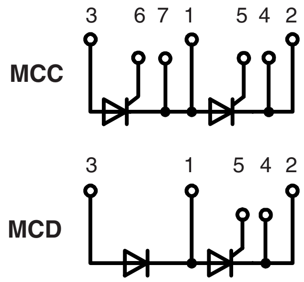
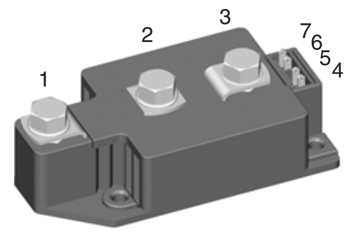
Thyristor Modules
Thyristor/Diode Modules

I_{TRMS} = 2x 500 A
I_{TAVM} = 2x 320 A
V_{RRM} = 2200 V

V_{RSM} V_{DSM}	V_{RRM} V_{DRM}	Type	
V	V	Version 1	Version 1
2300	2200	MCC 310-22io1	MCD 310-22io1





Symbol	Conditions		Maximum Ratings	
I_{TRMS}, I_{FRMS}	$T_{VJ} = T_{VJM}$		500	A
I_{TAVM}, I_{FAVM}	T_C = 85°C; 180° sine		320	A
I_{TSM}, I_{FSM}	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	8000	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	8600	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	7000	A
	V_R = 0	t = 8.3 ms (60 Hz), sine	7500	A
I^2dt	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	320 000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	310 000	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	245 000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz), sine	235 000	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 = 960 A	100	A/µs
	I_G = 1 A di_G/dt = 1 A/µs	non repetitive, I_T = 320 A	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}			20	W
V_{RGM}			10	V
T_{VJ}			-40...+140	°C
T_{VJM}			140	°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 (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

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

Features

- International standard package
- Direct copper bonded 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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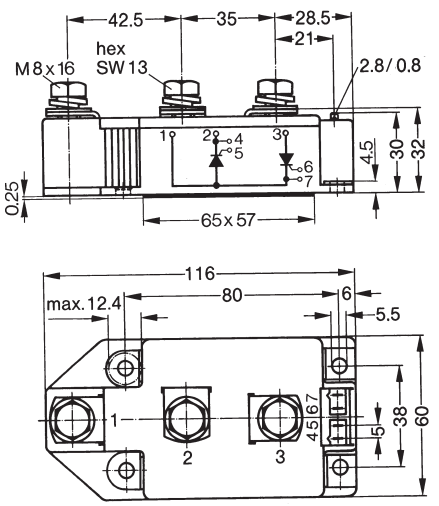
Symbol	Conditions		Characteristic Values	
I_{RRM}	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		70	mA
I_{DRM}			40	mA
V_T, V_F	I_T, I_F = 600 A; T_{VJ} = 25°C		1.40	V
V_{T0}	For power-loss calculations only (T_{VJ} = 140°C)		0.8	V
r_T			0.82	mΩ
V_{GT}	V_D = 6 V;	T_{VJ} = 25°C	2	V
		T_{VJ} = -40°C	3	V
I_{GT}	V_D = 6 V;	T_{VJ} = 25°C	150	mA
		T_{VJ} = -40°C	200	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	$V_D = {}^2/_3\ V_{DRM}$	0.25	V
I_{GD}			10	mA
I_L	T_{VJ} = 25°C; t_P = 30 µs; V_D = 6 V I_G = 0.45 A; di_G/dt = 0.45 A/µs		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 = ½ V_{DRM} I_G = 1 A; di_G/dt = 1 A/µs		2	µs
t_q	$T_{VJ} = T_{VJM}$; I_T = 300 A, t_P = 200 µs; -di/dt = 10 A/µs V_R = 100 V; dv/dt = 50 V/µs; $V_D = {}^2/_3\ V_{DRM}$		typ. 200	µs
Q_S	T_{VJ} = 125°C; I_T, I_F = 400 A, -di/dt = 50 A/µs		760	µC
I_{RM}			275	A
R_{thJC}	per thyristor/diode; DC current	other values see Fig. 8/9	0.112	K/W
	per module		0.056	K/W
R_{thJK}	per thyristor/diode; DC current		0.152	K/W
	per module		0.076	K/W
d_S	Creepage distance on surface		12.7	mm
d_A	Strike distance through air		9.6	mm
a	Maximum allowable acceleration		50	m/s²

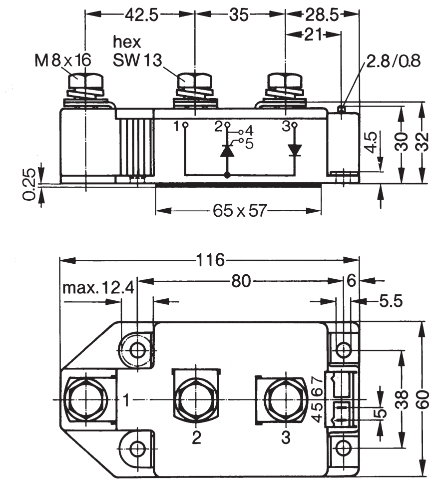
Optional accessories for modules
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **ZY 180L** (L = Left for pin pair 4/5) UL 758, style 1385,
Type **ZY 180R** (R = right for pin pair 6/7) CSA class 5851, guide 460-1-1

Dimensions in mm (1 mm = 0.0394")

MCC



MCD



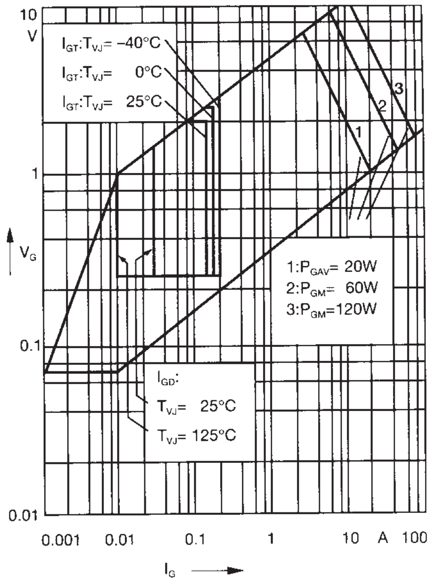


Fig. 1 Gate trigger characteristics

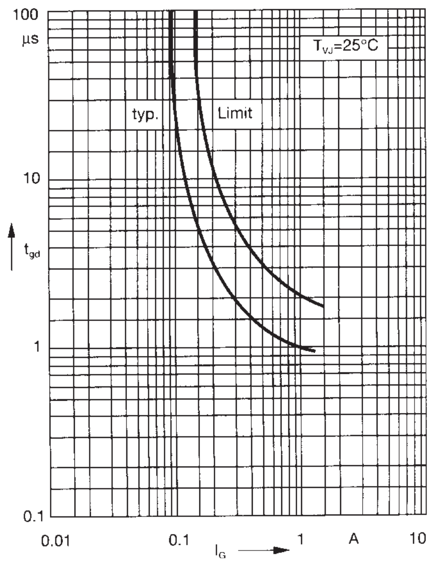
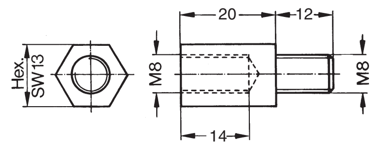


Fig. 2 Gate trigger delay time

Threaded spacer for higher Anode/ Cathode construction:
Type **ZY 250**, material brass



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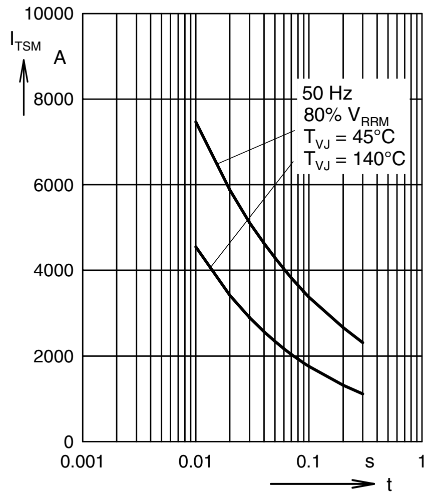

Fig. 3 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

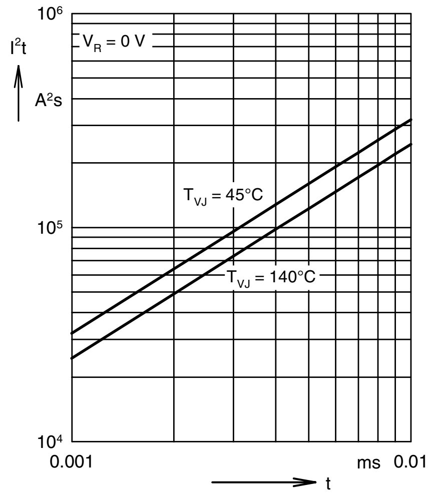

Fig. 4 $\int i^2dt$ versus time (1-10 ms)

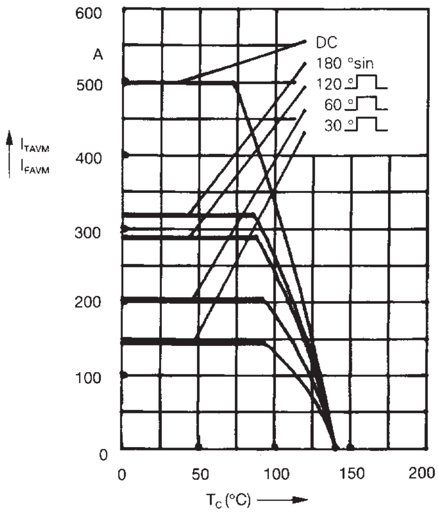

Fig. 4a Maximum forward current at case temperature

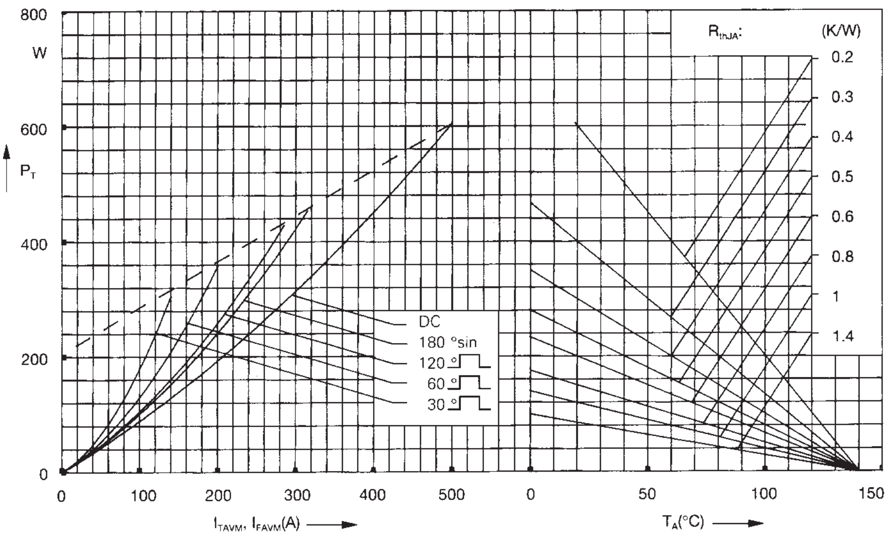

Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

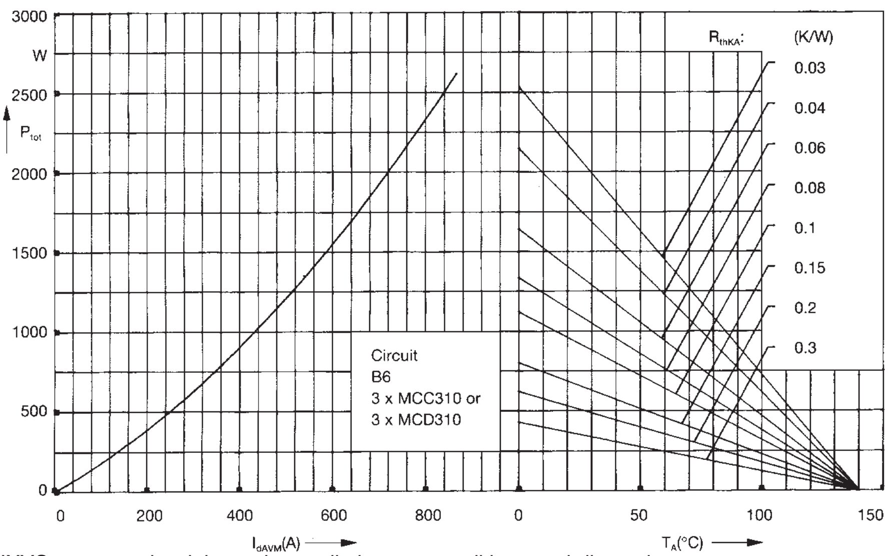

Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

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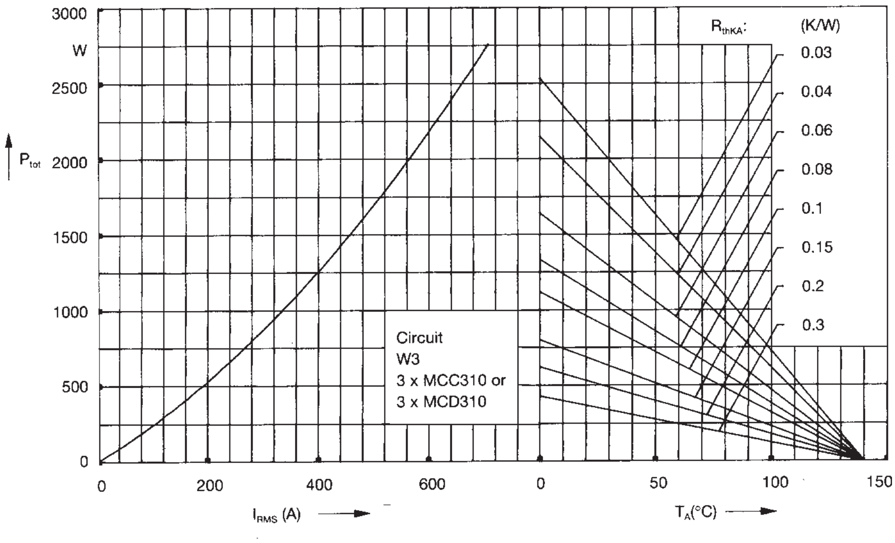

Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

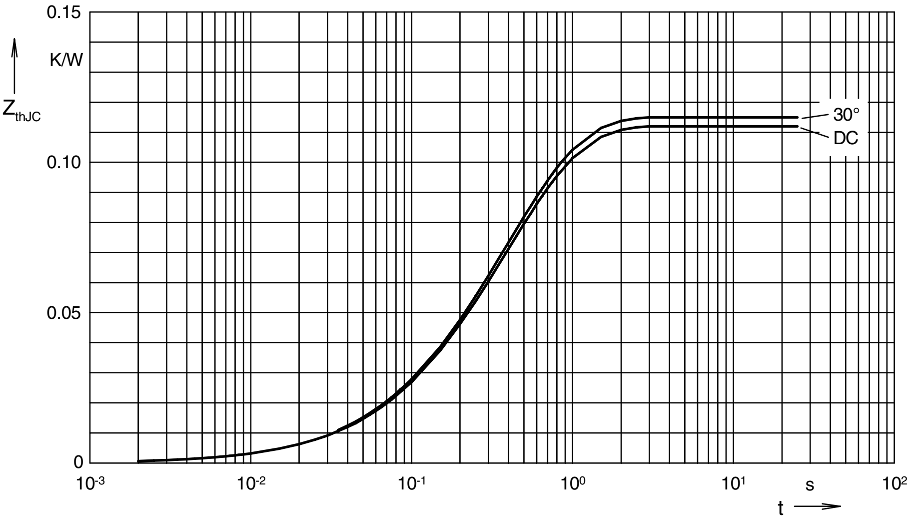

Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.112
180°C	0.113
120°C	0.114
60°C	0.115
30°C	0.115

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.003	0.099
2	0.0143	0.168
3	0.0947	0.456

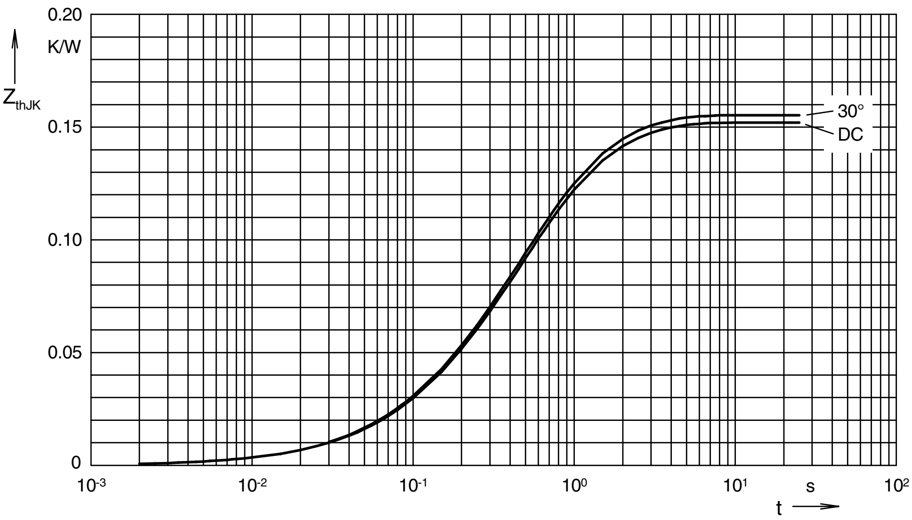

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.152
180°C	0.154
120°C	0.154
60°C	0.155
30°C	0.155

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.003	0.099
2	0.0143	0.168
3	0.0947	0.456
4	0.04	1.36

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