

# High Voltage Thyristor Module

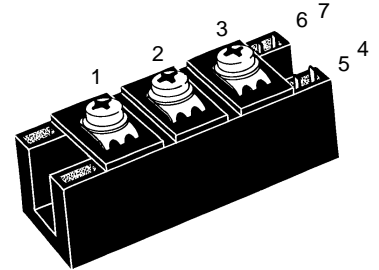
## High Voltage High Voltage

$$I_{TRMS} = 2 \times 300 \text{ A}$$

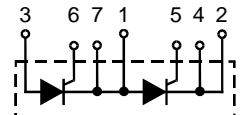
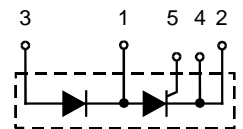
$$I_{TAVM} = 2 \times 165 \text{ A}$$

$$V_{RRM} = 2000-2200 \text{ V}$$

$V_{RSM}$ $V_{DSM}$ V	$V_{RRM}$ $V_{DRM}$ V	Type	
2100	2000	MCC 161-20io1	MCD 161-20io1
2300	2200	MCC 161-22io1	MCD 161-22io1



Symbol	Test Conditions	Maximum Ratings	
$I_{TRMS}$	$T_{VJ} = T_{VJM}$	300	A
$I_{TAVM}$	$T_C = 85^\circ\text{C}; 180^\circ \text{ sine}$	165	A
$I_{TSM}$	$T_{VJ} = 45^\circ\text{C};$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$ $t = 8.3 \text{ ms (60 Hz)}$	A A
	$T_{VJ} = T_{VJM}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$ $t = 8.3 \text{ ms (60 Hz)}$	A A
$\int i^2 dt$	$T_{VJ} = 45^\circ\text{C}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$ $t = 8.3 \text{ ms (60 Hz)}$	$A^2s$ $A^2s$
	$T_{VJ} = T_{VJM}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$ $t = 8.3 \text{ ms (60 Hz)}$	$A^2s$ $A^2s$
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ repetitive, $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$	$I_T = 500 \text{ A}$	150 $A/\mu\text{s}$
	$I_G = 0.5 \text{ A},$ non repetitive, $di_G/dt = 0.5 \text{ A}/\mu\text{s}$	$I_T = I_{TAVM}$	500 $A/\mu\text{s}$
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}; V_{DR} = 2/3 V_{DRM}$ $R_{GK} = \infty;$ method 1 (linear voltage rise)		1000 $V/\mu\text{s}$
$P_{GM}$	$T_{VJ} = T_{VJM}$ $I_T = I_{TAVM}$	$t_p = 30 \mu\text{s}$ $t_p = 500 \mu\text{s}$	120 60 8 10 W W W V
$P_{GAV}$			8
$V_{RGM}$			10
$T_{VJ}$			-40 ... 125
$T_{VJM}$			125
$T_{stg}$			-40 ... 125
$V_{ISOL}$	50/60 Hz, RMS	$t = 1 \text{ min}$	3000 $V\sim$
	$I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ s}$	3600 $V\sim$
$M_d$	Mounting torque (M6)	2.25-2.75/20-25	Nm/lb.in.
	Terminal connection torque (M6)	4.5-5.5/40-48	Nm/lb.in.
Weight	Typical including screws	125	g

**MCC**

**MCD**


### Features

- International standard package
- **Direct Copper Bonded**  $\text{Al}_2\text{O}_3$  -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Keyed gate/cathode twin pins

### Applications

- Motor control
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Contactless switches

### Advantages

- Space and weight savings
- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

Data according to IEC 60747 and refer to a single thyristor/diode unless otherwise stated. IXYS reserves the right to change limits, test conditions and dimensions

Symbol	Test Conditions	Characteristic Values
$I_{RRM}, I_{DRM}$	$T_{VJ} = T_{VJM}; V_R = V_{RRM}$	40 mA
$V_T$	$I_T = 300 \text{ A}; T_{VJ} = 25^\circ\text{C}$	1.36 V
$V_{T0}$	For power-loss calculations only ( $T_{VJ} = T_{VJM}$ )	0.8 V
$r_T$		1.6 mΩ
$V_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	2 V
	$T_{VJ} = -40^\circ\text{C}$	2.6 V
$I_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	150 mA
	$T_{VJ} = -40^\circ\text{C}$	200 mA
$V_{GD}$	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	0.25 V
$I_{GD}$	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	10 mA
$I_L$	$T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; t_p = 30 \mu\text{s}$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}; I_G = 0.45 \text{ A}$	200 mA
$I_H$	$T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; R_{GK} = \infty$	150 mA
$t_{gd}$	$T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$ $di_G/dt = 0.5 \text{ A}/\mu\text{s}; I_G = 0.5 \text{ A}$	2 μs
$t_q$	$T_{VJ} = T_{VJM}; V_R = 100 \text{ V}; V_D = 2/3 V_{DRM}; t_p = 200 \mu\text{s}$ typ. 150 μs $dv/dt = 20 \text{ V}/\mu\text{s}; I_T = 160 \text{ A}; -di/dt = 10 \text{ A}/\mu\text{s}$	150 μs
$Q_S$	} $T_{VJ} = T_{VJM}$	550 μC
$I_{RM}$		-di/dt = 50 A/μs; $I_T = 300 \text{ A}$
$R_{thJC}$	per thyristor; DC current	0.155 K/W
	per module	0.078 K/W
$R_{thJK}$	per thyristor; DC current	0.225 K/W
	per module	0.113 K/W
$d_s$	Creeping distance on surface	12.7 mm
$d_A$	Creepage distance in air	9.6 mm
$a$	Maximum allowable acceleration	50 m/s <sup>2</sup>

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

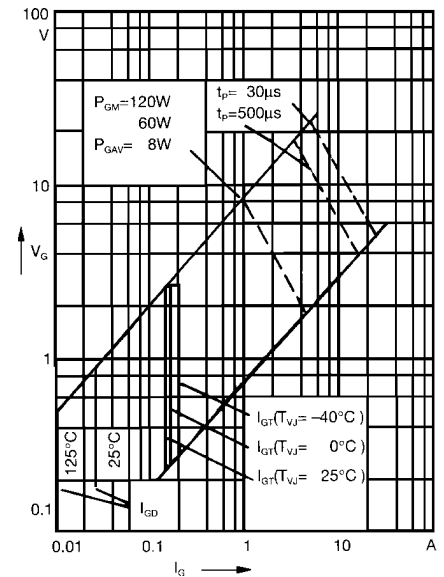


Fig. 1 Gate trigger characteristics

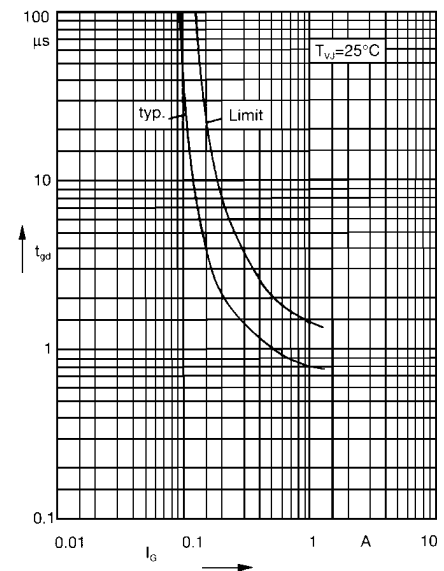
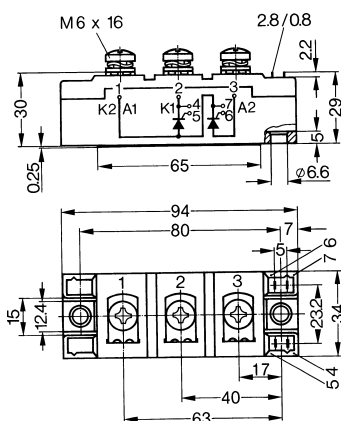


Fig. 2 Gate trigger delay time

### Dimensions in mm (1 mm = 0.0394")



### $R_{thJC}$ for various conduction angles d:

d	$R_{thJC}$ (K/W)
DC	0.155
180°	0.167
120°	0.175
60°	0.197
30°	0.226

### Constants for $Z_{thJC}$ calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0072	0.001
2	0.0188	0.08
3	0.129	0.2

### $R_{thJK}$ for various conduction angles d:

d	$R_{thJK}$ (K/W)
DC	0.225
180°	0.237
120°	0.245
60°	0.262
30°	0.296

### Constants for $Z_{thJK}$ calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.0072	0.001
2	0.0188	0.08
3	0.129	0.2
4	0.07	1.0