

High Voltage Thyristor Module

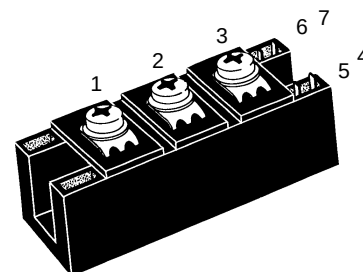
High Voltage High Voltage

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

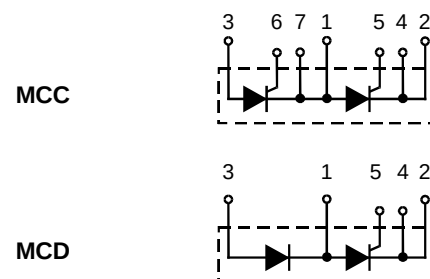
$$I_{TAVM} = 2 \times 165 \text{ A}$$

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

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}	$T_{VJ} = 45^\circ\text{C};$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$	A
		$t = 8.3 \text{ ms (60 Hz)}$	A
	$T_{VJ} = T_{VJM}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$	A
		$t = 8.3 \text{ ms (60 Hz)}$	A
$\int i^2 dt$	$T_{VJ} = 45^\circ\text{C}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$	A^2s
		$t = 8.3 \text{ ms (60 Hz)}$	A^2s
	$T_{VJ} = T_{VJM}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz)}$	A^2s
		$t = 8.3 \text{ ms (60 Hz)}$	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ repetitive, $I_T = 500 \text{ A}$ $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$	150	$\text{A}/\mu\text{s}$
	$I_G = 0.5 \text{ A},$ non repetitive, $I_T = I_{TAVM}$ $di_G/dt = 0.5 \text{ A}/\mu\text{s}$	500	$\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}; V_{DR} = 2/3 V_{DRM}$ $R_{GK} = \infty;$ method 1 (linear voltage rise)	1000	$\text{V}/\mu\text{s}$
P_{GM}	$T_{VJ} = T_{VJM}$ $I_T = I_{TAVM}$	$t_p = 30 \mu\text{s}$ $t_p = 500 \mu\text{s}$	120 W 60 W
P_{GAV}			8 W
V_{RGM}			10 V
T_{VJ}		-40 ...125	$^\circ\text{C}$
T_{VJM}		125	$^\circ\text{C}$
T_{stg}		-40 ...125	$^\circ\text{C}$
V_{ISOL}	50/60 Hz, RMS $t = 1 \text{ min}$	3000	V~
	$I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	3600	V~
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



Features

- International standard package
- Direct Copper Bonded Al_2O_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	$T_{VJ} = T_{VJM}; V_R = 100 \text{ V}; V_D = 2/3 V_{DRM}; t_p = 200 \mu\text{s}$ $dv/dt = 20 \text{ V}/\mu\text{s}; I_T = 160 \text{ A}; -di/dt = 10 \text{ A}/\mu\text{s}$	typ. 150	μs
Q_S	$T_{VJ} = T_{VJM}$ $-di/dt = 50 \text{ A}/\mu\text{s}; I_T = 300 \text{ A}$	550	μC
I_{RM}		235	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 ²

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

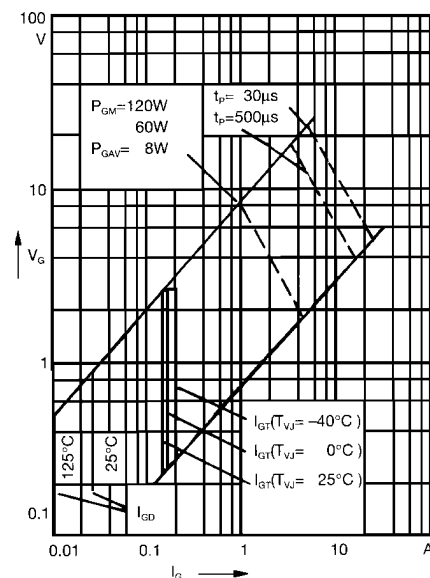


Fig. 1 Gate trigger characteristics

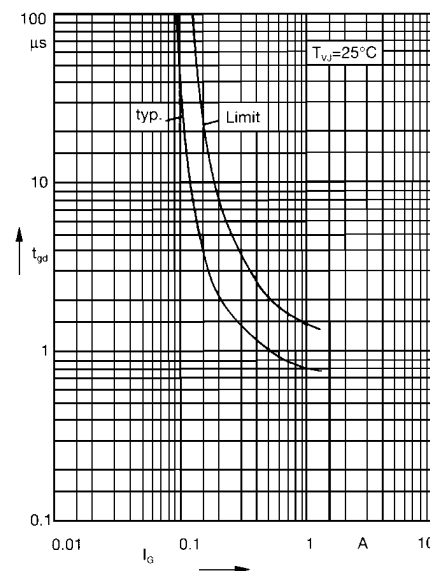
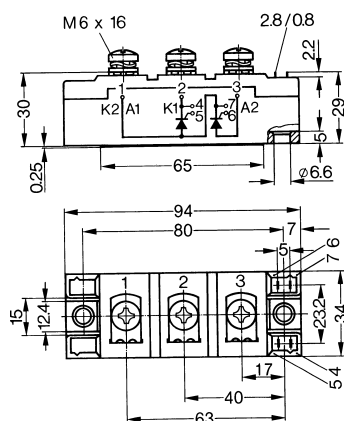


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")



R_{thJC} for various conduction angles d :

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

Constants for Z_{thJC} calculation:

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

R_{thJK} for various conduction angles d :

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

Constants for Z_{thJK} calculation:

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