



on request

Thyristor Module

$$V_{RRM} = 2 \times 1600 \text{ V}$$

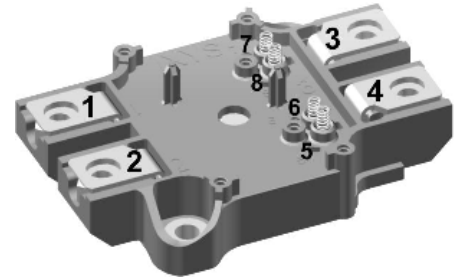
$$I_{TAV} = 200 \text{ A}$$

$$V_T = 1.13 \text{ V}$$

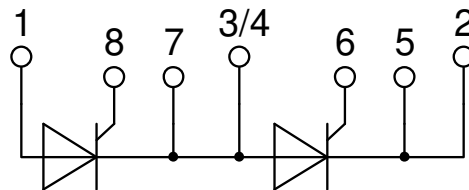
Phase leg

Part number

MCMA200P1600SA



Backside: isolated



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Copper base plate with Direct Copper Bonded Al₂O₃-ceramic
- Spring contacts for solder-free dirver connection

Applications:

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

Package: SimBus A

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Gate: Spring contacts for solder-free PCB-mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling

Disclaimer Notice

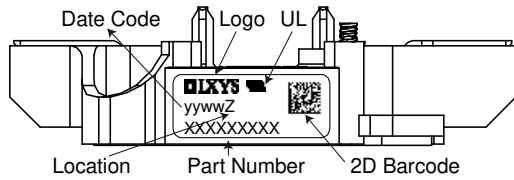
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Thyristor			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V
I_{RD}	reverse current, drain current	$V_{R/D} = 1600 V$	$T_{VJ} = 25^{\circ}C$		200	μA
		$V_{R/D} = 1600 V$	$T_{VJ} = 125^{\circ}C$		15	mA
V_T	forward voltage drop	$I_T = 200 A$	$T_{VJ} = 25^{\circ}C$		1.16	V
		$I_T = 400 A$			1.40	V
		$I_T = 200 A$	$T_{VJ} = 125^{\circ}C$		1.13	V
		$I_T = 400 A$			1.44	V
I_{TAV}	average forward current	$T_C = 90^{\circ}C$	$T_{VJ} = 140^{\circ}C$		200	A
$I_{T(RMS)}$	RMS forward current	180° sine			314	A
V_{T0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 140^{\circ}C$		0.81	V
r_T	slope resistance				1.6	m Ω
R_{thJC}	thermal resistance junction to case				0.15	K/W
R_{thCH}	thermal resistance case to heatsink		0.08			K/W
P_{tot}	total power dissipation		$T_C = 25^{\circ}C$		760	W
I_{TSM}	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		6.00	kA
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		6.48	kA
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 140^{\circ}C$		5.10	kA
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		5.51	kA
I^2t	value for fusing	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		180.0	kA ² s
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		174.7	kA ² s
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 140^{\circ}C$		130.1	kA ² s
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 V$		126.3	kA ² s
C_J	junction capacitance	$V_R = 400 V \quad f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$	273		pF
P_{GM}	max. gate power dissipation	$t_p = 30 \mu s$	$T_C = 140^{\circ}C$		120	W
		$t_p = 300 \mu s$			60	W
P_{GAV}	average gate power dissipation				8	W
$(di/dt)_{cr}$	critical rate of rise of current	$T_{VJ} = 140^{\circ}C; f = 50 \text{ Hz}$	repetitive, $I_T = 600 A$		150	A/ μs
		$t_p = 200 \mu s; di_G/dt = 0.5 A/\mu s;$ $I_G = 0.5 A; V = \frac{2}{3} V_{DRM}$	non-repet., $I_T = 200 A$		500	A/ μs
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$ $R_{GK} = \infty; \text{ method 1 (linear voltage rise)}$	$T_{VJ} = 140^{\circ}C$		1000	V/ μs
V_{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		2.5	V
			$T_{VJ} = -40^{\circ}C$		2.6	V
I_{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$		150	mA
			$T_{VJ} = -40^{\circ}C$		200	mA
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140^{\circ}C$		0.2	V
I_{GD}	gate non-trigger current				10	mA
I_L	latching current	$t_p = 30 \mu s$	$T_{VJ} = 25^{\circ}C$		300	mA
		$I_G = 0.5 A; di_G/dt = 0.5 A/\mu s$				
I_H	holding current	$V_D = 6 V \quad R_{GK} = \infty$	$T_{VJ} = 25^{\circ}C$		200	mA
t_{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$ $I_G = 0.5 A; di_G/dt = 0.5 A/\mu s$	$T_{VJ} = 25^{\circ}C$		2	μs
t_q	turn-off time	$V_R = 100 V; I_T = 200 A; V = \frac{2}{3} V_{DRM}$ $di/dt = 10 A/\mu s \quad dv/dt = 20 V/\mu s \quad t_p = 200 \mu s$	$T_{VJ} = 125^{\circ}C$	150		μs

on request

Package SimBus A		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal			300	A
T_{VJ}	virtual junction temperature		-40		140	°C
T_{op}	operation temperature		-40		125	°C
T_{stg}	storage temperature		-40		125	°C
Weight				152		g
M_D	mounting torque		3		5	Nm
M_T	terminal torque		2.5		5	Nm
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	14.0	10.0		mm
$d_{Spb/Apb}$		terminal to backside	14.0	10.0		mm
V_{ISOL}	isolation voltage	t = 1 second	4800			V
		t = 1 minute	4000			V


Part description

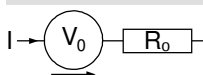
M = Module
 C = Thyristor (SCR)
 M = Thyristor
 A = (up to 1800V)
 200 = Current Rating [A]
 P = Phase leg
 1600 = Reverse Voltage [V]
 SA = SimBus A

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCMA200P1600SA	MCMA200P1600SA	Blister	9	510387

Similar Part	Package	Voltage class
MCMA200PD1600SA	Simbus A	1600

Equivalent Circuits for Simulation

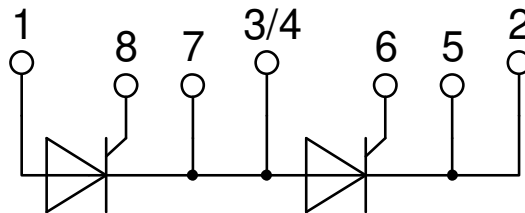
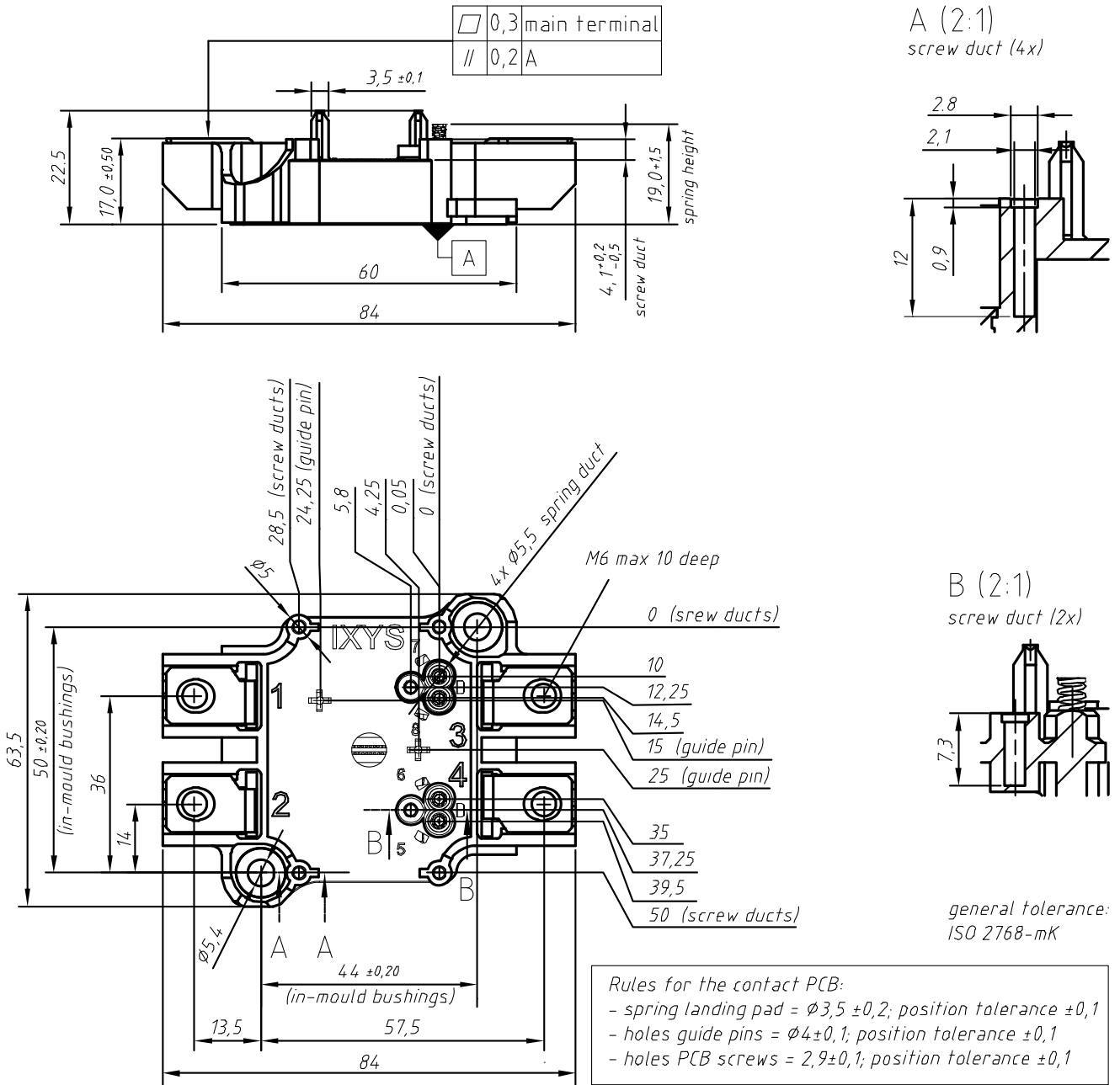
* on die level

 $T_{VJ} = 140^{\circ}\text{C}$

Thyristor

$V_{0\ max}$	threshold voltage	0.81	V
$R_{0\ max}$	slope resistance *	0.8	mΩ



Outlines SimBus A



Thyristor

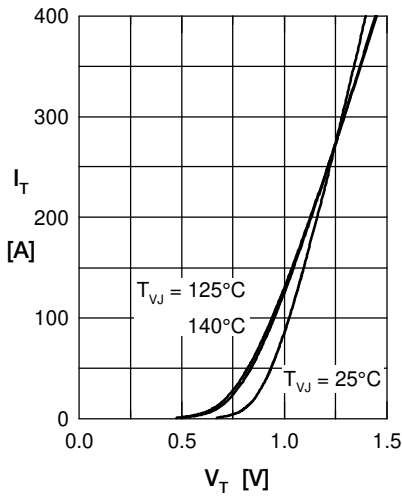


Fig. 1 Forward current vs. voltage drop per thyristor

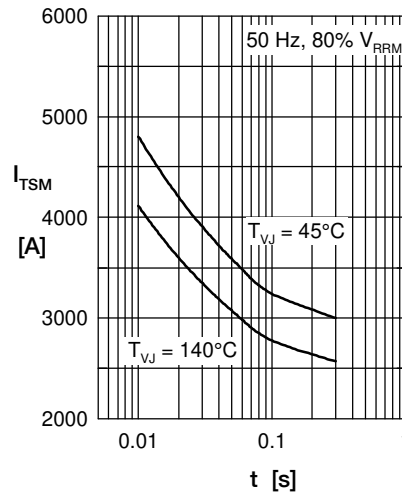


Fig. 2 Surge overload current vs. time per thyristor

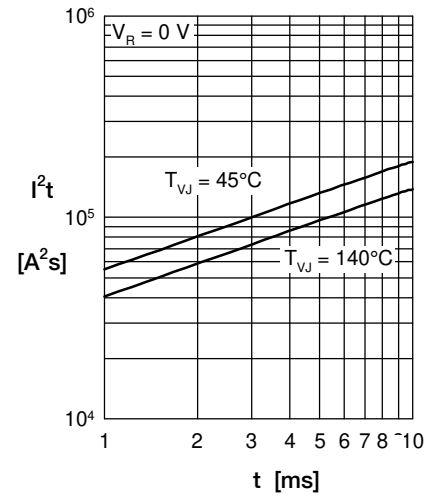


Fig. 3 I^2t vs. time per thyristor

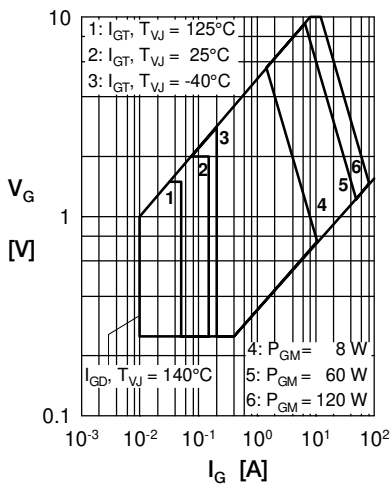


Fig. 4 Gate voltage & gate current

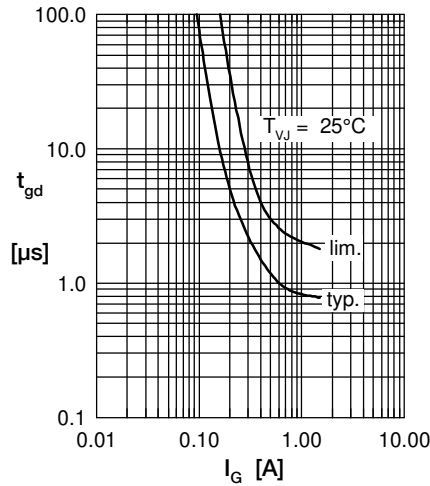


Fig. 5 Gate controlled delay time t_{gd}

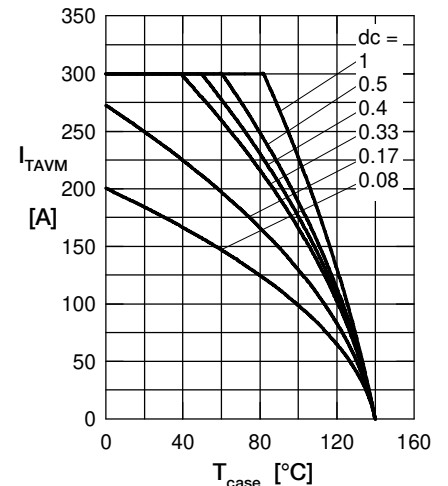


Fig. 6 Max. forward current vs. case temperature per thyristor.

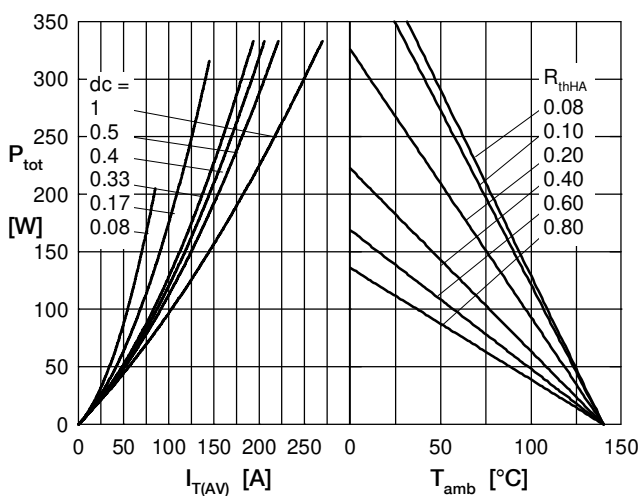


Fig. 7 Power dissipation vs. forward current and ambient temperature per thyristor

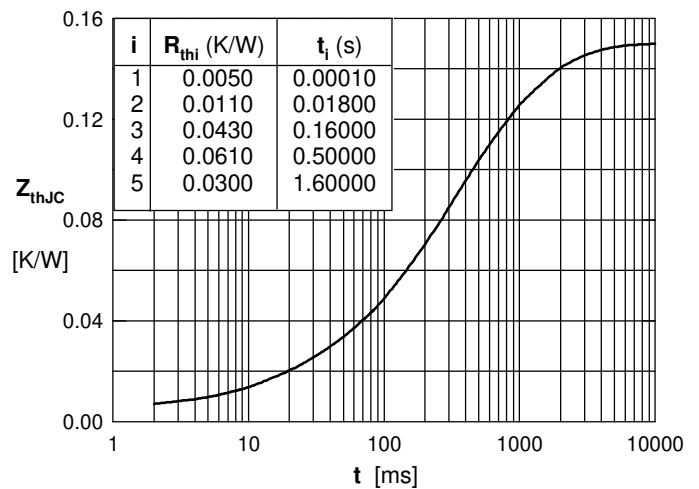


Fig. 8 Transient thermal impedance junction to case vs. time per thyristor