preliminary

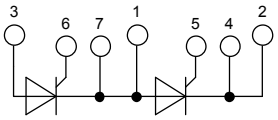
Thyristor Module

Voltage range: 1200 - 1800 V
Phase leg

V_{RRM} = 1600 V
$I_{T(RMS)}$ = 412 A
$I_{T(AV)M}$ = 262 A

Part number

MCMA 260 P 1600 YA



pending

Features / Advantages:

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

Applications:

- Motor control
- Power converter
- AC power controller
- Switch mode and resonant mode power supplies
- Lighting and temperature control

Package:

- Housing: Y4
- International standard package
- RoHS compliant
- Isolation voltage: 3600 V~
- Reduced weight
- Advanced power cycling

Ratings

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 = 1600 V	T_{VJ} = 25°C			300	µA
		V_R = 1600 V	T_{VJ} = 140°C			30	mA
V_T	*forward voltage*	I_T = 200 A	T_{VJ} = 25°C			1.20	V
		I_T = 400 A				1.55	V
		I_T = 200 A	T_{VJ} = 125°C			1.10	V
		I_T = 400 A				1.50	V
$I_{T(AV)M}$	*max. average forward current*	T_C = 90°C	T_{VJ} = 140°C			262	A
$I_{T(RMS)}$	*RMS forward current*	180° sine				412	A
V_{T0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 140°C			0.80	V
r_T	*slope resistance* }					1	mΩ
R_{thJC}	*thermal resistance junction to case*					0.13	K/W
T_{VJ}	*virtual junction temperature*			-40		140	°C
P_{tot}	*total power dissipation*		T_C = 25°C			885	W
P_{GM}	*max. gate power dissipation*	t_P = 30 µs	T_C = 140°C			120	W
		t_P = 500 µs				60	W
P_{GAV}	*average gate power dissipation*					20	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			8.30	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			8.97	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			7.06	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			7.62	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			344.5	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			334.3	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 140°C			248.9	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			241.6	kA²s
C_J	*junction capacitance*	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		366		pF

Symbol	Definition	Conditions	Ratings min.	typ.	max.	Unit
$(di/dt)_{cr}$	*critical rate of rise of current*	T_{VJ} = 140°C repetitive, I_T = 500 A			100	A/µs
		f = 50 Hz; t_P = 200 µs				
		I_G = 0.5A; di_G/dt = 0.5 A/µs				
		V_D = ⅔ V_{DRM} non-repetitive, I_T = 500 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			150	mA
		T_{VJ} = -40 °C			220	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			200	mA
		I_G = 0.5A; di_G/dt = 0.5 A/µs				
I_H	*holding current*	V_D = 6 V R_{GK} = ∞ T_{VJ} = 25 °C			150	mA
t_{gd}	*gate controlled delay time*	V_R = ½ V_{DRM} T_{VJ} = 25 °C			2	µs
		I_G = 0.5A; di_G/dt = 0.5 A/µs				
t_q	*turn-off time*	V_R = 100 V; I_T = 300 A T_{VJ} = 140 °C		200		µs
		V_D = ⅔ V_{DRM}; t_p = 200 µs				
		di/dt = 10 A/µs; dv/dt = 50 V/µs				

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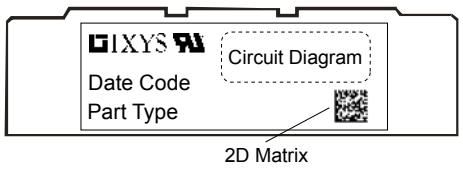
Symbol	Definition	Conditions	Ratings min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal			400	A
R_{thCH}	*thermal resistance case to heatsink*			0.08		K/W
T_{stg}	*storage temperature*		-40		125	°C
Weight				150		g
M_D	*mounting torque*		2.25		2.75	Nm
M_T	*terminal torque*		4.5		5.5	Nm
V_{ISOL}	*isolation voltage*	t = 1 second	3600			V
		t = 1 minute	3000			V
d_S	*creapage distance on surface*		12.7			mm
d_A	*striking distance through air*		9.6			mm



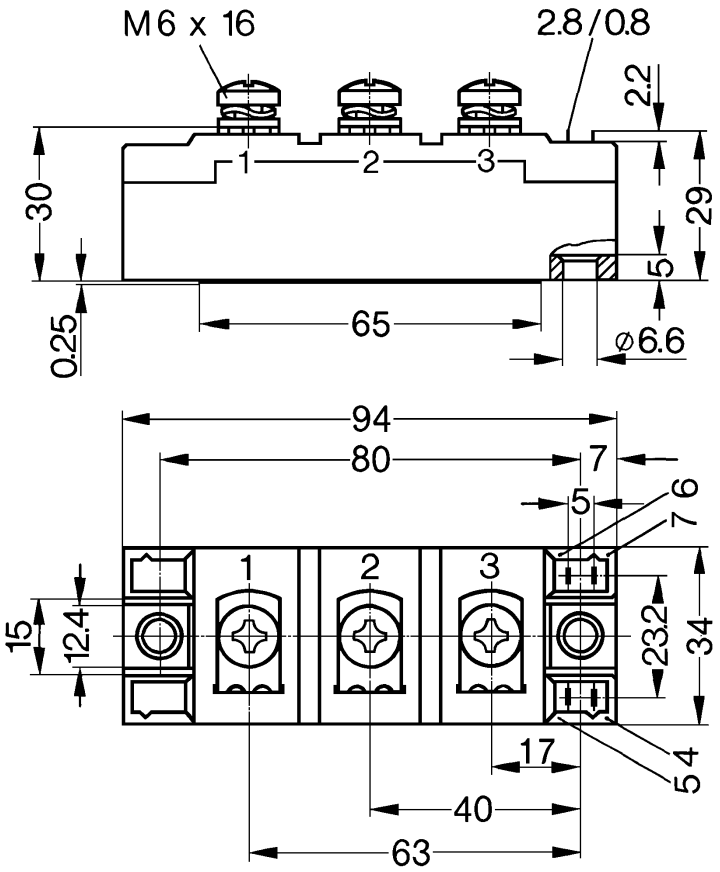
Part number

M = Module
C = Thyristor (SCR)
M = Thyristor
A = (up to 1800 V)
260 = Current Rating [A]
P = Phase leg
1600 = Reverse Voltage [V]
YA = Y4-M6

Ordering	Part Name	Marking on Product	Delivering Mode	Base Qty	Code Key
Standard	MCMA 260 P 1600 YA	MCMA260P1600YA	Box	6	509785

Similar Part	Package	Voltage class
MCMA260P1200YA	Y4-M6	1200
MCMA260P1400YA	Y4-M6	1400
MCMA260P1800YA	Y4-M6	1800
MCMA260PD1200YB	Y4-M6	1200
MCMA260PD1400YB	Y4-M6	1400
MCMA260PD1600YB	Y4-M6	1600
MCMA260PD1800YB	Y4-M6	1800

Outlines Y4



Optional accessories for modules
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type ZY 180L(L = Left for pin pair 4/5) } UL 758, style 1385,
Type ZY 180R(R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

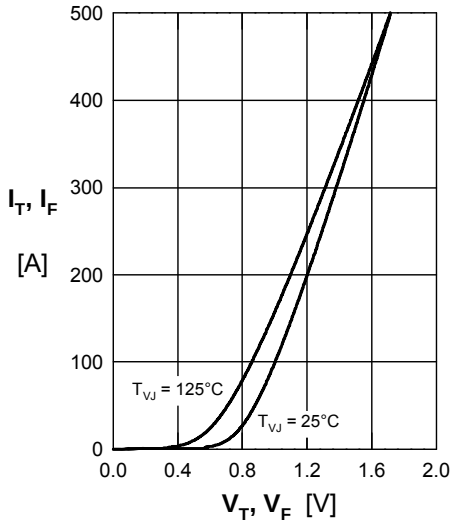


Fig. 1 Forward voltage drop

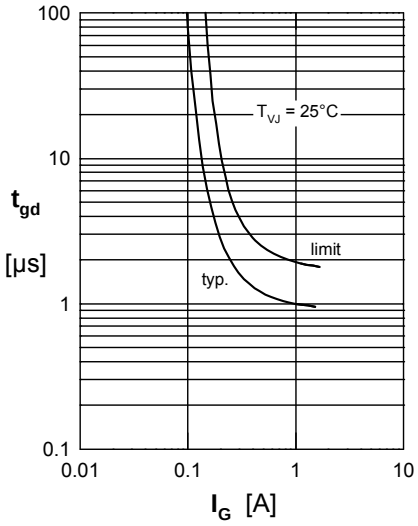


Fig. 2 Gate trigger delay time

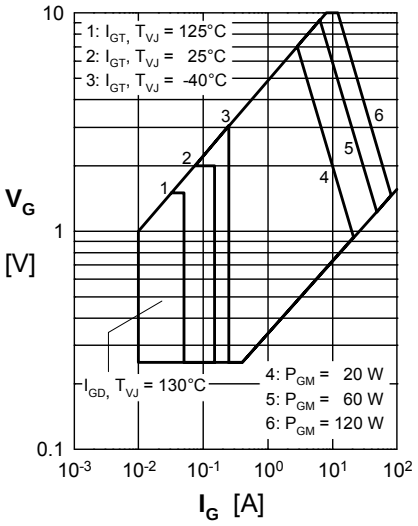


Fig. 3 Gate trigger characteristics

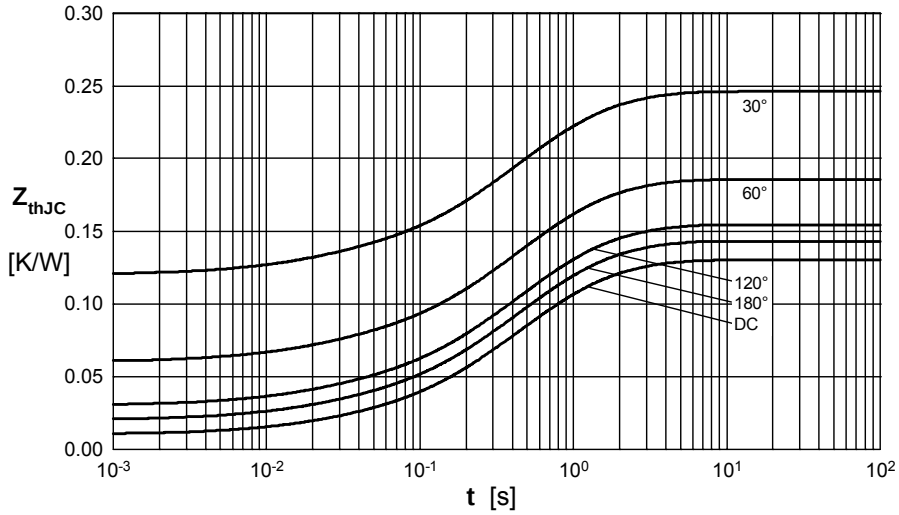


Fig. 4 Transient thermal impedance junction to case (per thyristor/diode)

Constants for Z_{th} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.01	0.00014
2	0.0065	0.019
3	0.025	0.18
4	0.0615	0.52
5	0.027	1.6