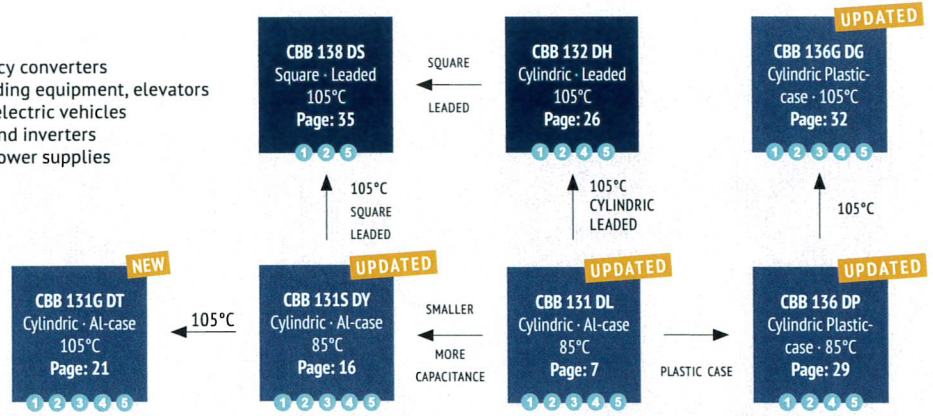


DC-LINK

APPLICATIONS:

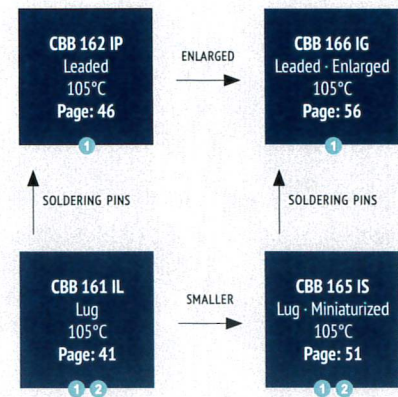
- 1 High power frequency converters
- 2 Motion control, welding equipment, elevators
- 3 Electric and hybrid electric vehicles
- 4 Photovoltaic and wind inverters
- 5 Industry high-end power supplies



SNUBBER

APPLICATIONS:

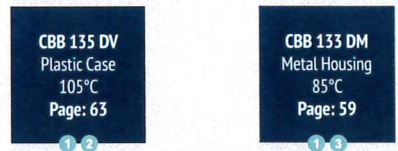
- 1 High pulse an high frequency circuits
- 2 IGBT mounting



MODULES

APPLICATIONS:

- 1 High power frequency converters
- 2 Electric and hybrid electric vehicles
- 3 Electric & hybrid electric vehicles, traction & trains

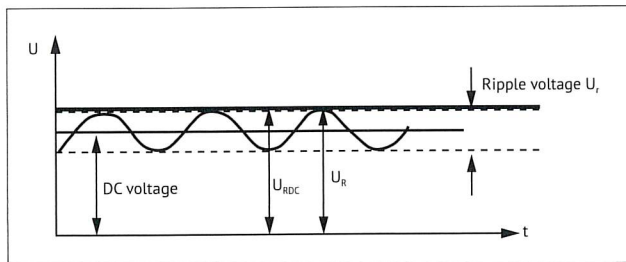


WARRANTY The information contained in this datasheet does neither form part of any quotation nor of a contract, it is believed to be accurate, reliable and up to date. Quality data are based on the statistical evaluations of a large quantity of parts and do not constitute a guarantee in a legal sense. However, agreement on these specifications does mean that the customer may claim for replacement of individual defective capacitors within the terms of delivery. We cannot assume any liability beyond the replacement of defective components. This applies in particular to any further consequences of component failure. Furthermore it must be taken into consideration that the figures stated for lifetime and failure rates refer to the average production status and are therefore to be understood as mean values (statistical expectations) for a large number of delivery lots of identical capacitors. These figures are based on application experience and data obtained from preceding tests under normal conditions, or – for purpose of accelerated aging – more severe conditions. JIANGHAI reserves the right to change these specifications without prior notice. Any application information given is advisory and does not form part of any specification. The products are not primarily designed for use in life supporting applications, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. JIANGHAI customers using or selling these products for use in such applications without prior written consent of JIANGHAI do so at their own risk and agree fully to indemnify JIANGHAI for any damage resulting from such improper use or sale. This version of the datasheet supersedes all previous versions.

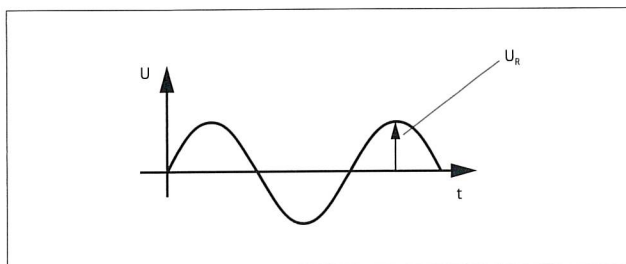
NOMINAL CAPACITANCE C_R Nominal Capacitance is defined at 20°C and 50Hz (120Hz).

RATED VOLTAGE U_R

DC Capacitors: U_{RDC} Maximum operating peak voltage of either polarity but of a non-reversing type waveform, for which the capacitor has been designed, for continuous operation. The maximum DC voltage is the sum of the DC voltage and peak AC voltage.



AC Capacitors: U_{RAC} Maximum operating peak recurrent voltage of either polarity of a reversing type waveform for which the capacitor has been designed.



OPERATING VOLTAGE The plastic film capacitor varies in the maximum applicable voltage depending on the applied voltage waveform, current waveform, frequency, ambient temperature (capacitor surface temperature), capacitance value, etc. Be sure to use capacitors within the specified values by checking the voltage waveform, current waveform, and frequency applied to them (In the application of high frequency, the permissible voltage varies with the type of the capacitor. Refer to the specification for details. See also Voltage Derating tables.)

NON-RECURRENT SURGE VOLTAGE U_S Peak voltage induced by a switching or any other disturbance of the system which is allowed for a limited number of times and for durations shorter than the basic period.

- Maximum duration: 50 ms / pulse
- Maximum number of occurrences: 1000 (during load)

MAXIMUM RATE OF VOLTAGE RISE dV/dt Maximum permissible repetitive rate of voltage rise of the operational voltage.

OPERATING CURRENT Due to the fact that the dissipation factor of the capacitor is greater than zero, heat will be generated in any application where alternating currents or pulses occur. The resulting internal temperature rise may cause a severe deterioration of the capacitor's withstanding voltage, or may lead to a breakdown (even smoke or fire may result). Therefore, the safe use of capacitor must be within the rated voltage (or category voltage) and the permissible current ranges. The rated current must be considered by dividing into pulse current (peak current) and continuous current (rms current) depending on the break down mode, and when using, should make sure the both currents are within the permissible range.

MAXIMUM CURRENT I_{MAX} Maximum Rms Current for continuous operation, see Current Derating tables.

MAXIMUM PEAK CURRENT \hat{I} Maximum permissible repetitive peak current which can occur during continuous operation. $\hat{I} = C_R \cdot (dV/dt)$

MAXIMUM SURGE CURRENT \hat{I}_S
- Maximum duration: 50 ms / pulse
- Maximum number of occurrences: 1000 (during load)

SERIES RESISTANCE R_S Effective ohmic resistance of the conducting elements of the capacitor.

EQUIVALENT SERIES RESISTANCE ESR The ESR represents all ohmic resistances: $ESR = \tan\delta/(\omega C) = R_S + \tan\delta_r/(\omega C)$

DIELECTRIC DISSIPATION FACTOR $\tan\delta_0$ Constant dissipation factor of the dielectric material.

LOSS FACTOR $\tan\delta$ The dissipation factor is the ratio between the reactive and effective power.

HOTSPOT TEMPERATURE $\Theta_{HOTSPOT}$ Temperature at the hottest position inside the capacitor. $\Theta_{hotspot} = \Theta_{ambient} + P_{loss} \cdot R_{th}$

R_{th} : thermal resistance, P_{loss} : Power loss $P_{loss} = ESR \cdot I_{rms}^2$, $\Theta_{ambient}$ = ambient temperature

CHARGING AND DISCHARGING Because the charging and discharging current of capacitor is obtained by the product of voltage rise rate (dV/dt) and capacitance, low voltage charging and discharging may also cause deterioration of capacitor such as shorting and open due to sudden charging and discharging current. When charging and discharging, pass through a resistance of 20Ω/V to 1000Ω/V or more to limit the current. When connecting multiple film capacitors in parallel in withstand voltage test or life test, connect a resistance of 20Ω/V to 1000Ω/V or more in series to each capacitor. In addition, **capacitors must be discharged via a resistor before handling.** Because the capacitors do not have any discharge resistors built-in, there is a risk of residual voltages and electric energy contents that might be dangerous.

TEMPERATURE RANGE AND ALTITUDE Use film capacitors only within the specified operating temperature range. The altitude and barometric pressure have an impact on the functionality of the capacitor. Max. Altitude: 2000m above sea level.

ALTITUDE/m	VOLTAGE DERATING COEFFICIENT
≤ 2 000	1,00
2 500	0,95
3 000	0,90
3 500	0,85
4 000	0,80
4 500	0,75
5 000	0,70

EXPECTED LIFETIME The expected lifetime of the capacitor depends on the applied voltage and the hot spot temperature during operation. For capacitors applied in different situations, the obtainable average service lives are different. Please refer to the life time diagrams of each series.

FAILURE RATE λ (FAILURE IN TIME FIT) 1 FIT = 1/10⁹h (1 failure per 10⁹ components test hours), $\lambda = r/(nt)$

r = number of failure, n = test number, t = test time

INSULATION VOLTAGE U_i Rms value of AC voltage designed for the insulation between terminals of the capacitor to case or earth. The insulation voltage is equal to the rated voltage of the capacitor, divided by , unless otherwise specified.

INSULATION RESISTANCE R_i Ration between applied DC Voltage and resulting leakage current after 1 minute of charge. It is defined in MΩ. Typically it is given as time constant $R_i \cdot C$ [μF] in seconds.

VOLTAGE BETWEEN TERMINALS U_{TT} Voltage between terminals.

VOLTAGE BETWEEN TERMINALS AND CASE U_{TC} Voltage between terminals and case.

BUZZING NOISE Any buzzing noise produced by a capacitor is caused by the vibration of the film due to the Coulomb force that is generated between the electrodes with opposite poles. It is of no harm to the capacitor.

SURFACE OVER TEMPERATURE $\Delta\theta_{\text{case}}$ When current continuously flow through the capacitor, the temperature inside the capacitor will rise induced by dissipated heat. If the temperature exceeds the maximum allowed hot-spot temperature, it might cause a short circuit or fire. The limits described in the catalogue must not be exceeded and it's necessary to check the temperature on the capacitor's surface in operation.

FLAME RETARDATION Although flame retarding PU resin or plastic case material is used in the coating or encapsulation of plastic film capacitors, continuous exposure to high temperature ambient or fire will break the coating layer or plastic case of the capacitor, and may lead to melting and ignition of the capacitor element.

HUMID AMBIENT If used for a long time in a humid ambient, the capacitor might absorb humidity and oxidize the electrodes causing damage to the capacitor. In case of AC application, high humidity would increase the corona effect. This phenomenon causes a drop in capacitance and an increase of capacitor losses. Humidity needs to be avoided. If needed please inform Jianghai separately for technical adopted components.

STORAGE CONDITIONS 1) Capacitors must not be stored in corrosive atmospheres, particularly not when chlorides, sulfides, alkali, acids, lye, salts, organic solvents or similar substances are present. 2) It must not be stored in high temperature and/or high humidity environments. The following storage conditions must be kept (applicable only for storage in the original package): Temperature: $\leq 35\text{ }^{\circ}\text{C}$; Humidity: $\leq 80\% \text{ RH}$, no dew allowed on the capacitor; Storage time: ≤ 24 months

MOUNTING Other devices, which are mounted near the capacitor, should not touch the capacitor. Additional heat coming from other components near the capacitor may reduce the lifetime of the capacitor. Do never attempt to bend or twist the capacitor after mounting and avoid any mechanical stress on the terminals. Never exceed the max. permissible torques when tightening the terminal screws or the mounting bolt's cap nuts.

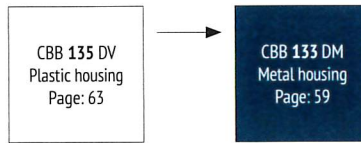
CAUTION & WARNINGS Do not touch the terminals of capacitors. The energy stored in capacitors may be lethal. Ensure that the operating environment of the equipment into which the capacitor has been built, is within the specified conditions. Capacitors must not be used in corrosive atmospheres, particularly not when chlorides, sulfides, alkali, acid, lye, salts, organic solvents or similar substances are present. Electrical or mechanical misapplication may be hazardous. Personal injury or property damage may result from bursting of the capacitors or from expulsion of melted material.

Jianghai Europe GmbH, v4 0922

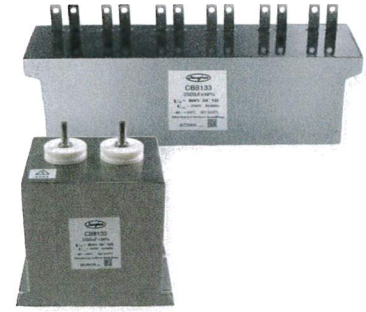
FEATURES

- Customer Specific Designs
- High ripple current capability
- Self-healing
- Long lifetime
- Metal Case, fire retardant resin

OVERVIEW



PRODUCT



APPLICATIONS

- High power frequency converters
- Electric and hybrid electric vehicles, Traction and Trains

CHARACTERISTICS

ITEM	CHARACTERISTICS
Climatic Category	40/85/56 (IEC 61071)
Operating Temperature	-40 ~ +70 °C ($\Theta_{\text{hotspot}} \leq 85$ °C)
Storage Temperature	-40 ~ +85 °C
Rated Voltage U_{RDC}	750 ~ 3.000 V _{DC}
Capacitance Range	500 ~ 65.000 μF
Capacitance Tolerance	± 10 % (K), ± 5 % (J)
Voltage between Terminals U_{TT}	$1,5 \cdot U_{\text{RDC}}$ (20°C, 10s)
Voltage between Terminals & Case U_{TC}	≥ 3.000 V _{AC} (20°C, 50 Hz, 10s)
Max. Overvoltage	Please see IEC 61071
Insulation Resistance R_{I} °C	≥ 5.000 M $\Omega \cdot \mu\text{F}$ (20 °C, 100 V _{DC} , 1 min)
Dielectric Dissipation Factor $\tan \delta_0$	$\leq 2 \cdot 10^{-4}$ (20 °C, 100 Hz)
Life Time Expectancy	100.000h, failure rate ≤ 100 FIT ($\Theta_{\text{hotspot}} \leq 70^\circ\text{C}, U_{\text{RDC}}$)
Reference Standard	IEC 61071:2007

ENVIRONMENTAL

The products are RoHS, WEEE and REACH compliant.

The detailed version please see separate "Environmental Certificates" document or www.jianghai-europe.com

APPROVALS

UL94-V0:

Plastic & Compound Mass

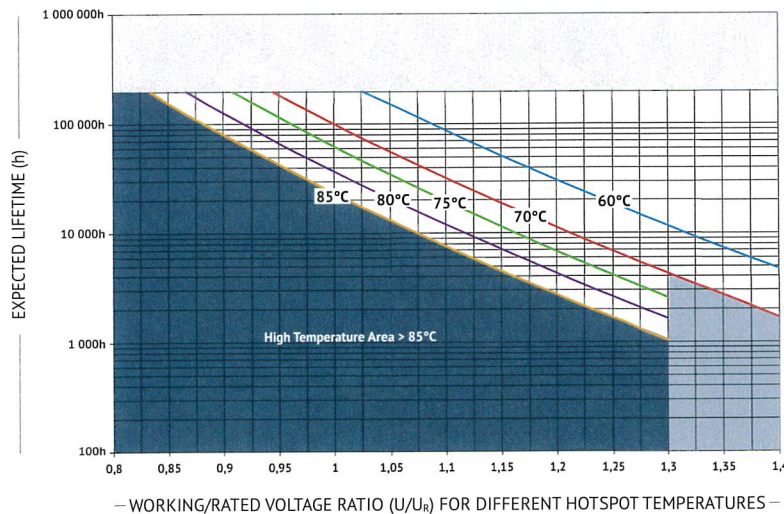
UL810:

CZDS2.E227010
(Construction)

(customized on request)

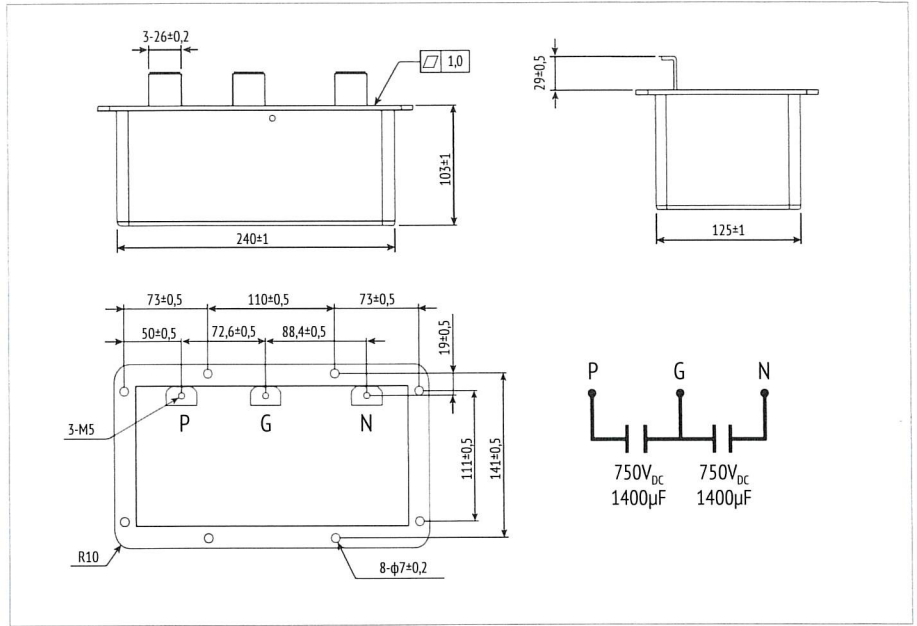
LIFETIME

END OF LIFE: 3% REDUCTION OF CAPACITANCE

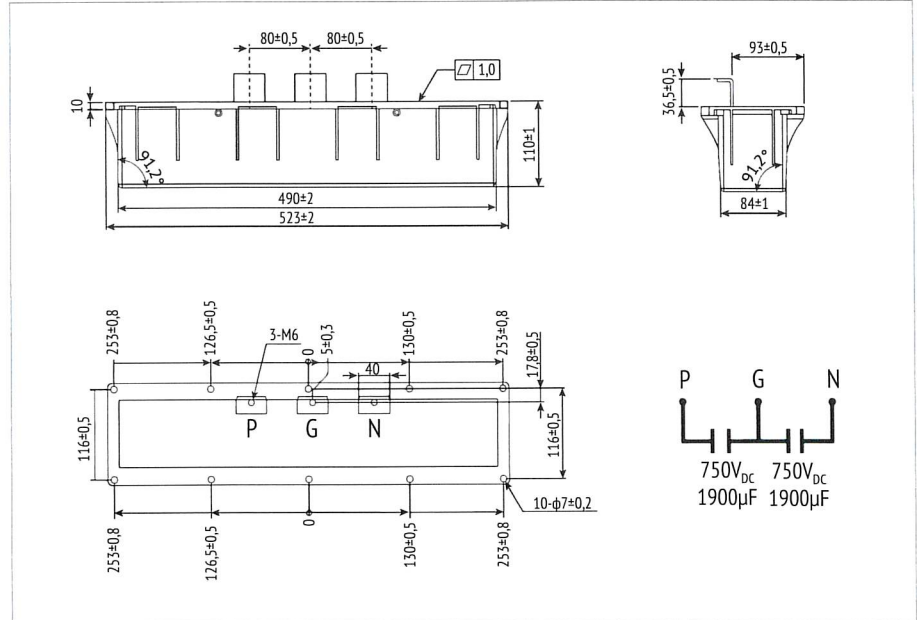




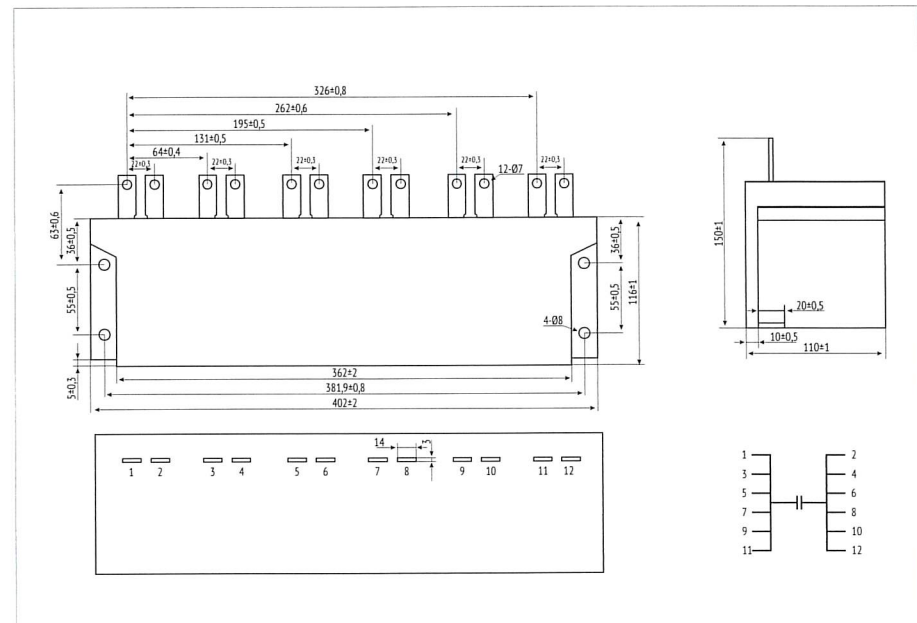
EXAMPLE DRAWING #1



EXAMPLE DRAWING #2



EXAMPLE DRAWING #3



in mm

MODULES



MARKING



BRAND

CBB 133

SERIES DESIGNATION

2500 μ F \pm 10%

CAPACITANCE AND TOLERANCE

$U_R = 800V_{DC}SH$

U_R RATED VOLTAGE

$U_{TC} = 3000V 50/60 HZ$

U_{TC} VOLTAGE BETWEEN TERMINALS AND CASE, FREQUENCY

-40~+85°C IEC61071

TEMPERATURE RANGE, REFERENCE STANDARD

Discharge before handling

SAFETY WARNING

J35F23104



DATE CODE

ORDER CODE

FC	S	2K	DM	158	K	024010013	E3
Capacitor type	Product shape	DC rated voltage code (V)	Series code	Capacitance Code Examples (μ F)	Capacitance tolerance	Dimension Code	For internal use
Film Cap. = FC	Square box = S	750 Q3 800 2K 900 R2 950 K3 1020 3A 1100 A3 1200 3B 2250 3T 2500 3E 3000 3F	CBB 133 = DM	1500 158 2800 288 13500 139	\pm 5% J \pm 10% K	0 2 4 0 1 0 0 1 3	

RATINGS

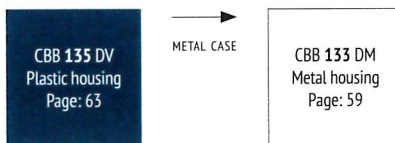
U_R	C_R	I_{MAX}	$\hat{I}^{(1)}$	ESR_{pp}	L_s	W	H	T	ORDER CODE
(V _{DC})	(μ F)	60°C 10kHz (A)	(A)	20°C 10kHz (m Ω)	20°C (nH)	(mm)	(mm)	(mm)	
750 Q3	2800	80	2200	0,8	80	240	103	125	FCSQ3DM288K024010013E3
	3800	80	3800	0,6	80	490	110	84	FCSQ3DM388K049011009E3
800 2K	2500	250	3500	0,6	50	190	195	170	FCS2KDM258K019020017E3
	2500	300	3500	0,4	50	402	116	110	FCS2KDM258K040012011E3
900 R2	18000	400	3600	0,7	50	500	460	120	FCSR2DM189K050046012E3
950 K3	3 x 2500	3 x 135	3 x 8400	3 x 1,5	50	500	205	270	FCSK3DM258J050021027E3
	2 x 3750	2 x 140	2 x 6200	2 x 1,2	50	500	205	270	FCSK3DM758J050021027E3
1020 3A	13500	300	5050	0,5	60	330	650	170	FCS3ADM139K033065017E3
1100 A3	900	100	9000	1	80	163	152	162	FCSA3DM907K016015016E3
1200 3B	8000	260	6000	0,5	80	620	200	140	FCS3BDM808K062020014E3
	9000	500	18.000	1,2	50	680	210	230	FCS3BDM908J068021023E3
	20.000	250	100.000	1	50	280	700	155	FCS3BDM209S028070016E3
	65.000	400	100.000	1	50	460	880	185	FCS3BDM659S046088019E3
2250 3T	4000	400	19.000	0,5	60	340	175	670	FCS3TDM408J034018067E3
2500 3E	30.000	100	90.000	0,8	100	395	1170	220	FCS3EDT309K040117022E3
3000 3F	1500	150	4000	1	100	340	360	230	FCS3FDM158J034036023E3

(1) Maximum permissible peak current

FEATURES

- Customer Specific Designs
- High ripple current capability
- Self-healing
- Long lifetime

OVERVIEW



PRODUCT



APPLICATIONS

- High power frequency converters
- Electric and hybrid electric vehicles

CHARACTERISTICS

ITEM	CHARACTERISTICS
Climatic Category	40/105/56 (IEC 61071)
Operating Temperature	-40 ~ +105 °C ($\Theta_{\text{hotspot}} \leq 105$ °C) $\Theta_{\text{hotspot}} = 85 \sim 105$ °C: See Voltage Derating Diagram
Storage Temperature	-40 ~ +105 °C
Rated Voltage U_{RDC}	450 ~ 800 V _{DC}
Capacitance Range	300 ~ 1.000 μF
Capacitance Tolerance	± 10 % (K), ± 5 % (J)
Voltage between Terminals U_{TT}	$1,5 \cdot U_{\text{RDC}}$ (20°C, 10s)
Voltage between Terminals and Case U_{TC}	$\geq 3.000 V_{\text{AC}}$ (20°C, 50 Hz, 10s)
Max. Overvoltage	$1,1 \cdot U_{\text{RDC}}$ (30 % of time under load) $1,15 \cdot U_{\text{RDC}}$ (30 min. per day) $1,2 \cdot U_{\text{RDC}}$ (5 min. per day) $1,3 \cdot U_{\text{RDC}}$ (1 min. per day) $1,5 \cdot U_{\text{RDC}}$ (max. 30 ms, 100ms per day)
Insulation Resistance R_i , °C	$\geq 10.000 M\Omega \cdot \mu\text{F}$ (20 °C, 100 V _{DC} , 1 min)
Dielectric Dissipation Factor $\tan \delta_o$	$\leq 2 \cdot 10^{-4}$ (20 °C, 1 kHz)
Life Time Expectancy	100.000h, failure rate 100 FIT ($\Theta_{\text{hotspot}} 70$ °C, U_{RDC})
Reference Standard	IEC 61071:2007

ENVIRONMENTAL

The products are RoHS, WEEE and REACH compliant.

The detailed version please see separate "Environmental Certificates" document or www.jianghai-europe.com

APPROVALS

UL94-V0:

Plastic & Compound Mass

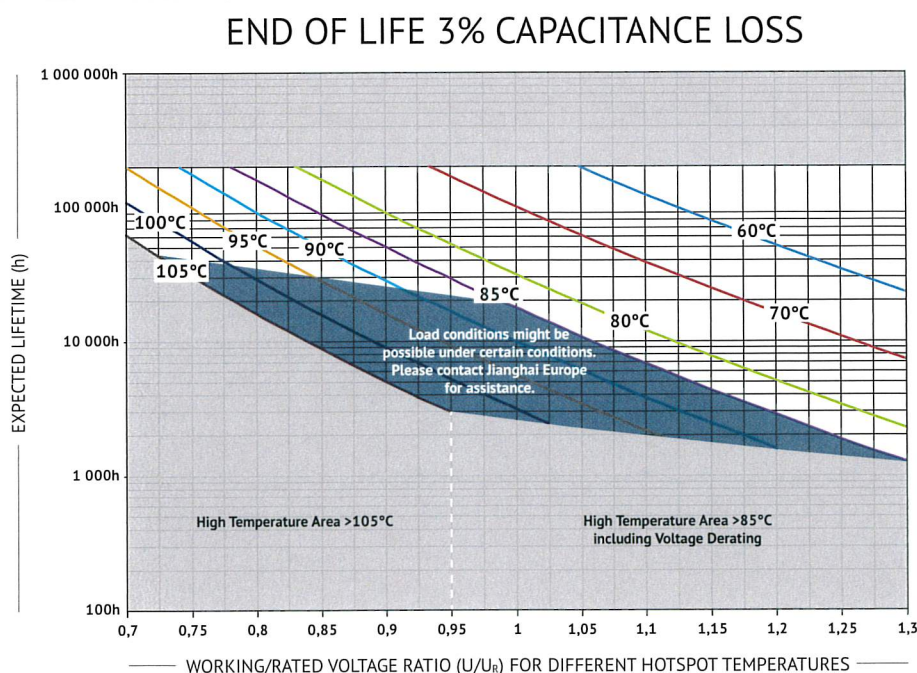
UL810:

CZDS2.E227010
(Construction)

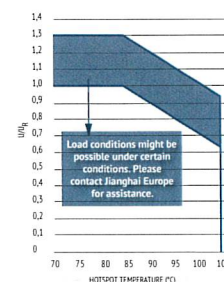
(customized on request)

MODULES

LIFETIME



VOLTAGE DERATING



MARKING



BRAND

CBB 135

SERIES DESIGNATION

500 μ F \pm 10%

CAPACITANCE AND TOLERANCE

$U_R = 800V_{DC}$ SH

U_R RATED VOLTAGE

$U_{TC} = 3000V$ 50/60 HZ

U_{TC} VOLTAGE BETWEEN TERMINALS AND CASE, FREQUENCY

-40~+105 $^{\circ}C$ IEC61071

TEMPERATURE RANGE, REFERENCE STANDARD

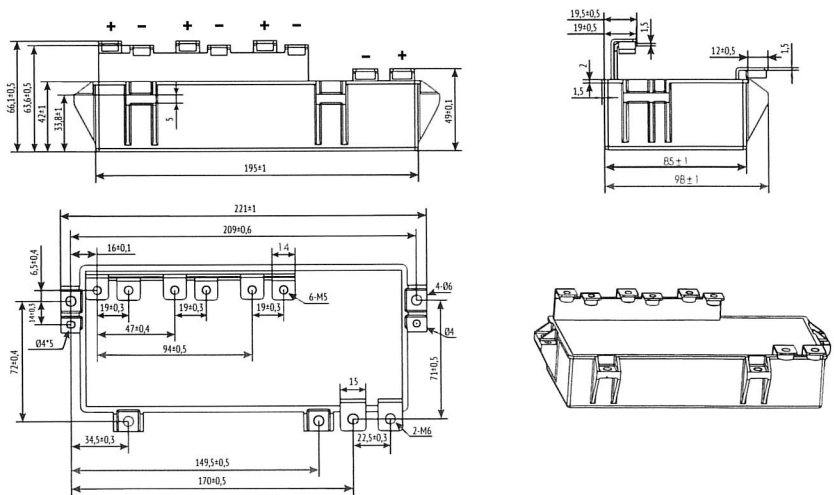
Discharge before handling

SAFETY WARNING

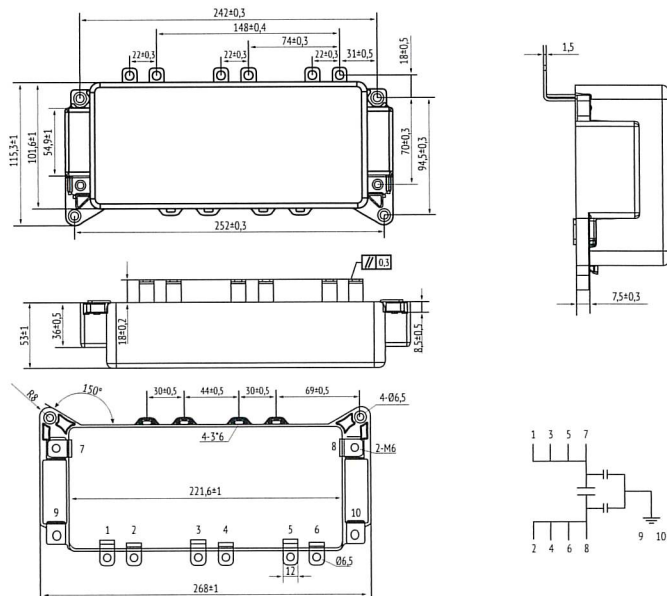
E03F0310

DATE CODE

EXAMPLE DRAWING #1



EXAMPLE DRAWING #2

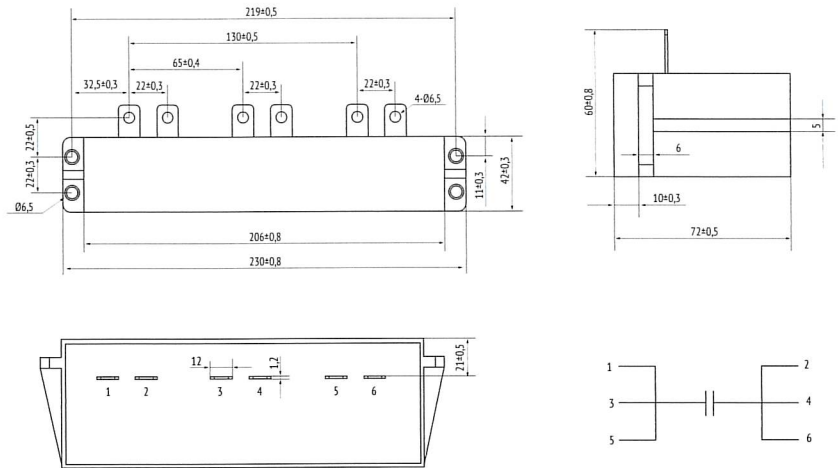


in mm

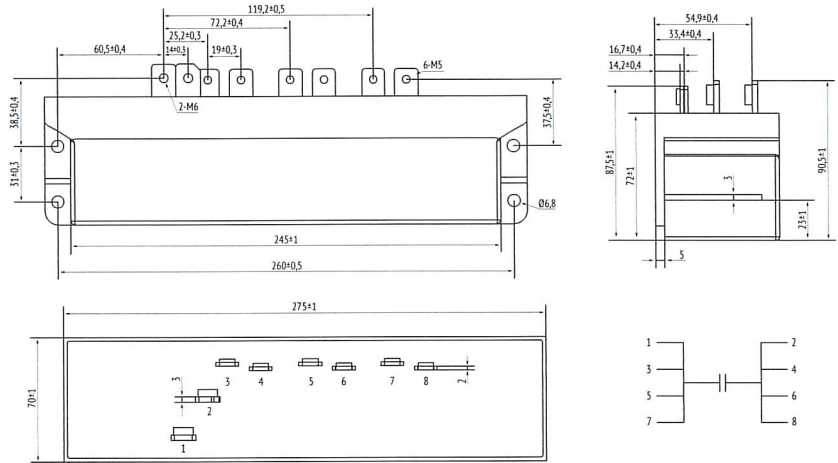
MODULES



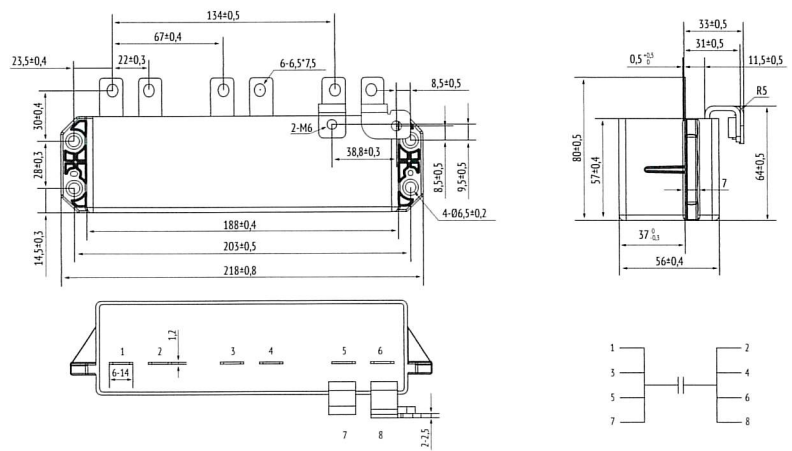
EXAMPLE DRAWING #3



EXAMPLE DRAWING #4



EXAMPLE DRAWING #5

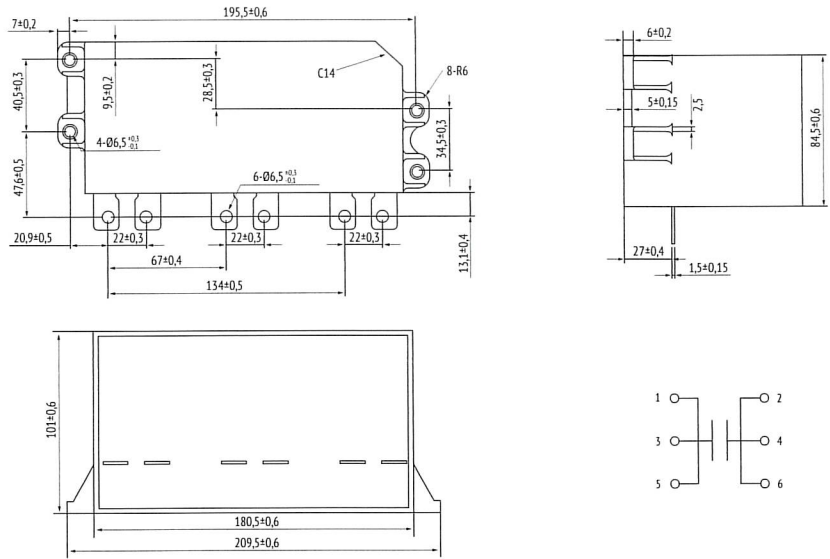


in mm

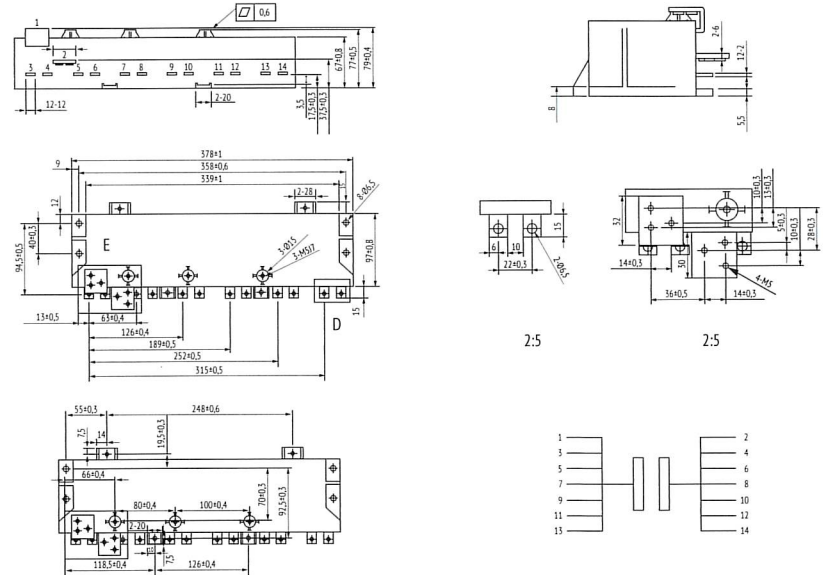
MODULES



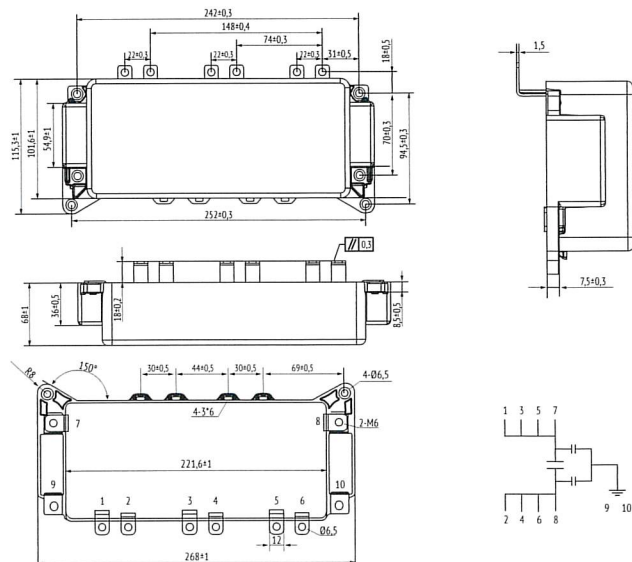
EXAMPLE DRAWING #9



EXAMPLE DRAWING #10



EXAMPLE DRAWING #11



in mm

MODULES

ORDER CODE

FC	S	2W	DV	507	K	B010	0	2	1	E 3						
Capacitor type	Product shape	DC rated voltage code (V)	Series code	Capacitance Code (μF)	Capacitance tolerance	Dimension Code W x H x T (mm)	Hole Shape (mm)	Terminal Pitch (mm)	Mounting Hole	For internal use						
Film Cap. = FC	Square box = S	450	2W	CBB 135 = DV	500	507	±5%	J	275 x 72 x 70	B010	6,5	0	19	1	Without	0
		500	2H		1000	108	±10%	K	376 x 97 x 67	B018	5,5	3	22	2	With	1
		600	2S		other on request		M6	1	Other	Y						
		800	2K		M5	2										

RATINGS

U _R	C _R	I _{max}	İ ⁽¹⁾	ESR _{typ}	L _s	W	H	T	ORDER CODE
≤85°C		85°C, 10kHz		20°C, 10kHz	20°C	±1,0	±1,0	±1,0	
(V _{DC})	(μF)	(A)	(A)	(mΩ)	(nH)	(mm)	(mm)	(mm)	
450 2W	400	100	2000	0,5	15	249	47	50	FCS2WDV407KB156021YE3
	1000	150	4000	0,6	30	268	53	101,6	FCS2WDV108KB025011E3
500 2H	500	90	2500	0,8	15	206	42	72	FCS2HDV507KB101021E3
	500	130	2500	0,45	18	197	78,5	40	FCS2HDV507KB191021YE3
	700	130	7000	0,5	15	214	42	82	FCS2HDV707KB194811E3
	850	180	5500	0,5	15	275	72	70	FCS2HDV857KB010811E3
600 2S	450	125	3300	0,42	18	188	57	56	FCS2SDV457KB109021E3
800 2K	300	125	3000	0,5	18	188	57	56	FCS2KDV307KB109021E3
	400	110	2000	0,6	20	193	76	79	FCS2KDV407KB059121E3
	420	100	4000	0,65	15	210	81	72	FCS2KDV427KB009021E3
	500	150	4000	0,6	15	275	72	70	FCS2KDV507KB010021E3
	500	160	6000	0,6	30	194,5	69,5	100	FCS2KDV507KB051021E3
	560	200	8000	0,4	24	209,5	84,5	101	FCS2KDV567KB037021E3
	850	200	8000	0,4	20	376	97	67	FCS2KDV857KB018021E3
	850	200	8000	0,4	15	361	70	65	FCS2KDV857KB166021E3
	900	180	4500	0,5	20	291	219	40	FCS2KDV907KB114231E3
	1000	160	4000	0,8	30	268	68	101,6	FCS2KDV108KB015021E3

(1) Maximum permissible peak current