

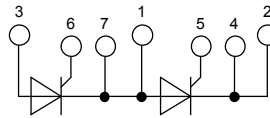
# Thyristor Module

Voltage range: 1200 - 1800 V

Phase leg

 $V_{RRM} = 1600 \text{ V}$ 
 $I_{T(RMS)} = 412 \text{ A}$ 
 $I_{T(AVM)} = 262 \text{ A}$ 

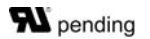
Part number

**MCMA 260 P 1600 YA**

**Features / Advantages:**

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al<sub>2</sub>O<sub>3</sub>-ceramic

**Applications:**

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

**Package:**


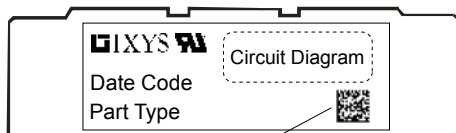
- Housing: Y4
- International standard package
- RoHS compliant
- Isolation voltage: 3600 V~
- Reduced weight
- Advanced power cycling

**Ratings**

Symbol	Definition	Conditions	Ratings			Unit	
			min.	typ.	max.		
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1700	V	
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1600	V	
$I_{RD}$	reverse current, drain current	$V_R = 1600 \text{ V}$			300	$\mu\text{A}$	
		$V_R = 1600 \text{ V}$	$T_{VJ} = 140^{\circ}\text{C}$		30	mA	
$V_T$	forward voltage	$I_T = 200 \text{ A}$			1.20	V	
		$I_T = 400 \text{ A}$			1.55	V	
		$I_T = 200 \text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1.10	V
		$I_T = 400 \text{ A}$				1.50	V
$I_{T(AVM)}$	max. average forward current	$T_C = 90^{\circ}\text{C}$			262	A	
$I_{T(RMS)}$	RMS forward current	180° sine			412	A	
$V_{T0}$	threshold voltage	$T_{VJ} = 140^{\circ}\text{C}$			0.80	V	
$r_T$	slope resistance				1	m $\Omega$	
$R_{thJC}$	thermal resistance junction to case				0.13	K/W	
$T_{VJ}$	virtual junction temperature		-40		140	$^{\circ}\text{C}$	
$P_{tot}$	total power dissipation	$T_C = 25^{\circ}\text{C}$			885	W	
$P_{GM}$	max. gate power dissipation	$t_p = 30 \mu\text{s}$			120	W	
		$t_p = 500 \mu\text{s}$			60	W	
$P_{GAV}$	average gate power dissipation				20	W	
$I_{FSM}$	max. forward surge current	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$		8.30	kA	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 \text{ V}$		8.97	kA	
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 140^{\circ}\text{C}$		7.06	kA	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 \text{ V}$		7.62	kA	
$I^2t$	value for fusing	$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$		344.5	kA <sup>2</sup> s	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 \text{ V}$		334.3	kA <sup>2</sup> s	
		$t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}$	$T_{VJ} = 140^{\circ}\text{C}$		248.9	kA <sup>2</sup> s	
		$t = 8,3 \text{ ms}; (60 \text{ Hz}), \text{ sine}$	$V_R = 0 \text{ V}$		241.6	kA <sup>2</sup> s	
$C_J$	junction capacitance	$V_R = 400 \text{ V}$ $f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		366	pF	

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$(di/dt)_{cr}$	<i>critical rate of rise of current</i>	$T_{VJ} = 140^{\circ}\text{C}$ repetitive, $I_T = 500\text{ A}$ $f = 50\text{ Hz}$ ; $t_p = 200\ \mu\text{s}$ $I_G = 0.5\text{ A}$ ; $di_G/dt = 0.5\text{ A}/\mu\text{s}$			100	$\text{A}/\mu\text{s}$
		$V_D = \frac{2}{3} V_{DRM}$ non-repetitive, $I_T = 500\text{ A}$			500	$\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	<i>critical rate of rise of voltage</i>	$V_D = \frac{2}{3} V_{DRM}$ $T_{VJ} = 140^{\circ}\text{C}$ $R_{GK} = \infty$ ; method 1 (linear voltage rise)			1000	$\text{V}/\mu\text{s}$
$V_{GT}$	<i>gate trigger voltage</i>	$V_D = 6\text{ V}$ $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$			2	V
$I_{GT}$	<i>gate trigger current</i>	$V_D = 6\text{ V}$ $T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = -40^{\circ}\text{C}$			3	V
					150	220
$V_{GD}$	<i>gate non-trigger voltage</i>	$V_D = \frac{2}{3} V_{DRM}$ $T_{VJ} = 140^{\circ}\text{C}$			0.25	V
$I_{GD}$	<i>gate non-trigger current</i>				10	mA
$I_L$	<i>latching current</i>	$t_p = 30\ \mu\text{s}$ $T_{VJ} = 25^{\circ}\text{C}$ $I_G = 0.5\text{ A}$ ; $di_G/dt = 0.5\text{ A}/\mu\text{s}$			200	mA
$I_H$	<i>holding current</i>	$V_D = 6\text{ V}$ $R_{GK} = \infty$ $T_{VJ} = 25^{\circ}\text{C}$			150	mA
$t_{gd}$	<i>gate controlled delay time</i>	$V_R = \frac{1}{2} V_{DRM}$ $T_{VJ} = 25^{\circ}\text{C}$ $I_G = 0.5\text{ A}$ ; $di_G/dt = 0.5\text{ A}/\mu\text{s}$			2	$\mu\text{s}$
$t_q$	<i>turn-off time</i>	$V_R = 100\text{ V}$ ; $I_T = 300\text{ A}$ $T_{VJ} = 140^{\circ}\text{C}$ $V_D = \frac{2}{3} V_{DRM}$ ; $t_p = 200\ \mu\text{s}$ $di/dt = 10\text{ A}/\mu\text{s}$ ; $dv/dt = 50\text{ V}/\mu\text{s}$		200		$\mu\text{s}$

Symbol	Definition	Conditions	Ratings			Unit
			min.	typ.	max.	
$I_{RMS}$	RMS current	per terminal			400	A
$R_{thCH}$	thermal resistance case to heatsink			0.08		K/W
$T_{stg}$	storage temperature		-40		125	°C
<b>Weight</b>				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
$d_s$	creepage distance on surface		12.7			mm
$d_A$	striking distance through air		9.6			mm



2D Matrix

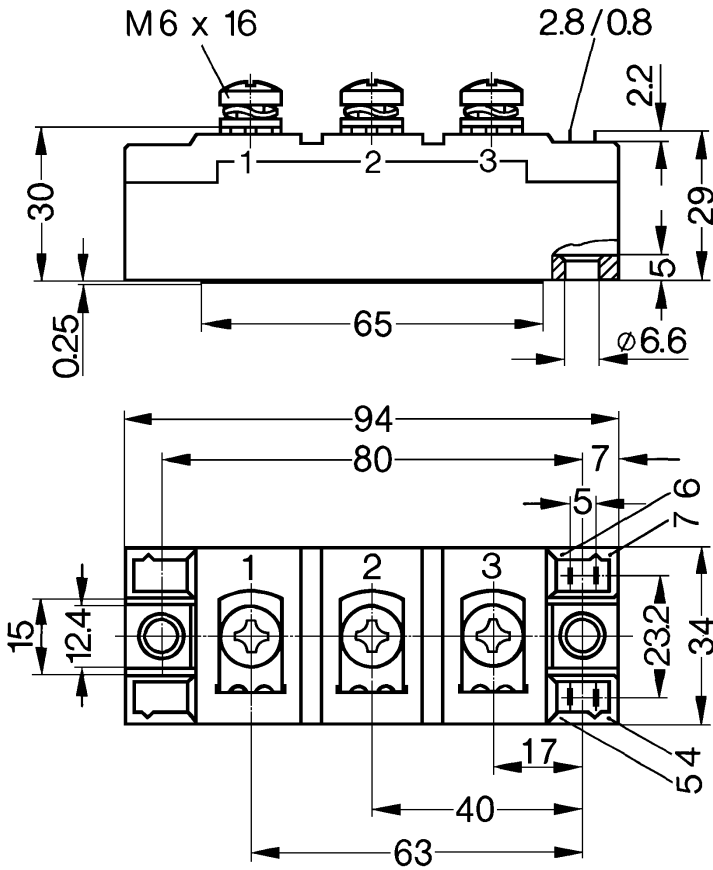
### Part number

- 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

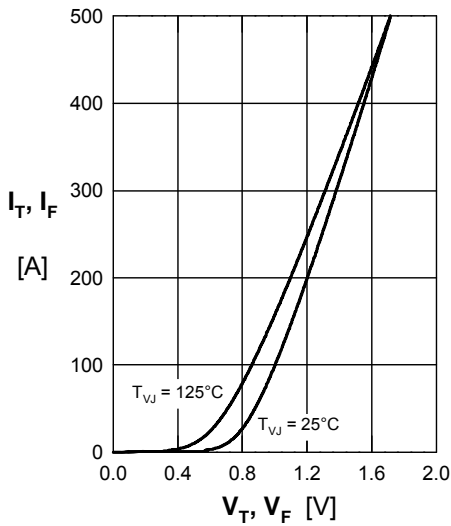


Fig. 1 Forward voltage drop

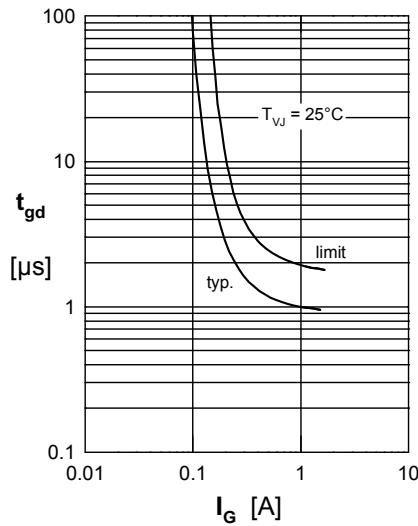


Fig. 2 Gate trigger delay time

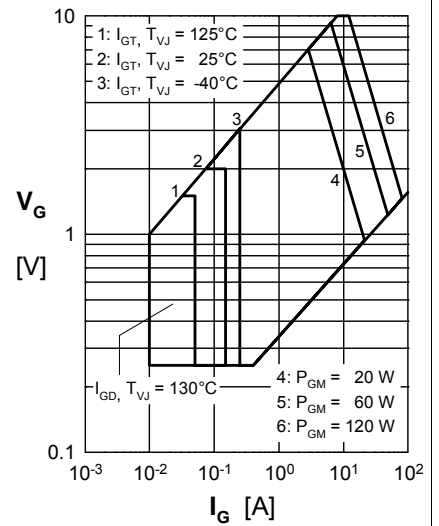


Fig. 3 Gate trigger characteristics

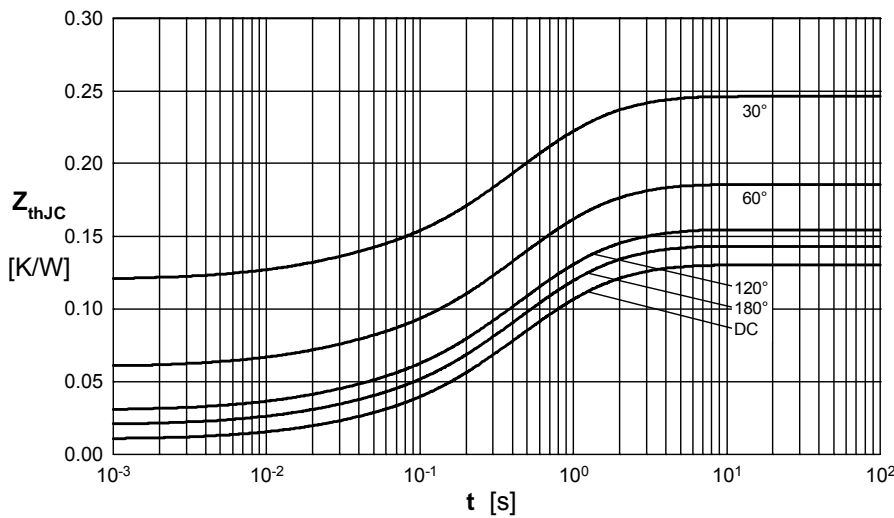


Fig. 4 Transient thermal impedance junction to case (per thyristor/diode)

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