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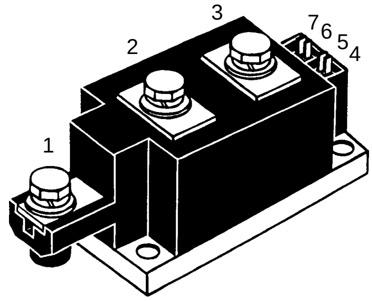
MCC 224
MCD 224

Thyristor Modules
Thyristor/Diode Modules

I_{TRMS} = 2x 400 A
I_{TAVM} = 2x 240 A
V_{RRM} = 2000-2200 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
2100	2000	MCC 224-20io1	MCD 224-20io1
2300	2200	MCC 224-22io1	MCD 224-22io1



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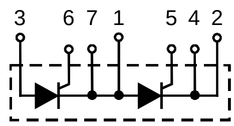

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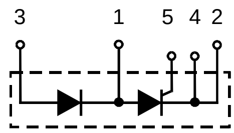

Symbol	Test Conditions		Maximum Ratings	
I_{TRMS}	$T_{VJ} = T_{VJM}$		400	A
I_{TAVM}	T_C = 85°C; 180° sine		240	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms (50 Hz)	8000	A
	V_R = 0	t = 8.3 ms (60 Hz)	8500	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz)	7000	A
	V_R = 0	t = 8.3 ms (60 Hz)	7500	A
∫i²dt	T_{VJ} = 45°C	t = 10 ms (50 Hz)	320000	A²s
	V_R = 0	t = 8.3 ms (60 Hz)	303000	A²s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz)	245000	A²s
	V_R = 0	t = 8.3 ms (60 Hz)	240000	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, $I_T = I_{TAVM}$	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} = ∞; 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 ...130	°C
T_{VJM}			130	°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

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Features

- International standard package
- **D**irect **C**opper **B**onded 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

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Symbol	Test Conditions	Characteristic Values	
I_{RRM}, I_{DRM}	T_{VJ} = T_{VJM}; V_R = V_{RRM}	40	mA
V_T	I_T = 600 A; T_{VJ} = 25°C	1.4	V
V_{T0}	For power-loss calculations only (T_{VJ} = T_{VJM})	0.8	V
r_T		0.76	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; 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} = ∞	150	mA
t_{gd}	T_{VJ} = 25°C; V_D = 1/2 V_{DRM} di_G/dt = 1 A/µs; I_G = 1 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 = 50 V/µs; I_T = 300 A; -di/dt = 10 A/µs	typ. 200	µs
Q_S	T_{VJ} = T_{VJM}	760	µC
I_{RM}	-di/dt = 50 A/µs; I_T = 400 A	275	A
R_{thJC}	per thyristor; DC current	0.139	K/W
	per module	0.069	K/W
R_{thJK}	per thyristor; DC current	0.179	K/W
	per module	0.089	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

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

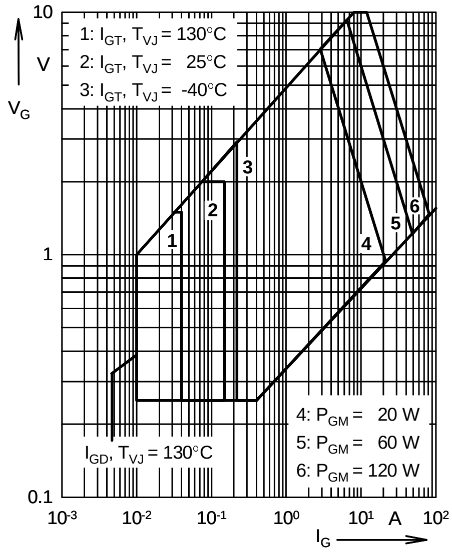

Fig. 1 Gate trigger characteristics

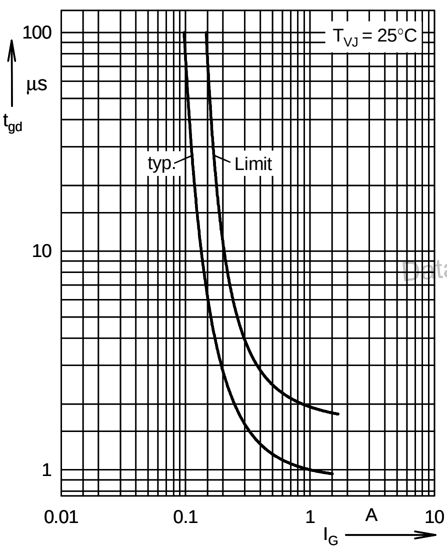

Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

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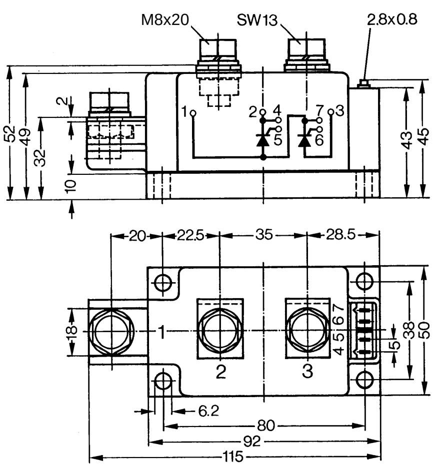

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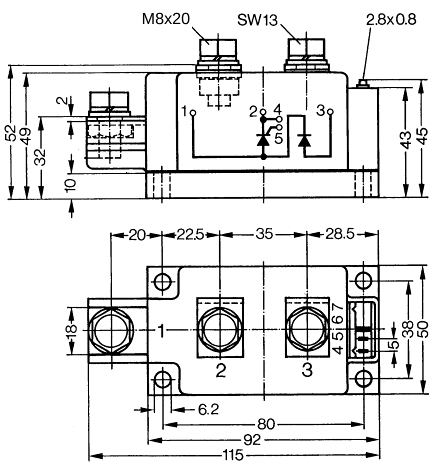

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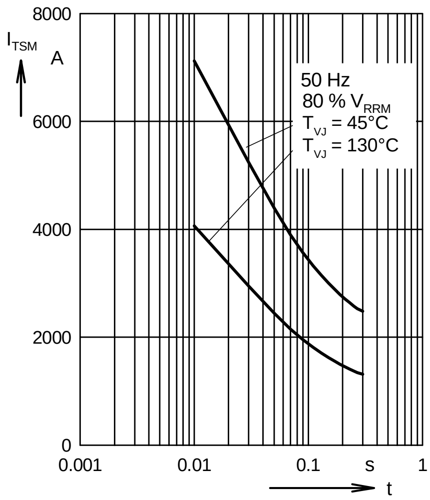

Fig. 3 Surge overload current
I_{TSM}: Crest value, t: duration

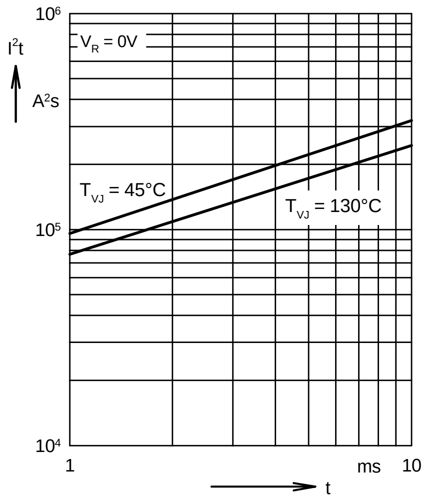

Fig. 4 I^2t versus time (1-10 ms)

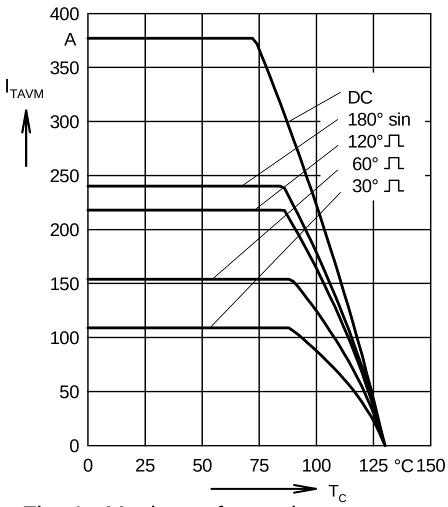

Fig. 4a Maximum forward current
at case temperature

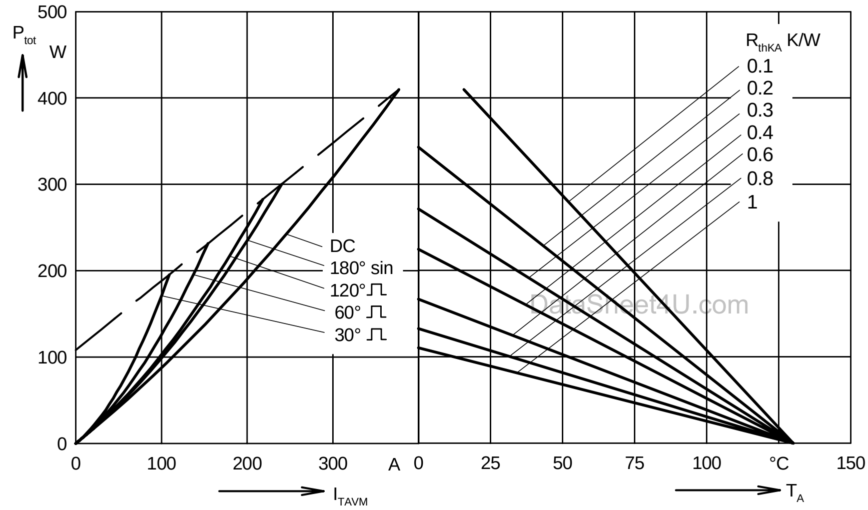

Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

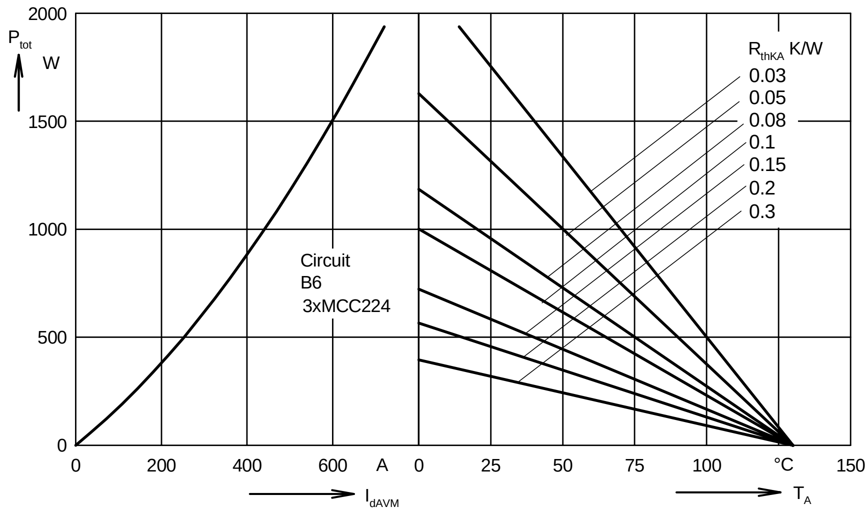

Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

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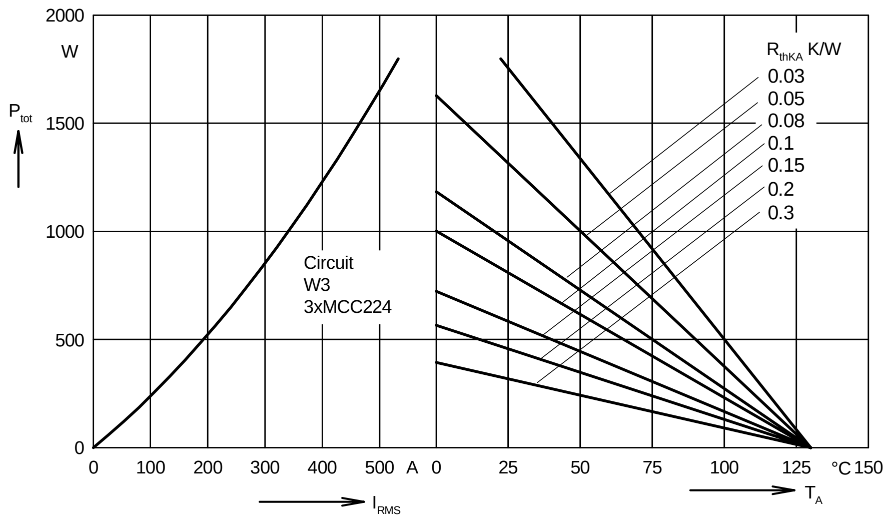

Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

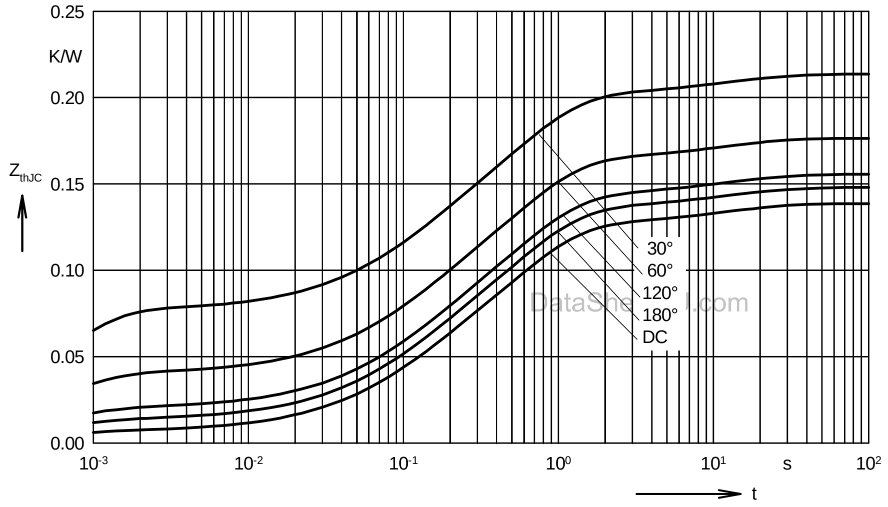

Fig. 8 Transient thermal impedance junction to case (per thyristor or diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	0.139
180°	0.148
120°	0.156
60°	0.176
30°	0.214

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0067	0.00054
2	0.0358	0.098
3	0.0832	0.54
4	0.0129	12

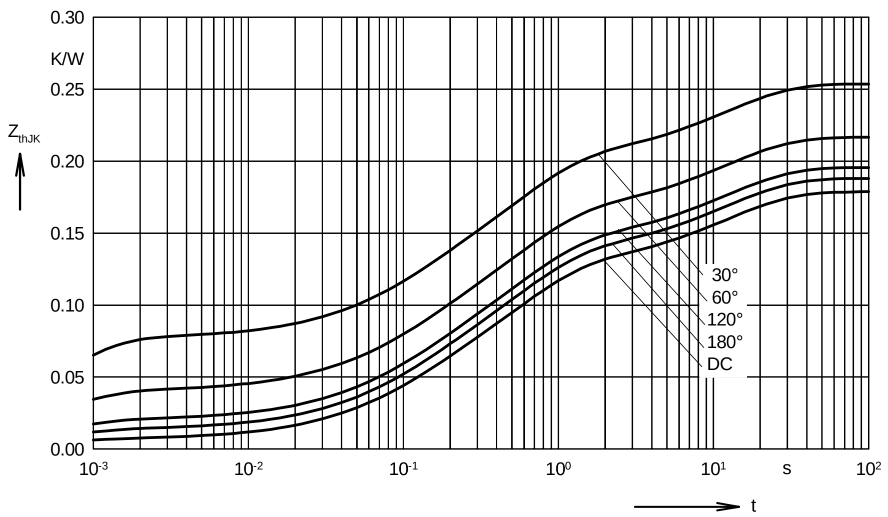

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor or diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	0.179
180°	0.188
120°	0.196
60°	0.216
30°	0.256

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.0067	0.00054
2	0.0358	0.098
3	0.0832	0.54
4	0.0129	12
5	0.04	12

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