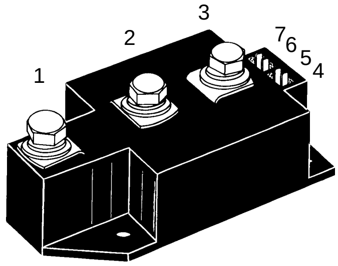
IXYS

MCC 220
MCD 220

Thyristor Modules
Thyristor/Diode Modules

I_{TRMS} = 2x 400 A
I_{TAVM} = 2x 250 A
V_{RRM} = 800-1600 V

V_{RSM} V_{DSM}	V_{RRM} V_{DRM}	Type	
V	V	Version 1	Version 1
900	800	MCC 220-08io1	MCD 220-08io1
1300	1200	MCC 220-12io1	MCD 220-12io1
1500	1400	MCC 220-14io1	MCD 220-14io1
1700	1600	MCC 220-16io1	MCD 220-16io1



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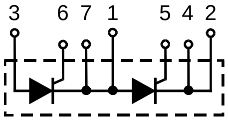

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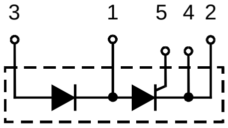

Symbol	Test Conditions		Maximum Ratings	
I_{TRMS}, I_{FRMS}	$T_{VJ} = T_{VJM}$		400	A
I_{TAVM}, I_{FAVM}	T_C = 85°C; 180° sine		250	A
I_{TSM}, I_{FSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz), sine	8500	A
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	9000	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	7000	A
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	7600	A
∫i²dt	T_{VJ} = 45°C	t = 10 ms (50 Hz), sine	360 000	A²s
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	336 000	A²s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	245 000	A²s
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	240 000	A²s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$	repetitive, I_T = 750 A	100	A/µs
	f =50 Hz, t_P =200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 1 A	non repetitive, I_T = 250 A	800	A/µs
	di_G/dt = 1 A/µs			
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$;	V_{DR} = 2/3 V_{DRM}	1000	V/µs
	R_{GK} = ∞; method 1 (linear voltage rise)			
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} ≤ 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.
IXYS reserves the right to change limits, test conditions and dimensions

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

Symbol	Test Conditions		Characteristic Values	
I_{RRM} I_{DRM}	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		70 40	mA mA
V_T, V_F	I_T, I_F = 600 A; T_{VJ} = 25°C		1.53	V
V_{T0} r_T	For power-loss calculations only (T_{VJ} = 140°C)		0.9 1.0	V 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} I_{GD}	$T_{VJ} = T_{VJM}$;	V_D = 2/3 V_{DRM}	0.25 10	V 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 = 1/2 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 I_{RM}	T_{VJ} = 125°C; I_T, I_F = 400 A, -di/dt = 50 A/µs		760 275	µC A
R_{thJC}	per thyristor/diode; DC current	other values see Fig. 8/9	0.139	K/W
	per module		0.0695	K/W
R_{thJK}	per thyristor/diode; DC current		0.179	K/W
	per module		0.0895	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/s^2

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

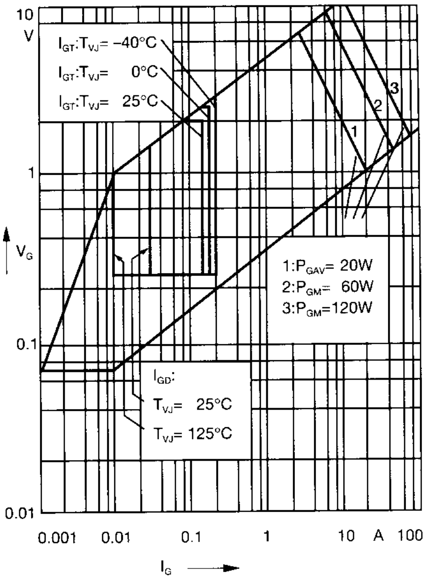

Fig. 1 Gate trigger characteristics

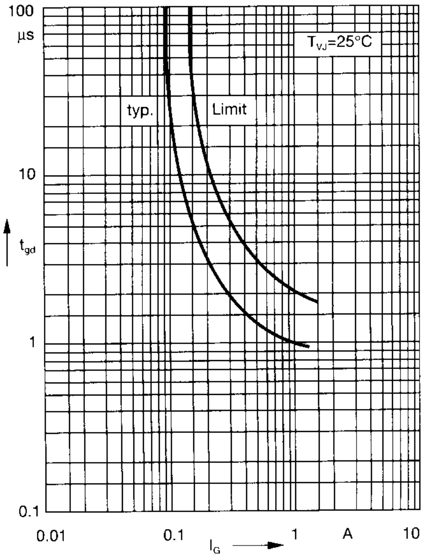

Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

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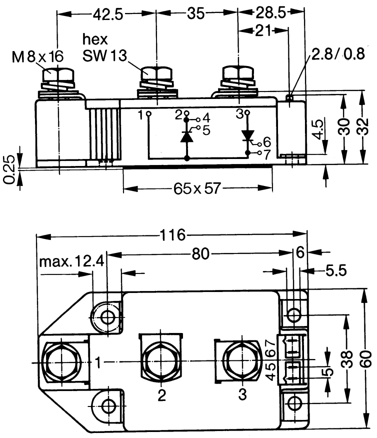

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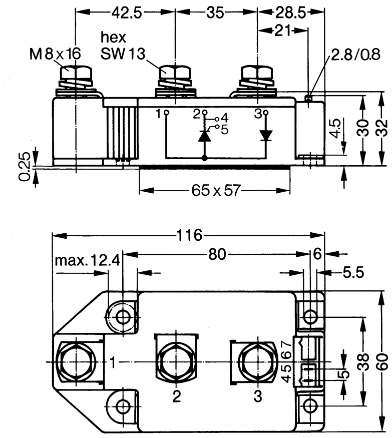
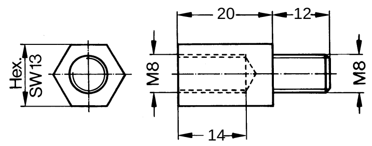


Threaded spacer for higher Anode/
Cathode construction:
Type **ZY 250**, material brass



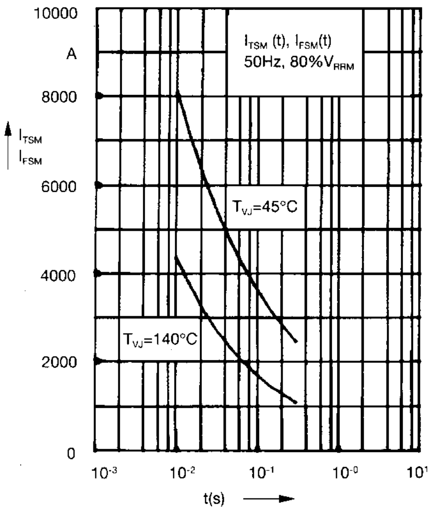


Fig. 3 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

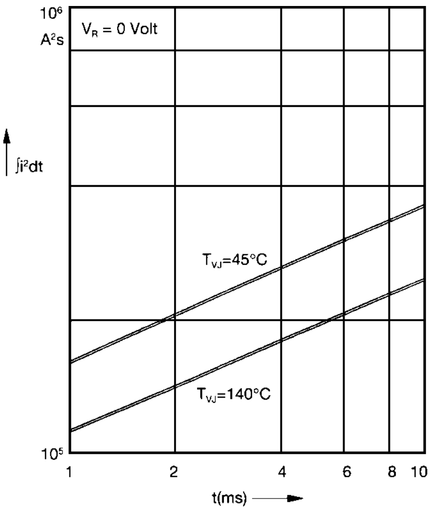


Fig. 4 $\int i^2dt$ versus time (1-10 ms)

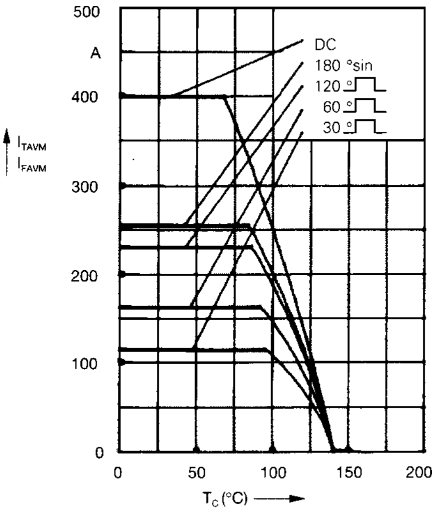


Fig. 4a Maximum forward current at case temperature

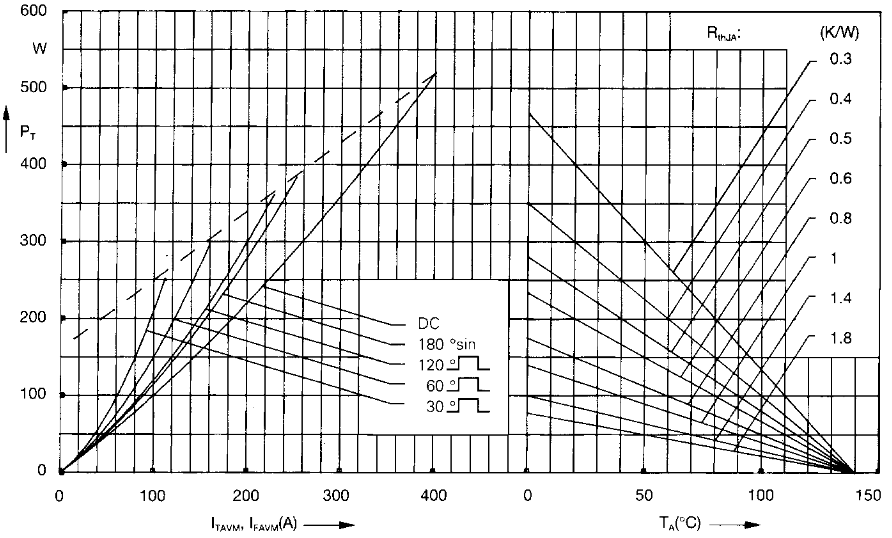


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

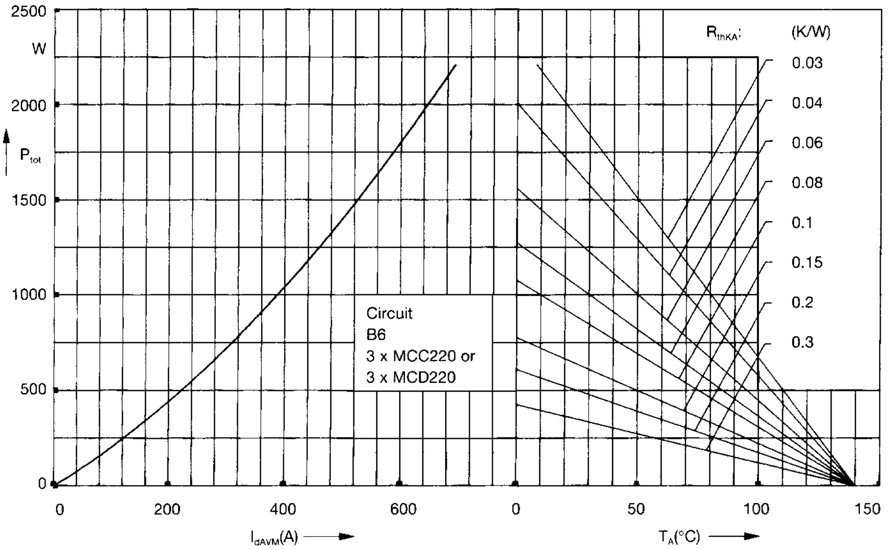


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

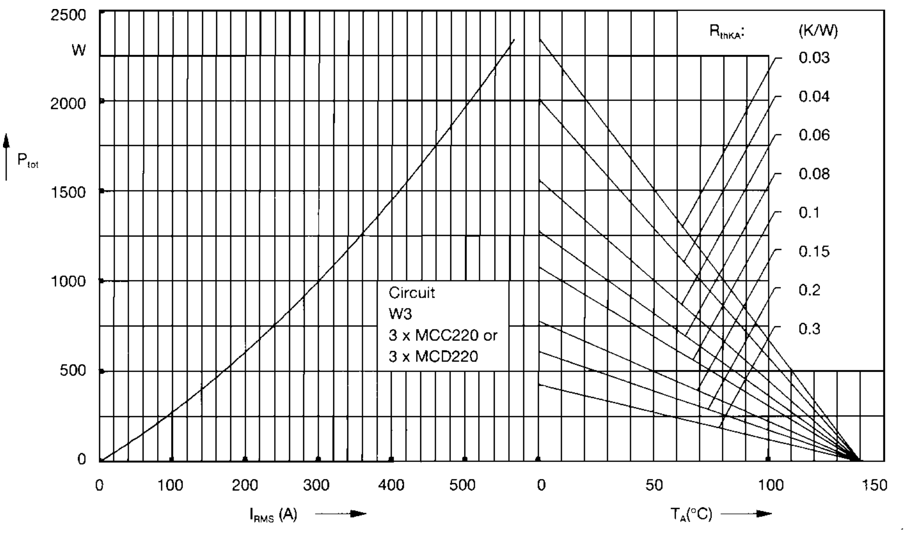


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

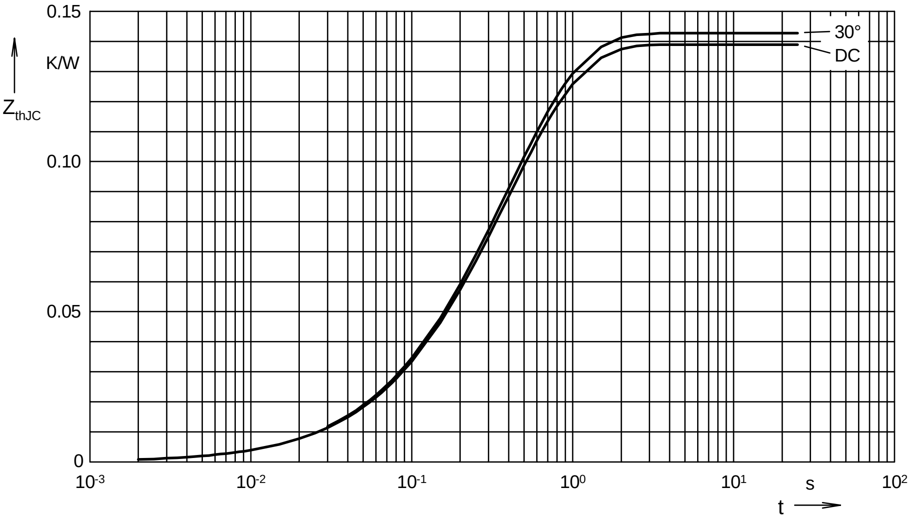


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.139
180°C	0.141
120°C	0.142
60°C	0.142
30°C	0.143

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0037	0.0099
2	0.0177	0.168
3	0.1175	0.456

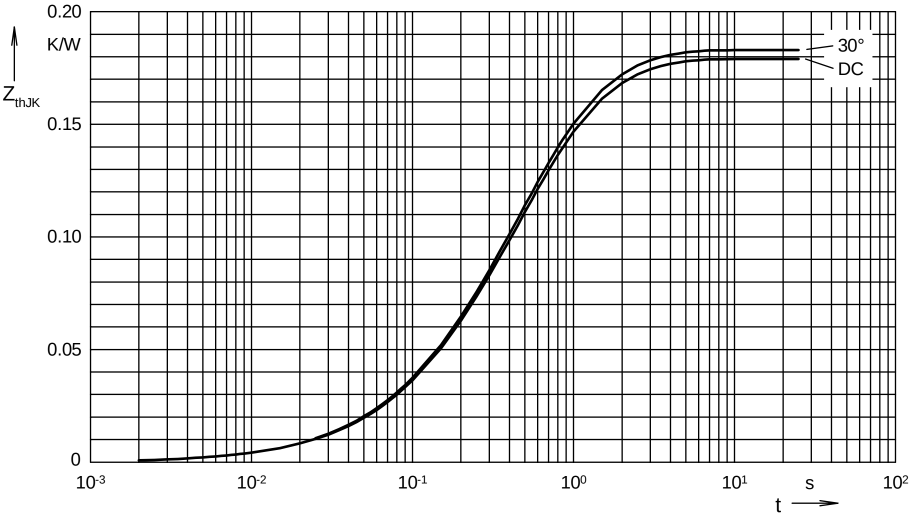


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.179
180°C	0.181
120°C	0.182
60°C	0.183
30°C	0.183

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0037	0.0099
2	0.0177	0.168
3	0.1175	0.456
4	0.04	1.36