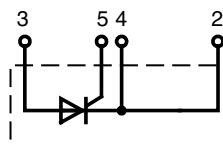


High Power Single Thyristor Modules

$$\begin{aligned} I_{\text{FRMS}} &= 750 \text{ A} \\ I_{\text{FAVM}} &= 464 \text{ A} \\ V_{\text{RRM}} &= 2000\text{-}2200 \text{ V} \end{aligned}$$

V_{RSM} V	V_{RRM} V	Type
2100	2000	MCO 450-20io1
2300	2200	MCO 450-22io1



E72873

Symbol	Conditions	Maximum Ratings	
I_{TRMS}	$T_{\text{VJ}} = T_{\text{VJM}}$ 180° sine	$T_{\text{C}} = 25^{\circ}\text{C}$	750 A
I_{TAV}		$T_{\text{C}} = 85^{\circ}\text{C}$	464 A
I_{TSM}	$T_{\text{VJ}} = 45^{\circ}\text{C};$ $V_{\text{R}} = 0$	$t = 10 \text{ ms}$ (50 Hz)	15000 A
		$t = 8.3 \text{ ms}$ (60 Hz)	16000 A
	$T_{\text{VJ}} = T_{\text{VJM}};$ $V_{\text{R}} = 0$	$t = 10 \text{ ms}$ (50 Hz)	13000 A
		$t = 8.3 \text{ ms}$ (60 Hz)	14400 A
I^2t	$T_{\text{VJ}} = 45^{\circ}\text{C};$ $V_{\text{R}} = 0$	$t = 10 \text{ ms}$ (50 Hz)	1 125 000 A ² s
		$t = 8.3 \text{ ms}$ (60 Hz)	1 062 000 A ² s
	$T_{\text{VJ}} = T_{\text{VJM}};$ $V_{\text{R}} = 0$	$t = 10 \text{ ms}$ (50 Hz)	845 000 A ² s
		$t = 8.3 \text{ ms}$ (60 Hz)	813 000 A ² s
$(di/dt)_{\text{cr}}$	$T_{\text{VJ}} = T_{\text{VJM}};$ $f = 50 \text{ Hz}; t_{\text{p}} = 200 \mu\text{s};$	repetitive, $I_{\text{T}} = 960 \text{ A}$	100 A/ μs
	$V_{\text{D}} = \frac{2}{3} V_{\text{DRM}};$ $I_{\text{G}} = 1 \text{ A};$ $di_{\text{G}}/dt = 1 \text{ A}/\mu\text{s}$	non repetitive, $I_{\text{T}} = I_{\text{TAVM}}$	500 A/ μs
$(dv/dt)_{\text{cr}}$	$T_{\text{VJ}} = T_{\text{VJM}};$ $V_{\text{D}} = \frac{2}{3} V_{\text{DRM}};$ $R_{\text{GK}} = \infty;$ method 1 (linear voltage rise)		1000 V/ μs
P_{GM}	$T_{\text{VJ}} = T_{\text{VJM}};$ $t_{\text{p}} = 30 \mu\text{s}$ $I_{\text{T}} = I_{\text{T(AV)M}};$ $t_{\text{p}} = 500 \mu\text{s}$		120 W 60 W 30 W
P_{GAV}			30 W
V_{RGM}			10 V
T_{VJ}			-40...+130 °C
T_{VJM}			130 °C
T_{stg}			-40...+125 °C
V_{ISOL}	50/60 Hz, RMS $t = 1 \text{ min}$		3000 V~
	$I_{\text{ISOL}} \leq 1 \text{ mA}$ $t = 1 \text{ s}$		3600 V~
M_{d}	Mounting torque (M6)	4.5 - 7	Nm
	Terminal connection torque (M8)	11-13	Nm
Weight	Typical including screws	650	g

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

Features

- Direct Copper Bonded Al_2O_3 ceramic with copper base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered
- Keyed gate/cathode twin pins

Applications

- Motor control, soft starter
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- L

Advantages

- Improved temperature & power cycling
- Reduced protection circuits

Symbol	Conditions	Characteristic Values	
		typ.	max.
I_{RRM}	$V_R = V_{RRM}$ $T_{VJ} = T_{VJM}$		40 mA
V_T	$I_T = 600$ A $T_{VJ} = 25^\circ\text{C}$		1.15 V
V_{T0}	For power-loss calculations only		0.77 V
r_t	$T_{VJ} = T_{VJM}$		0.42 mΩ
V_{GT}	$V_D = 6$ V $T_{VJ} = 25^\circ\text{C}$		2 V
	$T_{VJ} = -40^\circ\text{C}$		3 V
I_{GT}	$V_D = 6$ V $T_{VJ} = 25^\circ\text{C}$		300 mA
	$T_{VJ} = -40^\circ\text{C}$		400 mA
V_{GD}	$V_D = \frac{2}{3} V_{DRM}$ $T_{VJ} = T_{VJM}$		0.25 V
I_{GD}			10 mA
I_L	$t_p = 30$ μs; $V_D = 6$ V $I_G = 1$ A; $di_G/dt = 1$ A/μs $T_{VJ} = 25^\circ\text{C}$		400 mA
I_H	$V_D = 6$ V; $R_{GK} = \infty$; $T_{VJ} = 25^\circ\text{C}$		300 mA
t_{gd}	$V_D = \frac{1}{2} V_{DRM}$ $I_G = 1$ A; $di_G/dt = 1$ A/μs $T_{VJ} = 25^\circ\text{C}$		2 μs
t_q	$V_D = \frac{2}{3} V_{DRM}$ $dv/dt = 50$ V/μs; $-di/dt = 10$ A/μs $I_T = 500$ A; $V_R = 100$ V; $t_p = 200$ μs $T_{VJ} = T_{VJM}$	350	μs
R_{thJC}	DC current		0.072 K/W
R_{thJK}	DC current		0.096 K/W
d_S	Creeping distance on surface		12.7 mm
d_A	Creepage distance in air		9.6 mm
a	Maximum allowable acceleration		50 m/s ²

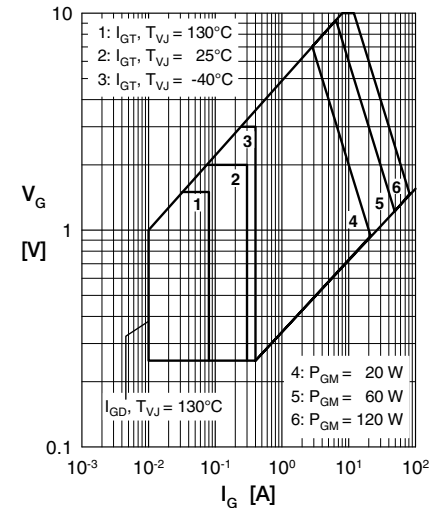


Fig. 1 Gate trigger characteristics

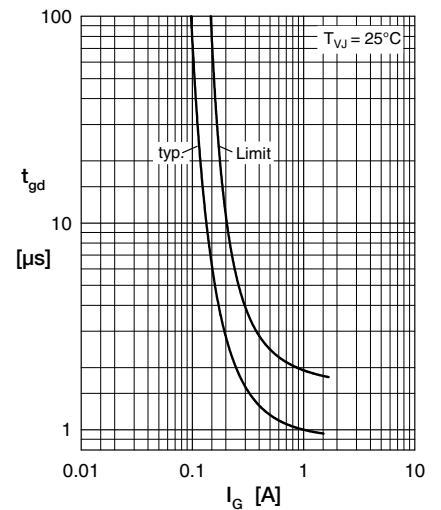
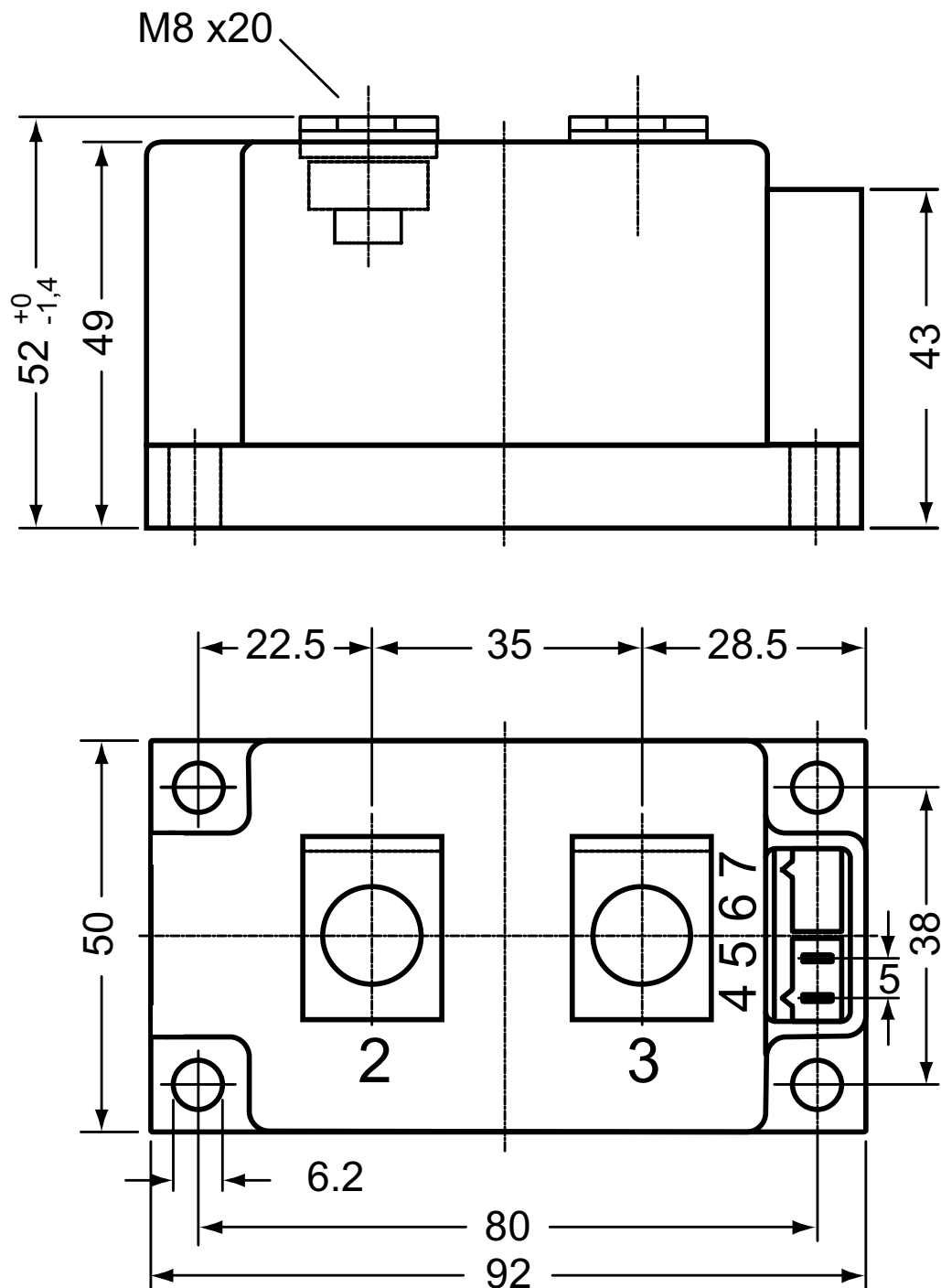


Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")



Optional accessories for modules

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red

Type ZY 180L (L = Left for pin pair 4/5)

Type ZY 180R (R = Right for pin pair 6/7) } UL 758, style 3751

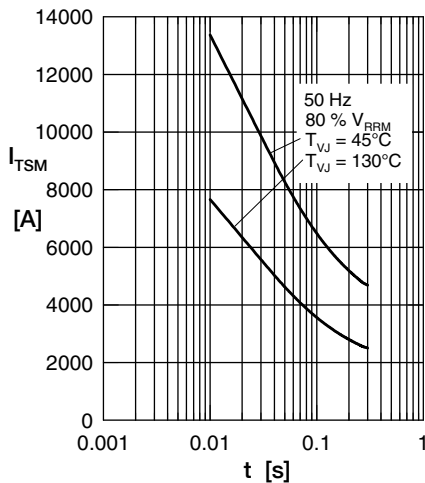


Fig. 3 Surge overload current
 I_{TSM} : Crest value, t : duration

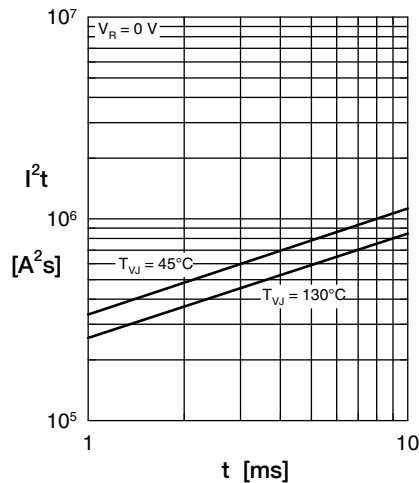


Fig. 4 I^2t versus time (1-10 ms)

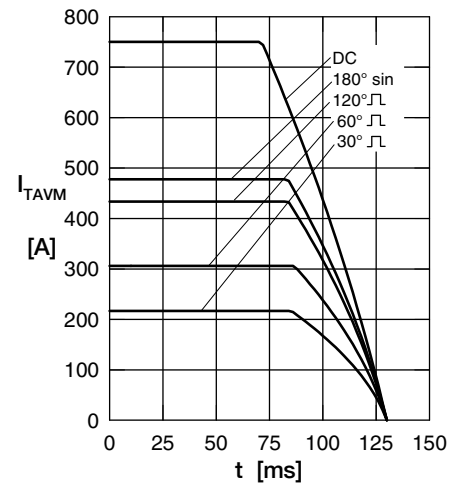


Fig. 5 Maximum forward current at case temperature

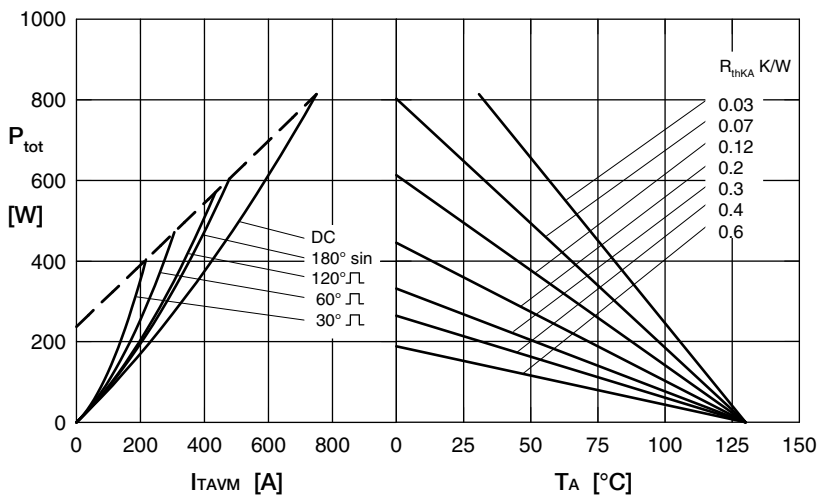


Fig. 6 Power dissipation versus on-state current & ambient temperature

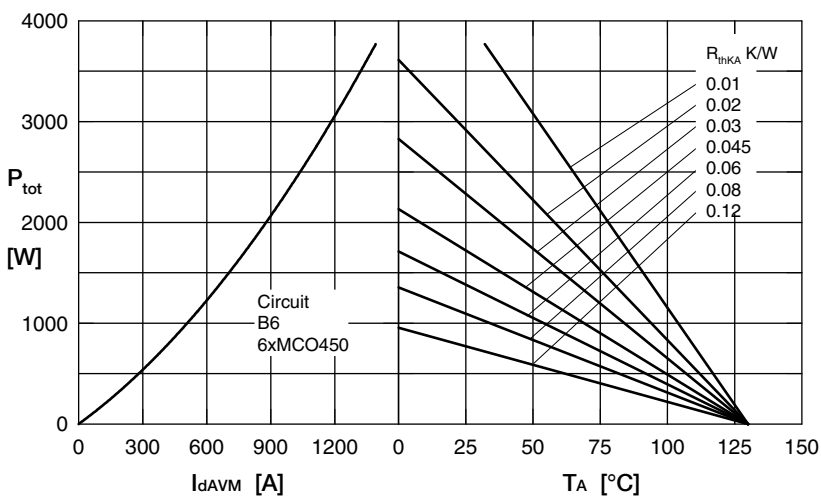


Fig. 7 Three phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature

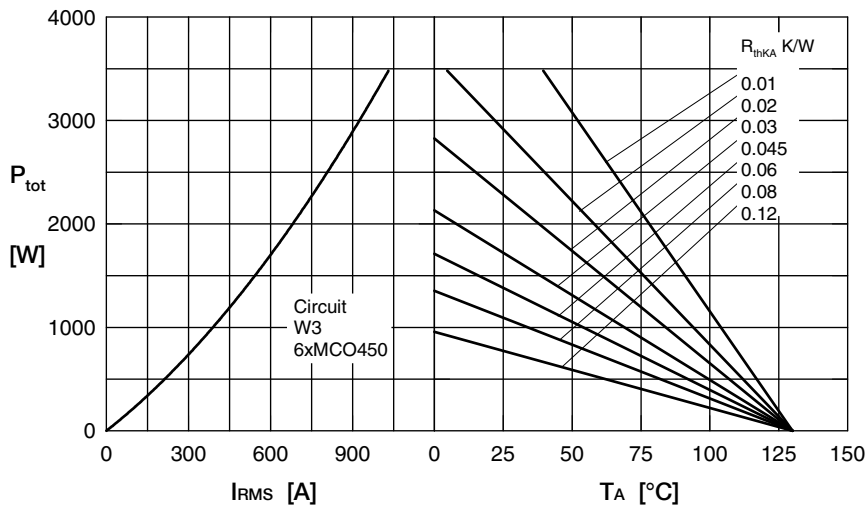


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

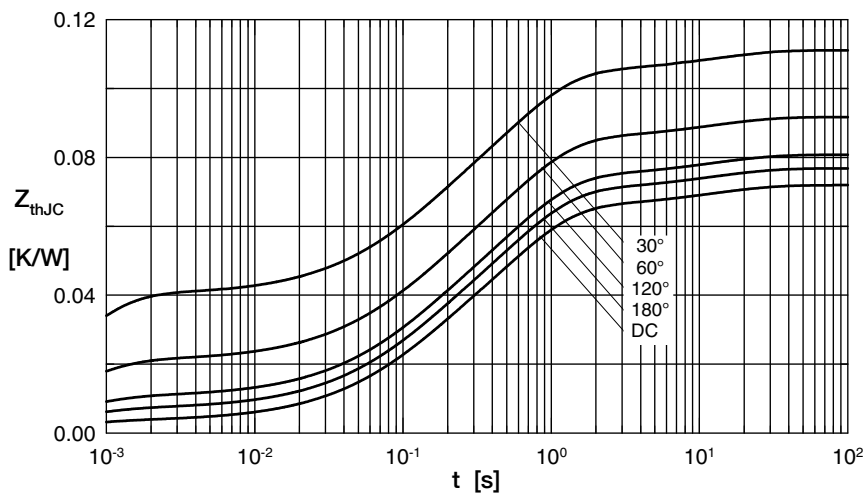


Fig. 9 Transient thermal impedance junction to case

R_{thJC} for various conduction angles d :

d	R_{thJC} (K/W)
DC	0.072
180°	0.0768
120°	0.081
60°	0.092
30°	0.111

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.00054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12

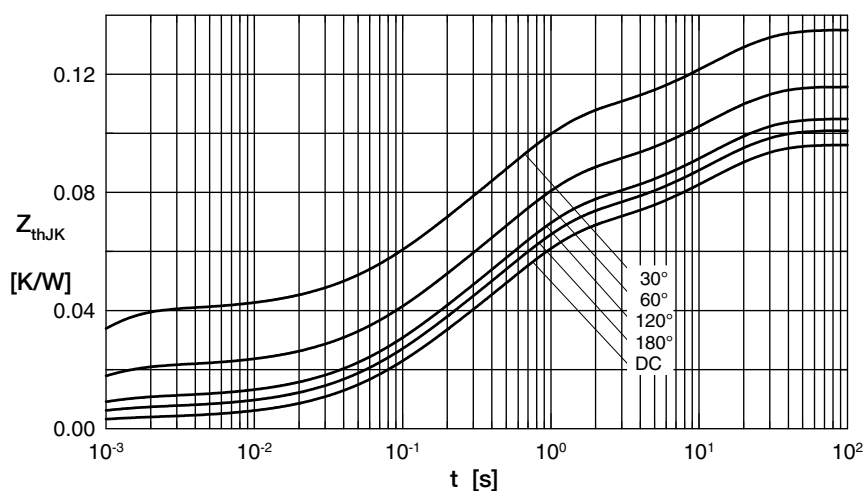


Fig.10 Transient thermal impedance junction to heatsink

R_{thJK} for various conduction angles d :

d	R_{thJK} (K/W)
DC	0.096
180°	0.1
120°	0.105
60°	0.116
30°	0.135

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0035	0.0054
2	0.0186	0.098
3	0.0432	0.54
4	0.0067	12
5	0.024	12

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