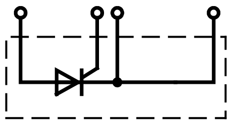
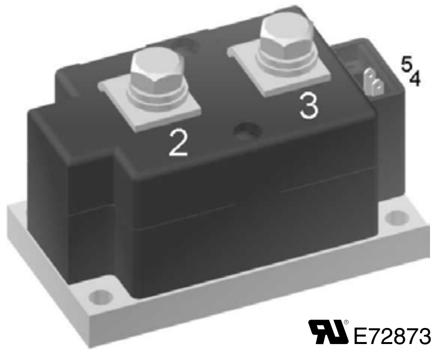
High Power Single Thyristor Modules

I_{FRMS} = 750 A
I_{FAVM} = 464 A
V_{RRM} = 2000-2200 V

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





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Symbol	Conditions			Maximum Ratings	
I_{TRMS}	$T_{VJ} = T_{VJM}$		$T_C = 25°C$	750	A
I_{TAV}	180° sine		$T_C = 85°C$	464	A
I_{TSM}	$T_{VJ} = 45°C$;	t = 10 ms	(50 Hz)	15000	A
	$V_R = 0$	t = 8.3 ms	(60 Hz)	16000	A
	$T_{VJ} = T_{VJM}$;	t = 10 ms	(50 Hz)	13000	A
	$V_R = 0$	t = 8.3 ms	(60 Hz)	14400	A
I^2t	$T_{VJ} = 45°C$;	t = 10 ms	(50 Hz)	1 125 000	A^2s
	$V_R = 0$	t = 8.3 ms	(60 Hz)	1 062 000	A^2s
	$T_{VJ} = T_{VJM}$;	t = 10 ms	(50 Hz)	845 000	A^2s
	$V_R = 0$	t = 8.3 ms	(60 Hz)	813 000	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f = 50 Hz; t_p = 200 µs;	repetitive, I_T = 960 A		100	A/µs
	$V_D = {}^2/_3 V_{DRM}$; I_G = 1 A; di_G/dt = 1 A/µs	non repetitive, $I_T = I_{TAVM}$		500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $V_D = {}^2/_3 V_{DRM}$; $R_{GK} = \infty$; method 1 (linear voltage rise)			1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$; t_p = 30 µs			120	W
	$I_T = I_{T(AV)M}$; t_p = 500 µs			60	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 min		3000	V~
	$I_{ISOL} \leq 1$ mA	t = 1 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°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°C		2	V
		T_{VJ} = -40°C		3	V
I_{GT}	V_D = 6 V	T_{VJ} = 25°C		300	mA
		T_{VJ} = -40°C		400	mA
V_{GD}	$V_D = {}^2/_3\, V_{DRM}$;	$T_{VJ} = T_{VJM}$		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°C		400	mA
I_H	V_D = 6 V; $R_{GK} = \infty$;	T_{VJ} = 25°C		300	mA
t_{gd}	$V_D = ½V_{DRM}$ I_G = 1 A; di_G/dt = 1 A/µs	T_{VJ} = 25°C		2	µs
t_q	$V_D = {}^2/_3\, V_{DRM}$ 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/s²

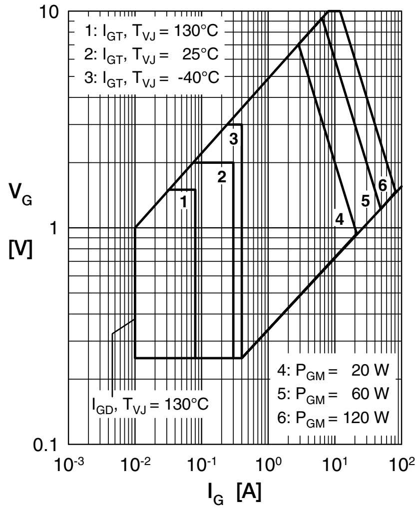

Fig. 1 Gate trigger characteristics

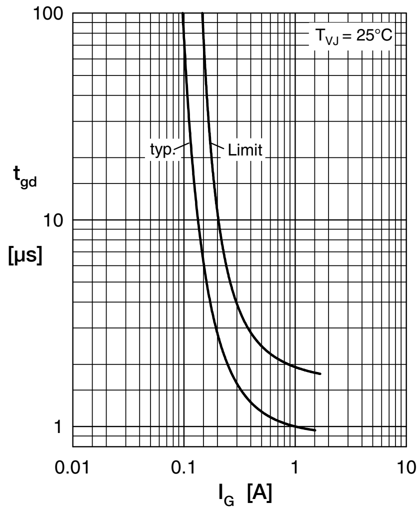

Fig. 2 Gate trigger delay time

IXYS reserves the right to change limits, test conditions and dimensions.

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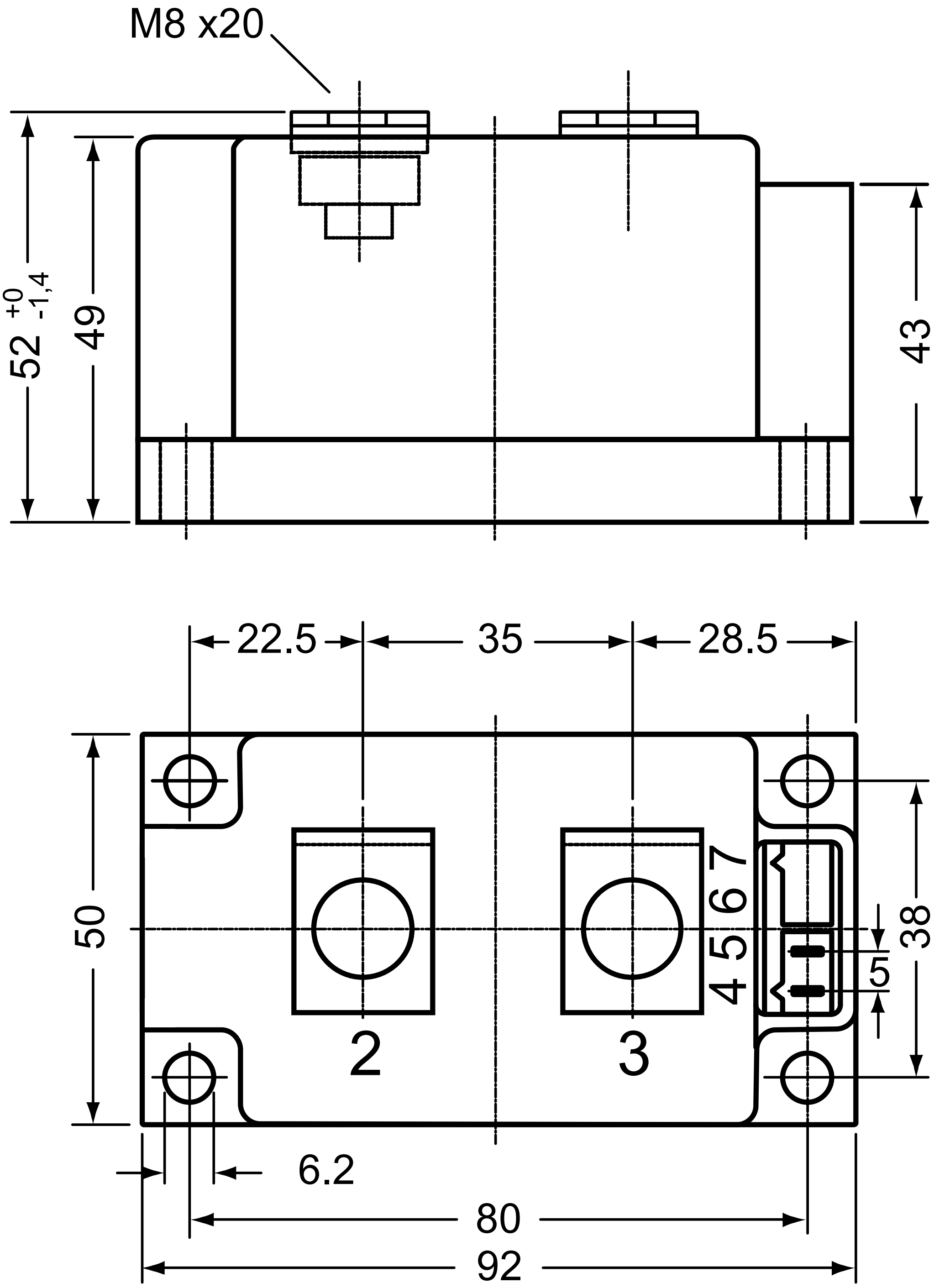
Dimensions in mm (1 mm = 0.0394“)



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) } UL 758, style 3751

Type ZY 180R (R = Right for pin pair 6/7) }

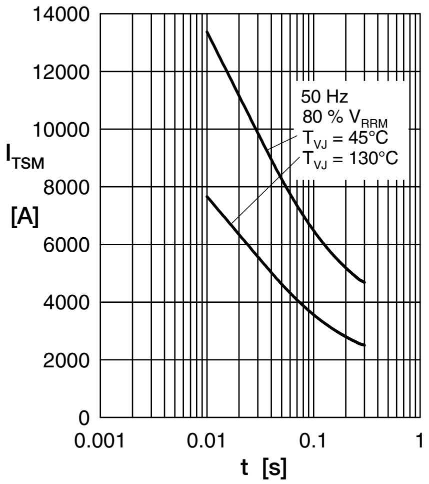


Fig. 3 Surge overload current
I_{TSM}: Crest value, t: duration

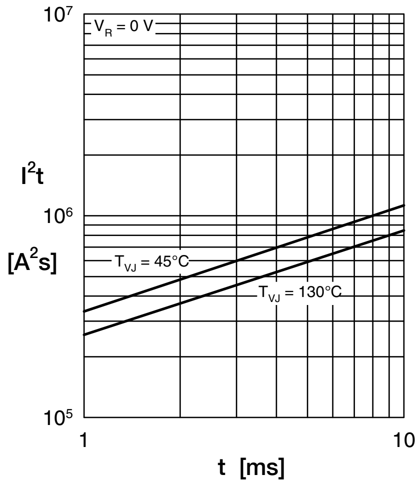


Fig. 4 I^2t versus time (1-10 ms)

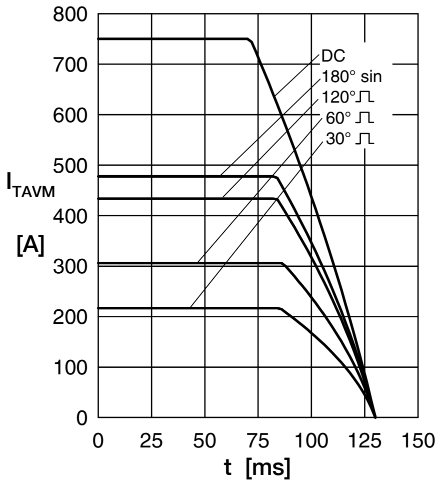


Fig. 5 Maximum forward current at case temperature

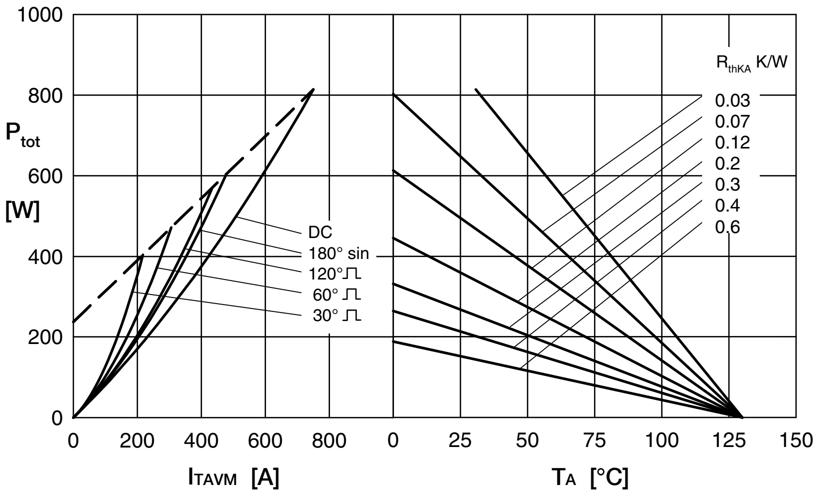


Fig. 6 Power dissipation versus on-state current & ambient temperature

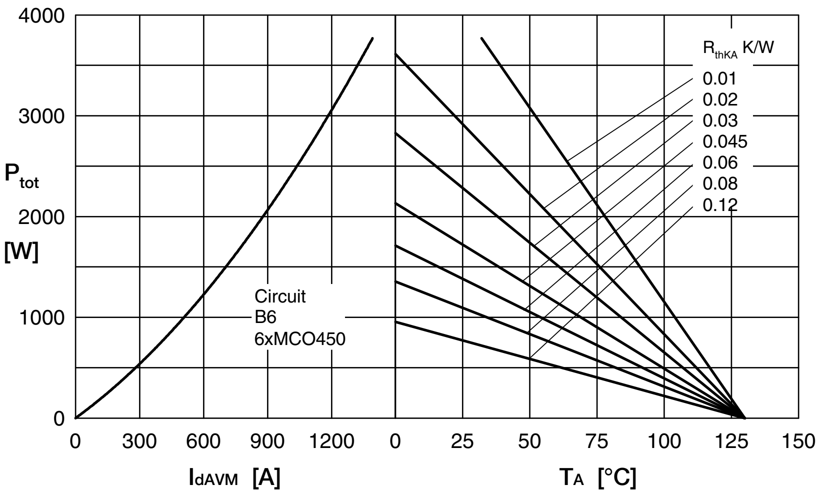


Fig. 7 Three phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature

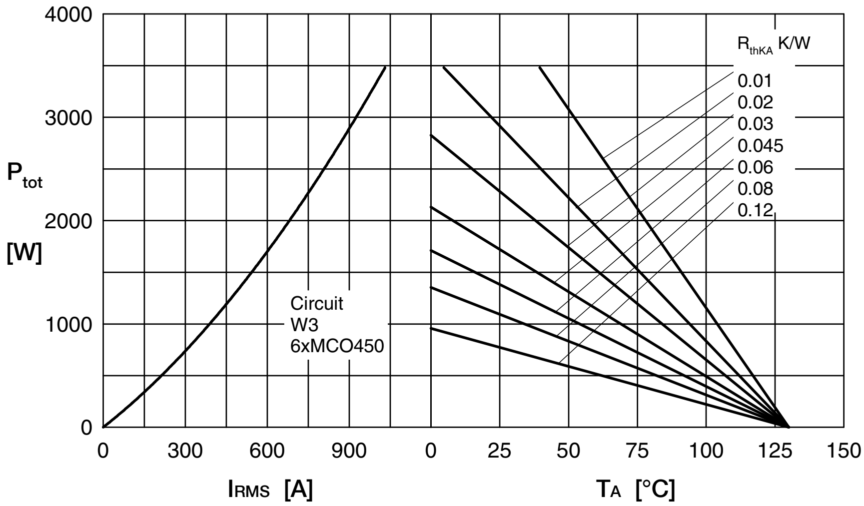


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

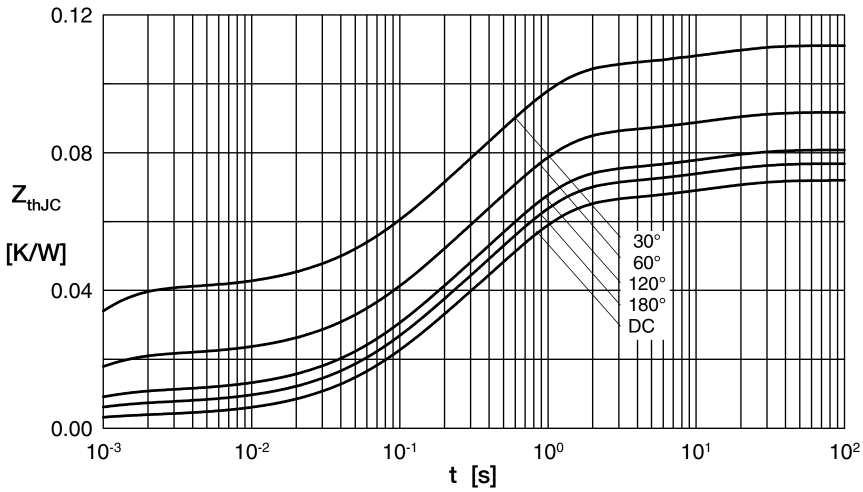


Fig. 9 Transient thermal impedance junction to case

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

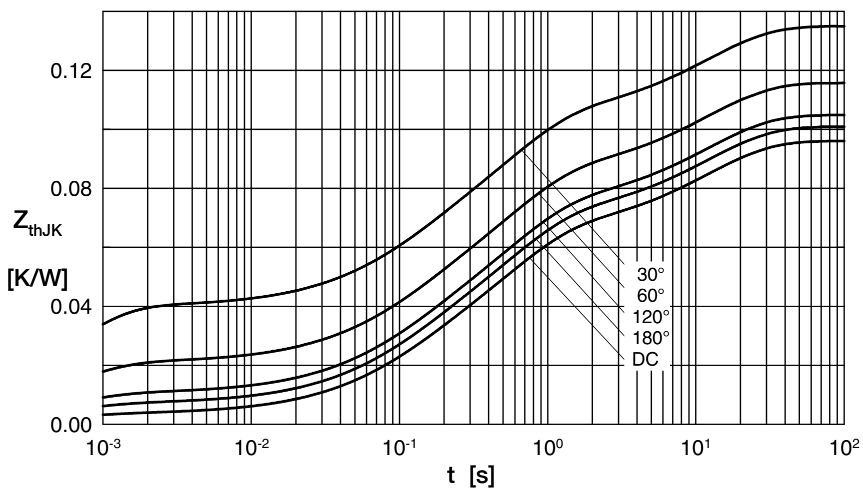


Fig.10 Transient thermal impedance junction to heatsink

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