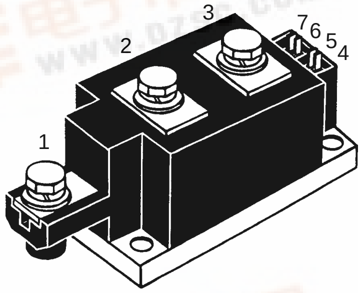
IXYS

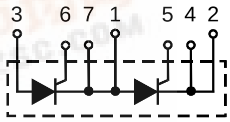
Thyristor Modules
Thyristor/Diode Modules

I_{TRMS} = 2x 520 A
I_{TAVM} = 2x 320 A
V_{RRM} = 1200-1800 V

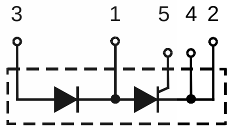
V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
1300	1200	MCC 312-12io1	MCD 312-12io1
1500	1400	MCC 312-14io1	MCD 312-14io1
1700	1600	MCC 312-16io1	MCD 312-16io1
1900	1800	MCC 312-18io1	MCD 312-18io1



MCC



MCD



Symbol	Test Conditions		Maximum Ratings	
I_{TRMS}, I_{FRMS}	$T_{VJ} = T_{VJM}$		520	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)	9200	A
	V_R = 0	t = 8.3 ms (60 Hz)	10100	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz)	8000	A
	V_R = 0	t = 8.3 ms (60 Hz)	8800	A
$\int i^2dt$	T_{VJ} = 45°C	t = 10 ms (50 Hz)	423 000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	423 000	A^2s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz)	320 000	A^2s
	V_R = 0	t = 8.3 ms (60 Hz)	321 000	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$	repetitive, I_T = 960 A	100	A/µs
	f =50 Hz, t_P =200 µs			
	V_D = 2/3 V_{DRM}			
	I_G = 1 A,	non repetitive, $I_T = I_{TAVM}$	500	A/µs
	di_G/dt = 1 A/µs			
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; V_{DR} = 2/3 V_{DRM}		1000	V/µs
	$R_{GK} = \infty$; 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 (M6)		4.5-7/40-62	Nm/lb.in.
	Terminal connection torque (M8)		11-13/97-115	Nm/lb.in.
Weight	Typical including screws		750	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 with copper base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered E 72873
- Keyed gate/cathode twin pins

Applications
- Motor control, softstarter
- Power converter
- Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Solid state switches

Advantages
- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

Symbol	Test Conditions	Characteristic Values	
I_{RRM}, I_{DRM}	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$	40	mA
V_T, V_F	I_T, I_F = 600 A; T_{VJ} = 25°C	1.32	V
V_{T0}	For power-loss calculations only (T_{VJ} = 140°C)	0.8	V
r_T		0.68	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	220	mA
V_{GD}	$T_{VJ} = T_{VJM}$; $V_D = 2/3\ V_{DRM}$	0.25	V
I_{GD}	$T_{VJ} = T_{VJM}$; $V_D = 2/3\ V_{DRM}$	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; $V_D = 1/2\ V_{DRM}$ 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 typ. V_R = 100 V; dv/dt = 50 V/µs; $V_D = 2/3\ V_{DRM}$	200	µs
Q_S	T_{VJ} = 125°C; I_T, I_F = 300 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)	0.12	K/W
	per module	0.06	K/W
R_{thJK}	per thyristor (diode); DC current	0.16	K/W
	per module	0.08	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

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

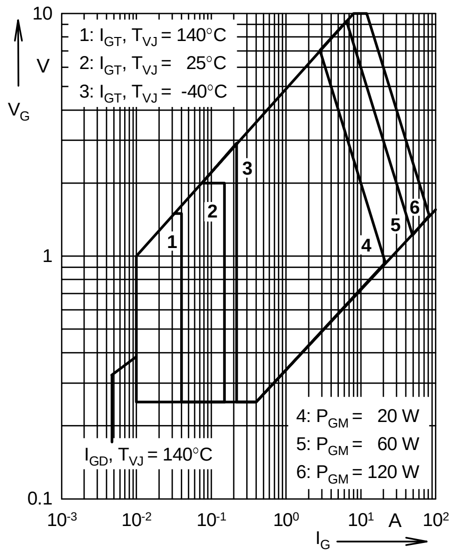


Fig. 1 Gate trigger characteristics

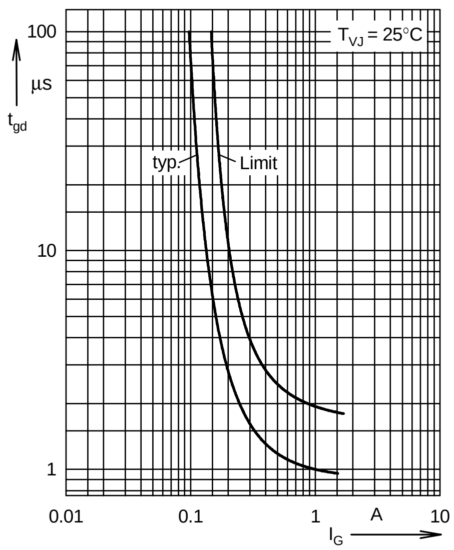
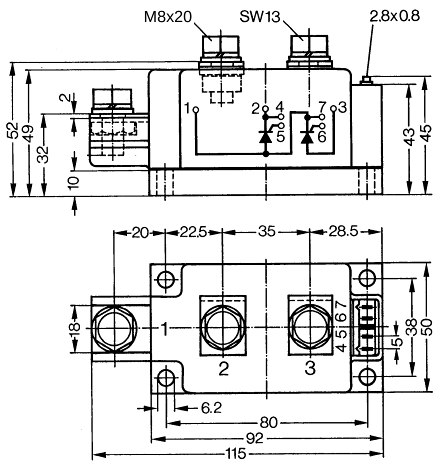


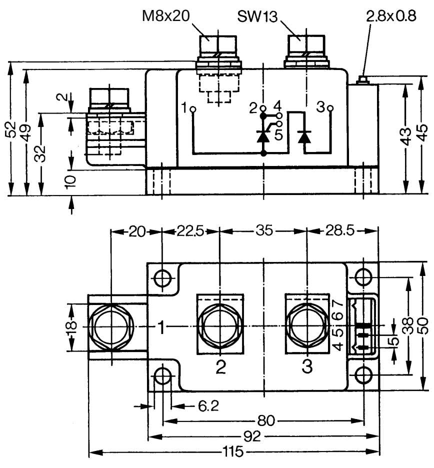
Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

MCC



MCD



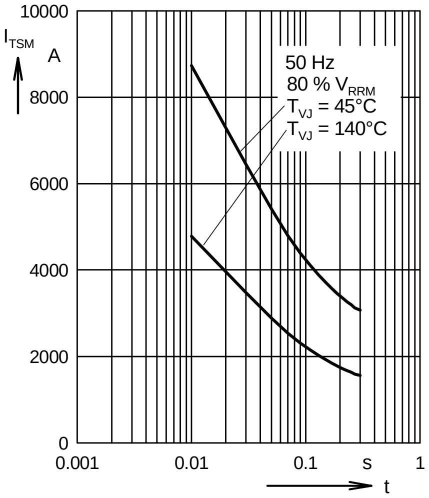


Fig. 3 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

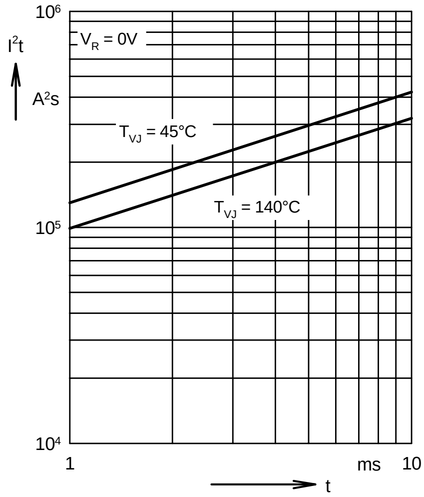


Fig. 4 I²t versus time (1-10 ms)

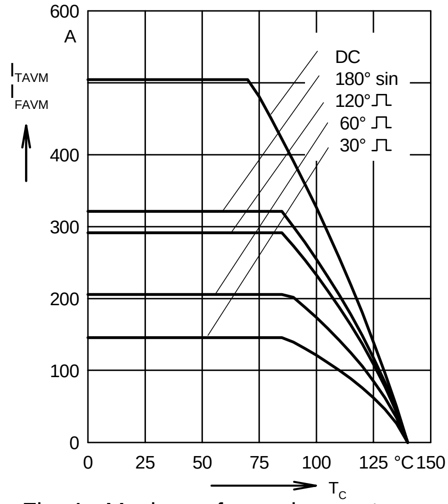


Fig. 4a Maximum forward current at case temperature

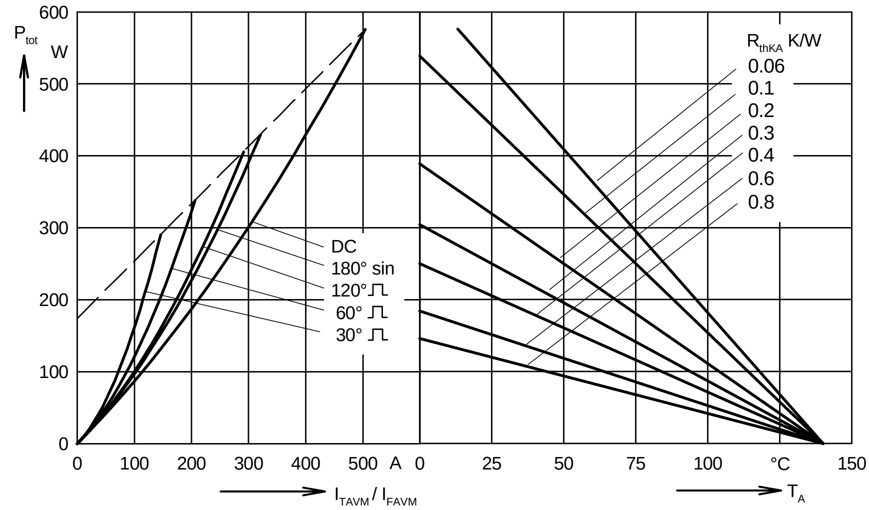


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

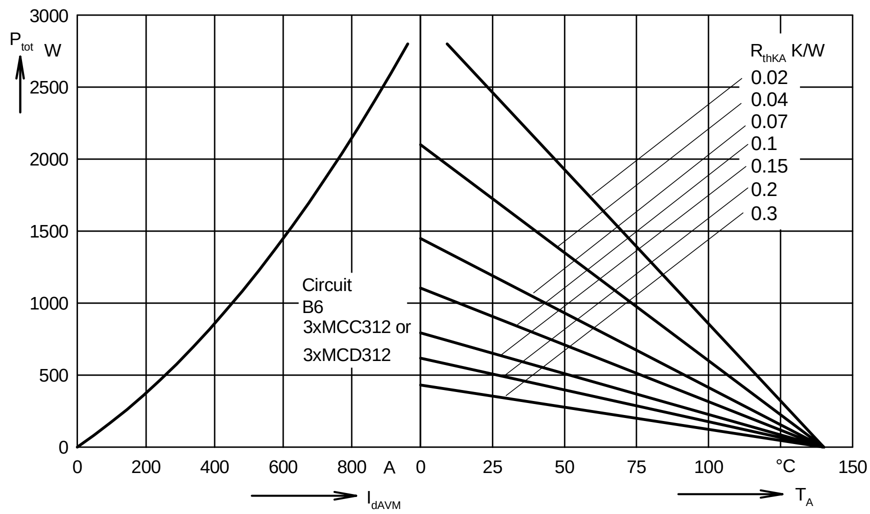


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

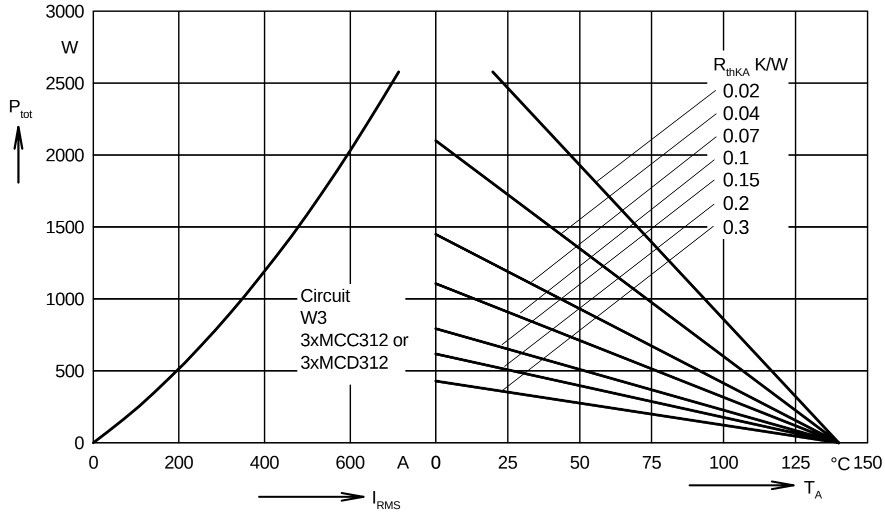


Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

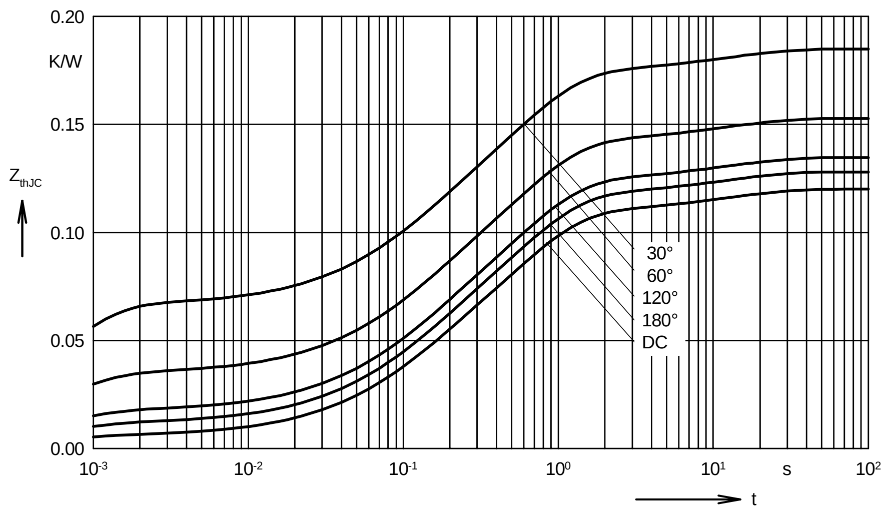


Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.120
180°	0.128
120°	0.135
60°	0.153
30°	0.185

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0058	0.00054
2	0.031	0.098
3	0.072	0.54
4	0.0112	12

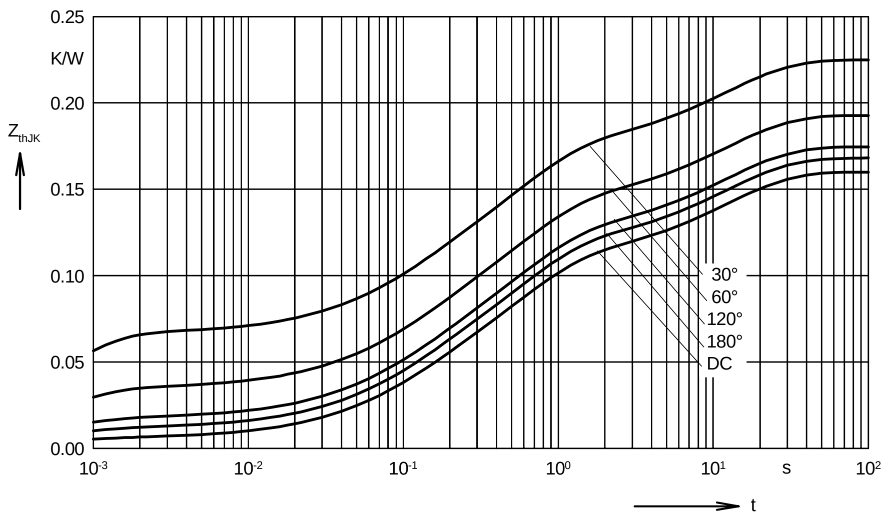


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.160
180°	0.168
120°	0.175
60°	0.193
30°	0.225

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0058	0.00054
2	0.031	0.098
3	0.072	0.54
4	0.0112	12
5	0.04	12