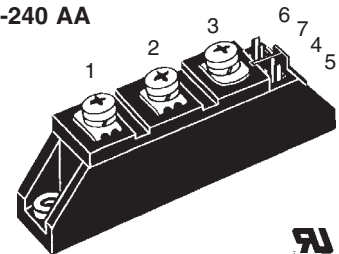


# Thyristor Modules

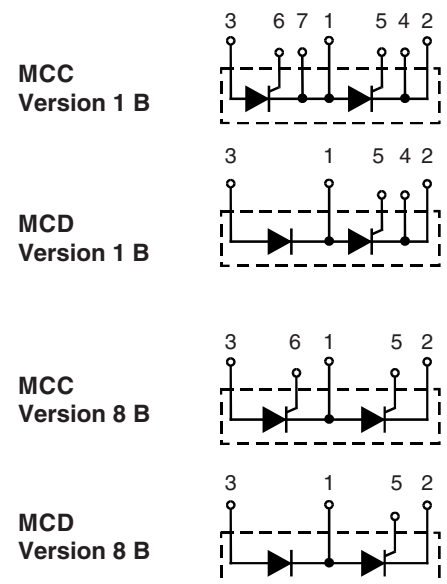
## Thyristor/Diode Modules

$I_{TRMS} = 2x80 \text{ A}$   
 $I_{TAVM} = 2x51 \text{ A}$   
 $V_{RRM} = 800-1800 \text{ V}$

$V_{RSM}$	$V_{RRM}$	Type			Type		
$V_{DSM}$	$V_{DRM}$	Version			Version		
V	V	1 B	8 B	1 B	8 B	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	
$I_{TSM}, I_{FSM}$	$T_{VJ} = 45^\circ\text{C};$ $V_R = 0;$ $t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	1150 1230	A A	
	$T_{VJ} = T_{VJM};$ $t = 10 \text{ ms};$ $V_R = 0;$ $(50 \text{ Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	1000 1070	A A	
$P_{dt}$	$T_{VJ} = 45^\circ\text{C};$ $V_R = 0,$ $t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	6600 6280	$\text{A}^2\text{s}$ $\text{A}^2\text{s}$	
	$T_{VJ} = T_{VJM};$ $V_R = 0;$ $t = 10 \text{ ms (50 Hz), sine}$ $t = 8.3 \text{ ms (60 Hz), sine}$	5000 4750	$\text{A}^2\text{s}$ $\text{A}^2\text{s}$	
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM};$ $f = 50\text{Hz}; t_p = 200\mu\text{s};$ $V_D = \frac{2}{3} V_{DRM};$ $I_G = 0.45 \text{ A};$ $di_G/dt = 0.45 \text{ A}/\mu\text{s}$	repetitive, $I_T = 150 \text{ A}$ non repetitive, $I_T = I_{TAVM}$	150 500	$\text{A}/\mu\text{s}$ $\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM};$ $R_{GK} = \infty;$ 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 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	$\text{V}\sim$ $\text{V}\sim$
$M_d$	Mounting torque (M5) Terminal connection torque (M5)		2.5-4.0/22-35	$\text{Nm}/\text{lb.in.}$ $\text{Nm}/\text{lb.in.}$
<b>Weight</b>	typical including screws		90	g


**Features**

- International standard package, JEDEC TO-240 AA
- Direct copper bonded  $\text{Al}_2\text{O}_3$ -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



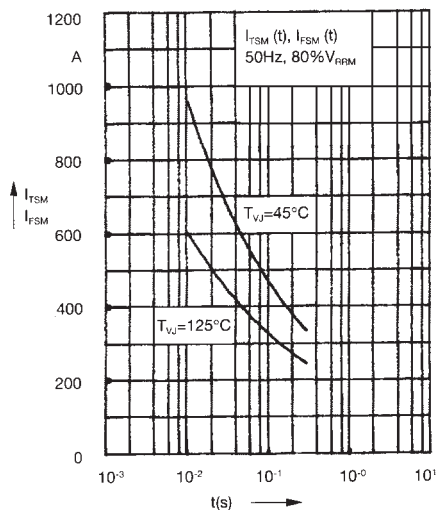


Fig. 3 Surge overload current  
 $I_{TSM}$ ,  $I_{FSM}$ : Crest value, t: duration

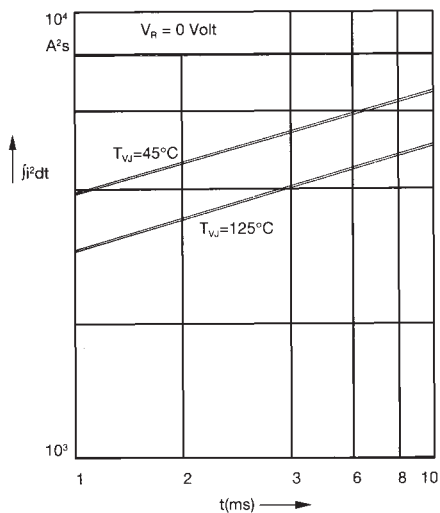


Fig. 4  $j^2dt$  versus time (1-10 ms)

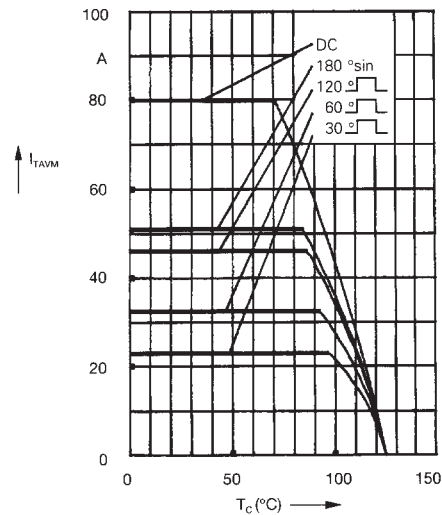


Fig. 4a Maximum forward current at case temperature

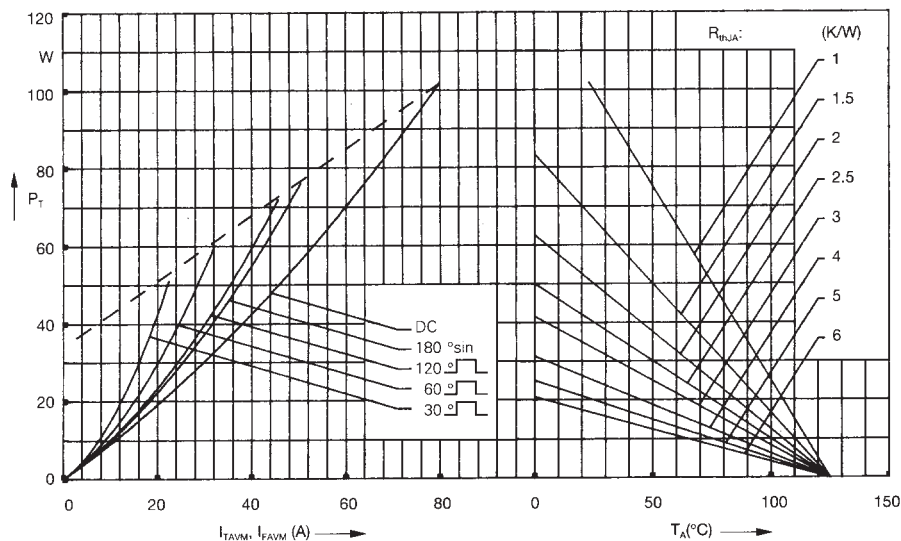


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

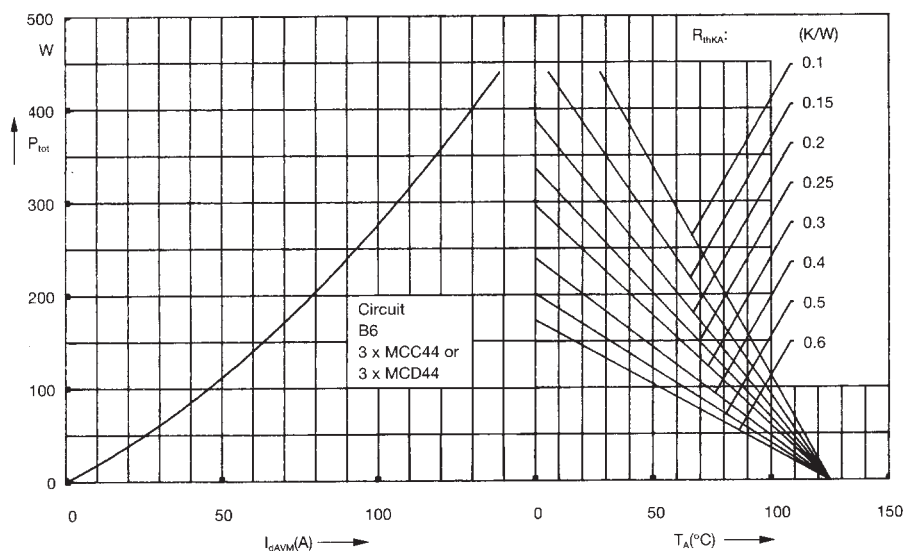


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

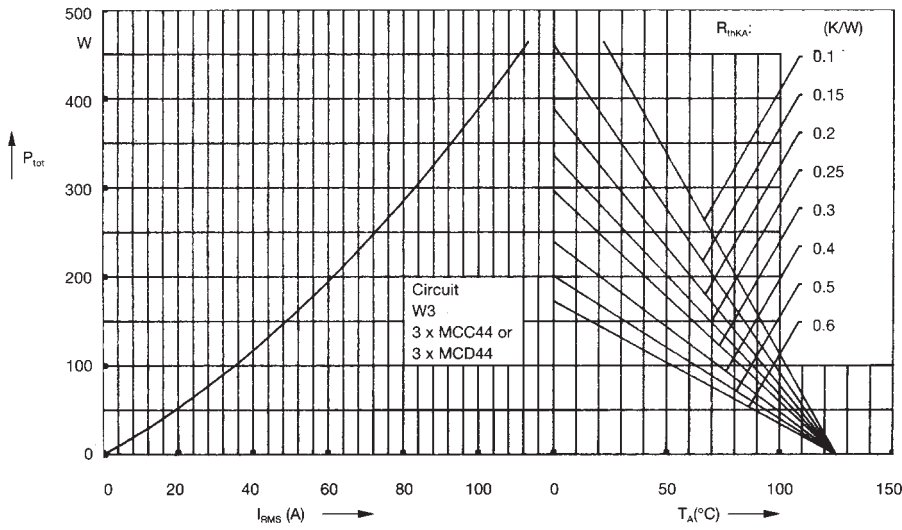


Fig. 7 Three phase AC-controller:  
Power dissipation versus RMS  
output current and ambient  
temperature

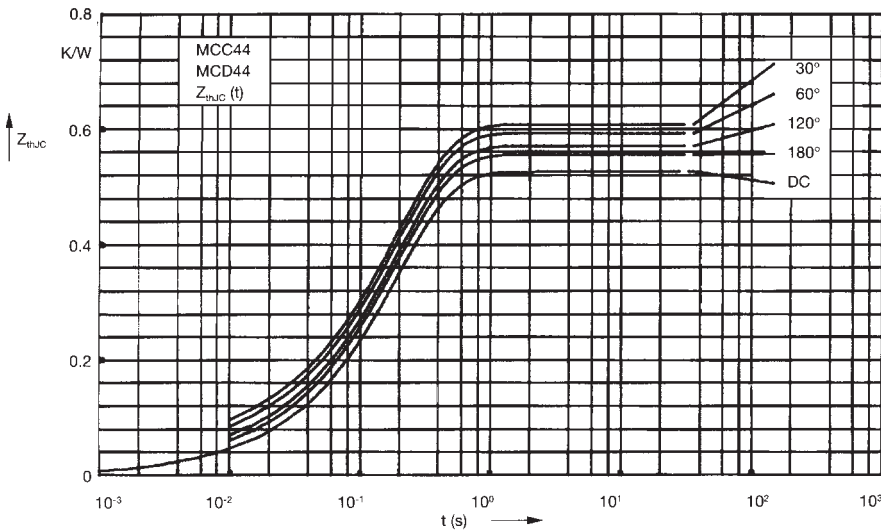


Fig. 8 Transient thermal impedance  
junction to case (per thyristor or  
diode)

$R_{thJC}$  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

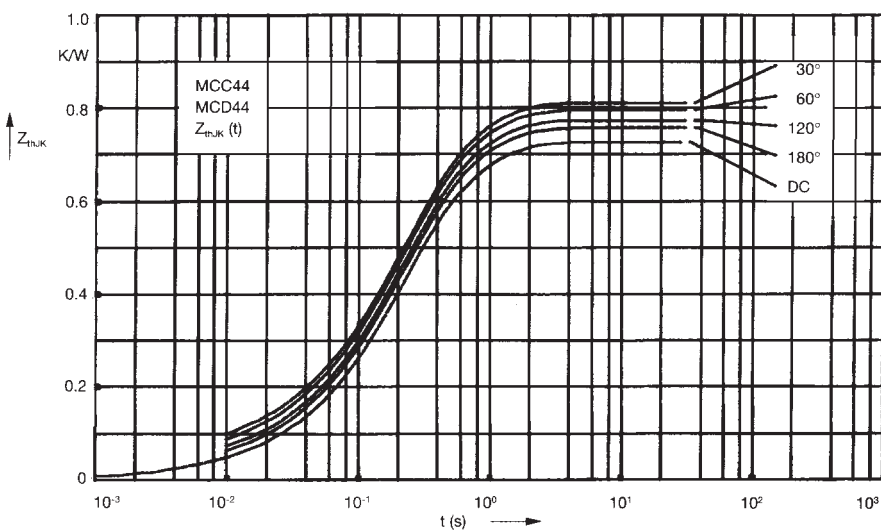


Fig. 9 Transient thermal impedance  
junction to heatsink (per thyristor  
or diode)

$R_{thJK}$  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