

Thyristor Modules

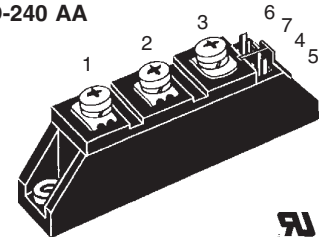
Thyristor/Diode Modules

$$I_{TRMS} = 2 \times 80 \text{ A}$$

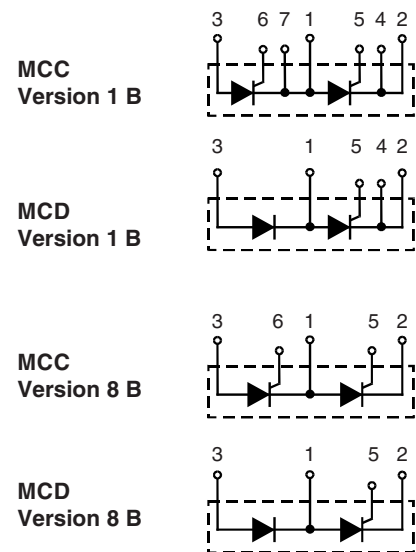
$$I_{TAVM} = 2 \times 51 \text{ A}$$

$$V_{RRM} = 800\text{-}1800 \text{ V}$$

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

TO-240 AA


Symbol	Conditions	Maximum Ratings	
I_{TRMS}, I_{FRMS} I_{TAVM}, I_{FAVM}	$T_{VJ} = T_{VJM}$ $T_C = 83^\circ\text{C}; 180^\circ \text{ sine}$ $T_C = 85^\circ\text{C}; 180^\circ \text{ sine}$	80 51 49	A A A
I_{TSM}, I_{FSM}	$T_{VJ} = 45^\circ\text{C};$ $V_R = 0;$ $T_{VJ} = T_{VJM};$ $t = 10 \text{ ms};$ $V_R = 0;$	$t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$ $(50 \text{ Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	1150 A 1230 A 1000 A 1070 A
I^2dt	$T_{VJ} = 45^\circ\text{C};$ $V_R = 0;$ $T_{VJ} = T_{VJM};$ $V_R = 0;$	$t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$ $t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	6600 A^2s 6280 A^2s 5000 A^2s 4750 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, $I_T = 150 \text{ A}$ non repetitive, $I_T = I_{TAVM}$	150 $\text{A}/\mu\text{s}$ 500 $\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM};$ $R_{GK} = \infty;$ 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 W 5 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 V~ 3600 V~
M_d	Mounting torque (M5) Terminal connection torque (M5)		2.5-4.0/22-35 Nm/lb.in. 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

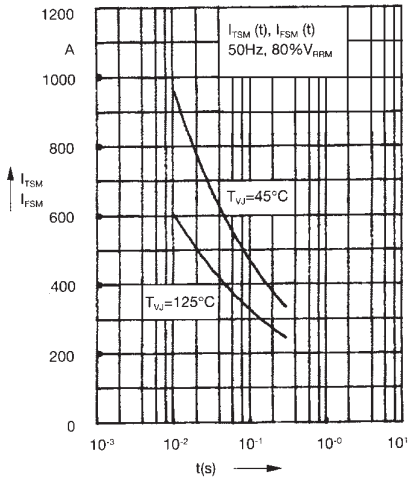


Fig. 3 Surge overload current
 I_{TSM} , I_{FSM} : Crest value, t : duration

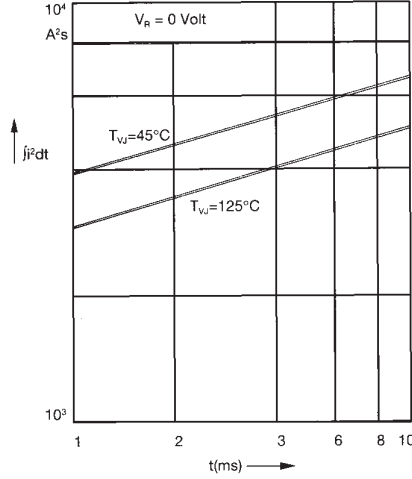


Fig. 4 $\int j^2 dt$ versus time (1-10 ms)

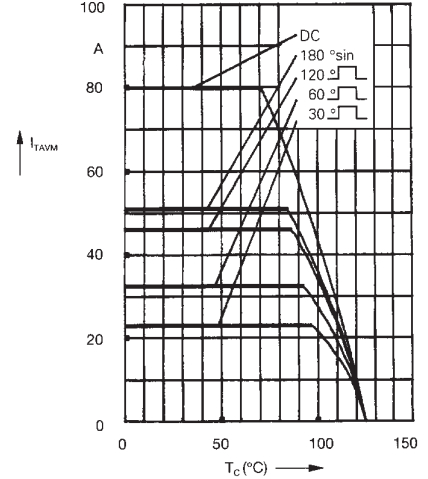


Fig. 4a Maximum forward current at case temperature

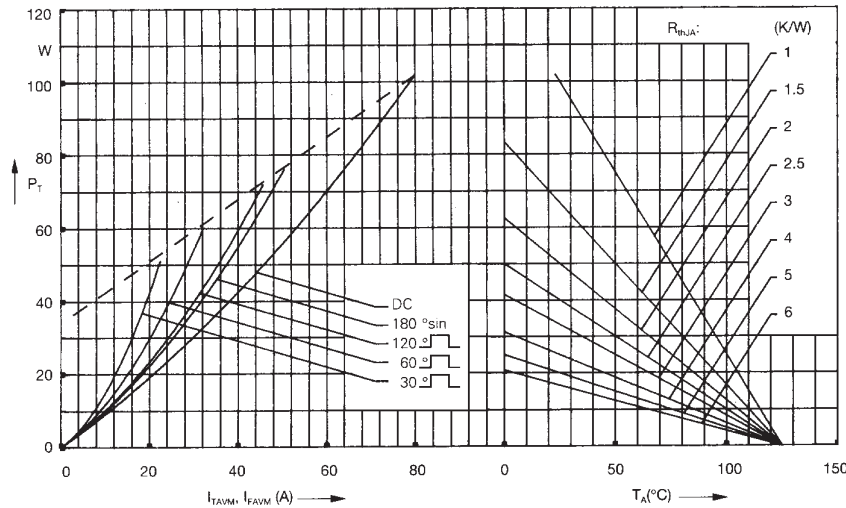


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

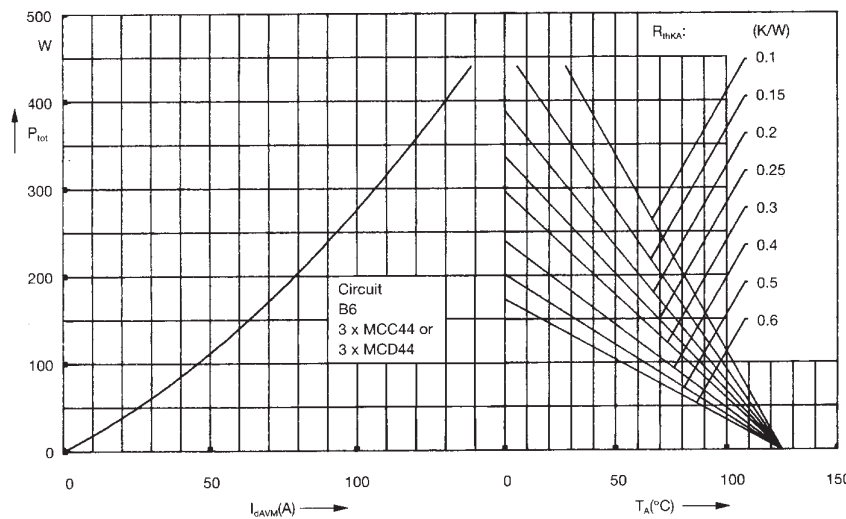


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

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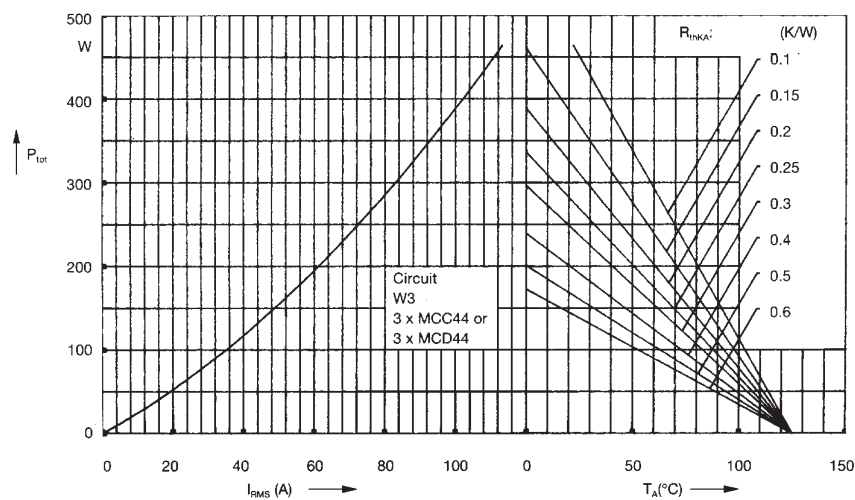


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

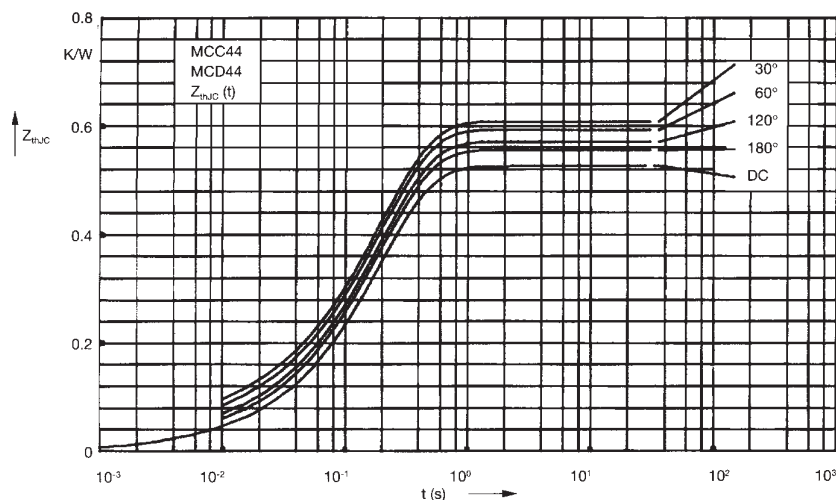


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

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

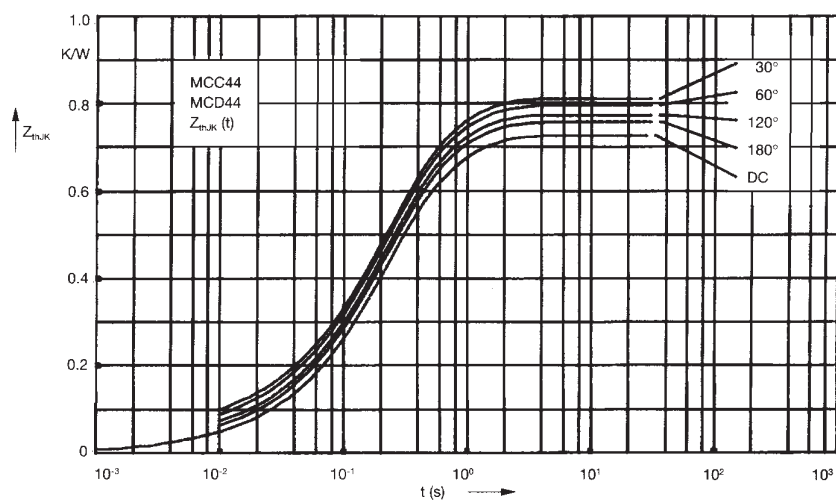


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

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