

Thyristor Modules

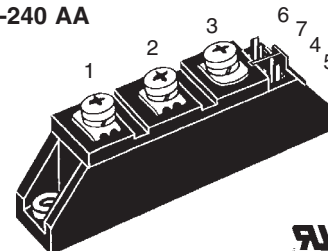
Thyristor/Diode Modules

$$I_{TRMS} = 2 \times 50 \text{ A}$$

$$I_{TAVM} = 2 \times 32 \text{ A}$$

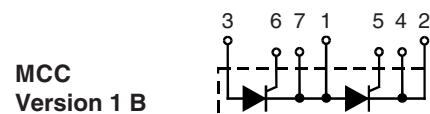
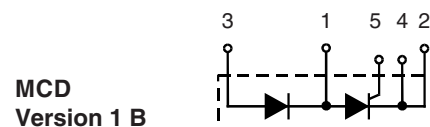
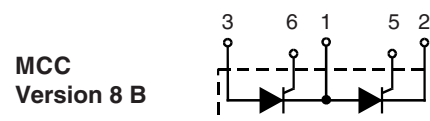
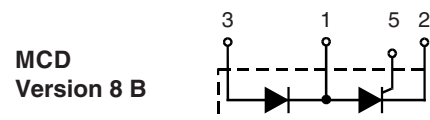
$$V_{RRM} = 800-1600 \text{ V}$$

V_{RSM}	V_{RRM}	Type					
V_{DSM}	V_{DRM}	Version			Version		
V	V	1 B	8 B	1 B	8 B	1 B	8 B
900	800	MCC 26-08	io1 B / io8 B	MCD 26-08	io1 B / io8 B		
1300	1200	MCC 26-12	io1 B / io8 B	MCD 26-12	io1 B / io8 B		
1500	1400	MCC 26-14	io1 B / io8 B	MCD 26-14	io1 B / io8 B		
1700	1600	MCC 26-16	io1 B / io8 B	MCD 26-16	io1 B / io8 B		

TO-240 AA


Symbol	Conditions	Maximum Ratings	
I_{TRMS}, I_{FRMS} I_{TAVM}, I_{FAVM}	$T_{VJ} = T_{VJM}$ $T_C = 75^\circ\text{C}; 180^\circ \text{ sine}$ $T_C = 85^\circ\text{C}; 180^\circ \text{ sine}$	50 32 27	A A A
I_{TSM}, I_{FSM}	$T_{VJ} = 45^\circ\text{C};$ $V_R = 0$ $T_{VJ} = T_{VJM}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$ $t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	520 560 460 500 A A A A
$\int i^2 dt$	$T_{VJ} = 45^\circ\text{C}$ $V_R = 0$ $T_{VJ} = T_{VJM}$ $V_R = 0$	$t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$ $t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	1350 1300 1050 1030 A^2s A^2s A^2s A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = \frac{2}{3} V_{DRM}$ $I_G = 0.45 \text{ A}$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}$	repetitive, $I_T = 45 \text{ A}$ non repetitive, $I_T = I_{TAVM}$	150 500 $\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM};$ $R_{GK} = \infty; \text{method 1 (linear voltage rise)}$	$V_{DR} = \frac{2}{3} V_{DRM}$	1000 $\text{V}/\mu\text{s}$
P_{GM}	$T_{VJ} = T_{VJM}$ $I_T = I_{TAVM}$	$t_p = 30 \mu\text{s}$ $t_p = 300 \mu\text{s}$	10 5 W W
P_{GAV}			0.5 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 $I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ min}$ $t = 1 \text{ s}$	3000 3600 V~ V~
M_d	Mounting torque (M5) Terminal connection torque (M5)		2.5-4.0/22-35 2.5-4.0/22-35 $\text{Nm}/\text{lb.in.}$ $\text{Nm}/\text{lb.in.}$
Weight	Typical including screws		90 g

Data according to IEC 60747 and refer to a single thyristor/diode unless otherwise stated.


MCC
Version 1 B

MCD
Version 1 B

MCC
Version 8 B

MCD
Version 8 B

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

Symbol	Conditions	Characteristic Values
I_{RRM}, I_{DRM}	$T_{VJ} = T_{VJM}; V_R = V_{RRM}; V_D = V_{DRM}$	3 mA
V_T, V_F	$I_T, I_F = 80 \text{ A}; T_{VJ} = 25^\circ\text{C}$	1.64 V
V_{T0}	For power-loss calculations only ($T_{VJ} = 125^\circ\text{C}$)	0.85 V
r_T		11.0 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}	$T_{VJ} = T_{VJM}; V_D = 2/3 V_{DRM}$	0.2 V
I_{GD}		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	$T_{VJ} = T_{VJM}; I_T = 20 \text{ A}, t_p = 200 \mu\text{s}; -di/dt = 10 \text{ A}/\mu\text{s}$ $V_R = 100 \text{ V}; dv/dt = 20 \text{ V}/\mu\text{s}; V_D = 2/3 V_{DRM}$	typ. 150 μs
Q_S	$T_{VJ} = T_{VJM}; I_T, I_F = 25 \text{ A}, -di/dt = 0.64 \text{ A}/\mu\text{s}$	50 μC
I_{RM}		6 A
R_{thJC}	per thyristor/diode; DC current per module	0.88 K/W
R_{thJK}	per thyristor/diode; DC current per module	0.44 K/W
	other values see Fig. 8/9	1.08 K/W
		0.54 K/W
d_s	Creepage distance on surface	12.7 mm
d_A	Strike distance through air	9.6 mm
a	Maximum allowable acceleration	50 m/s ²

Optional accessories for module-type MCC 26 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

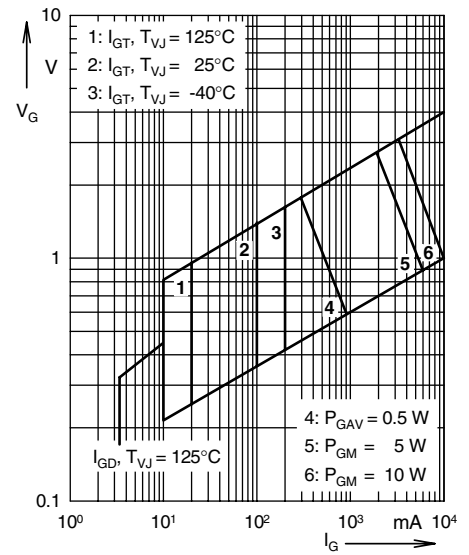


Fig. 1 Gate trigger characteristics

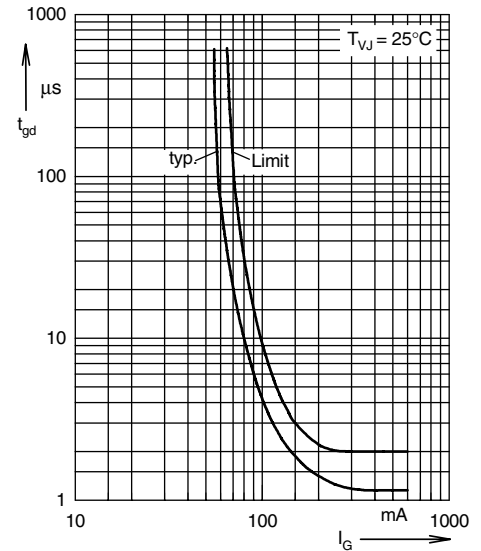
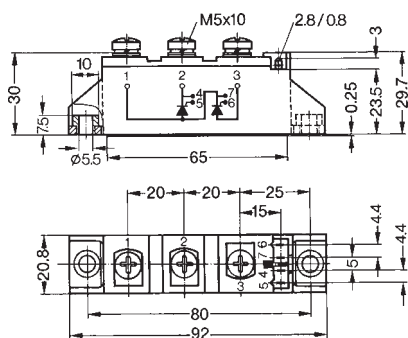


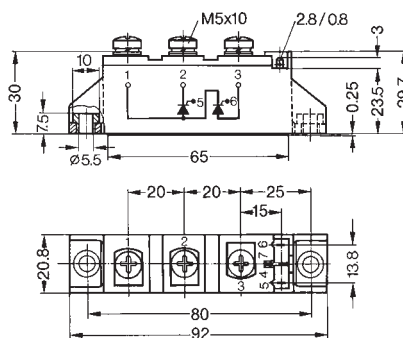
Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

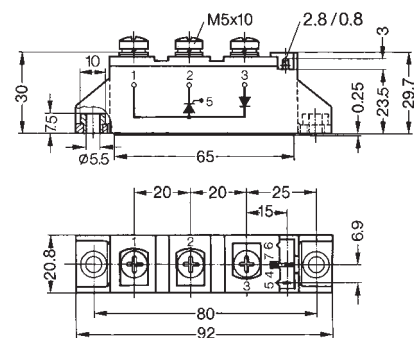
MCC Version 1 B



MCC Version 8 B



MCD Version 8 B



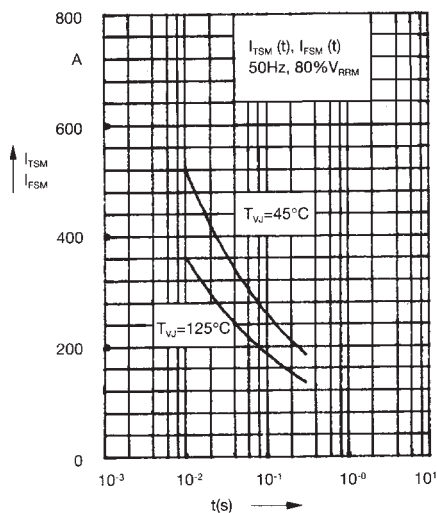


Fig. 3 Surge overload current
 I_{TSM}, I_{FSM} : Crest value, t : duration

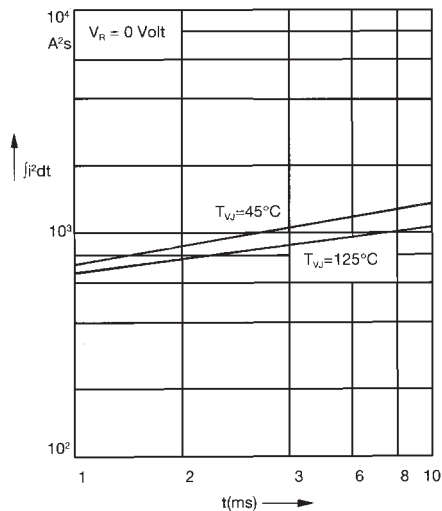


Fig. 4 $\int j^2 dt$ versus time (1-10 ms)

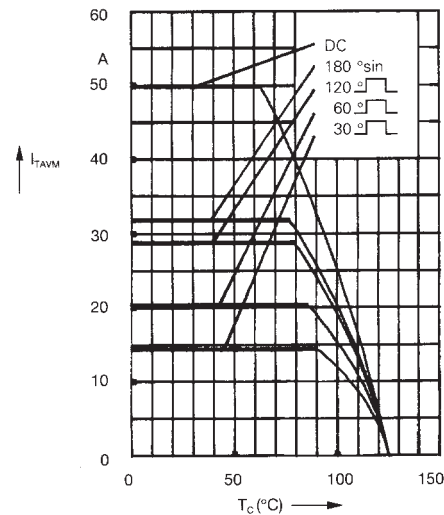


Fig. 4a Maximum forward current at case temperature

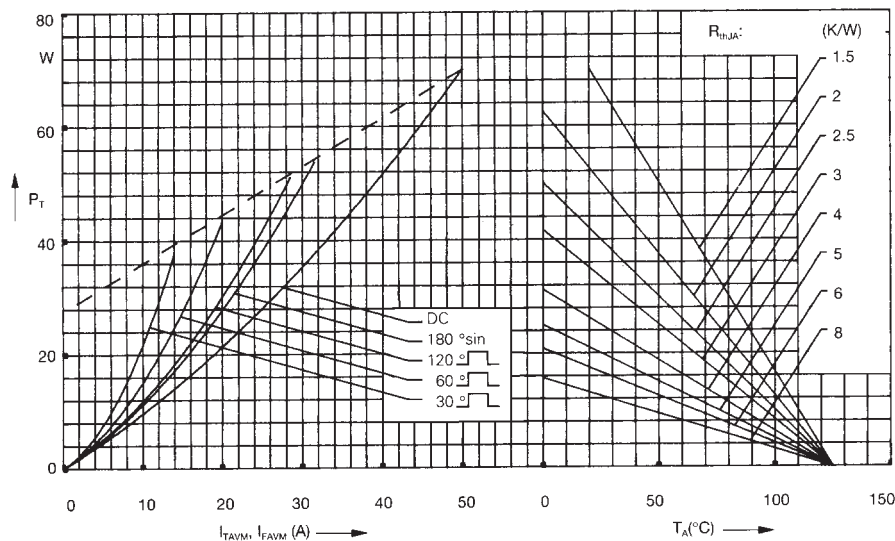


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

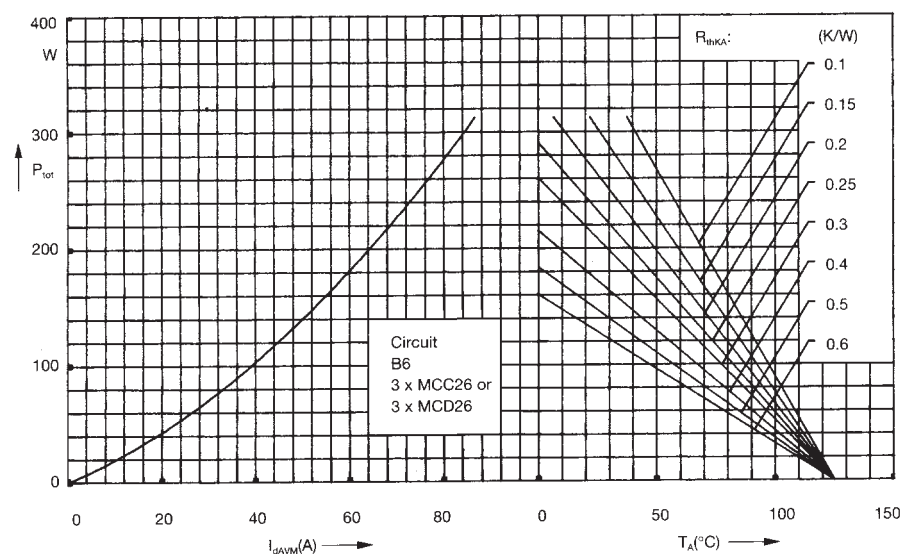


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

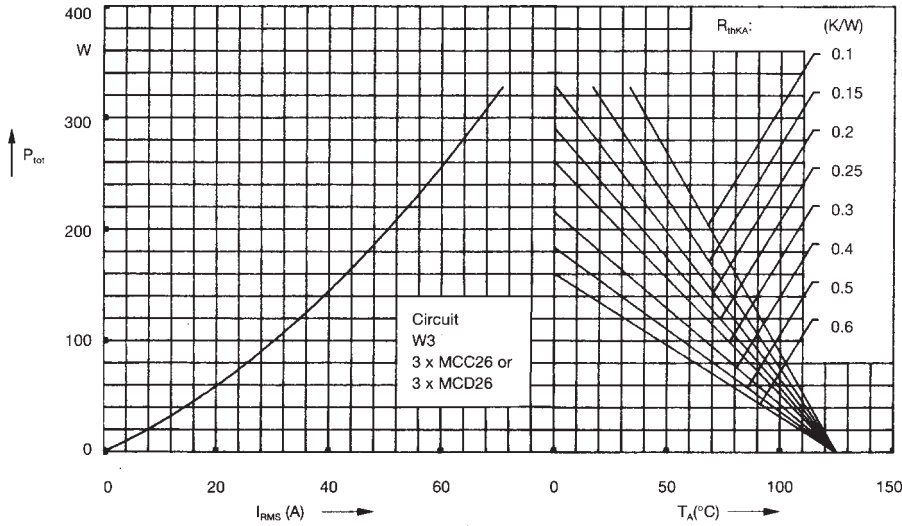


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

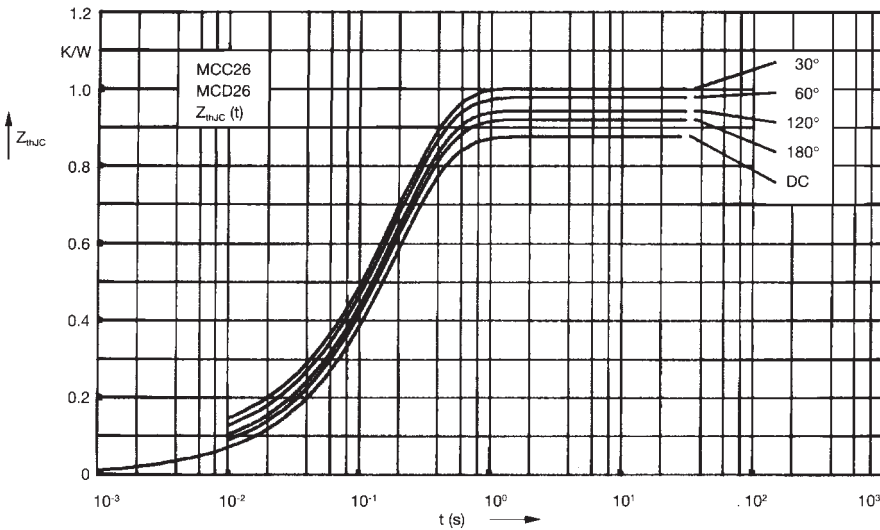


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thjC} for various conduction angles d:

d	R_{thjC} (K/W)
DC	0.88
180°	0.92
120°	0.95
60°	0.98
30°	1.01

Constants for Z_{thjC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.019	0.0031
2	0.029	0.0216
3	0.832	0.191

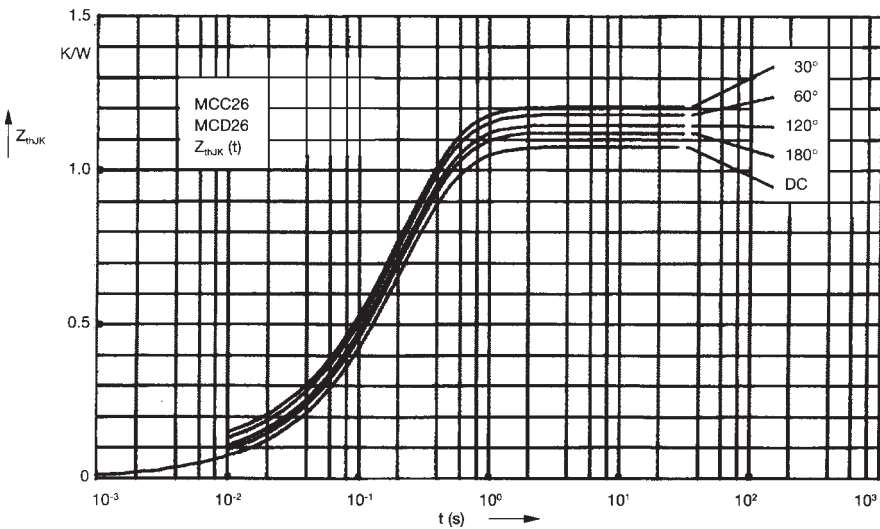


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thjK} for various conduction angles d:

d	R_{thjK} (K/W)
DC	1.08
180°	1.12
120°	1.15
60°	1.18
30°	1.21

Constants for Z_{thjK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.019	0.0031
2	0.029	0.0216
3	0.832	0.191
4	0.2	0.45