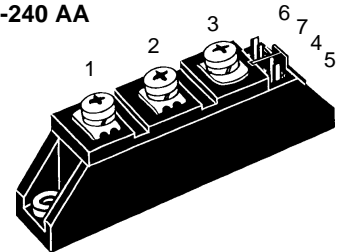


# Thyristor Modules

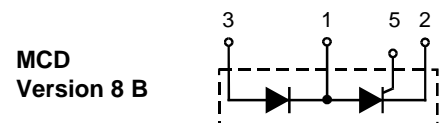
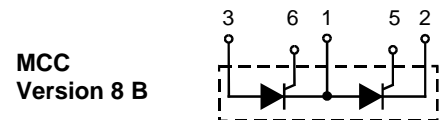
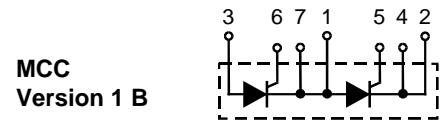
## Thyristor/Diode Modules

$I_{TRMS} = 2x 80 A$   
 $I_{TAVM} = 2x 51 A$   
 $V_{RRM} = 800-1800 V$

$V_{RSM}$	$V_{RRM}$	Type		
$V_{DSM}$	$V_{DRM}$	Version 1 B	Version 8 B	Version 8 B
V	V			
900	800	MCC 44-08io1 B	MCC 44-08io8 B	MCD 44-08io8 B
1300	1200	MCC 44-12io1 B	MCC 44-12io8 B	MCD 44-12io8 B
1500	1400	MCC 44-14io1 B	MCC 44-14io8 B	MCD 44-14io8 B
1700	1600	MCC 44-16io1 B	MCC 44-16io8 B	MCD 44-16io8 B
1900	1800	MCC 44-18io1 B	MCC 44-18io8 B	MCD 44-18io8 B

**TO-240 AA**


Symbol	Test Conditions	Maximum Ratings	
$I_{TRMS}, I_{FRMS}$ $I_{TAVM}, I_{FAVM}$	$T_{VJ} = T_{VJM}$	80	A
	$T_C = 83^{\circ}C; 180^{\circ}$ sine	51	A
	$T_C = 85^{\circ}C; 180^{\circ}$ sine	49	A
$I_{TSM}, I_{FSM}$	$T_{VJ} = 45^{\circ}C;$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	1150 A 1230 A
	$T_{VJ} = T_{VJM}$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	1000 A 1070 A
$\int i^2 dt$	$T_{VJ} = 45^{\circ}C$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	6600 A <sup>2</sup> s 6280 A <sup>2</sup> s
	$T_{VJ} = T_{VJM}$ $V_R = 0$	t = 10 ms (50 Hz), sine t = 8.3 ms (60 Hz), sine	5000 A <sup>2</sup> s 4750 A <sup>2</sup> s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f = 50 Hz, $t_p = 200 \mu s$ $V_D = 2/3 V_{DRM}$ $I_G = 0.45 A$ $di_G/dt = 0.45 A/\mu s$	repetitive, $I_T = 150 A$	150 A/ $\mu s$
	$T_{VJ} = T_{VJM}$ $R_{GK} = \infty$ ; method 1 (linear voltage rise)	non repetitive, $I_T = I_{TAVM}$	500 A/ $\mu s$
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$ $V_{DR} = 2/3 V_{DRM}$		1000 V/ $\mu s$
$P_{GM}$	$T_{VJ} = T_{VJM}$ $I_T = I_{TAVM}$	$t_p = 30 \mu s$ $t_p = 300 \mu s$	10 W 5 W
			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~
	$I_{ISOL} \leq 1 mA$	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  $Al_2O_3$  -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
$I_{RRM}, I_{DRM}$	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	5 mA
$V_T, V_F$	$I_T, I_F = 200 \text{ A}; T_{VJ} = 25^\circ\text{C}$	1.75 V
$V_{T0}$	For power-loss calculations only ( $T_{VJ} = 125^\circ\text{C}$ )	0.85 V
$r_T$		5.3 mΩ
$V_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	1.5 V
	$T_{VJ} = -40^\circ\text{C}$	1.6 V
$I_{GT}$	$V_D = 6 \text{ V}; T_{VJ} = 25^\circ\text{C}$	100 mA
	$T_{VJ} = -40^\circ\text{C}$	200 mA
$V_{GD}, I_{GD}$	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	0.2 V 10 mA
$I_L$	$T_{VJ} = 25^\circ\text{C}; t_p = 10 \mu\text{s}, V_D = 6 \text{ V}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	450 mA
$I_H$	$T_{VJ} = 25^\circ\text{C}; V_D = 6 \text{ V}; R_{GK} = \infty$	200 mA
$t_{gd}$	$T_{VJ} = 25^\circ\text{C}; V_D = 1/2 V_{DRM}$ $I_G = 0.45 \text{ A}; di_G/dt = 0.45 \text{ A}/\mu\text{s}$	2 μs
$t_q$	$T_{VJ} = T_{VJM}; I_T = 120 \text{ A}, t_p = 200 \mu\text{s}; -di/dt = 10 \text{ A}/\mu\text{s}$ typ. $V_R = 100 \text{ V}; dv/dt = 20 \text{ V}/\mu\text{s}; V_D = 2/3 V_{DRM}$	150 μs
$Q_S, I_{RM}$	$T_{VJ} = T_{VJM}; I_T, I_F = 50 \text{ A}, -di/dt = 0.64 \text{ A}/\mu\text{s}$	90 μC 11 A
$R_{thJC}, R_{thJK}$	per thyristor/diode; DC current per module other values see Fig. 8/9	0.53 K/W 0.265 K/W 0.73 K/W 0.365 K/W
$d_s, d_A, a$	Creepage distance on surface Strike distance through air Maximum allowable acceleration	12.7 mm 9.6 mm 50 m/s <sup>2</sup>

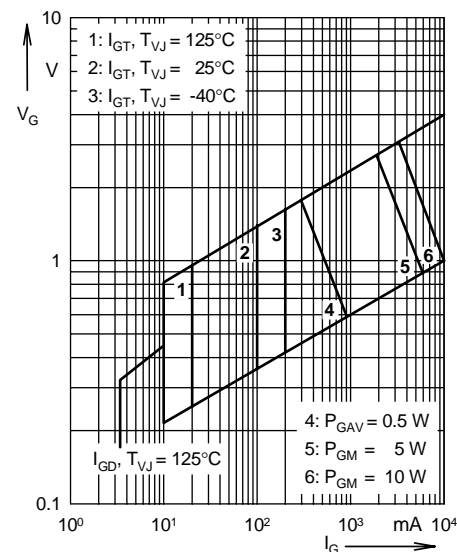


Fig. 1 Gate trigger characteristics

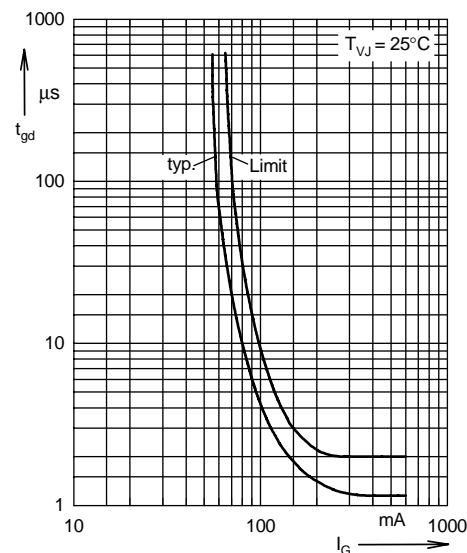
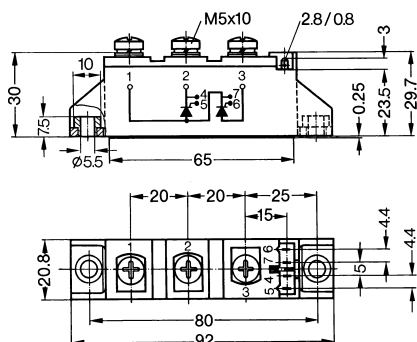


Fig. 2 Gate trigger delay time

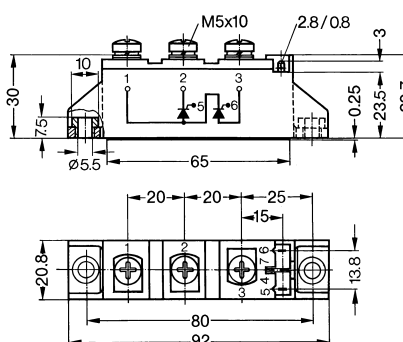
Optional accessories for module-type MCC 44 version 1 B  
 Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red  
 Type ZY 200L (L = Left for pin pair 4/5) } UL 758, style 1385,  
 Type ZY 200R (R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

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

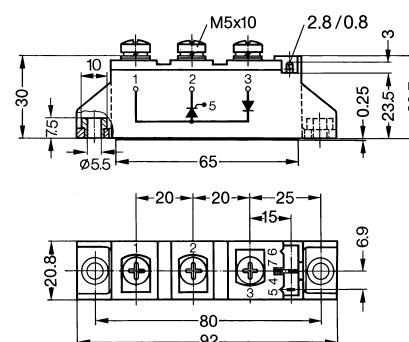
**MCC Version 1 B**



**MCC Version 8 B**



**MCD Version 8 B**



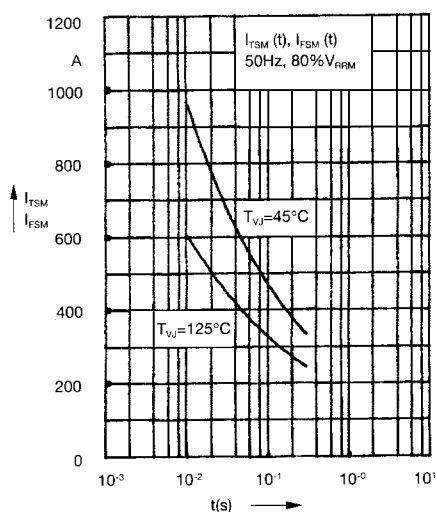


Fig. 3 Surge overload current  
 $I_{TSM}, I_{FSM}$ : Crest value,  $t$ : duration

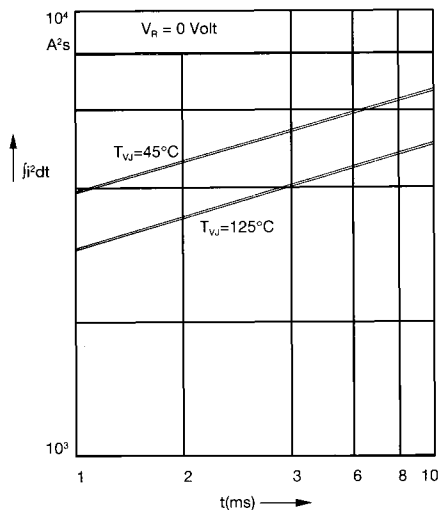


Fig. 4  $\int i^2 dt$  versus time (1-10 ms)

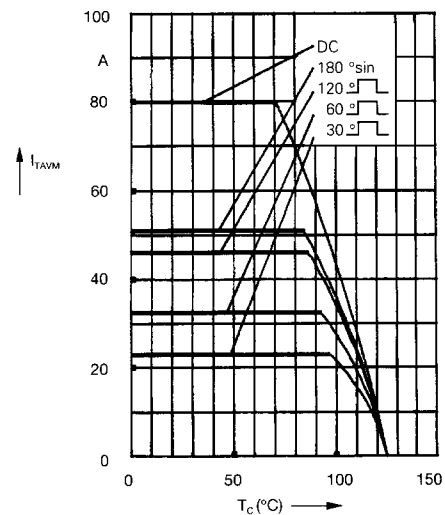


Fig. 4a Maximum forward current at case temperature

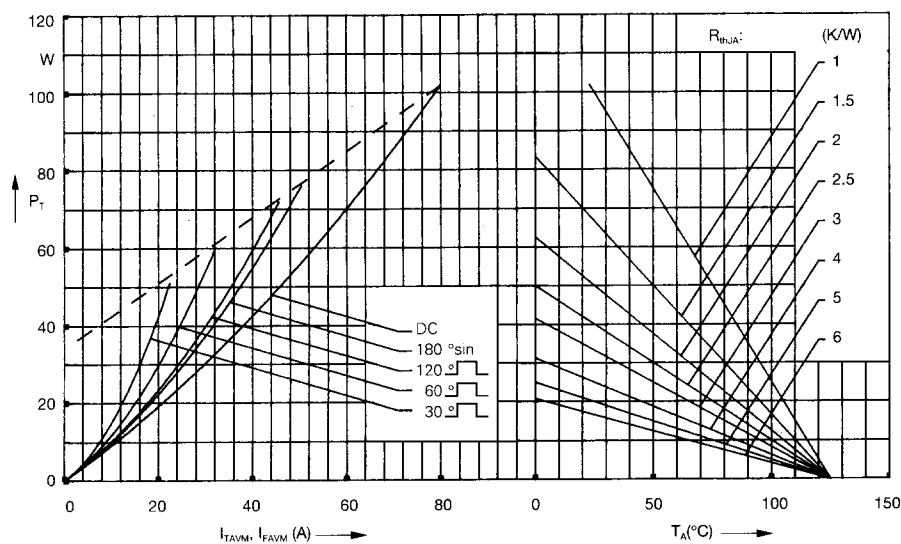


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

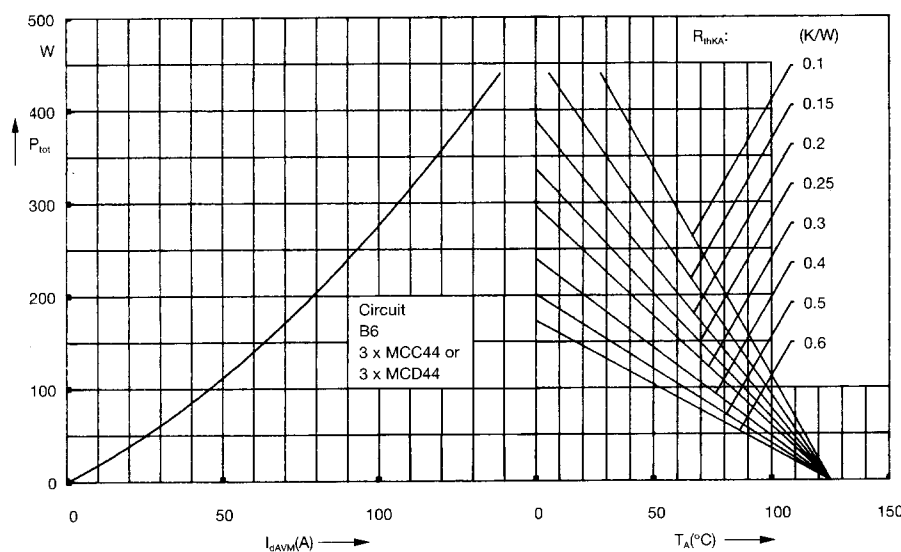


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

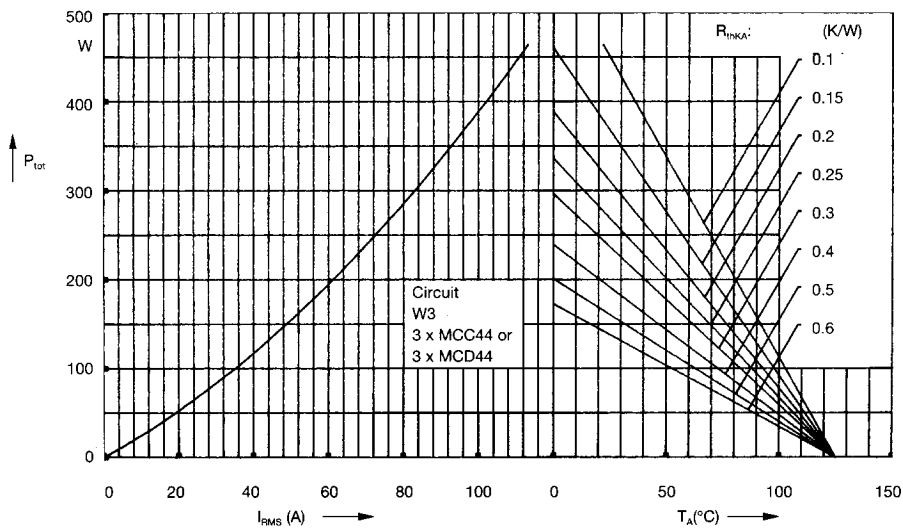


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

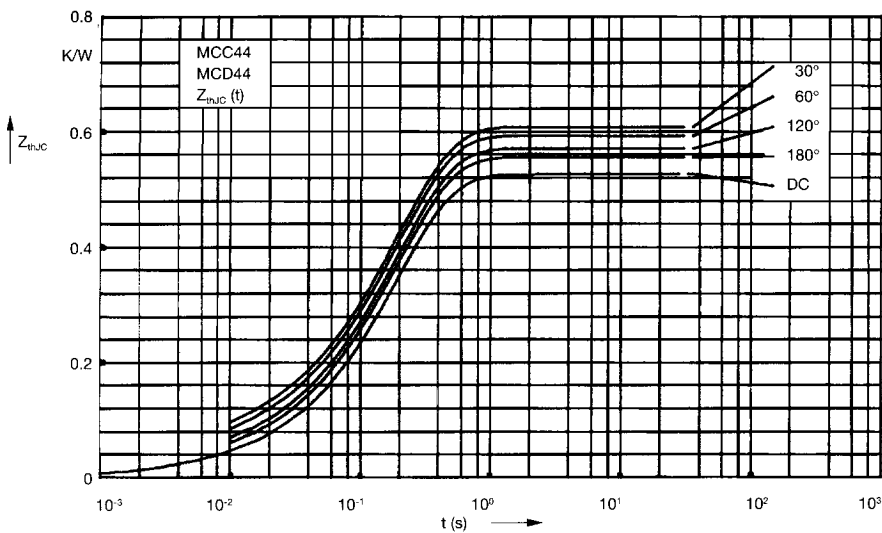


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

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

$d$	$R_{thJC}$ (K/W)
DC	0.53
180°	0.55
120°	0.58
60°	0.6
30°	0.62

Constants for  $Z_{thJC}$  calculation:

$i$	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.015	0.0035
2	0.026	0.02
3	0.489	0.195

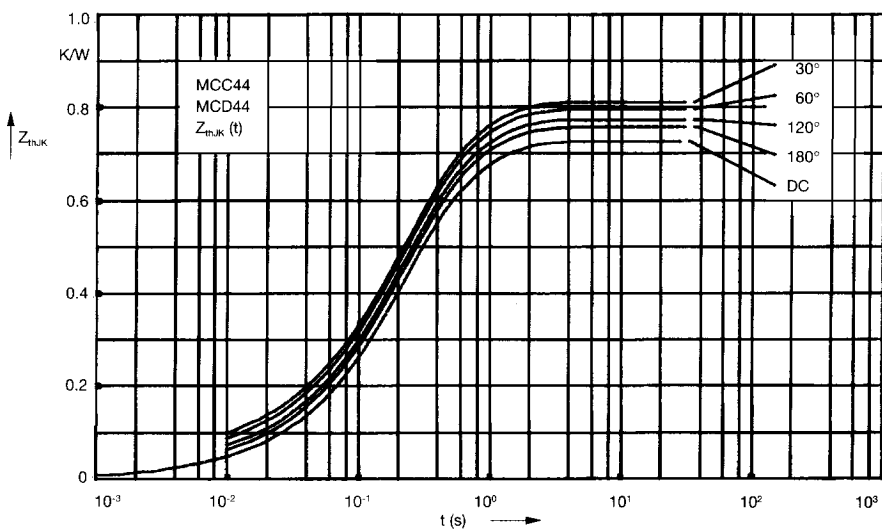


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

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

$d$	$R_{thJK}$ (K/W)
DC	0.73
180°	0.75
120°	0.78
60°	0.8
30°	0.82

Constants for  $Z_{thJK}$  calculation:

$i$	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.015	0.0035
2	0.026	0.02
3	0.489	0.195
4	0.2	0.68