

High Voltage Thyristor Module

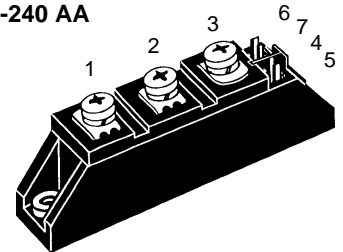
High Voltage Thyristor/Diode Modules

$$I_{TRMS} = 2 \times 180 \text{ A}$$

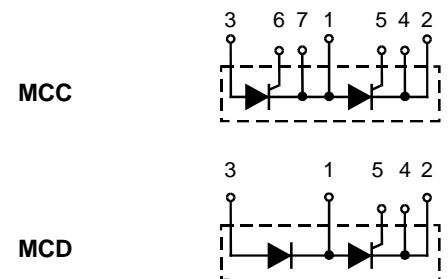
$$I_{TAVM} = 2 \times 104 \text{ A}$$

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

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
2100	2000	MCC 94-20io1 B	MCD 94-20io1 B
2300	2200	MCC 94-22io1 B	MCD 94-22io1 B

TO-240 AA


Symbol	Test Conditions	Maximum Ratings
I_{TRMS}	$T_{VJ} = T_{VJM}$	180 A
I_{TAVM}	$T_C = 85^\circ\text{C}; 180^\circ \text{ sine}$	104 A
I_{TSM}	$T_{VJ} = 45^\circ\text{C}; V_R = 0$	t = 10 ms (50 Hz) 1700 A t = 8.3 ms (60 Hz) 1800 A
	$T_{VJ} = T_{VJM}; V_R = 0$	t = 10 ms (50 Hz) 1540 A t = 8.3 ms (60 Hz) 1640 A
$\int i^2 dt$	$T_{VJ} = 45^\circ\text{C}; V_R = 0$	t = 10 ms (50 Hz) 14450 A ² s t = 8.3 ms (60 Hz) 13500 A ² s
	$T_{VJ} = T_{VJM}; V_R = 0$	t = 10 ms (50 Hz) 11850 A ² s t = 8.3 ms (60 Hz) 11300 A ² s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ repetitive, $I_T = 250 \text{ A}$ $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$	150 A/ μs
	$I_G = 0.45 \text{ A}$, non repetitive, $I_T = I_{TAVM}$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}$	500 A/ μs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}; V_{DR} = 2/3 V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)	1000 V/ μs
P_{GM}	$T_{VJ} = T_{VJM}$ $t_p = 30 \mu\text{s}$	10 W
	$I_T = I_{TAVM}$ $t_p = 300 \mu\text{s}$	5 W
P_{GAV}		0.5 W
V_{RGM}		10 V
T_{VJ}		-40 ... 125 °C
T_{VJM}		125 °C
T_{stg}		-40 ... 125 °C
V_{ISOL}	50/60 Hz, RMS t = 1 min	3000 V~
	$I_{ISOL} \leq 1 \text{ mA}$ t = 1 s	3600 V~
M_d	Mounting torque (M5)	2.5-4.0/22-35 Nm/lb.in.
	Terminal connection torque (M5)	2.5-4.0/22-35 Nm/lb.in.
Weight	Typical including screws	90 g


Features

- International standard package, JEDEC TO-240 AA
- **Direct Copper Bonded** Al₂O₃ -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Gate-cathode twin pins for version 1B

Applications

- DC motor control
- Softstart AC motor controller
- Light, heat and temperature control

Advantages

- Space and weight savings
- Simple mounting with two screws
- 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}	$T_{VJ} = T_{VJM}; V_R = V_{RRM}$	15 mA
V_T	$I_T = 300 A; T_{VJ} = 25^\circ C$	1.74 V
V_{T0}	For power-loss calculations only ($T_{VJ} = T_{VJM}$)	0.85 V
r_T		3.2 mΩ
V_{GT}	$V_D = 6 V; T_{VJ} = 25^\circ C$	1.5 V
	$T_{VJ} = -40^\circ C$	1.6 V
I_{GT}	$V_D = 6 V; T_{VJ} = 25^\circ C$	100 mA
	$T_{VJ} = -40^\circ C$	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	$T_{VJ} = 25^\circ C; V_D = 6 V; t_p = 30 \mu s$ $di_G/dt = 0.45 A/\mu s; I_G = 0.45 A$	200 mA
I_H	$T_{VJ} = 25^\circ C; V_D = 6 V; R_{GK} = \infty$	150 mA
t_{gd}	$T_{VJ} = 25^\circ C; V_D = 1/2 V_{DRM}$ $di_G/dt = 0.45 A/\mu s; I_G = 0.45 A$	2 μs
t_q	$T_{VJ} = T_{VJM}; V_R = 100 V; V_D = 2/3 V_{DRM}; t_p = 200 \mu s$ $dv/dt = 20 V/\mu s; I_T = 150 A; -di/dt = 10 A/\mu s$	typ. 185 μs
Q_S	$T_{VJ} = T_{VJM}$ $-di/dt = 6 A/\mu s; I_T = 50 A$	170 μC
I_{RM}		45 A
R_{thJC}	per thyristor; DC current	0.22 K/W
	per module	0.11 K/W
R_{thJK}	per thyristor; DC current	0.42 K/W
	per module	0.21 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 module-type MCC 94 version 1 B

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red

Type ZY 200L (L = Left for pin pair 4/5) } UL 758, style 1385,
Type ZY 200R (R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

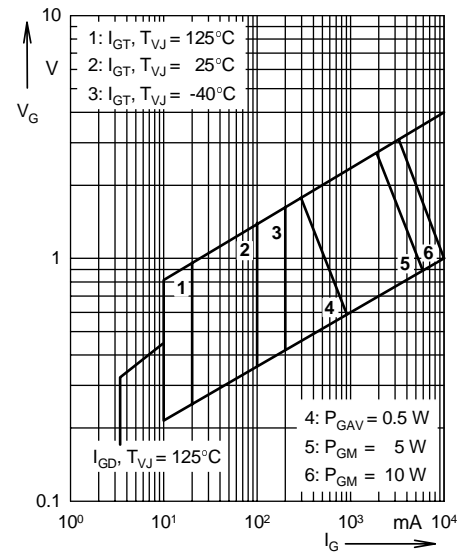


Fig. 1 Gate trigger characteristics

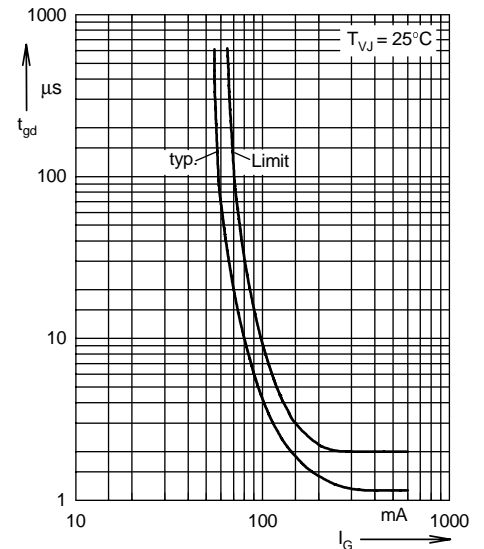
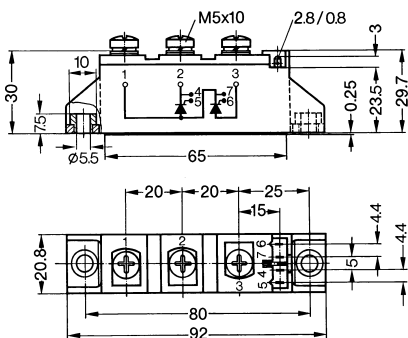


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")



R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.22
180°	0.23
120°	0.25
60°	0.27
30°	0.28

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.42
180°	0.43
120°	0.45
60°	0.47
30°	0.48

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0066	0.0019
2	0.0678	0.0477
3	0.1456	0.344
4	0.2	1.32