

Thyristor Modules

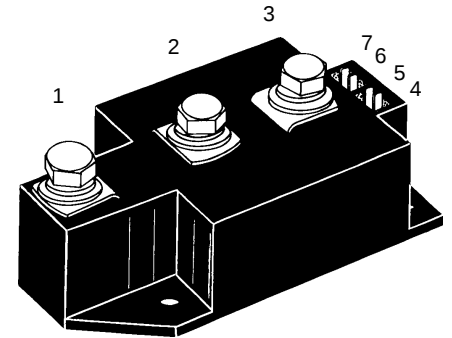
Thyristor/Diode Modules

$$I_{TRMS} = 2 \times 450 \text{ A}$$

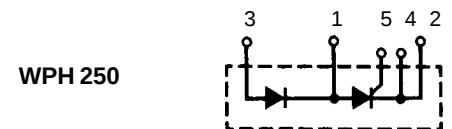
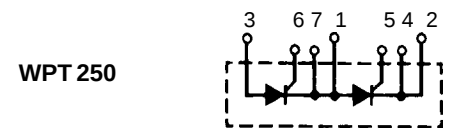
$$I_{TAVM} = 2 \times 287 \text{ A}$$

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

V_{RSM}	V_{RRM}	Type	
V_{DSM}	V_{DRM}		
V	V		
900	800	WPT 250-08	WPH 250-08
1300	1200	WPT 250-12	WPH 250-12
1500	1400	WPT 250-14	WPH 250-14
1700	1600	WPT 250-16	WPH 250-16
1900	1800	WPT 250-18	



Symbol	Test Conditions		Maximum Ratings	
I_{TRMS}, I_{FRMS}	$T_{VJ} = T_{VJM}$		450	A
I_{TAVM}, I_{FAVM}	$T_C = 85^\circ\text{C}; 180^\circ \text{ sine}$		287	A
I_{TSM}, I_{FSM}	$T_{VJ} = 45^\circ\text{C};$	$t = 10 \text{ ms (50 Hz), sine}$	9000	A
	$V_R = 0$	$t = 8.3 \text{ ms (60 Hz), sine}$	9600	A
	$T_{VJ} = T_{VJM}$	$t = 10 \text{ ms (50 Hz), sine}$	7800	A
	$V_R = 0$	$t = 8.3 \text{ ms (60 Hz), sine}$	8500	A
$\int i^2 dt$	$T_{VJ} = 45^\circ\text{C}$	$t = 10 \text{ ms (50 Hz), sine}$	405 000	A^2s
	$V_R = 0$	$t = 8.3 \text{ ms (60 Hz), sine}$	380 000	A^2s
	$T_{VJ} = T_{VJM}$	$t = 10 \text{ ms (50 Hz), sine}$	304 000	A^2s
	$V_R = 0$	$t = 8.3 \text{ ms (60 Hz), sine}$	300 000	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ $f = 50 \text{ Hz}, t_p = 200 \mu\text{s}$ $V_D = 2/3 V_{DRM}$ $I_G = 1 \text{ A}$ $di_G/dt = 1 \text{ A}/\mu\text{s}$	repetitive, $I_T = 860 \text{ A}$	100	$\text{A}/\mu\text{s}$
		non repetitive, $I_T = 290 \text{ A}$	800	$\text{A}/\mu\text{s}$
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM};$ $R_{GK} = \infty; \text{method 1 (linear voltage rise)}$	$V_{DR} = 2/3 V_{DRM}$	1000	$\text{V}/\mu\text{s}$
P_{GM}	$T_{VJ} = T_{VJM}$	$t_p = 30 \mu\text{s}$	120	W
	$I_T = I_{TAVM}$	$t_p = 500 \mu\text{s}$	60	W
P_{GAV}			20	W
V_{RGM}			10	V
T_{VJ}			-40...+140	$^\circ\text{C}$
T_{VJM}			140	$^\circ\text{C}$
T_{stg}			-40...+125	$^\circ\text{C}$
V_{ISOL}	50/60 Hz, RMS	$t = 1 \text{ min}$	3000	V~
	$I_{ISOL} \leq 1 \text{ mA}$	$t = 1 \text{ s}$	3600	V~
M_d	Mounting torque (M5)		2.5-5/22-44	Nm/lb.in.
	Terminal connection torque (M8)		12-15/106-132	Nm/lb.in.
Weight	Typical including screws		320	g



Features

- International standard package
- Direct copper bonded Al_2O_3 -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- Keyed gate/cathode twin pins

Applications

- Motor control
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Contactless switches

Advantages

- Space and weight savings
- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

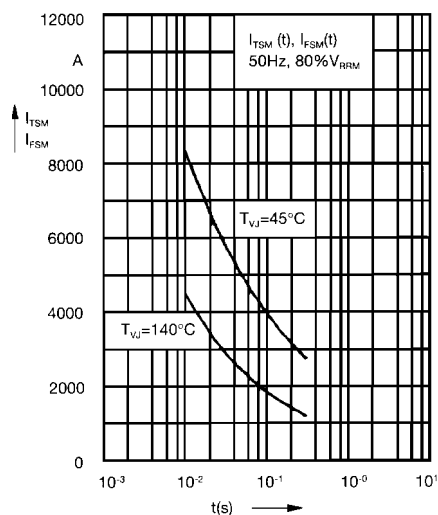


Fig. 3 Surge overload current
 I_{TSM} , I_{FSM} : Crest value, t : duration

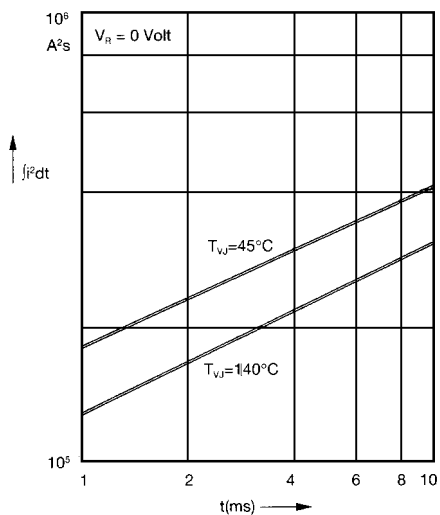


Fig. 4 j^2dt versus time (1-10 ms)

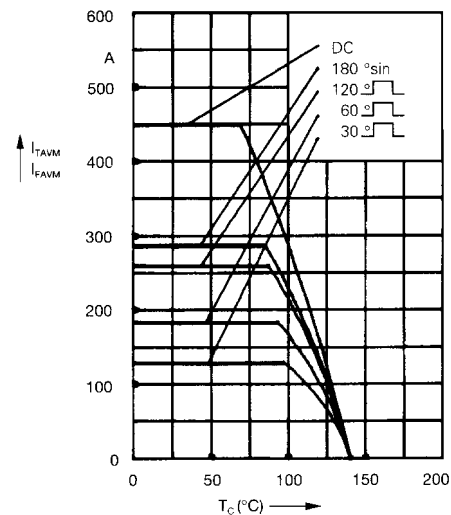


Fig. 4a Maximum forward current at case temperature

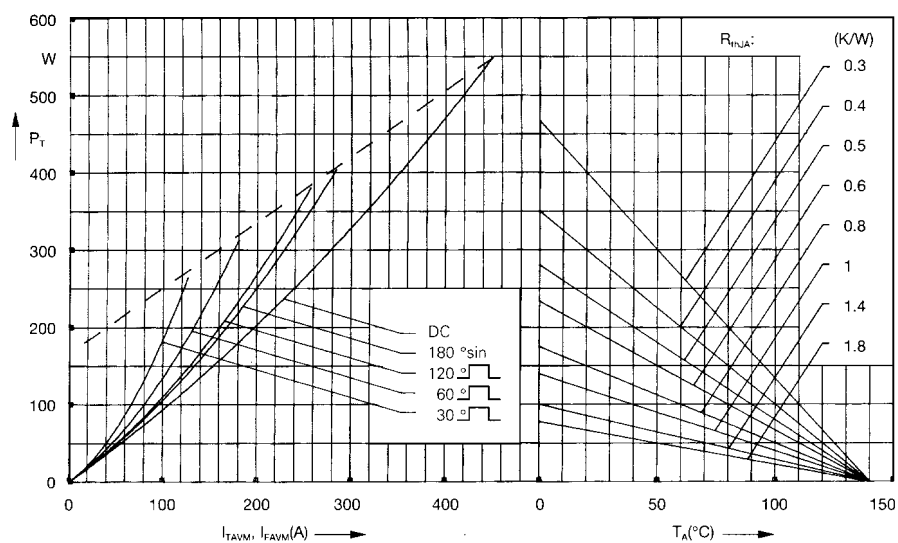


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

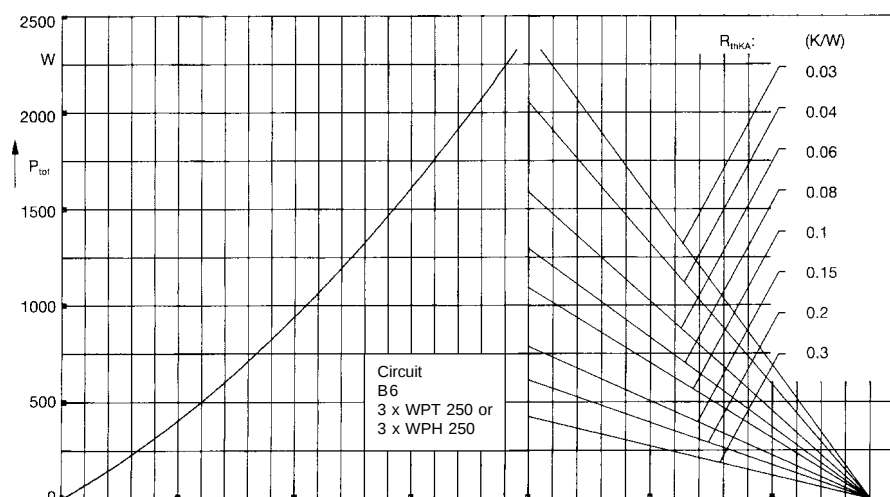


Fig. 6 Three phase rectifier bridge:
 Power dissipation versus direct output current and ambient temperature

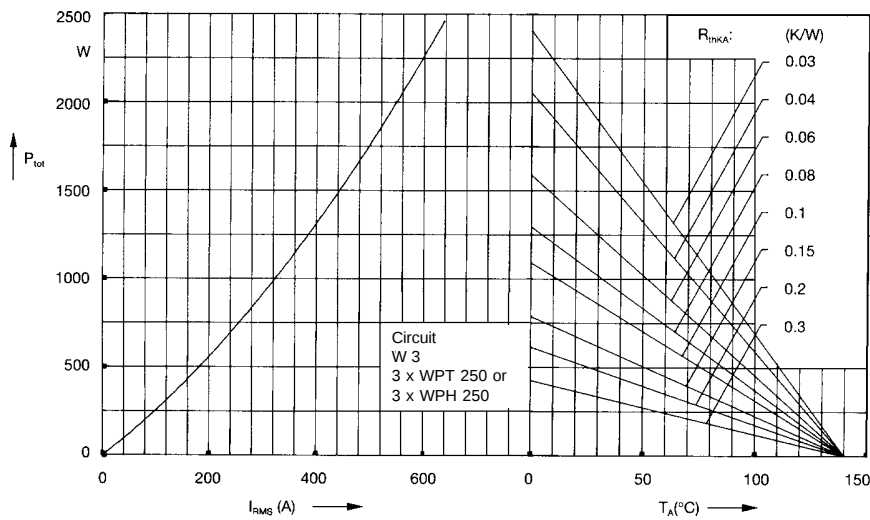


Fig. 7 Three phase AC-controller:
Power dissipation versus RMS output
current and ambient temperature

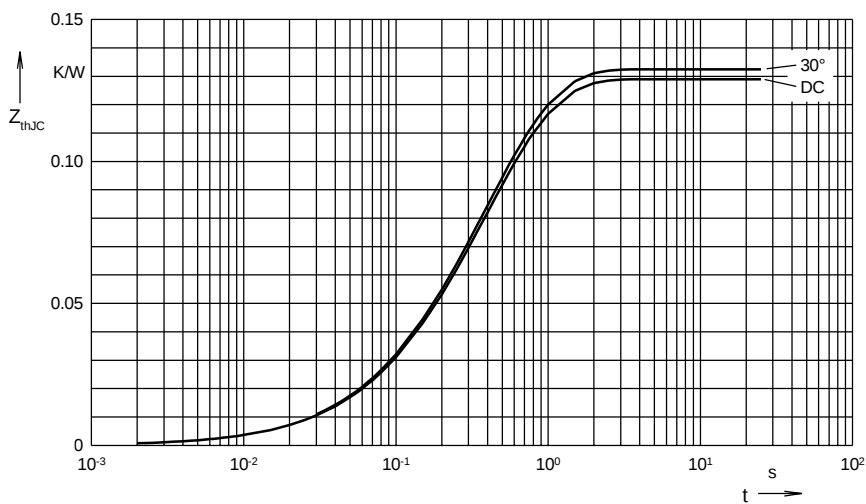


Fig. 8 Transient thermal impedance junction
to case (per thyristor or diode)

R_{thJC} for various conduction angles d :

d	R_{thJC} (K/W)
DC	0.129
180°C	0.131
120°C	0.131
60°C	0.132
30°C	0.132

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.099
2	0.0165	0.168
3	0.1091	0.456

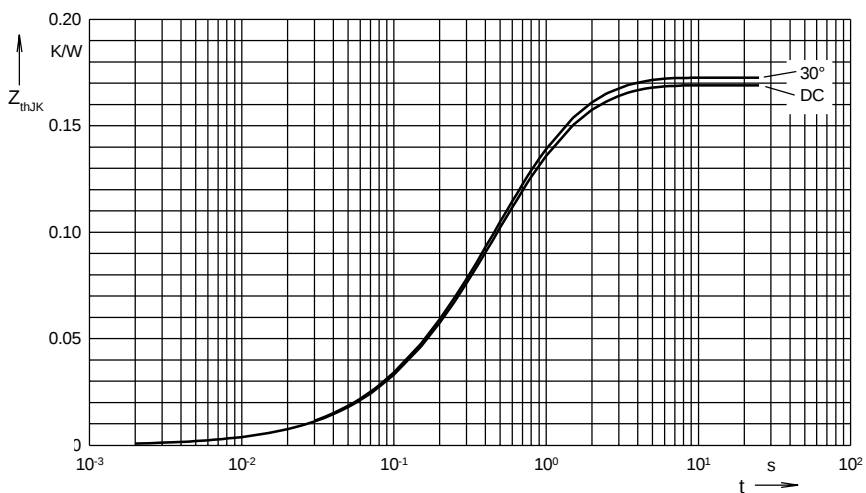


Fig. 9 Transient thermal impedance junction
to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d :

d	R_{thJK} (K/W)
DC	0.169
180°C	0.171
120°C	0.172
60°C	0.172
30°C	0.173

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0033	0.099
2	0.0159	0.168
3	0.1053	0.456
4	0.04	1.36

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