Thyristor Diode Module

MCMA700P1600CA

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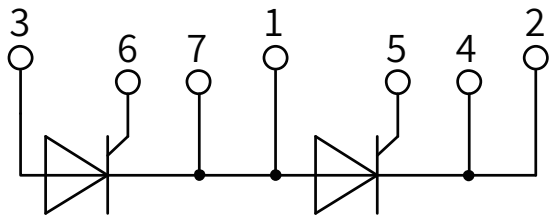
Thyristor Module

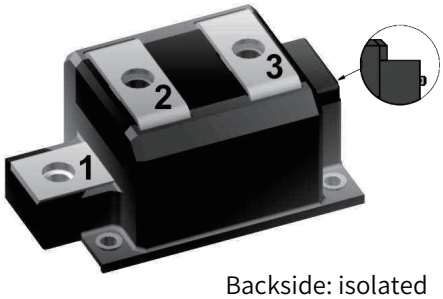
V_{RRM} = 2 x 1600 V

I_{TAV} = 700 A

V_T = 1,11 V

MCMA700P1600CA





Backside: isolated

Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

Applications:

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

Package: ComPack

- Isolation Voltage: 4800V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

Rectifier

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage		T_{VJ} = 25°C			1700	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage		T_{VJ} = 25°C			1600	V
$I_{R/D}$	reverse current, drain current	$V_{R/D}$ = 1600 V	T_{VJ} = 25°C			2	mA
		$V_{R/D}$ = 1600 V	T_{VJ} = 125°C			40	mA
V_T	forward voltage drop	I_T = 700 A	T_{VJ} = 25°C			1,16	V
		I_T = 1400 A				1,41	V
		I_T = 700 A	T_{VJ} = 125 °C			1,11	V
		I_T = 1400 A				1,41	V
I_{TAV}	average forward current	T_C = 85 °C	T_{VJ} = 140°C			700	A
$I_{T(RMS)}$	RMS forward current	180° sine				1100	A
V_{T0}	threshold voltage } for power loss calculation only		T_{VJ} = 140°C			0,82	V
r_T	slope resistance } for power loss calculation only					0,4	mΩ
R_{thJC}	thermal resistance junction to case					0,05	K/W
R_{thCH}	thermal resistance case to heatsink				0,02		K/W
P_{tot}	total power dissipation		T_C = 25°C			2300	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			19,0	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			20,5	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			16,2	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			17,4	kA
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1,81	MA^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1,75	MA^2s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			1,30	MA^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1,27	MA^2s
C_J	junction capacitance	V_R = 400V f = 1 MHz	T_{VJ} = 25°C		876		pF
P_{GM}	max. gate power dissipation	t_P = 30 µs	T_C = 140°C			240	W
		t_P = 300 µs				120	W
P_{GAV}	average gate power dissipation					40	W
$(di/dt)_{cr}$	critical rate of rise of current	T_{VJ} = 140°C; f = 50 Hz	repetitive, I_T =2100 A			100	A/µs
		t_P = 200 µs; di_G/dt= 1 A/µs;					
		I_G =1A; V_D= ⅔ V_{DRM}	non-repet., I_T = 700 A			500	A/µs
$(dv/dt)_{cr}$	critical rate of rise of voltage	V_D= ⅔ V_{DRM}	T_{VJ} = 140°C			1000	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	gate trigger voltage	V_D = 6 V	T_{VJ} = 25°C			2	V
			T_{VJ} = -40°C			3	V
I_{GT}	gate trigger current	V_D = 6 V	T_{VJ} = 25°C			300	mA
			T_{VJ} = -40°C			400	mA
V_{GD}	gate non-trigger voltage	V_D= ⅔ V_{DRM}	T_{VJ} = 140°C			0,25	V
I_{GD}	gate non-trigger current					10	mA
I_L	latching current	t_p = 30 µs	T_{VJ} = 25°C			400	mA
		I_G = 1A; di_G/dt = 1 A/µs					
I_H	holding current	V_D = 6 V R_{GK}= ∞	T_{VJ} = 25°C			300	mA
t_{gd}	gate controlled delay time	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G=1A; di_G/dt=1 A/µs					
t_q	turn-off time	V_R = 100 V; I_T = 700A; V_D= ⅔ V_{DRM}	T_{VJ} =125 °C		350		µs
		di/dt = 10 A/µs; dv/dt = 50 V/µs; t_p = 200 µs					

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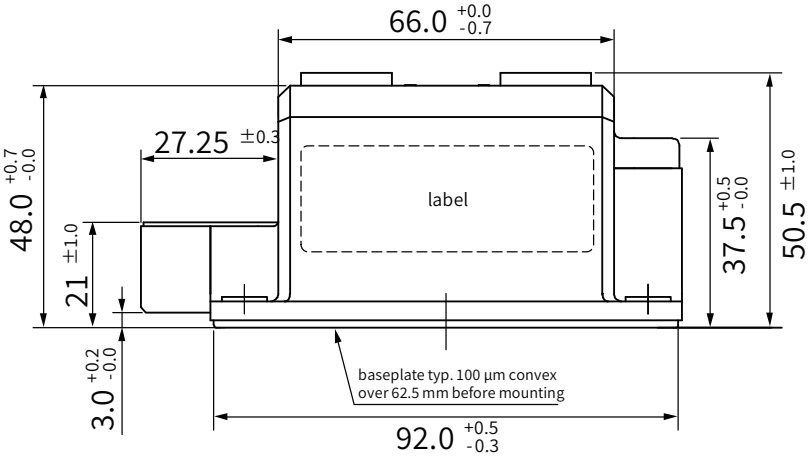
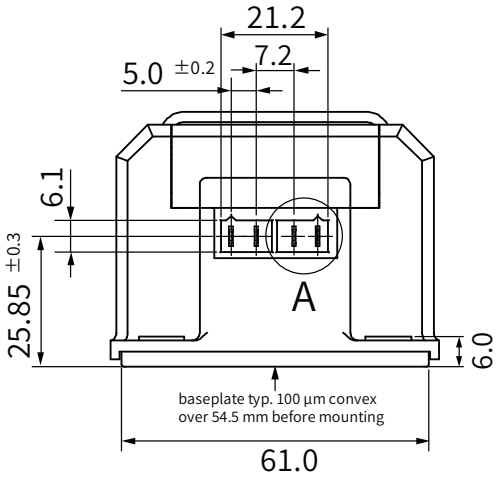
Package ComPack

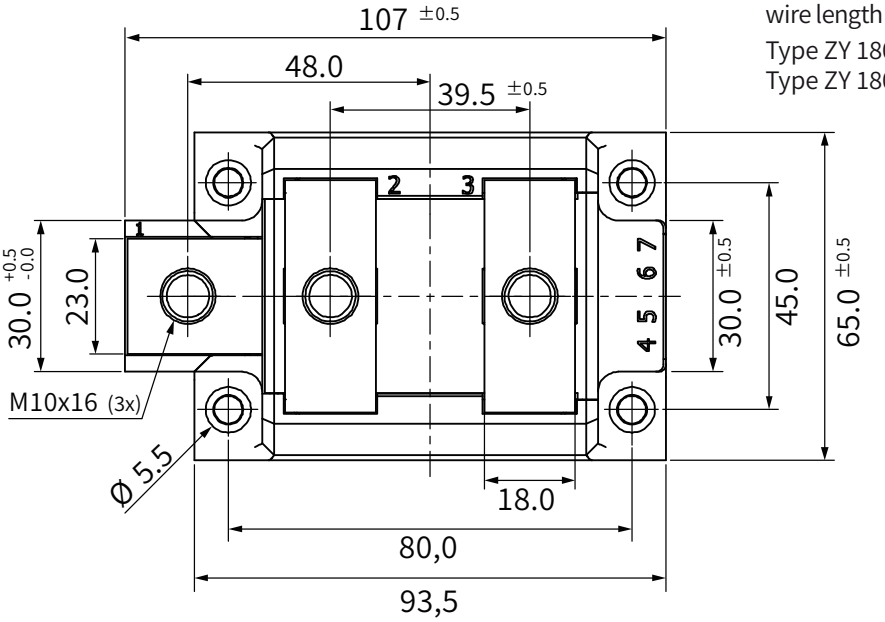
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal				1200	A
T_{VJ}	virtual junction temperature			-40		140	°C
T_{op}	operation temperature			-40		125	°C
T_{stg}	storage temperature			-40		125	°C
Weight					500		g
M_D	mounting torque			3		5	Nm
M_T	terminal torque			12		14	Nm
$d_{Spp/App}$	creepage distance on surface | striking distance through air		terminal to terminal	21,0			mm
$d_{Spb/Apb}$			terminal to backside	18,0			mm
V_{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	4800			V
		t = 1 minute		4000			V

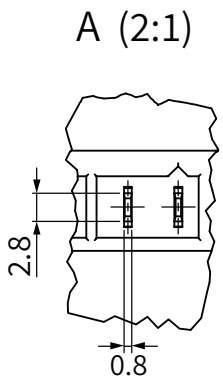
Outlines ComPack

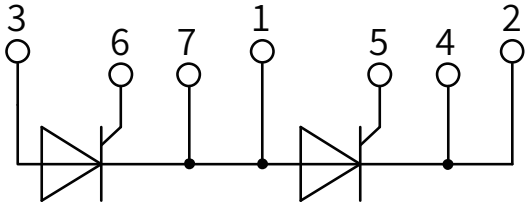




Optional accessories for modules
Keyed gate/cathode twin plugs with
wire length = 350 mm, gate = white, cathode = red
Type ZY 180L (L = Left for pin pair 4/5) } UL 758,
Type ZY 180R (R = Right for pin pair 6/7) } style 3751







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Thyristor

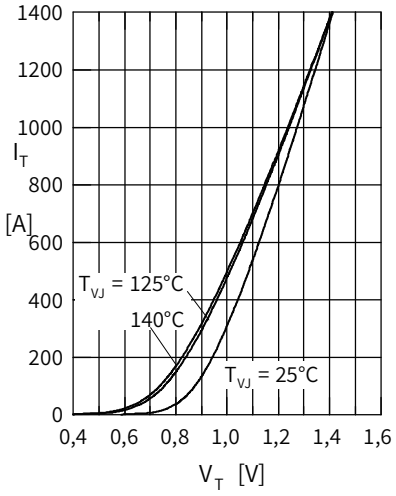

Fig. 1 Forward characteristics

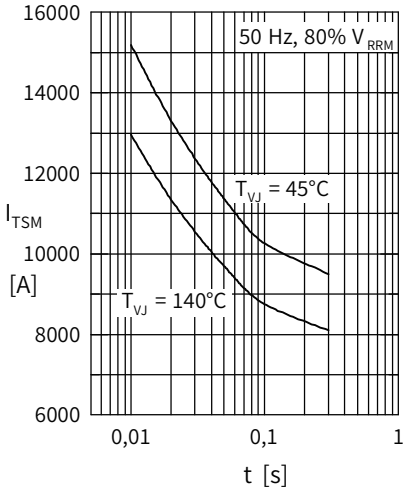

Fig. 2 Surge overload current
I_{TSM}: crest value, t: duration

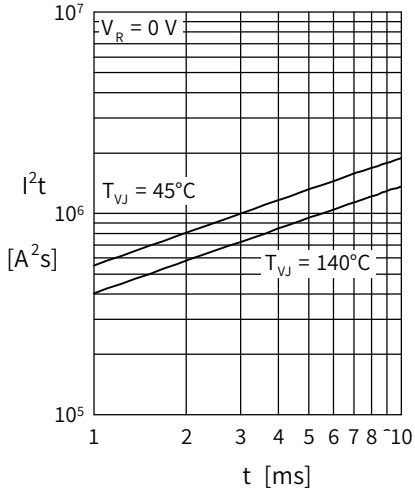

Fig. 3 I^2t versus time (1-10 s)

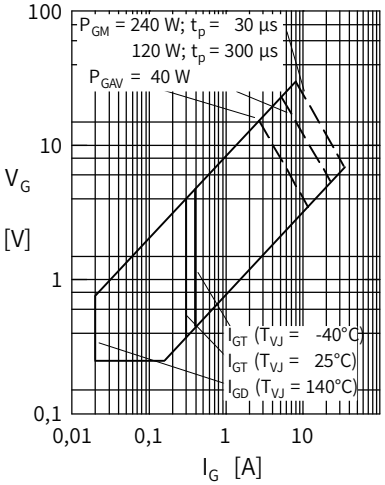

Fig. 4 Gate voltage & gate current

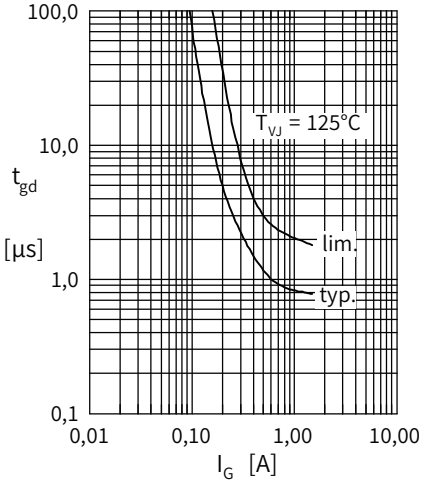

Fig. 5 Gate controlled delay time t_{gd}

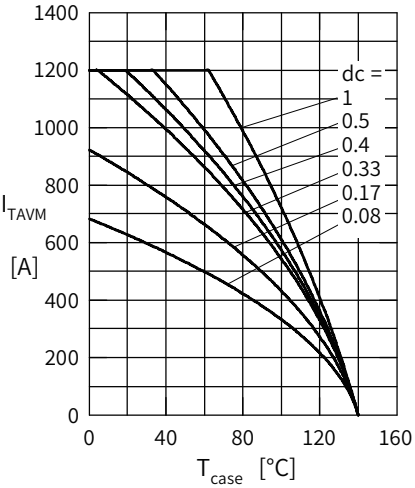

Fig. 6 Max. forward current at case temperature

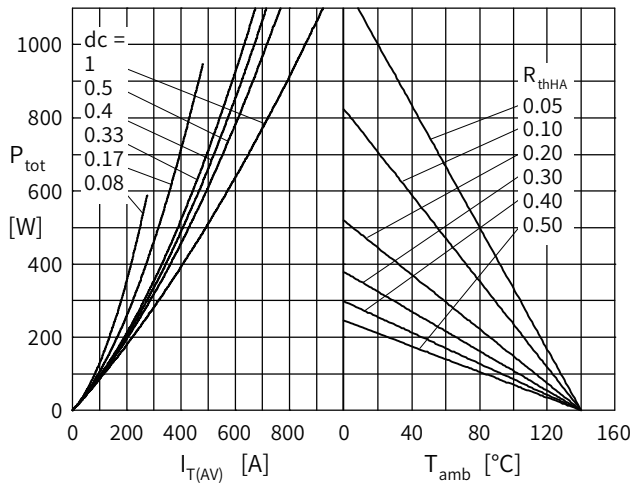

Fig. 7a Power dissipation versus direct output current
Fig. 7b and ambient temperature

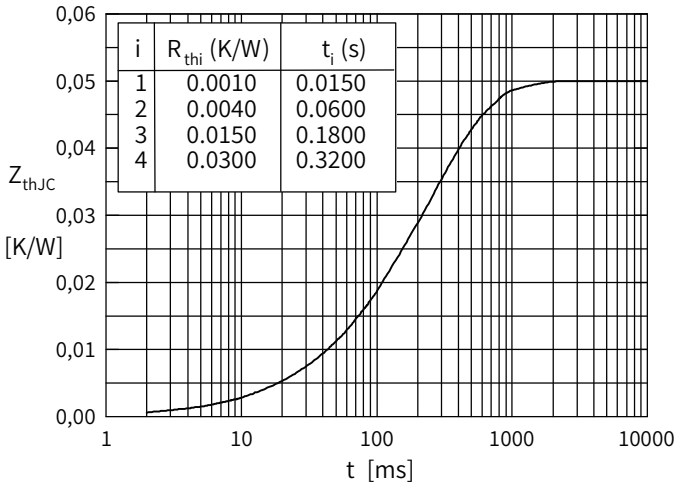

Fig. 8 Transient thermal impedance junction to case