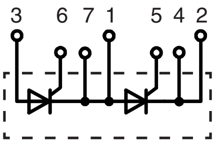
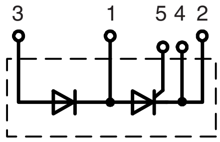
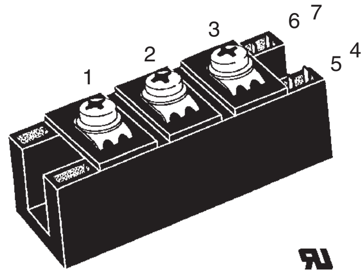
High Voltage Thyristor Module

I_{TRMS} = 2x300 A
I_{TAVM} = 2x165 A
V_{RRM} = 2000-2200 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
2100	2000	MCC 161-20io1	MCD 161-20io1
2300	2200	MCC 161-22io1	MCD 161-22io1

MCC


MCD




Symbol	Conditions		Maximum Ratings	
I_{TRMS}	$T_{VJ} = T_{VJM}$		300	A
I_{TAVM}	T_C = 85°C; 180° sine		165	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz)	6000	A
	V_R = 0	t = 8.3 ms (60 Hz)	6400	A
	$T_{VJ} = T_{VJM}$;	t = 10 ms (50 Hz)	5250	A
	V_R = 0	t = 8.3 ms (60 Hz)	5600	A
I^2dt	T_{VJ} = 45°C;	t = 10 ms (50 Hz)	180000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	170000	A^2s
	$T_{VJ} = T_{VJM}$;	t = 10 ms (50 Hz)	137000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	128000	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f = 50 Hz; t_P = 200 µs; $V_D = {}^2/_3\ V_{DRM}$;	repetitive, I_T = 500 A	150	A/µs
	I_G = 0.5 A; di_G/dt = 0.5 A/µs	non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $V_{DR} = {}^2/_3\ V_{DRM}$ $R_{GK} = \infty$; method 1 (linear voltage rise)		1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$;	t_P = 30 µs	120	W
	$I_T = I_{TAVM}$;	t_P = 500 µs	60	W
P_{GAV}			8	W
V_{RGM}			10	V
T_{VJ}			-40...125	°C
T_{VJM}			125	°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)		2.25-2.75	Nm
	Terminal connection torque (M6)		4.5-5.5	Nm
Weight	Typical including screws		125	g

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

Features

- International standard package
- **D**irect **C**opper **B**onded Al_2O_3-ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- 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

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

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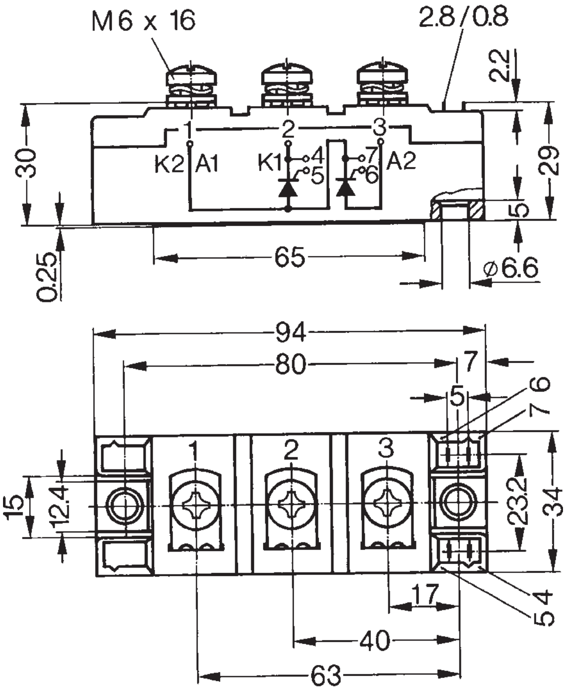
Symbol	Conditions	Characteristic Values	
I_{RRM}, I_{DRM}	$V_R = V_{RRM}$; $T_{VJ} = T_{VJM}$	40	mA
V_T	I_T = 300A; T_{VJ} = 25°C	1.36	V
V_{T0} r_T	For power-loss calculations only ($T_{VJ} = T_{VJM}$)	0.8 1.6	V mΩ
V_{GT} I_{GT}	V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C V_D = 6 V; T_{VJ} = 25°C T_{VJ} = -40°C	2 2.6 150 200	V V mA mA
V_{GD} I_{GD}	$V_D = {}^2/_3 V_{DRM}$; $T_{VJ} = T_{VJM}$ $V_D = {}^2/_3 V_{DRM}$; $T_{VJ} = T_{VJM}$	0.25 10	V mA
I_L	T_{VJ} = 25°C; V_D = 6 V; t_P = 30 µs di_G/dt = 0.45 A/µs; I_G = 0.45 A	200	mA
I_H	T_{VJ} = 25°C; V_D = 6 V; $R_{GK} = \infty$	150	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} di_G/dt = 0.5 A/µs; I_G = 0.5 A	2	µs
t_q	$T_{VJ} = T_{VJM}$; V_R = 100 V; $V_D = {}^2/_3 V_{DRM}$; t_P = 200 µs dv/dt = 20 V/µs; I_T = 160 A; -di/dt = 10A/µs	typ. 150	µs
Q_S I_{RM}	} $T_{VJ} = T_{VJM}$ } -di/dt = 50 A/µs; I_T = 300 A	550 235	µC A
R_{thJC} R_{thJK}	per thyristor; DC current per module per thyristor; DC current per module	0.155 0.078 0.225 0.113	K/W K/W K/W K/W
d_S d_A a	Creeping distance on surface Creepage distance in air Maximum allowable acceleration	12.7 9.6 50	mm mm m/s^2

Dimensions in mm (1 mm = 0.0394")



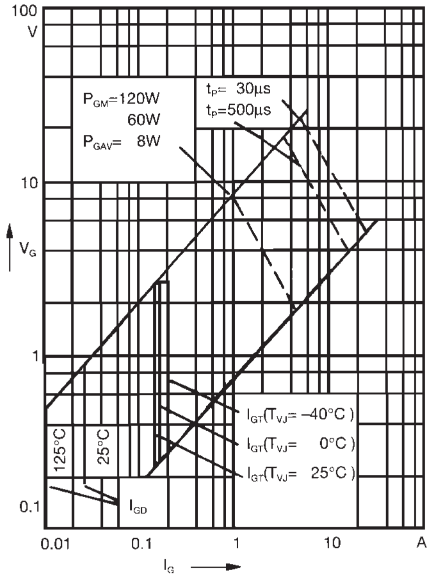


Fig. 1 Gate trigger characteristics

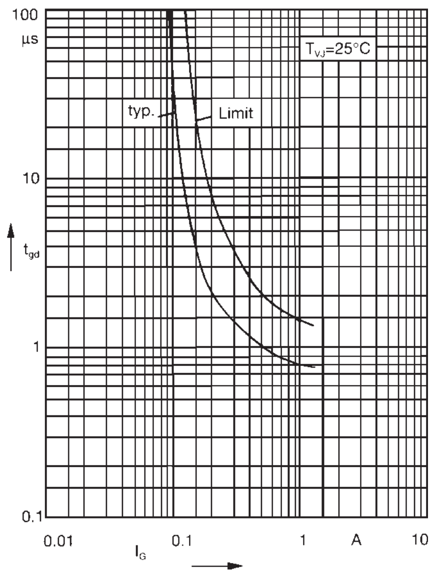


Fig. 2 Gate trigger delay time

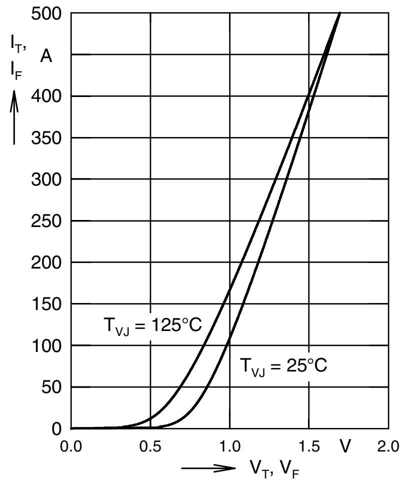


Fig 3: Forward current vs. voltage drop per thyristor/diode

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Optional accessories for modules
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **ZY 180L** (L = Left for pin pair 4/5) } UL 758, style 1385,
Type **ZY 180R** (R = right for pin pair 6/7) } CSA class 5851, guide 460-1-1

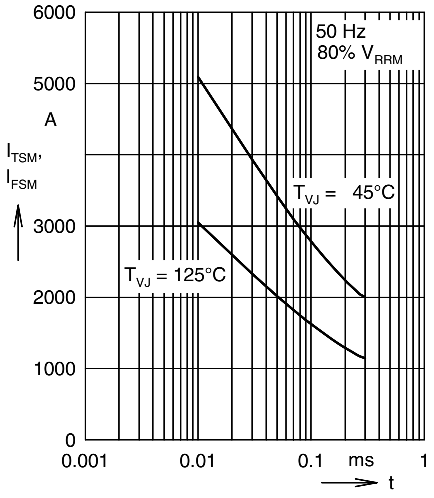

Fig. 4: Surge overload current I_{TSM}, I_{FSM} = f(t)

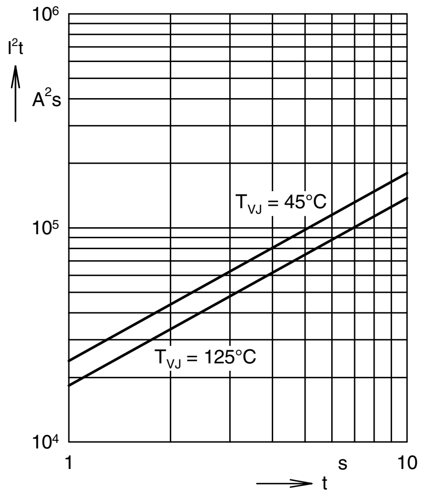

Fig. 5: I^2t versus time per diode

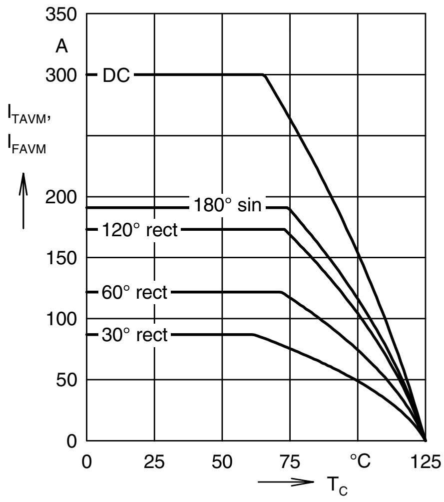

Fig. 6: Max. forward current at case temperature $I_{TAVM/FAVM}$ = f (T_C,d)

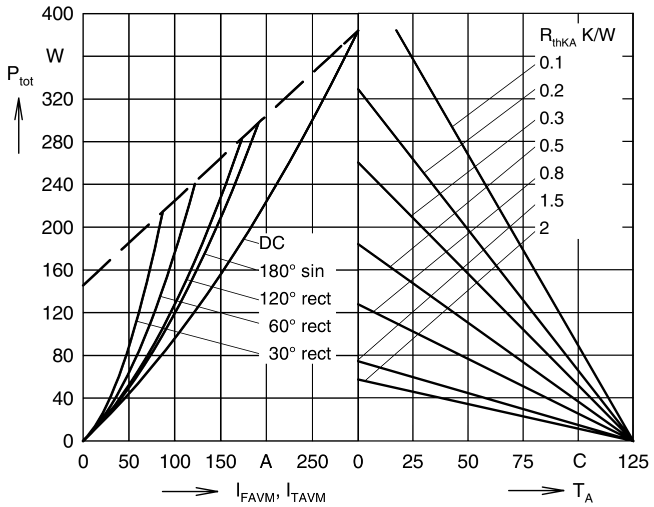

Fig. 7: Power dissipation vs. on-state current and ambient temperature (per thyristor/diode)

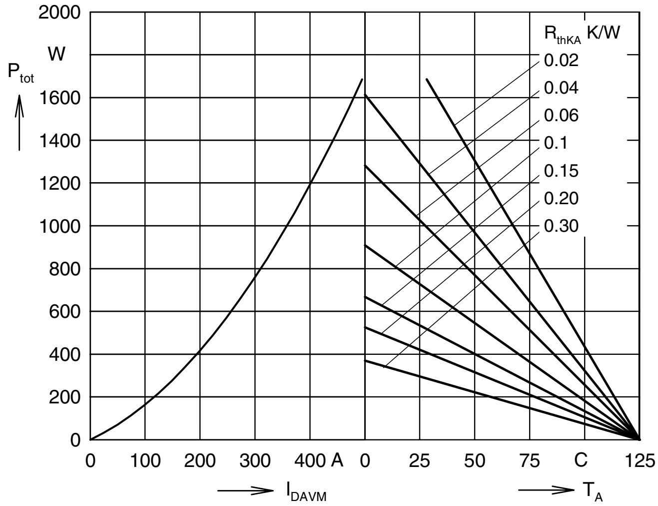

Fig. 8: Power dissipation vs. direct output current and ambient temperature (three phase rectifier bridge)

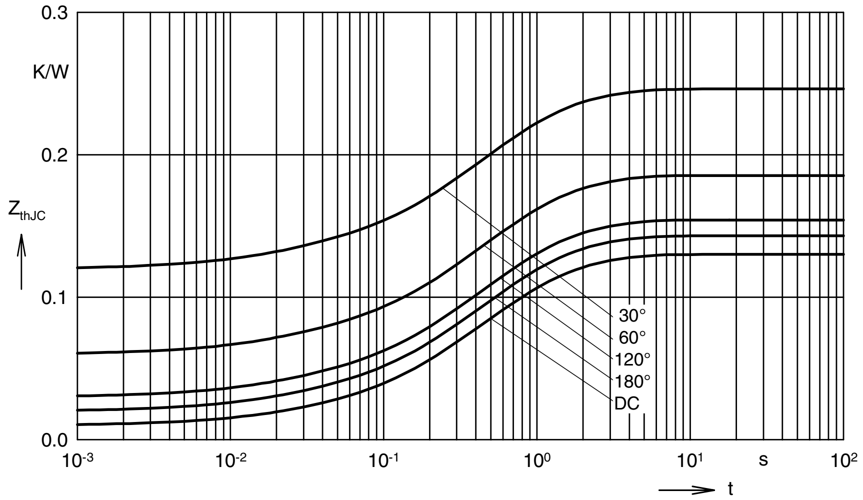

Fig. 9: Transient thermal impedance junction to case Z_{thjC} at various conduction angles

R_{thJC} for various condition angles:

d	R_{thJC} (K/W)
DC	0.155
180°	0.171
120°	0.184
60°	0.222
30°	0.294

Constants for Z_{thJC} calculation (DC):

i	R_{thi} (K/W)	t_i (s)
1	0.012	0.00014
2	0.008	0.019
3	0.03	0.18
4	0.073	0.52
5	0.032	1.6

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