6	56140035045
	680	30x70	187	1,8	68140030070
	680	35x60	187	1,8	68140035060
	820	35x50	155	2,0	82140035050
	820	35x60	155	2,1	82140035060
	820	40x50	155	2,1	82140040050
	1200	35x80	106	2,8	12240035080
	1200	40x60	106	2,7	12240040060
	1500	35x10	85	3,5	15240035100
	1500	40x80	85	3,3	15240040080
	1800	45x60	71	3,3	18240045060
	1800	40x10	71	4,0	18240040100
1800	45x80	71	3,6	18240045080	
2700	45x10	47	4,9	27240045100	
450	120	25x30	929	0,6	12145025030
	150	25x35	743	0,7	15145025035
	180	25x40	619	0,8	18145025040
	220	25x45	507	0,9	22145025045
	180	30x30	619	0,7	18145030030
	220	30x35	507	0,9	22145030035
	220	25x50	507	0,9	22145025050
	270	30x40	413	1,0	27145030040
	220	35x30	507	0,9	22145035030
	270	30x45	413	1,0	27145030045
	270	35x35	413	1,1	27145035035
	330	30x50	338	1,2	33145030050
	390	35x40	286	1,3	39145035040
	390	35x45	286	1,4	39145035045
	560	30x70	199	1,8	56145030070
	470	35x50	237	1,6	47145035050
	560	35x60	199	1,9	56145035060
	560	40x50	199	1,8	56145040050
	820	35x80	136	2,5	82145035080
	1200	40x60	93	2,8	12245040060
1000	35x10	111	3,0	10245035100	
1000	45x60	111	2,6	10245045060	
1200	40x80	93	3,3	12245040080	
1500	40x10	74	4,0	15245040100	
1200	45x80	93	3,2	12245045080	
1800	45x10	62	4,3	18245045100	
500	120	25x30	796	0,6	12150025030
	120	25x35	796	0,6	12150025035
	150	25x40	637	0,7	15150025040
	180	25x45	531	0,9	18150025045
	150	30x30	637	0,7	15150030030



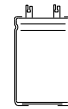
	180	30x35	531	0,8	18150030035
	220	25x50	434	1,0	22150025050
Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R [V]	C_R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	Plain base: LFA... Stud mounting: LFB...
500	220	30x40	434	1,0	22150030040
	180	35x30	531	0,9	18150035030
	270	30x45	354	1,1	27150030045
	270	35x35	354	1,1	27150035035
	270	30x50	354	1,2	27150030050
	270	35x40	354	1,2	27150035040
	390	35x45	245	1,5	39150035045
	470	30x70	203	1,8	47150030070

	390	35x50	245	1,6	39150035050
Rated voltage	Rated cap.	Case size	Typ. ESR	Ripple current	Order code
U_R [V]	C_R [μF]	D x L [mm]	100 Hz, 20°C [mΩ]	100 Hz, 85°C [A]	Plain base: LFA... Stud mounting: LFB...
500	560	35x60	171	2,0	56150035060
	680	35x80	141	2,5	68150035080
	680	40x60	141	2,3	68150040060
	820	35x10	117	3,0	82150035100
	820	45x60	117	2,6	82150045060
	820	40x10	117	3,1	82150040100
	1200	40x80	80	3,4	12250040080
	1200	45x80	80	3,4	12250045080
	1500	45x10	64	4,2	15250045100

Useful life
as a function of ambient temperature and actual ripple current



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Ultra compact design

Photoflash

Solder lug pins

RoHS compliant
REACH compliant

Features

- All contacts welded
- Soldering lug terminals
- High reliability
- Stud mounted

Applications

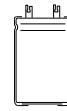
- Laser
- Welding
- Tube amplifier
- Telecommunications

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

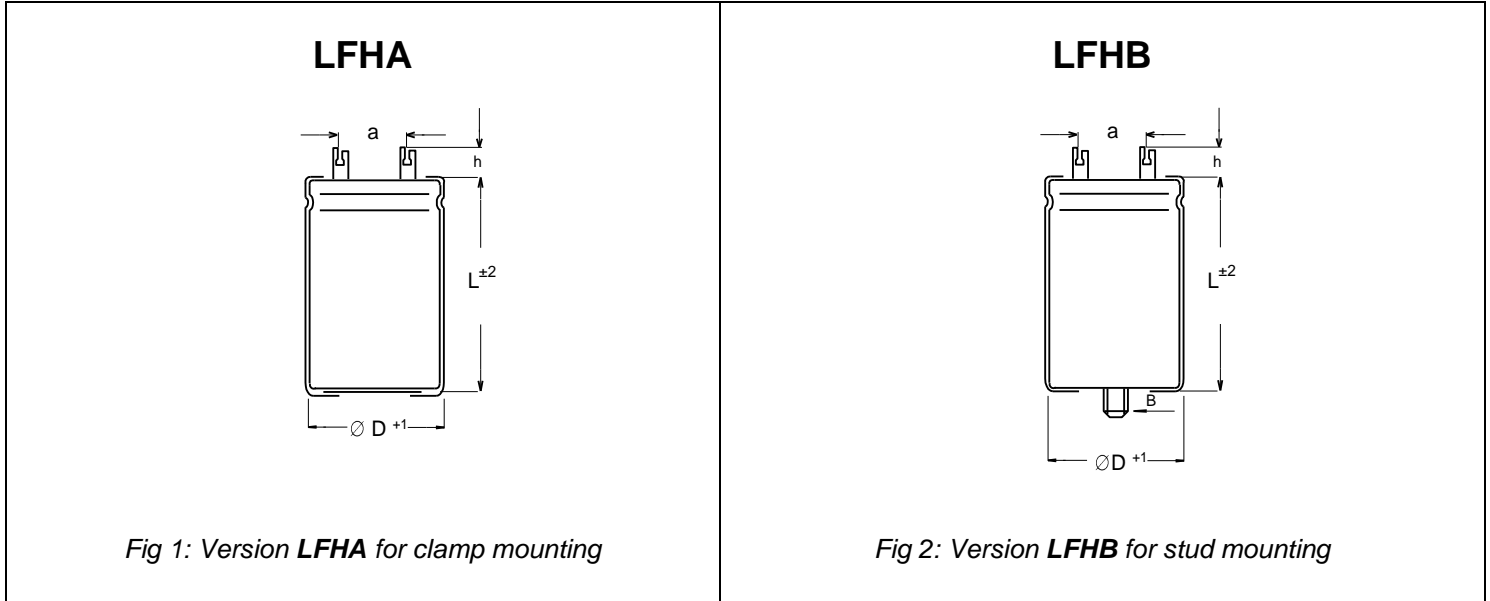
General specifications

Items		Characteristics
Rated capacitance range C_R		68 ... 150.000 μF
Capacitance tolerance		$\pm 20\%$
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315 \text{ V}: U_S = 1,15 U_R$ $U_R > 315 \text{ V}: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range		- 40°C ... + 105°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	5000 h @ 105 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30 \%$ of initial value $\text{ESR} \leq 300 \%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 105 °C , U_R	Requirements $\Delta C/C \leq 20 \%$ of initial value $\text{ESR} \leq 130 \%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/105/56
Voltage proof of the external insulation		$\geq 2500 \text{ V AC}$
Sectional specification		IEC 60384-4

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Drawings for series *LFHA* and *LFHB*



D	h	a	B
[mm]	[mm]	[mm]	
25	10	10	M 8 x 12
30	10	10	M 8 x 12
35	10	10	M 8 x 12
40	10	20	M 8 x 12
50	10	20	M 12 x 16

	Thread	Max. tightening torque
Mounting	M 8	4 Nm
Mounting	M 12	10 Nm

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Electrical data and ordering code for series LFH

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Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current I_{R-} 100 Hz, 105°C [A]	Order code	
					Plain base: LFHA...	
					Stud mounting: LFHB...	
16	10000	25x30	48	2,4	10301625030	
	12000	25x35	40	2,8	12301625035	
	15000	25x40	32	3,3	15301625040	
	15000	30x30	32	3,3	15301630030	
	18000	25x45	27	3,8	18301625045	
	18000	25x50	27	4,0	18301625050	
	18000	30x35	27	3,8	18301630035	
	18000	35x30	27	4,0	18301635030	
	22000	30x40	22	4,4	22301630040	
	22000	35x35	22	4,6	22301635035	
	27000	30x45	18	5,1	27301630045	
	27000	30x50	18	5,3	27301630050	
	27000	35x40	18	5,3	27301635040	
	33000	35x45	14	6,2	33301635045	
	39000	30x70	12	7,2	39301630070	
	39000	35x50	12	7,0	39301635050	
	47000	40x50	10	8,1	47301640050	
	56000	35x80	9	10,0	56301635080	
	56000	40x50	9	8,8	56301640050	
	68000	40x60	7	10,4	68301640060	
	82000	35x10	6	13,3	82301635100	
	82000	40x80	6	12,7	82301640080	
	82000	45x60	6	11,4	82301645060	
	100000	45x80	5	14,0	10401645080	
120000	40x10	4	16,9	12401640100		
150000	45x10	3	18,8	15401645100		
25	6800	25x30	66	2,1	68202525030	
	8200	25x35	54	2,4	82202525035	
	10000	25x40	45	2,8	10302525040	
	10000	30x30	45	2,8	10302530030	
	12000	25x45	37	3,2	12302525045	
	12000	30x35	37	3,2	12302530035	
	15000	25x50	30	3,7	15302525050	
	15000	30x40	30	3,7	15302530040	
	15000	35x30	30	3,7	15302535030	
	18000	30x45	26	4,2	18302530045	
	18000	30x50	26	4,4	18302530050	
	18000	35x35	26	4,2	18302535035	
	22000	35x40	21	4,9	22302535040	
	22000	35x45	21	5,1	22302535045	
	27000	30x70	17	6,1	27302530070	
	27000	35x50	17	5,9	27302535050	
	33000	35x60	14	7,0	33302535060	
	39000	40x50	12	7,5	39302540050	
	47000	35x80	10	9,3	47302535080	
	47000	40x60	10	8,8	47302540060	
	56000	35x10	8	11,2	56302535100	
	56000	45x60	8	9,6	56302545060	

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size $D \times L$ [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current I_{R-} 100 Hz, 105°C [A]	Order code		
					Plain base: LFHA...		
					Stud mounting: LFHB...		
25	68000	40x80	7	11,8	68302540080		
	68000	40x10	7	12,9	68302540100		
	82000	45x80	6	12,9	82302545080		
	100000	45x10	5	15,6	10402545100		
	1500	22x25	255	0,9	15204022025		
40	2200	22x30	174	1,2	22204022030		
	2700	22x35	142	1,4	27204022035		
	2700	25x30	142	1,4	27204025030		
	3300	22x40	116	1,6	33204022040		
	3300	25x35	116	1,7	33204025035		
	3900	25x40	98	1,9	39204025040		
	3900	30x30	98	1,9	39204030030		
	4700	25x45	81	2,2	47204025045		
	4700	30x35	81	2,2	47204030035		
	5600	25x50	68	2,5	56204025050		
	5600	30x40	68	2,5	56204030040		
	5600	35x30	68	2,5	56204035030		
	6800	30x45	56	2,8	68204030045		
	6800	35x35	56	2,9	68204035035		
	8200	30x50	47	3,2	82204030050		
	8200	35x40	47	3,3	82204035040		
	8200	35x45	47	3,4	82204035045		
	10000	35x50	38	3,9	10304035050		
	12000	30x70	32	4,5	12304030070		
	12000	35x60	32	4,6	12304035060		
	15000	40x50	25	5,1	15304040050		
	18000	35x80	21	6,4	18304035080		
	18000	40x60	21	6,0	18304040060		
	22000	35x10	17	7,7	22304035100		
	22000	40x80	17	7,4	22304040080		
	22000	45x60	17	6,6	22304045060		
	27000	40x10	14	8,9	27304040100		
	27000	45x80	14	8,2	27304045080		
	39000	45x10	10	10,7	39304045100		
	63	1800	25x30	159	1,3	18206325030	
		2200	25x35	130	1,6	22206325035	
		2700	25x40	106	1,8	27206325040	
2700		30x30	106	1,8	27206330030		
3300		25x45	87	2,1	33206325045		
3300		30x35	87	2,1	33206330035		
3900		25x50	73	2,4	39206325050		
3900		30x40	73	2,4	39206330040		
3900		35x30	73	2,4	39206335030		
4700		30x45	61	2,7	47206330045		
4700		35x35	61	2,8	47206335035		
5600		30x50	51	3,1	56206330050		
6800		35x45	42	3,6	68206335045		
8200		30x70	35	4,3	82206330070		



Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code
					Plain base: LFHA...
					Stud mounting: LFHB...
63	10000	35x60	29	4,9	10306335060
	10000	40x50	29	4,8	10306340050
	12000	35x80	24	6,0	12306335080
	12000	40x60	24	5,6	12306340060
	15000	45x60	19	6,3	15306345060
	18000	35x10	16	8,1	18306335100
	18000	40x80	16	7,7	18306340080
	22000	40x10	13	9,3	22306340100
	22000	45x80	13	8,5	22306345080
	27000	45x10	11	10,3	27306345100
80	1200	25x30	265	1,0	12208025030
	1500	25x35	212	1,2	15208025035
	1800	25x40	177	1,4	18208025040
	1800	30x30	177	1,4	18208030030
	2200	25x45	145	1,6	22208025045
	2200	25x50	145	1,7	22208025050
	2200	30x35	145	1,6	22208030035
	2200	35x30	145	1,7	22208035030
	2700	30x40	118	1,9	27208030040
	2700	30x45	118	2,0	27208030045
	2700	35x35	118	2,0	27208035035
	3300	30x50	97	2,3	33208030050
	3300	35x40	97	2,3	33208035040
	3900	35x45	82	2,6	39208035045
	4700	35x50	68	3,0	47208035050
	5600	30x70	57	3,4	56208030070
	5600	35x60	57	3,5	56208035060
	5600	40x50	57	3,4	56208040050
	6800	35x80	47	4,3	68208035080
	6800	40x60	47	4,0	68208040060
	10000	35x10	32	5,7	10308035100
	10000	45x60	32	4,9	10308045060
12000	40x80	27	6,0	12308040080	
12000	45x80	27	6,0	12308045080	
15000	40x10	21	7,3	15308040100	
18000	45x10	18	8,0	18308045100	
100	1000	25x30	159	1,3	10210025030
	1200	25x35	133	1,5	12210025035
	1500	25x40	106	1,8	15210025040
	1500	30x30	106	1,8	15210030030
	1800	25x45	88	2,1	18210025045
	1800	25x50	88	2,2	18210025050
	1800	35x30	88	2,2	18210035030
	2200	30x40	72	2,4	22210030040
	2200	30x45	72	2,5	22210030045
	2200	35x35	72	2,5	22210035035
	2700	30x50	59	2,9	27210030050
	2700	35x40	59	2,9	27210035040
	3300	35x45	48	3,4	33210035045
	3900	30x70	41	4,0	39210030070

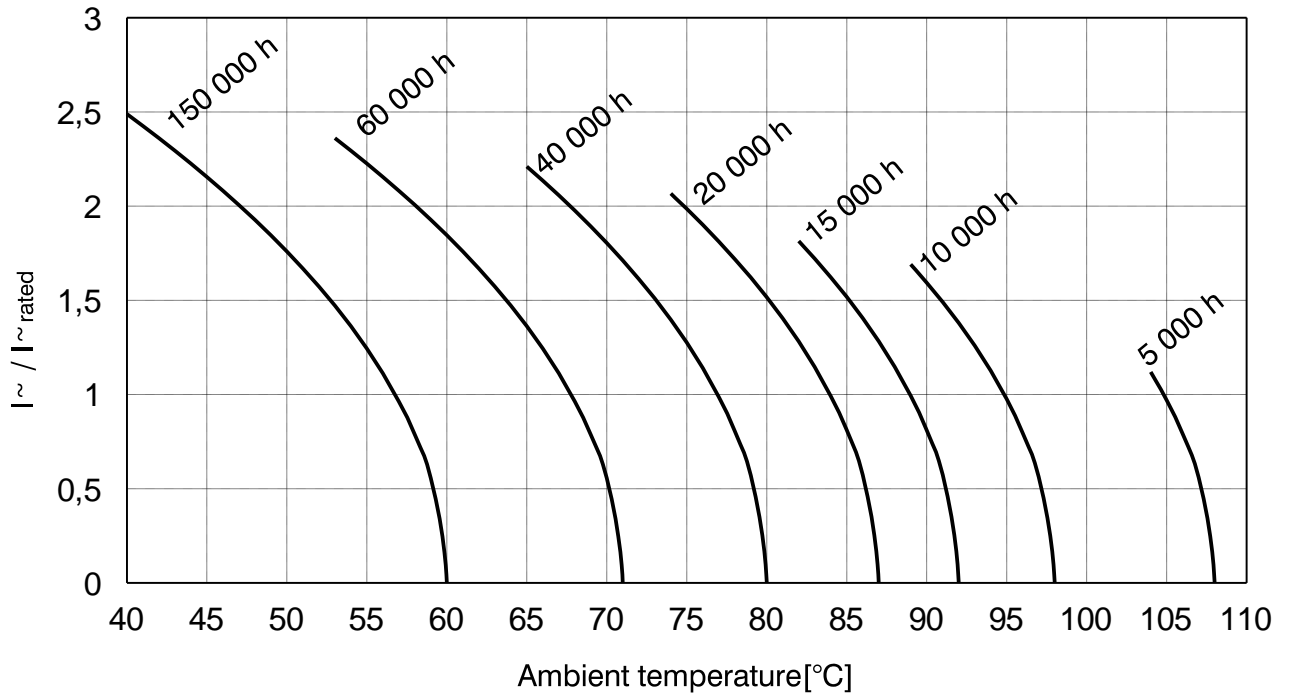
Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current IR~ 100 Hz, 105°C [A]	Order code	
					Plain base: LFHA...	
					Stud mounting: LFHB...	
100	3900	35x50	41	3,8	39210035050	
	4700	35x60	34	4,5	47210035060	
	4700	40x50	34	4,4	47210040050	
	5600	35x80	28	5,5	56210035080	
	5600	40x60	28	5,1	56210040060	
	8200	35x10	19	7,3	82210035100	
	8200	40x80	19	7,0	82210040080	
	8200	45x60	19	6,2	82210045060	
	10000	45x80	16	7,7	10310045080	
	12000	40x10	13	9,2	12310040100	
	15000	45x10	11	10,3	15310045100	
	160	470	25x30	237	1,1	47116025030
		560	25x35	199	1,3	56116025035
680		25x40	164	1,5	68116025040	
680		30x30	164	1,4	68116030030	
820		25x45	136	1,6	82116025045	
820		30x35	136	1,7	82116030035	
1000		25x50	111	1,9	10216025050	
1000		30x40	111	1,9	10216030040	
1000		35x30	111	1,9	10216035030	
1200		30x45	93	2,2	12216030045	
1200		35x35	93	2,2	12216035035	
1500		30x50	74	2,6	15216030050	
1500		35x40	74	2,6	15216035040	
1800		35x45	62	3,0	18216035045	
1800		35x50	62	3,1	18216035050	
2200		30x70	51	3,6	22216030070	
2200		35x60	51	3,7	22216035060	
2700		40x50	41	4,0	27216040050	
3300		35x80	34	5,0	33216035080	
3300		40x60	34	4,7	33216040060	
3900		35x10	29	6,2	39216035100	
3900		45x60	29	5,2	39216045060	
4700	40x80	24	6,3	47216040080		
5600	40x10	20	7,5	56216040100		
5600	45x80	20	6,9	56216045080		
6800	45x10	16	8,3	68216045100		
250	330	25x30	290	1,0	33125025030	
	390	25x35	245	1,1	39125025035	
	470	25x40	203	1,3	47125025040	
	470	30x30	203	1,3	47125030030	
	560	25x45	171	1,5	56125025045	
	560	30x35	171	1,5	56125030035	
	560	35x30	171	1,6	56125035030	
	680	25x50	141	1,7	68125025050	
	680	30x40	141	1,7	68125030040	
	820	30x45	117	2,0	82125030045	
	820	30x50	117	2,1	82125030050	
	820	35x35	117	2,0	82125035035	
	1000	35x40	96	2,3	10225035040	



Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	Ripple current I_{R-} 100 Hz, 105°C [A]	Order code		
					Plain base: LFHA...		
					Stud mounting: LFHB...		
250	1200	35x45	80	2,6	12225035045		
	1200	35x50	80	2,7	12225035050		
	1500	30x70	64	3,2	15225030070		
	1500	35x60	64	3,3	15225035060		
	1800	35x80	53	4,0	18225035080		
	1800	40x50	53	3,5	18225040050		
	1800	40x60	53	3,8	18225040060		
	2700	35x10	35	5,4	27225035100		
	2700	40x80	35	5,2	27225040080		
	2700	45x60	35	4,6	27225045060		
	3300	40x10	29	6,3	33225040100		
	3300	45x80	29	5,7	33225045080		
	4700	45x10	20	7,4	47225045100		
	350	180	25x30	531	0,7	18135025030	
220		25x35	434	0,9	22135025035		
270		25x40	354	1,0	27135025040		
270		30x30	354	1,0	27135030030		
330		25x45	290	1,2	33135025045		
330		30x35	290	1,1	33135030035		
330		35x30	290	1,2	33135035030		
390		25x50	245	1,3	39135025050		
390		30x40	245	1,3	39135030040		
470		30x45	203	1,5	47135030045		
470		35x35	203	1,5	47135035035		
560		30x50	171	1,7	56135030050		
560		35x40	171	1,7	56135035040		
560		35x45	171	1,8	56135035045		
680		35x50	141	2,1	68135035050		
820		30x70	117	2,3	82135030070		
820		35x60	117	2,4	82135035060		
820		40x50	117	2,4	82135040050		
1200		35x80	80	3,3	12235035080		
1200		40x60	80	3,1	12235040060		
1500		35x10	64	4,0	15235035100		
1500		45x60	64	3,4	15235045060		
1800	40x80	53	4,2	18235040080			
1800	40x10	53	4,6	18235040100			
1800	45x80	53	4,2	18235045080			
2700	45x10	35	5,6	27235045100			
400	150	25x30	849	0,6	15140025030		
	180	25x35	708	0,7	18140025035		
	220	25x40	579	0,8	22140025040		
	220	30x30	579	0,8	22140030030		
	270	25x45	472	0,9	27140025045		
	270	25x50	472	0,9	27140025050		
	270	30x35	472	0,9	27140030035		
	400	270	35x30	472	0,9	27140035030	
		330	25x45	338	1,2	33140025045	
		330	30x40	338	1,2	33140030040	
330		35x40	338	1,2	33140035040		
390		35x45	286	1,4	39140035045		
470		30x70	237	1,6	47140030070		
470		35x50	237	1,6	47140035050		
560		35x60	199	1,9	56140035060		
560		40x50	199	1,8	56140040050		
680		35x80	164	2,3	68140035080		
680		40x60	164	2,1	68140040060		
820		35x10	136	2,8	82140035100		
820		45x60	136	2,4	82140045060		
1000		40x80	111	2,9	10240040080		
1200		40x10	93	3,5	12240040100		
1200		45x80	93	3,2	12240045080		
1500		45x10	74	3,9	15240045100		
250		270	35x30	472	0,9	27140035030	
		330	30x40	386	1,0	33140030040	
		330	35x35	386	1,1	33140035035	
		390	30x45	327	1,2	39140030045	
		390	30x50	327	1,2	39140030050	
		390	35x40	327	1,2	39140035040	
		470	35x45	271	1,4	47140035045	
		560	30x70	227	1,7	56140030070	
		560	35x50	227	1,6	56140035050	
		680	35x60	187	1,9	68140035060	
		680	40x50	187	1,9	68140040050	
	820	35x80	155	2,3	82140035080		
	820	40x60	155	2,2	82140040060		
	1200	35x10	106	3,1	12240035100		
1200	40x80	106	3,0	12240040080			
1200	45x60	106	2,7	12240045060			
1500	40x10	85	3,6	15240040100			
1500	45x80	85	3,3	15240045080			
2200	45x10	58	4,4	22240045100			
450	120	25x30	929	0,6	12145025030		
	150	25x35	743	0,7	15145025035		
	150	25x40	743	0,7	15145025040		
	180	25x45	619	0,8	18145025045		
	180	30x30	619	0,7	18145030030		
	180	30x35	619	0,8	18145030035		
	220	25x50	507	0,9	22145025050		
	220	30x40	507	0,9	22145030040		
	220	35x30	507	0,9	22145035030		
	390	35x50	286	1,5	39145035050		
	270	30x45	413	1,0	27145030045		
	270	35x35	413	1,1	27145035035		
	330	30x50	338	1,2	33145030050		
	330	35x40	338	1,2	33145035040		
	390	35x45	286	1,4	39145035045		
	470	30x70	237	1,6	47145030070		
	470	35x50	237	1,6	47145035050		
	560	35x60	199	1,9	56145035060		
	560	40x50	199	1,8	56145040050		
	680	35x80	164	2,3	68145035080		
	680	40x60	164	2,1	68145040060		
	820	35x10	136	2,8	82145035100		
	820	45x60	136	2,4	82145045060		



Useful life
 as a function of ambient temperature and actual ripple current



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Central mounting

SZ: Double capacitance 85°C

RoHS compliant
 REACH compliant

Features

- All contacts welded
- Central mounting
- Soldering lug terminals
- High mechanical stability

Applications

- Industrial
- Tube amplifier
- SMPS

Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

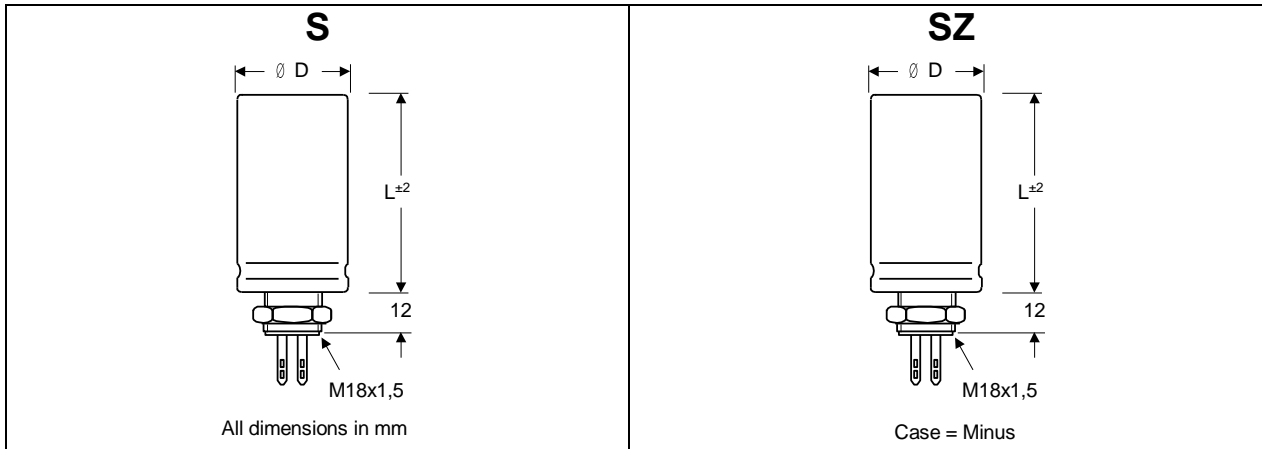
General specifications

Items		Characteristics
Rated capacitance range C_R		22 ... 22.000 μF
Capacitance tolerance		-10 +30 %
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315 \text{ V}: U_S = 1,15 U_R$ $U_R > 315 \text{ V}: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Category temperature range S, SZ		- 40°C ... + 85°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu\text{F}] * U_R [\text{V}] + 6 \mu\text{A} [\mu\text{A}]$
Useful life	3000 h @ 85 °C ; U_R ; I_{R-}	Requirements $\Delta C/C \leq 30 \%$ of initial value $\text{ESR} \leq 300 \%$ of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 85 °C , U_R	Requirements $\Delta C/C \leq 20 \%$ of initial value $\text{ESR} \leq 130 \%$ of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/85/56
Voltage proof of the external insulation		$\geq 2500 \text{ V AC}$
Sectional specification		IEC 60384-4

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Drawings for series S and SZ



Electrical data and ordering code for series S

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	$\tan \delta_{100\text{Hz}}$ 20°C max. [%]	Ripple current IR~ 100 Hz, 85°C [A]	Order code S...
16	10000	30 x 40	30	30	1,9	10301630040
	22000	35 x 54	20	36	2,8	22301635054
25	2200	25 x 40	32	15	1,7	22202525040
	4700	25 x 40	30	18	1,7	47202525040
	10000	30 x 54	27	22	2,2	10302530054
	22000	35 x 54	17	30	3,0	22302535054
40	1000	25 x 40	50	11	1,3	10204025040
	2200	25 x 40	45	12	1,4	22204025040
	4700	30 x 40	40	14	1,6	47204030040
	10000	35 x 54	23	20	2,6	10304035054
63	470	25 x 40	113	10	0,9	47106325040
	1000	25 x 40	93	10	1,0	10206325040
	2200	25 x 40	63	12	1,2	22206325040
	4700	30 x 54	37	13	1,9	47206330054
100	10000	35 x 70	21	14	3,1	10306335070
	220	25 x 40	233	8	0,6	22110025040
	470	25 x 40	167	9	0,7	47110025040
	1000	25 x 54	107	10	1,0	10210025054
160	2200	35 x 54	60	12	1,6	22210035054
	100	25 x 40	500	8	0,7	10116025040
	220	25 x 40	400	9	0,8	22116025040
	470	30 x 54	200	9	1,4	47116030054
250	1000	35 x 70	93	10	2,5	10216035070
	100	25 x 40	493	7	0,7	10125025040
	220	25 x 54	347	8	1,0	22125025054
	470	35 x 54	167	8	1,7	47125035054

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	$\tan \delta_{100\text{Hz}}$ 20°C max. [%]	Ripple current IR~ 100 Hz, 85°C [A]	Order code S...
350	47	25 x 40	1267	7	0,5	47035025040
	100	25 x 40	1000	7	0,5	10135025040
	220	25 x 54	387	7	0,9	22135025054
	470	35 x 70	187	8	1,8	47135035070
450	22	25 x 40	1600	8	0,4	22045025040
	33	25 x 40	1200	8	0,5	33045025040
	47	25 x 40	1000	8	0,5	47045025040
	100	30 x 54	547	8	0,8	10145030054
	220	35 x 54	213	8	1,5	22145035054

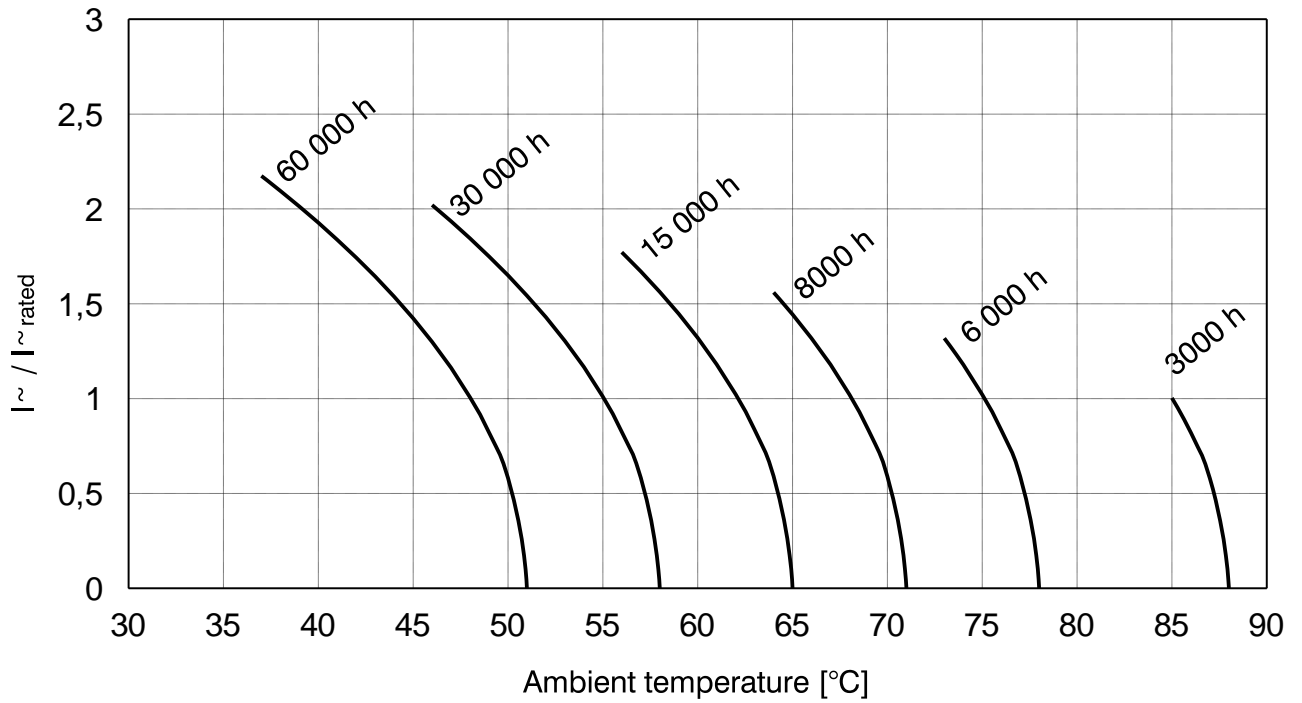
Electrical data and ordering code for series SZ

Rated voltage U_R [V]	Rated cap. C_R [μF]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [mΩ]	$\tan \delta_{100\text{Hz}}$ 20°C max	Ripple current IR~ 100 Hz, 85°C [A]	Order code SZ...
350	33+33	25 x 40	1600	15	0,2	33035025040
	47+47	25 x 40	1267	15	0,2	47035025040
	100+100	30 x 54	1000	15	0,3	10135030054
450	22+22	25 x 40	1600	15	0,2	22045025040
	33+33	25 x 54	1200	15	0,3	33045025054
	47+47	30 x 54	1000	15	0,3	47045030054
	100+100	35 x 54	547	15	0,5	10145035054

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Useful life
 as a function of ambient temperature and actual ripple current



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Central mounting

RoHS compliant
REACH compliant

Features

- All contacts welded
- Central mounting
- Soldering lug terminals
- High reliability

Applications

- HiFi
- Signalization
- Industrial

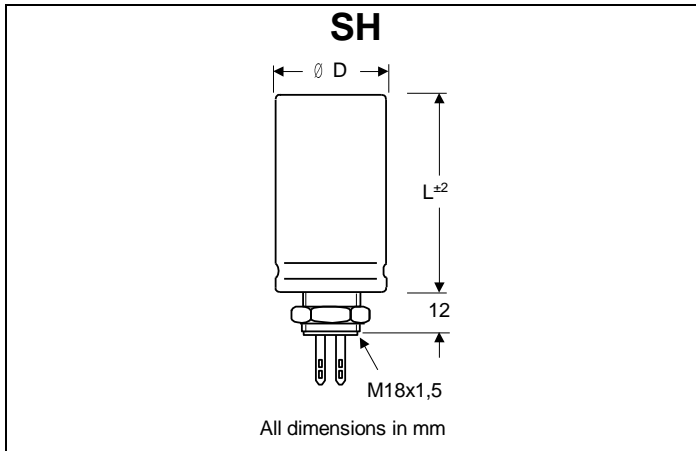
Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items		Characteristics
Rated capacitance range C_R		22 ... 22.000 μF
Capacitance tolerance		-10; +30 %
Rated voltage range U_R		16 ... 450 V
Surge voltage U_S		$U_R \leq 315 V: U_S = 1,15 U_R$ $U_R > 315 V: U_S = 1,10 U_R$
Max. reverse voltage		2 V
Ctegory temperature range S, SZ		- 40°C ... + 105°C
Leakage current I_L after 5 min @ U_R		$\leq 0,008 * C_R [\mu F] * U_R [V] + 6 \mu A [\mu A]$
Useful life	3000 h @ 105 °C ; U_R ; I_R -	Requirements $\Delta C/C \leq 30$ % of initial value $ESR \leq 300$ % of specified limit $I_L \leq$ specified limit
Endurance test	2000 h @ 105 °C , U_R	Requirements $\Delta C/C \leq 20$ % of initial value $ESR \leq 130$ % of specified limit $I_L \leq$ specified limit
Climatic category IEC 60068		40/105/56
Voltage proof of the external insulation		≥ 2500 V AC
Sectional specification		IEC 60384-4



Drawings for series SH



Electrical data and ordering code for series SH

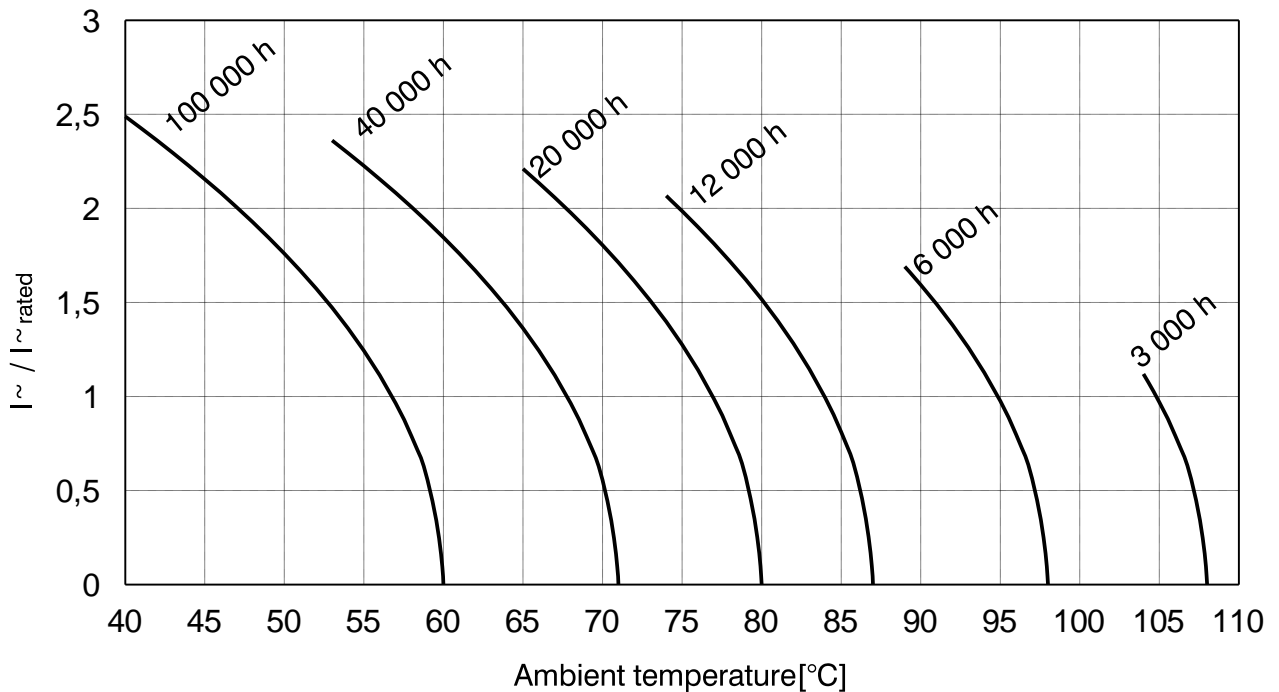
Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	$\tan \delta_{100\text{Hz}}$ 20°C max. [%]	Ripple current $I_{R\sim}$ 100 Hz, 105°C [A]	Order code SH...
16	10000	30 x 40	30	30	1,9	10301630040
	22000	35 x 54	20	36	2,8	22301635054
25	2200	25 x 40	32	15	1,7	22202525040
	4700	25 x 40	30	18	1,7	47202525040
	10000	30 x 54	27	22	2,2	10302530054
	22000	35 x 54	17	30	3,0	22302535054
40	1000	25 x 40	50	11	1,3	10204025040
	2200	25 x 40	45	12	1,4	22204025040
	4700	30 x 40	40	14	1,6	47204030040
	10000	35 x 54	23	20	2,6	10304035054
63	470	25 x 40	113	10	0,9	47106325040
	1000	25 x 40	93	10	1,0	10206325040
	2200	25 x 40	63	12	1,2	22206325040
	4700	30 x 54	37	13	1,9	47206330054
	10000	35 x 70	21	14	3,1	10306335070
100	220	25 x 40	233	8	0,6	22110025040
	470	25 x 40	167	9	0,7	47110025040
	560	25 x 40	140	10	0,8	56110025040

Rated voltage U_R [V]	Rated cap. C_R [μ F]	Case size D x L [mm]	Typ. ESR 100 Hz, 20°C [m Ω]	$\tan \delta_{100\text{Hz}}$ 20°C max. [%]	Ripple current $I_{R\sim}$ 100 Hz, 105°C [A]	Order code SH...
100	1000	25 x 54	107	10	1,0	10210025054
	2200	35 x 54	60	12	1,6	22210035054
160	100	25 x 40	500	8	0,7	10116025040
	220	25 x 40	400	9	0,8	22116025040
	470	30 x 54	200	9	1,4	47116030054
	1000	35 x 70	93	10	2,5	10216035070
250	100	25 x 40	493	7	0,7	10125025040
	220	25 x 54	347	8	1,0	22125025054
	470	35 x 54	167	8	1,7	47125035054
350	47	25 x 40	1267	7	0,5	47035025040
	100	25 x 40	1000	7	0,5	10135025040
	220	25 x 54	387	7	0,9	22135025054
	470	35 x 70	187	8	1,8	47135035070
450	22	25 x 40	1600	8	0,4	22045025040
	33	25 x 40	1200	8	0,5	33045025040
	47	25 x 40	1000	8	0,5	47045025040
	100	30 x 54	547	8	0,8	10145030054
	220	35 x 54	213	8	1,5	22145035054

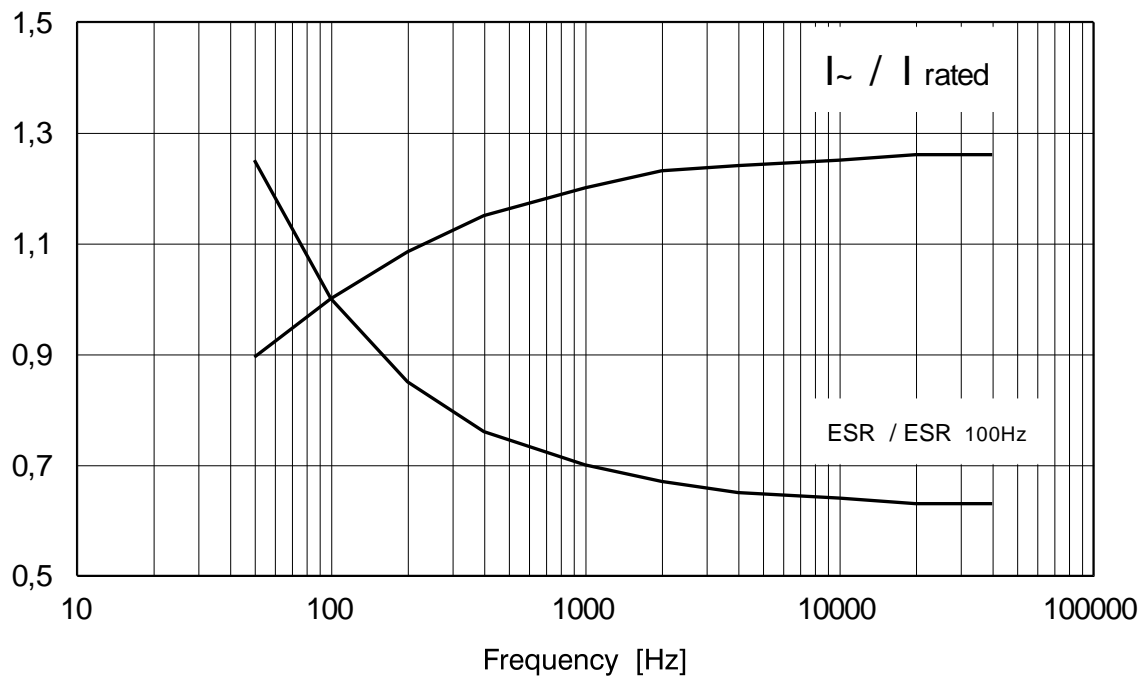
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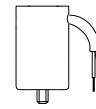
Useful life
 as a function of ambient temperature and actual ripple current



Ripple current and ESR
 As a function of frequency f



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RoHS compliant
REACH compliant

Features

- Insulated aluminium can
- Protection according to IP 54
- Connection cable
- Double potted design
- VDE approval for selected products



Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

Applications

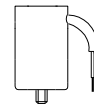
- Motorstart
- Whitegood motorcontrol

General specifications

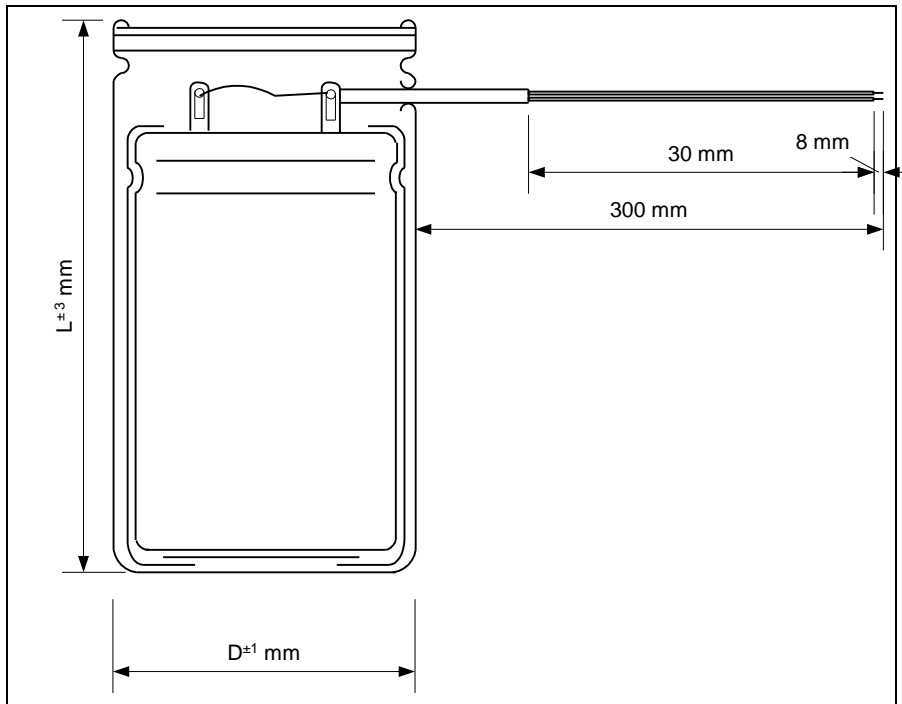
Items	Characteristics
Clima category	10/060/21
Tolerance	±10%
Specs. for selected items	VDE DIN EN 60252-2
Content of supply	If mounting stud then with fixing nut
Terminals	Connection cable: normal length 300mm or custom-tailored

The alternated current load may occur at most 20 times per hour with the following values:

Percentage duty cycle	Ripple current loading
AB 0,55 % ED	20 turn-ons with each 1,0 sec duration
AB 1,50 % ED	20 turn-ons with each 2,7 sec duration
AB 1,70 % ED	20 turn-ons with each 3,0 sec duration



Drawings for series MDK



Standard Values Type MDK

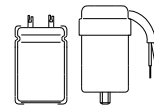
U _R ~ 50-60 Hz [V]	C _R [μF]	DC @50 Hz [%]	DC @60 Hz [%]	Dx L [mm]	VDE sign	Order code
						Plain base: MDKA...
160 V ~	10	1,70	1,36	36,8 x 69	-	10116036,8069
	12	1,70	1,36	36,8 x 69	-	2116036,8069
	14	1,70	1,36	36,8 x 69	-	14116036,8069
	16	1,70	1,36	36,8 x 69	-	16116036,8069
	18	1,70	1,36	36,8 x 69	-	18116036,8069
	20	1,70	1,36	36,8 x 69	-	20116036,8069
	25	1,70	1,36	36,8 x 83	-	25116036,8083
	30	1,70	1,36	36,8 x 83	-	30116036,8083
	35	1,70	1,36	36,8 x 83	-	35116036,8083
	40	1,70	1,36	41,8 x 83	-	40116041,8083
	45	1,70	1,36	41,8 x 83	-	45116041,8083
	50	1,70	1,36	41,8 x 83	-	50116041,8083
	85	1,70	1,36	51,8 x 118	-	85116051,8118
320 V ~	70	0,55	0,44	36,8 x 83	-	70032036,8083
	80	0,55	0,44	36,8 x 83	-	80032036,8083
	90	0,55	0,44	36,8 x 83	-	90032036,8083
	10	0,55	0,44	36,8 x 83	-	10132036,8083
	12	0,55	0,44	36,8 x 83	-	12132036,8083
	14	0,55	0,44	36,8 x 83	-	14132036,8083
	16	0,55	0,44	41,8 x 83	-	16132041,8083

U _R ~ 50-60 Hz [V]	C _R [μF]	DC @50 Hz [%]	DC @60 Hz [%]	Dx L [mm]	VDE sign	Order code
						Plain base: MDKA...
320 V ~	180	0,55	0,44	41,8 x 83	-	18132041,8083
	200	0,55	0,44	41,8 x 83	-	20132041,8083
	250	0,55	0,44	51,8 x 118	-	25132051,8118
	300	0,55	0,44	51,8 x 118	-	30132051,8118
	10	1,70	1,36	36,8 x 72	yes	10032036,8072
	15	1,70	1,36	36,8 x 72	yes	15032036,8072
	20	1,70	1,36	36,8 x 72	yes	20032036,8072
	25	1,70	1,36	36,8 x 72	yes	25032036,8072
	30	1,70	1,36	36,8 x 72	yes	30032036,8072
	40	1,70	1,36	36,8 x 72	yes	40032036,8072
	50	1,70	1,36	36,8 x 85	yes	50032036,8085
	60	1,70	1,36	36,8 x 85	yes	60032036,8085
	70	1,70	1,36	36,8 x 85	yes	70032036,8085
	80	1,70	1,36	41,8 x 85	yes	80032041,8085
	90	1,70	1,36	41,8 x 85	yes	90032041,8085
	100	1,70	1,36	41,8 x 85	yes	10132041,8085
	125	1,70	1,36	51,8 x 85	yes	12132051,8085
	140	1,70	1,36	51,8 x 118	-	14132051,8118
160	1,70	1,36	51,8 x 118	-	16132051,8118	
180	1,70	1,36	51,8 x 118	-	18132051,8118	

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Please state additionally to your order:

cable length (normal length 300mm) / with or without discharge resistor (22 / 47 / 100 kΩ) / with or without stud



RoHS compliant
REACH compliant

Features

- With cap and connecting cable or plug in tags
- With clamp attachment or mounting stud
- Cable outcoming radial or axial
- VDE approval for selected products



Different case sizes, voltages and capacitance combinations are available on request. Also in small lots.

Applications

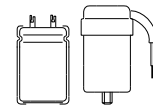
- Motorstart
- Whitegood motorcontrol

General specifications

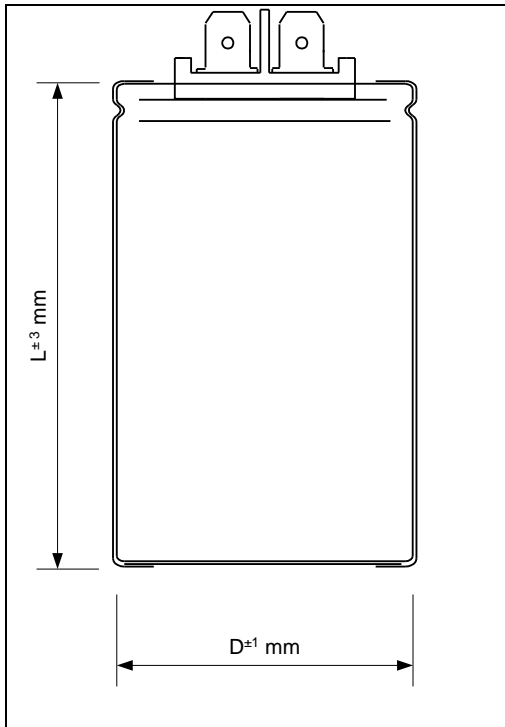
Items	Characteristics
Clima category	10/060/21
Tolerance	±10%
Specs. for selected items	VDE DIN EN 60252-2
Terminals	Cap and cable or faston tags 4,8 mm, 6,3 mm single and double

The alternated current load may occur at most 20 times per hour with the following values:

Percentage duty cycle	
AB 0,55 % ED	20 turn-ons with each 1,0 sec duration
AB 1,50 % ED	20 turn-ons with each 2,7 sec duration
AB 1,70 % ED	20 turn-ons with each 3,0 sec duration



Drawings for series MEK



Standard values type MEK

U _R ~ 50-60 Hz	C _R	DC* @50 Hz	DC* @60 Hz	D x L / with cap	VDE sign	Order code
[V]	[µF]	[%]	[%]	[mm]		MEK...
320 V ~	10	1,70	1,36	35x51 / 70	yes	10032035051
	15	1,70	1,36	35x66 / 85	yes	15032035066
	20	1,70	1,36	35x66 / 85	yes	20032035066
	25	1,70	1,36	35x66 / 85	yes	25032035066
	30	1,70	1,36	35x66 / 85	yes	30032035066
	40	1,70	1,36	35x66 / 85	yes	40032035066
	50	1,70	1,36	35x66 / 85	yes	50032035066
	60	1,70	1,36	35x66 / 85	yes	60032035066
	70	1,70	1,36	35x66 / 85	yes	70032035066
	80	1,70	1,36	40x66 / 85	yes	80032040066
	90	1,70	1,36	40x66 / 85	yes	90032040066
	100	1,70	1,36	40x66 / 85	yes	10132040066
	125	1,70	1,36	50x66 / 112	yes	12132050066
	140	1,70	1,36	50x96 / 112	-	14132050096
	160	1,70	1,36	50x96 / 112	-	16132050096
	180	1,70	1,36	50x96 / 112	-	18132050096
200	1,70	1,36	50x96 / 112	-	20132050096	

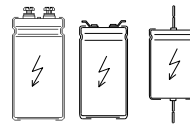
Special versions of the MEK

U _R ~ 50-60 Hz	C _R	DC @50 Hz	D x L	VDE sign	Order code
[V]	[µF]		[mm]		MEK...
320 V ~	95	0,60 %	35 x 66	-	95032035066
250 V ~	220	0,55 %	35 x 76	-	22125035076

Please state additionally to your order:

- with or without cap
- cable length
- with or without discharge resistor 22 kΩ, **47 kΩ (Standard)**, 100 kΩ

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Pulse and Photoflash capacitors

**Outstanding charge-discharge
characteristic**

High reliability

A, SI, LF and G Terminals available

**RoHS compliant
REACH compliant**

Features

- All contacts welded
- Charge/discharge proof
- High CV product
- High flash frequencies

Applications

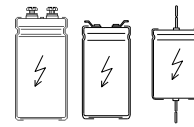
- Photoflash
- Warning and safety lamps
- Laser
- Hair removal

General specifications

Items	Characteristics
Rated capacitance range C_R	Up to 80000 μF @ 100 Hz
Capacitance tolerance	$\pm 10\%$; $-10\%/+30\%$
U_R rated voltage	Up to 500 V
Number of flashes	Depending on application
Category temperature range	$-55^\circ\text{C} \dots +60/+70/+85/+105^\circ\text{C}$
Climatic category IEC 60068	55/105/56
Voltage proof of the external insulation	≥ 2500 V AC

**Different case sizes, voltages and
capacitance combinations are
available on request.
Also in small lots.**

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Overview of common photoflash capacitors and pulse capacitors

Photoflash capacitors are specially adapted to the application. Hence, the following overview includes only some examples of possible capacitance / voltage / dimension - combinations. For further information please contact our technical service.

Axial case

Voltage [V]	Capacitance [μ F]	Stored energy [Ws]	\varnothing x L [mm]
250	100	3,1	16 x 39
350	12	0,7	12 x 30
350	22	1,3	12 x 30
350	47	3,0	16 x 39
350	120	7,8	25 x 49
350	220	14	30 x 49
400	27	2,2	16 x 30
500	33	4,1	18 x 39
500	47	5,9	25 x 38
500	55	6,9	30 x 49

Radial case (warning beacon)

Voltage[V]	Capacitance [μ F]	Stored energy [Ws]	\varnothing x L [mm]
350	330	20,0	30 x 55
360	100	6,5	25 x 36
360	220	14,3	30 x 50

Radial case (professional pulse capacitors)

Voltage [V]	Capacitance [μ F]	Stored energy [Ws]	\varnothing x L [mm]
360	1600	103,7	35 x 66
360	2200	142,6	35 x 85
360	3300	214,0	50 x 85
360	3900	252,7	50 x 100
400	1600	128,0	45 x 70
400	3200	256,0	45 x 105
500	100	12,5	35 x 53
500	220	27,5	45 x 42
500	600	75,0	35 x 80
500	950	118,8	50 x 80
500	1600	200,0	50 x 100
500	2400	300,0	50 x 145

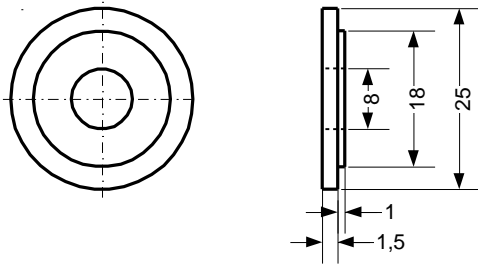
Charge Capacitors (SKS/SKP)

Bipolar charge capacitors are often used as capacitive resistors to charge large photo flash capacitor banks. The bipolar construction is favorable for low thermal losses. FT_{CAP} is offering SKS and SKP types. These capacitors are designed on request.

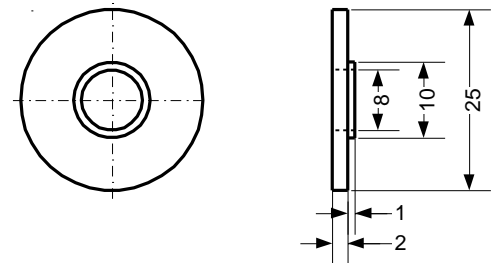
Accessory equipment

Insulating disks and nuts

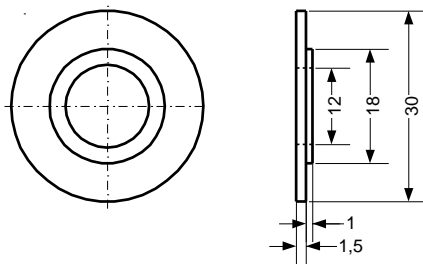
Insulation disc for stud M8
18 mm mounting hole
Order code I 8 – 18



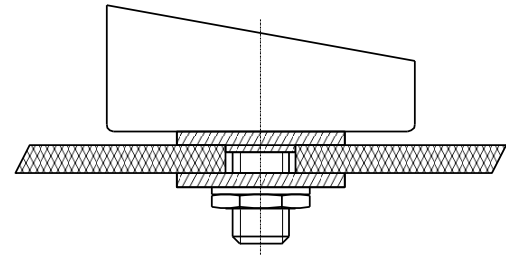
Insulation disc for stud M8
10 mm mounting hole
Order code I 8 – 10



Insulation disc for stud M12
18 mm mounting hole
Order code I 12 – 18



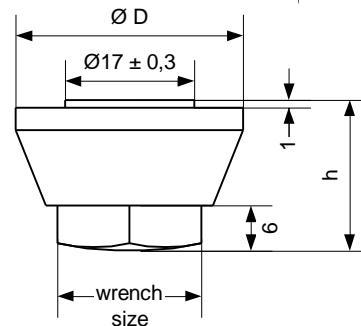
Mounting example



Material PAG ULVO

Nylon cap nuts

for stud M8 : order code HM 8
for stud M12 : order code HM 12



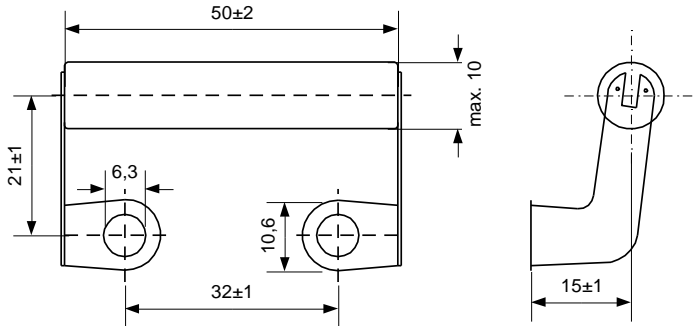
	D	h	W
HM 8	25 mm	15 mm	17
HM 12	30 mm	17,5 mm	19

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Discharge / Balancing Resistor

Resistor for discharge and / or voltage balancing.
 Suitable for can diameter 65 / 75 / 90 mm
 Other values on request

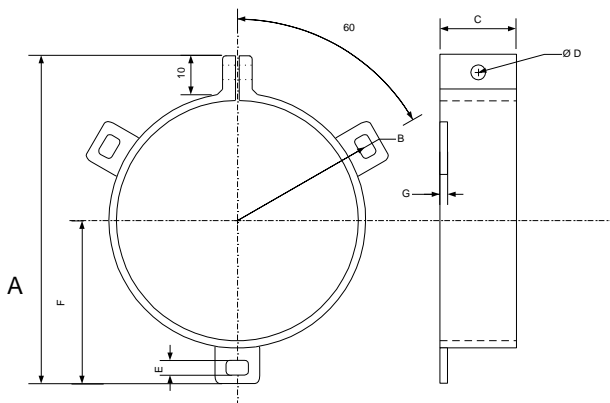
Rated Voltage 700Vdc
 Temp. range -55 to +105°C
 Tolerance ±5%
 Resistance 68 kΩ
 47 kΩ



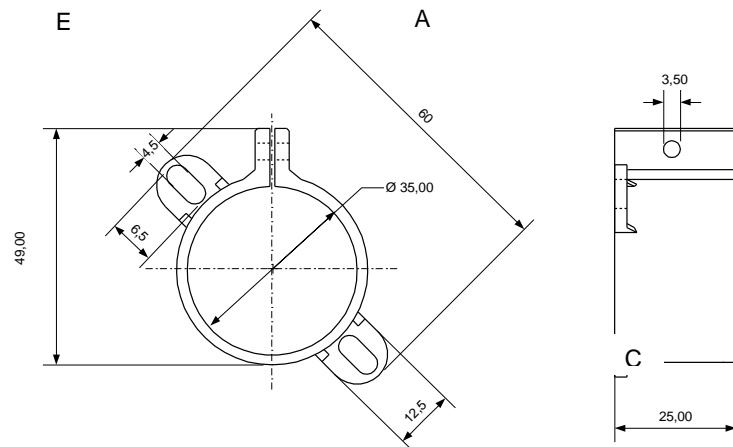
Nylon Clamps

Can diameter 35 mm
 Order code NRS 35

Can diameter 50 / 65 / 75 / 90





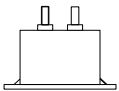
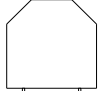


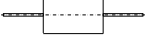
Can diameter 35



Order Code	CAN Ø	A	B	C	D	E	F	G
NRS 35	35	60		25	3,5	4,5		2,5
NRS 50	50	74	32	25	4	4,7	37	2,5
NRS 65	65	87	38,5	25	4	4,7	43,5	2,5
NRS 75	75	100	45	25	4	4,7	50	2,5
NRS 90	90	115	60	25	4	4,7	65	2,5
Material : Nylon - all dimensions in mm								

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TERMINAL DESIGNS

Terminal Design	Terminal Design
<p>PCB Pins, radial</p> 	<p>Solder lugs</p> 
<p>PCB Pins</p> 	<p>Axial leaded</p> 
<p>Screw terminals / threaded studs</p> 	<p>Screw terminals on ceramic bushing</p> 
<p>Screw terminals / internal thread</p> 	<p>Direkt busbar connection</p> 
<p>Screw terminals / internal thread</p> 	<p>Faston connection</p> 
<p>Screw terminal / internal thread</p> 	<p>Direct IGBT-connection</p> 



Joule Cap

RoHS compliant
REACH compliant

Features

- Greatest Capacitance/Voltage product in smallest size package
- Box construction facilitates high density PCB layout
- Low inductance achieved by horizontal layering of capacitor elements

Applications

- Inverters
- Photoflash
- Stroboscopes
- Motor Drivers
- Bulk energy storage for applications with high active currents

Different voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items	Characteristics
Capacitance range	2,5...50 µF
Rated voltage DC	500...1500 Vdc
Available tolerance	±5% (J) ... ±10% (K)
Rated RMS current	Max. 23 Arms
Operating temperature range	-40 °C ... +85 °C
Climatic category DIN IEC 68/1	40/085/21
Terminals	PCB Pins, 2x 1mm or 4x 1mm
Terminal length	3,5 - 25 mm

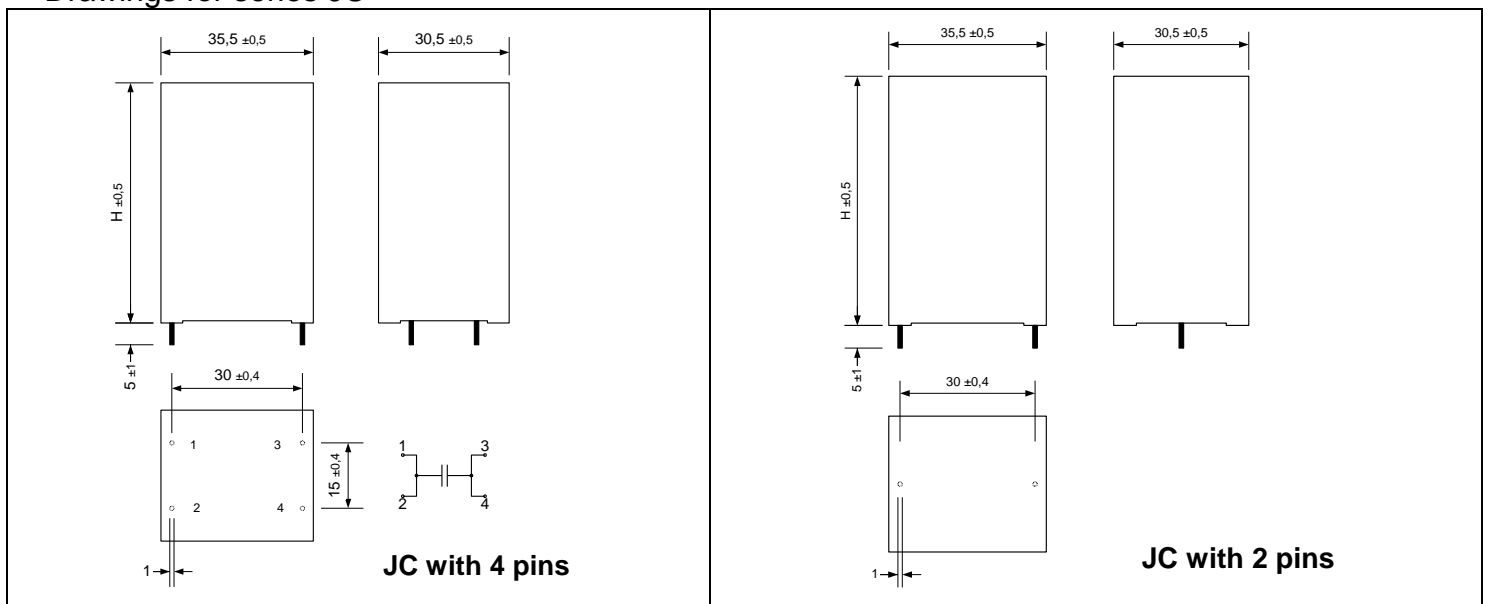
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Electrical data and ordering code for series JC

Un [Vdc]	Cn [μF]	Heigth [mm]	Max. ESR @10kHz	Max. Irms [A] @10kHz/30°C		Rth [K/W]	Weigth (approx) [g]	Part No.
			[mOhm]	2-Pin	4-Pin			
500	18	38	6	15	23	13	55	JC18μ500d38...
	35	55	4	15	23	10	70	JC35μ500d55...
	50	84	3	-	23	7	110	JC50μ500d84...
600	15	38	7	15	23	13	55	JC15μ600d38...
	30	55	4	15	23	10	70	JC30μ600d55...
	40	84	3,5	-	23	7	110	JC40μ600d84...
750	10	38	8	15	23	13	55	JC10μ750d38...
	20	55	4,5	15	23	10	70	JC20μ750d55...
	33	84	4	-	23	7	110	JC33μ750d84...
900	6,8	38	9	15	23	13	55	JC6.8μ900d38...
	14	55	5	15	23	10	70	JC14μ900d55...
	22	84	4,5	-	23	7	110	JC22μ900d84...
1000	5,6	38	10	15	22	13	55	JC5.6μ1000d38...
	10	55	6	15	23	10	70	JC10μ1000d55...
	16	84	5	-	23	7	110	JC16μ1000d84...
1200	4,2	38	11	15	21	13	55	JC4.2μ1200d38...
	7	55	7	15	23	10	70	JC7μ1200d55...
	12	84	5,5	-	23	7	110	JC12μ1200d84...
1500	2,5	38	12	15	18	13	55	JC2.5μ1500d38...
	4,7	55	8	15	23	10	70	JC4.7μ1500d55...
	7,5	84	6	-	23	7	110	JC7.5μ1500d84...

Drawings for series JC





Power Link

RoHS compliant
REACH compliant

Features

- High CV product
- Compact design
- Overvoltage capability

Applications

- High-end and industrial power supplies
- Solar inverters
- Frequency converters

Different voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items	Characteristics
Capacitance Range	6 ... 65 μ F
Rated Voltage DC	700 ... 1500 Vdc
Available Tolerance	\pm 5% (J) or \pm 10% (K)
Rated RMS Current @ 30 °C	max. 29 A
Operating Temperature Range	-40 °C ... + 85 °C
Climatic Category DIN IEC 68/1	40/085/21
Terminals	PCB Pins 4x 1 mm or 4x 1,2 mm
Capacitance Range	6 ... 65 μ F

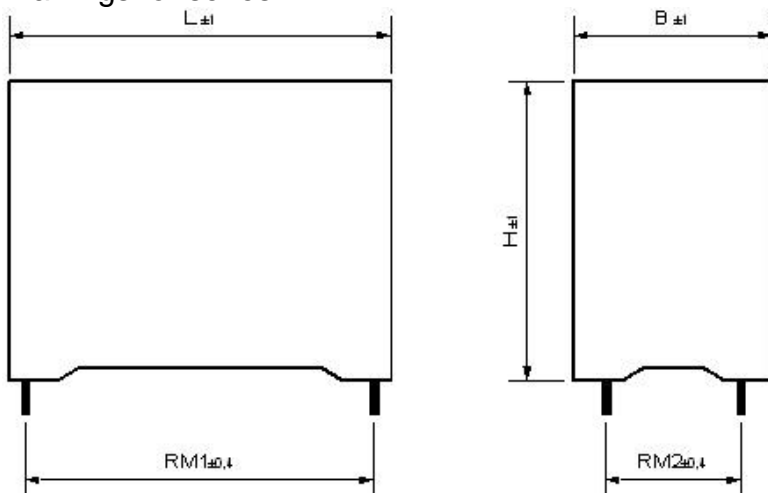
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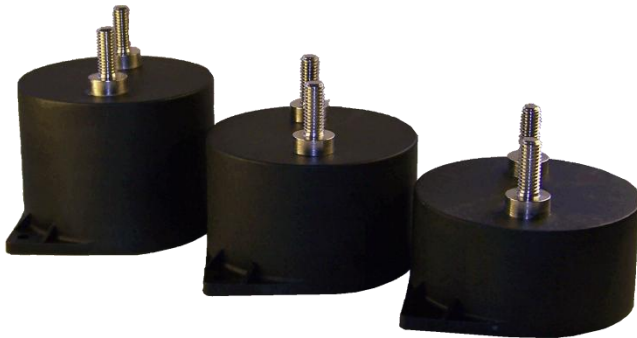
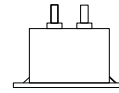


Electrical data and ordering code for series PL

Un	Cn	Dimensions	Pitch	Max. ESR	dU/dt	Max. Irms	Ipeak	Energy	Rth	Weight	Part No.
[Vdc]	[μ F]	[mm]	[mm]	@10kHz z [mOhm]	[V/ μ s]	@10kHz/30°C [A]	[A]	[Ws]	[K/W]	(approx) [g]	
700	24	40x27x36	37,5x16	9	33	22	795	5,9	14	50	PL24 μ 700d040027036...
	33	43x30x45	37,5x16	7	33	29	1093	8,1	11	75	PL33 μ 700d043030045...
	50	58x30x45	52,5x20,3	9	22	28	1116	12,3	9	100	PL50 μ 700d058030045...
	65	58x35x50	52,5x20,3	7	22	29	1451	15,9	7	135	PL65 μ 700d058035050...
900	16	40x27x36	37,5x16	10	41	20	662	6,5	14	50	PL16 μ 900d040027036...
	22	43x30x45	37,5x16	6	41	29	911	8,9	11	75	PL22 μ 900d043030045...
	32	58x30x45	52,5x20,3	11	28	26	893	13,0	9	100	PL32 μ 900d058030045...
	42	58x35x50	52,5x20,3	8	28	29	1172	17,0	7	135	PL42 μ 900d058035050...
1100	11	40x27x36	37,5x16	13	50	18	303	6,1	14	50	PL11 μ 1100d040027036...
	15	43x30x45	37,5x16	9	50	24	745	9,1	11	75	PL15 μ 1100d043030045...
	22	58x30x45	52,5x20,3	13	33	23	737	13,3	9	100	PL22 μ 1100d058030045...
	30	58x35x50	52,5x20,3	10	33	29	1004	18,2	7	135	PL30 μ 1100d058035050...
1300	8	40x27x36	37,5x16	15	58	17	464	6,8	14	50	PL8 μ 1300d040027036...
	10	43x30x45	37,5x16	12	58	22	580	8,5	11	75	PL10 μ 1300d043030045...
	16	58x30x45	52,5x20,3	15	39	22	625	13,5	9	100	PL16 μ 1300d058030045...
	21	58x35x50	52,5x20,3	12	39	27	820	17,8	7	135	PL21 μ 1300d058035050...
1500	6	40x27x36	37,5x16	16	66	16	397	6,8	14	50	PL6 μ 1500d040027036...
	8	43x30x45	37,5x16	13	66	21	530	9,0	11	75	PL8 μ 1500d043030045...
	12	58x30x45	52,5x20,3	17	45	20	536	13,5	9	100	PL12 μ 1500d058030045...
	16	58x35x50	52,5x20,3	13	45	25	714	18,0	7	135	PL16 μ 1500d058035050...

Drawings for series PL





Coax Cap

RoHS compliant
REACH compliant

Features

- Self-healing
- Temperatur range -25 °C to 85 °C
- Usable in high duty cycles with higher currents
- Optimized bottom side cooling by achieving plain bottom surface

Applications

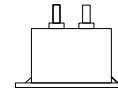
- High Power
- Very low Inductance
- Medium-High Frequency
- Power Electronics

General specifications

Different terminals, voltages and capacitance combinations are available on request. Also in small lots.

Items	Characteristics
Capacitance range	20 ... 400 μ F
Rated voltage DC	600 ... 1900 Vdc
Available tolerance	\pm 5% (J) or \pm 10% (K)
Operating temperature range	Max. 100 Arms
Climatic category DIN IEC 68/1	-40 °C ... +85 °C
Terminals	40/085/21

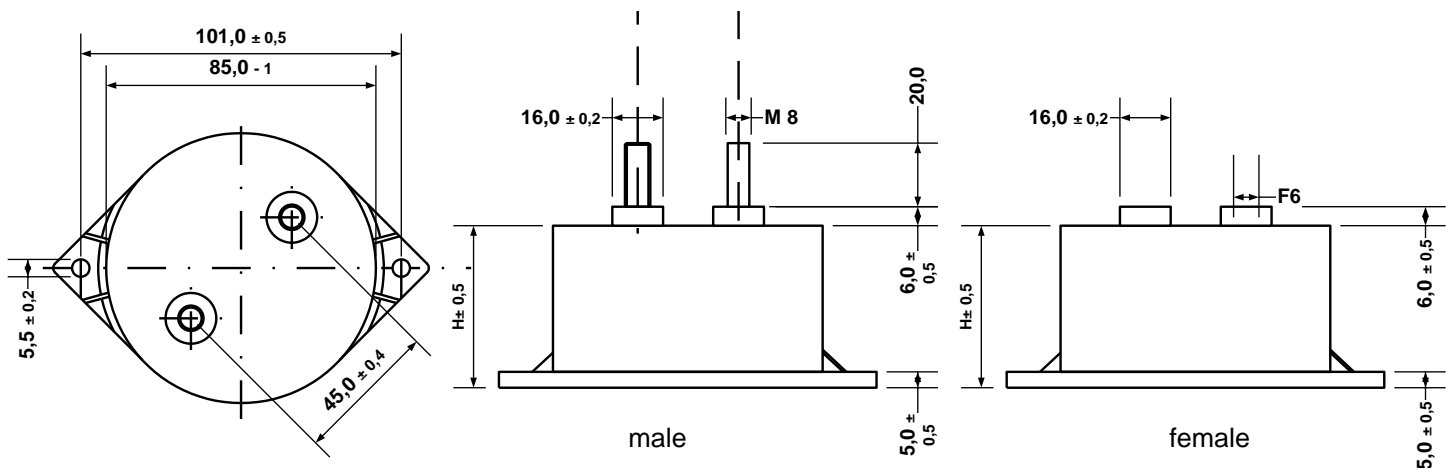
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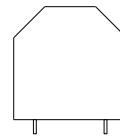


Electrical data and ordering code for series CX

Un	Cn	Un	Heigth	Max. ESR	dU/dt	Max. I _{rms}	I _{peak}	Energy	R _{th}	Weigth	Part No.
[Vdc]	[µF]	[Vac]	[mm]	@10kHz	[V/µs]	@10kHz/ 30°C	[kA]	[Ws]	[K/W]	(approx)	
				[mOhm]		[A]				[g]	
600	200	100	40	1	18	100	3,7	36	4,5	350	CX200µ600d40
	300	100	51	1	13	100	3,9	54	4	410	CX300µ600d51
	400	100	64	1	9,4	100	3,7	72	3,5	480	CX400µ600d64
700	150	100	40	1	22	100	3,4	37	4,5	350	CX150µ700d40
	220	100	51	1	15	100	3,3	54	4	410	CX220µ700d51
	300	100	64	1	11	100	3,3	74	3,5	480	CX300µ700d64
800	130	100	40	1	25	100	3,2	42	4,5	350	CX130µ800d40
	180	100	51	1	17	100	3,1	58	4	410	CX180µ800d51
	260	100	64	1	12	100	3,2	83	3,5	480	CX260µ800d64
900	100	115	40	1	26	100	2,6	41	4,5	350	CX100µ900d40
	150	115	51	1	20	100	2,9	61	4	410	CX150µ900d51
	200	115	64	1	13	95	2,6	81	3,5	480	CX200µ900d64
1000	85	125	40	1	32	100	2,7	43	4,5	350	CX85µ1000d40
	120	125	51	1,2	22	98	2,6	60	4	410	CX120µ1000d51
	170	125	64	1,5	16	93	2,7	85	3,5	480	CX170µ1000d64
1100	65	200	40	1	34	97	2,2	39	4,5	350	CX65µ1100d40
	100	200	51	1,2	23	93	2,3	61	4	410	CX100µ1100d51
	140	200	64	1,5	17	87	2,3	85	3,5	480	CX140µ1100d64
1200	55	200	40	1,6	39	95	2,1	40	4,5	350	CX55µ1200d40
	85	200	51	2	26	91	2,2	61	4	410	CX85µ1200d51
	115	200	64	2,5	19	84	2,1	83	3,5	480	CX115µ1200d64
1400	40	200	40	2	45	88	1,8	39	4,5	350	CX40µ1400d40
	60	200	51	2,5	30	83	1,8	59	4	410	CX60µ1400d51
	85	200	64	3	22	78	1,9	83	3,5	480	CX85µ1400d64
1900	20	200	40	2,8	61	72	1,2	36	4,5	350	CX20µ1900d40
	32	200	51	3,3	41	70	1,3	58	4	410	CX32µ1900d51
	45	200	64	4	30	66	1,3	81	3,5	480	CX45µ1900d64

Drawings for series CX





Castor Cap

RoHS compliant
REACH compliant

Features

- Compact design
- Controlled self-healing process
- Designed for printed circuit board mounting

Applications

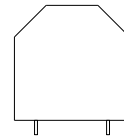
- Medical application
- Aviation technology
- Inverters
- Railway application
- Signalling
- Flash application

Different voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items	Characteristics
Capacitance Range	4,2...32 μ F
Rated Voltage DC	600...1700 Vdc
Available Tolerance	\pm 5% (J) or \pm 10% (K)
Rated RMS Current @ 30°C	Max. 30 Arms
Operating Temperature Range	-40 °C ... +85 °C
Climatic Category DIN IEC 68/1	40/085/21
Terminals	PCB Pins, 4x 1,2mm
Weigth	approx. 70 g
Thermal Resistance	11 K/W

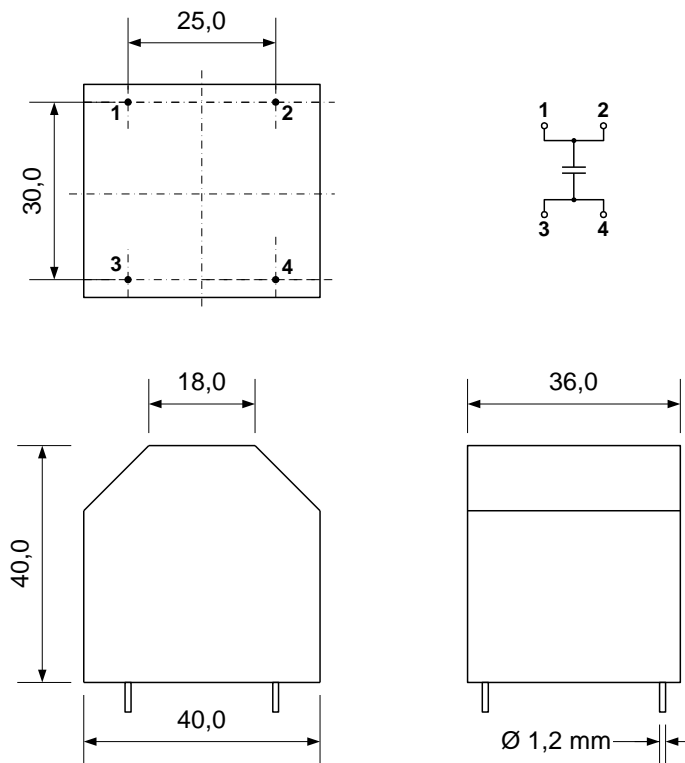
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Electrical data and ordering code for series CC

Un	Cn	Max. ESR @10kHz	dU/dt	Max. Irms @10kHz/30°C	Ipeak	Part No.
[Vdc]	[μF]	[mOhm]	[V/μs]	[A]	[A]	
600	32	3,4	24	30	753	CC32μ600d...
700	25	4,1	26	30	656	CC25μ700d...
750	20	4,6	29	30	578	CC20μ750d...
900	17	4,8	32	30	549	CC17μ900d...
1000	13	5,5	37	30	481	CC13μ1000d...
1100	10	6	42	30	424	CC10μ1100d...
1200	8,5	6,8	46	30	389	CC8.5μ1200d...
1300	7,5	7,1	49	30	368	CC7.5μ1300d...
1400	6,5	7,4	55	28	354	CC6.5μ1400d...
1700	4,2	9,6	65	26	274	CC4.2μ1700d...

Drawings for series CC



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Energy Cap

RoHS compliant
REACH compliant

Features

- Robust design
- Aluminum Case
- Stud mounting
- Long lifetime

Applications

- Laser
- Industrial
- High voltage power supplies
- Baggage scanners
- Railway

Different terminals, case sizes, voltages and capacitance combinations are available on request. Also in small lots.

General specifications

Items	Characteristics
Capacitance Range	200 ... 3300 µF
Rated Voltage DC	700 ... 1500 Vdc
Available Tolerance	±10% (K)
Rated RMS Current @ 30 °C	Max. 100 Arms
Operating Temperature Range	-40 °C ... +85 °C
Climatic Category DIN IEC 68/1	40/085/21

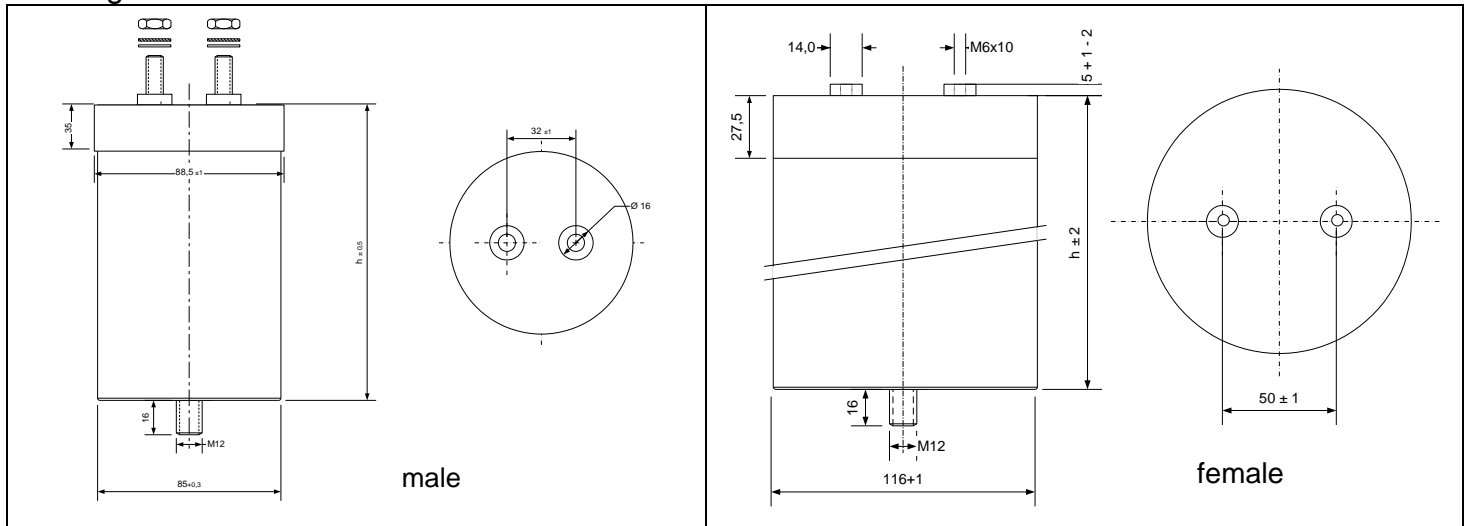
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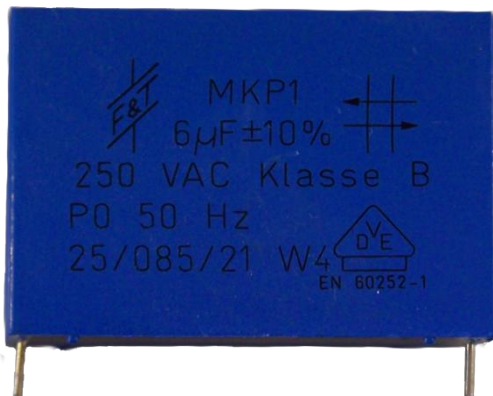


Electrical data and ordering code for series EC

Un	Cn	Diameter	Height	Max. ESR	dU/dt	Max. Irms	Ipeak	Energy	Rth	Weight	Part No.
[Vdc]	[μF]	[mm]	[mm]	@1kHz	[V/μs]	@1kHz/30°				(appro x)	
				[mOhm]		C	[kA]	[Ws]	[K/W]	[kg]	
700	850	85	136	4	4,3	53	3,7	208	2,2	1,1	EC850μ700d085136...
	1400	85	230	2	5,2	80	7,3	343	1,4	1,7	EC1400μ700d085230...
	1500	116	136	2,6	4,3	53	6,5	368	1,4	1,8	EC1500μ700d116136...
	1700	116	165	1	8	80	14	417	1,3	2,3	EC1700μ700d116165...
	2100	116	200	1,3	6,3	80	13	515	1,1	2,6	EC2100μ700d116200...
	2600	116	230	0,8	7,6	100	20	637	1	3,1	EC2600μ700d116230...
3300	116	295	1	6,3	100	21	809	0,8	3,8	EC3300μ700d116295...	
900	550	85	136	4,5	5,6	53	3	223	2,2	1,1	EC550μ900d085136...
	920	85	230	2,2	13	80	12	373	1,4	1,7	EC920μ900d085230...
	1000	116	136	3	11	53	11	405	1,4	1,8	EC1000μ900d116136...
	1150	116	165	1,2	10	80	12	466	1,3	2,3	EC1150μ900d116165...
	1500	116	200	1,3	8	80	12	608	1,1	2,6	EC1500μ900d116200...
	1700	116	230	0,8	9,8	100	17	689	1	3,1	EC1700μ900d116230...
2200	116	295	1	8	100	18	891	0,8	3,8	EC2200μ900d116295...	
1100	420	85	136	4	5,9	53	2,5	254	2,2	1,1	EC420μ1100d085136...
	610	85	230	2,5	8,3	80	5	369	1,4	1,7	EC610μ1100d085230...
	680	116	136	3,5	6,8	53	4,6	411	1,4	1,8	EC680μ1100d116136...
	770	116	165	1,4	12	80	9,5	466	1,3	2,3	EC770μ1100d116165...
	1000	116	200	1,5	9,2	80	9,2	605	1,1	2,6	EC1000μ1100d116200...
	1150	116	230	1	12	100	14	696	1	3,1	EC1150μ1100d116230...
1400	116	295	1,2	9,5	100	13	847	0,8	3,8	EC1400μ1100d116295...	
1300	260	85	136	6,5	8,1	53	2,1	220	2,2	1,1	EC260μ1300d085136...
	430	85	230	3	9,8	80	4,2	363	1,4	1,7	EC430μ1300d085230...
	480	116	136	4	8,1	53	3,9	406	1,4	1,8	EC480μ1300d116136...
	540	116	165	1,4	15	80	8	456	1,3	2,3	EC540μ1300d116165...
	670	116	200	1,7	12	80	7,5	566	1,1	2,6	EC670μ1300d116200...
	820	116	230	1	14	100	12	693	1	3,1	EC820μ1300d116230...
1000	116	295	1,2	12	100	12	845	0,8	3,8	EC1000μ1300d116295...	
1500	190	85	136	8	9,3	53	1,7	214	2,2	1,1	EC190μ1500d085136...
	320	85	230	3,5	11	80	3,5	360	1,4	1,7	EC320μ1500d085230...
	360	116	136	4,5	9,3	53	3,3	405	1,4	1,8	EC360μ1500d116136...
	400	116	165	1,5	17	80	6,8	450	1,3	2,3	EC400μ1500d116165...
	500	116	200	1,8	13	80	6,7	563	1,1	2,6	EC500μ1500d116200...
	610	116	230	1,1	17	100	10	686	1	3,1	EC610μ1500d116230...
750	116	295	1,5	13	100	10	844	0,8	3,8	EC750μ1500d116295...	

Drawings for series EC





Motor Cap

RoHS compliant
REACH compliant

Features

- VDE approval
- Radial pins
- Long life time



Applications

- Motor run
- General purpose
- AC application
- Medium low power switching

General specifications

Items	Characteristics
Capacitance range	0,47 ... 15 μ F ; 0,1 ... 8 μ F
Rated voltage AC	250 V; 400 V
Available tolerance	$\pm 10 \%$
Operating temperature range	-25 °C ... +85 °C
Climatic category DIN IEC 68/1	25/085/21 Class B

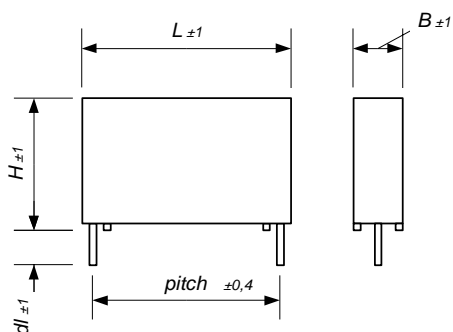
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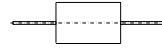
Electrical data and ordering code for series MKP R (radial)

U _N [VAC]	C _N [μF]	Dimensions				Pulse load capacity [V/μs]	Order code
		B	H	L	pitch		
		[mm]					
250	0,47	7,5	15,8	25,5	22,5	100	FK 401
	0,56	7,5	15,8	25,5	22,5	100	FK 402
	0,68	9	17,5	25,5	22,5	100	FK 403
	0,82	10	18,3	31	27,5	70	FK 404
	1	11,5	19,8	31	27,5	70	FK 405
	1,2	11,5	19,8	31	27,5	70	FK 406
	1,5	11,5	19,8	31	27,5	70	FK 407
	1,8	18	22,5	32	27,5	70	FK 408
	2	18	22,5	32	27,5	70	FK 409
	2,2	18	22,5	32	27,5	70	FK 410
	2,7	14,5	25,5	38,5	35	40	FK 411
	3	14,5	25,5	38,5	35	40	FK 412
	4	16	28,5	41	37,5	32	FK 413
	5	26,5	36	39,5	35	40	FK 414
	6	26,5	36	39,5	35	40	FK 415
	8	26,5	36	39,5	35	40	FK 416
	10	44,5	35,5	47	42,5	18	FK 417
12	44,5	35,5	47	42,5	18	FK 418	
15	44,5	35,5	47	42,5	18	FK 419	
400	0,1	6	14,3	25,5	22,5	140	FK 601
	0,15	7,5	15,8	25,5	22,5	140	FK 602
	0,22	7,5	15,8	25,5	22,5	140	FK 603
	0,27	9	17,5	25,5	22,5	140	FK 604
	0,33	10	18,3	31	27,5	100	FK 605
	0,39	10	18,3	31	27,5	100	FK 606
	0,47	10	18,3	31	27,5	100	FK 607
	0,56	11,5	19,8	31	27,5	100	FK 608
	0,68	11,5	19,8	31	27,5	100	FK 609
	0,75	13	22	31	27,5	100	FK 610
	0,82	13	22	31	27,5	100	FK 611
	1	14,5	25,5	38,5	35	64	FK 612
	1,2	14,5	25,5	38,5	35	64	FK 613
	1,5	14,5	25,5	38,5	35	64	FK 614
	1,8	16	28,5	41	37,5	55	FK 615
	2	16	28,5	41	37,5	55	FK 616
	2,2	16	28,5	41	37,5	55	FK 617
	2,7	26,5	36	39,5	35	64	FK 618
	3	26,5	36	39,5	35	64	FK 619
	4	26,5	36	39,5	35	64	FK 620
5	26,5	36	39,5	35	64	FK 621	
6	35,5	45,5	47,5	42,5	38	FK 622	
8	35,5	45,5	47,5	42,5	38	FK 623	

Drawings for series MKP R (radial)



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Motor Cap

RoHS compliant
REACH compliant

Features

- Axial
- Wrapped with foil
- Tin-plated copper



adhesive

wire leads

Applications

- Motor run
- General purpose
- AC application
- Medium low power switching

General specifications

Items	Characteristics		
Capacitance range	0,47 ... 33 µF	0,47 ... 8 µF	0,1 ... 5 µF
Rated voltage AC	125 V	250 V	400 V
Available tolerance	5 % / 10 %		
Operating temperature range	-25 °C ... +85 °C		
Climatic category DIN IEC 68/1	25/085/21		

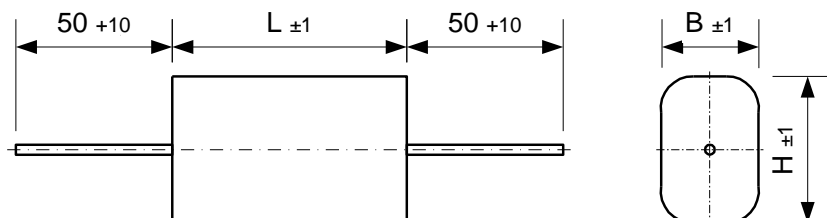
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Electrical data and ordering code for series MKP A (axial)


U _N [VAC]	C _N [μF]	Dimmension			Order code
		B	H	L	
		[mm]			
125	0,47	4,5	11	27	FK 251
	1	6,5	13	27	FK 252
	1,5	8	15	27	FK 253
	2,2	9	15	33	FK 254
	3,3	12	16	33	FK 255
	4,7	14	19	33	FK 256
	6,8	16	22	33	FK 257
	8,2	18	24	33	FK 258
	10	19	27	33	FK 259
	13	20	26	38	FK 260
	15	22	28	38	FK 261
	18	23	29	38	FK 262
	22	26	33	38	FK 263
	30	26	33	42	FK 264
33	28	35	42	FK 265	
250	0,47	6	12	27	FK 451
	0,56	6,5	12,5	27	FK 452
	0,68	7,5	13	33	FK 453
	0,82	8,5	14	33	FK 454
	1	10	15,5	33	FK 455
	1,2	10,5	16	33	FK 456
	1,5	11	17,5	33	FK 457
	1,8	14	19	33	FK 458
	2	14	19,5	33	FK 459
	2,2	14,5	20	33	FK 460
	2,7	12,5	22	38	FK 461
	3	13,5	23	38	FK 462
	4	16	25,5	38	FK 463
	5	19	26	38	FK 464
6	20	28	38	FK 465	
8	22,5	31,5	38	FK 466	
400	0,1	5	10,5	27	FK 651
	0,15	5,5	12	27	FK 652
	0,22	7	13	27	FK 653
	0,27	7,5	13	27	FK 654
	0,33	8	13	33	FK 655
	0,39	8	13	33	FK 656
	0,47	9	15	33	FK 657
	0,56	10	15,5	33	FK 658
	0,68	10	17	33	FK 659
	0,75	12	17	33	FK 660
	0,82	12,5	19	33	FK 661
	1	10,5	20	38	FK 662
	1,2	11,5	21,5	38	FK 663
	1,5	13	22,5	38	FK 664
	1,8	13	23	47	FK 665
	2	14	23	47	FK 666
	2,2	15	23	47	FK 667
	2,7	18	28	38	FK 668
3	19	27	38	FK 669	
4	23,5	33	47	FK 670	
5	24	33	47	FK 671	


Drawings for series MKP A (axial)





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Intermediate-circuit Film Capacitor for direct busbar connection 	<i>Items</i>	<i>Characteristics</i>
	<i>Capacitance</i>	1000 μF
	<i>Rated voltage DC</i>	800 V
	<i>Available tolerance</i>	$\pm 10 \%$
	<i>Rated RMS current</i>	60 A_{rms}
	<i>Pulse rise time</i>	10,2 V/μs
	<i>Operating temperature range</i>	-40 °C ... +70 °C
	<i>Climatic category DIN IEC 68/1</i>	40/070/21

High voltage Film Capacitor with terminals on ceramic bushing 	<i>Items</i>	<i>Characteristics</i>
	<i>Capacitance</i>	0,1 μF
	<i>Rated voltage DC</i>	14 kV
	<i>Rated voltage AC</i>	4,6 kV
	<i>Available tolerance</i>	$\pm 10 \%$
	<i>Rated RMS current</i>	8 A_{rms}
	<i>Pulse rise time</i>	1108 V/μs
	<i>Operating temperature range</i>	-25 °C ... +85 °C
	<i>Climatic category DIN IEC 68/1</i>	25/085/21


Intermediate-circuit Film Capacitor with robust and compact design 	<i>Items</i>	<i>Characteristics</i>
	<i>Capacitance</i>	1000 μF
	<i>Rated voltage DC</i>	1800 V
	<i>Available tolerance</i>	$\pm 10 \%$
	<i>Rated RMS current</i>	130 A_{rms}
	<i>Pulse rise time</i>	25 V/μs
	<i>Operating temperature range</i>	-40 °C ... +70 °C
	<i>Climatic category DIN IEC 68/1</i>	40/070/21


Film Capacitor for DC-link applications with mounting clamps for bottom side cooling	Items	Characteristics
	Capacitance	550 µF
	Rated voltage DC	1100 V
	Available tolerance	± 10 %
	Max. peak periodic current	3270 A
	Pulse rise time	5,95 V/µs
	Operating temperature range	-40 °C ... +85 °C
	Climatic category DIN IEC 68/1	40/085/21


Film Capacitor for DC filters subject to high vibrations	Items	Characteristics
	Capacitance	125 µF
	Rated voltage DC	450 V
	Available tolerance	± 5 %
	Rated RMS current	24 A _{rms}
	Pulse rise time	5,22 V/µs
	Operating temperature range	-25 °C ... +85 °C
	Climatic category DIN IEC 68/1	25/085/21

Film Capacitors, with internal temperature sensor and ring-form constructions	Items	Characteristics
	Capacitance	140 µF
	Rated voltage DC	400 V
	Available tolerance	10 %
	Operating temperature range	-40 °C ... +85 °C
	Climatic category DIN IEC 68/1	40/085/21

Custom-made Film Capacitors

High voltage Film Capacitor with low ESR and flat construction 	<i>Items</i>	<i>Characteristics</i>
	<i>Capacitance</i>	100 pF
	<i>Rated voltage DC</i>	25 kV
	<i>Rated voltage AC</i>	12 kV
	<i>Available tolerance</i>	± 10 %
	<i>Operating temperature range</i>	-25 °C ... +50 °C
	<i>Climatic category DIN IEC 68/1</i>	25/050/21

Component assembly Film Capacitors 	<i>Items</i>	<i>Characteristics</i>
	<i>Capacitance</i>	1200 µF
	<i>Rated voltage DC</i>	63 V
	<i>Available tolerance</i>	± 10 %
	<i>Max. peak periodic current</i>	9100 A
	<i>Pulse rise time</i>	7,6 V/µs
	<i>Operating temperature range</i>	-40 °C ... +85 °C
	<i>Climatic category DIN IEC 68/1</i>	40/085/21

Very low inductive Film Capacitor for IGBT application 	<i>Items</i>	<i>Characteristics</i>
	<i>Capacitance</i>	1800 µF
	<i>Rated voltage DC</i>	850 V
	<i>Available tolerance</i>	± 10 %
	<i>Max. peak periodic current</i>	14760 A
	<i>Pulse rise time</i>	8,2 V/µs
	<i>Operating temperature range</i>	-40 °C ... +85 °C
	<i>Climatic category DIN IEC 68/1</i>	40/085/21