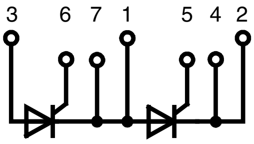
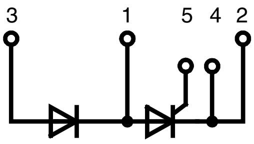
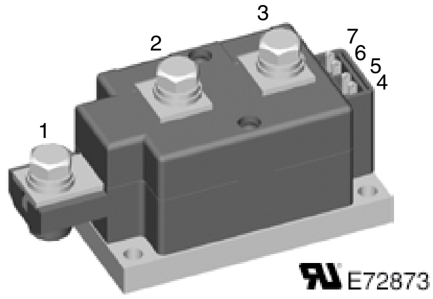
Thyristor Modules
Thyristor/Diode Modules

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







Symbol	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
I^2t	T_{VJ} = 45°C;	t = 10 ms	(50 Hz)	320 000	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz)	303 000	A^2s
	$T_{VJ} = T_{VJM}$;	t = 10 ms	(50 Hz)	245 000	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz)	240 000	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f = 50 Hz; t_p = 200 µs;	repetitive, I_T = 750 A		100	A/µs
	$V_D = ^2/_3 V_{DRM}$; I_G = 1 A; di_G/dt = 1 A/µs	non repetitive, $I_T = I_{TAVM}$		500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $V_D = ^2/_3 V_{DRM}$; $R_{GK} = \infty$; method 1 (linear voltage rise)			1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$; t_p = 30 µs			120	W
	$I_T = I_{T(AV)M}$; 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~
	$I_{ISOL} \leq$ 1 mA	t = 1 s		3600	V~
M_d	Mounting torque (M6)			4.5 - 7	Nm
	Terminal connection torque (M6)			11 - 13	Nm
Weight	Typical including screws			750	g

Data according to IEC 60747 and refer to a single 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, 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	Conditions		Characteristic Values typ.	max.	
I_{RRM}, I_{DRM}	V_R / V_D = V_{RRM} / V_{DRM}	$T_{VJ} = T_{VJM}$		40	mA
V_T	I_T = 600 A	T_{VJ} = 25°C		1.4	V
V_{T0}	For power-loss calculations only			0.8	V
r_t		$T_{VJ} = T_{VJM}$		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}	V_D = $^2/_3$ V_{DRM};	$T_{VJ} = T_{VJM}$		0.25	V
I_{GD}				10	mA
I_L	t_p = 30 µs; V_D = 6 V I_G = 0.45 A; di_G/dt = 0.45 A/µs	T_{VJ} = 25°C		200	mA
I_H	V_D = 6 V; R_{GK} = ∞;	T_{VJ} = 25°C		150	mA
t_{gd}	V_D = ½V_{DRM} I_G = 1 A; di_G/dt = 1 A/µs	T_{VJ} = 25°C		2	µs
t_q	V_D = $^2/_3$ V_{DRM} dv/dt = 50 V/µs; -di/dt = 10 A/µs I_T = 300 A; V_R = 100 V; t_p = 200 µs	$T_{VJ} = T_{VJM}$	200		µs
Q_S	I_T = 300 A; -di/dt = 50 A/µs	$T_{VJ} = T_{VJM}$		760	µC
I_{RM}				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 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

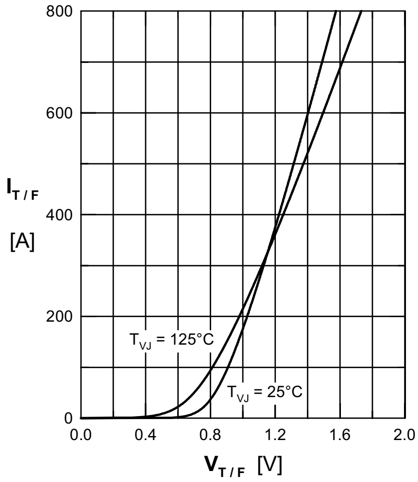


Fig. 1 Forward characteristics

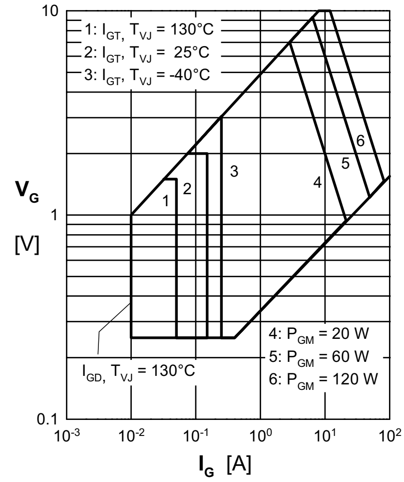
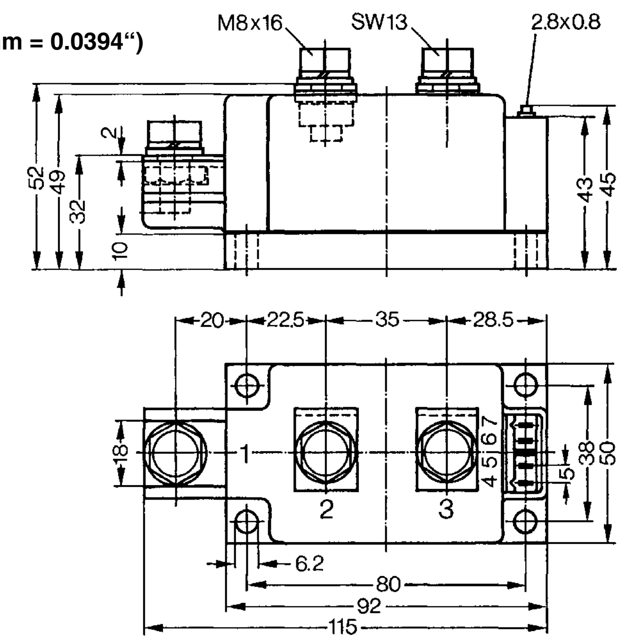


Fig. 2 Gate trigger characteristics

Dimensions in mm (1 mm = 0.0394")



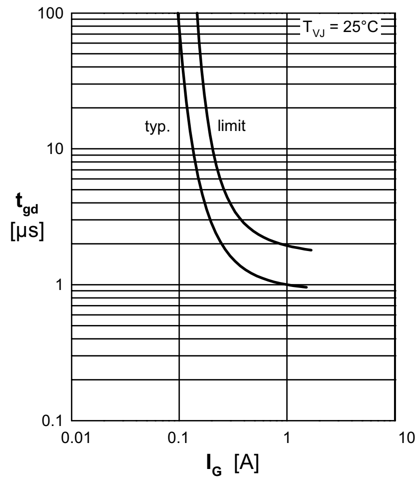


Fig. 3 Gate trigger delay time

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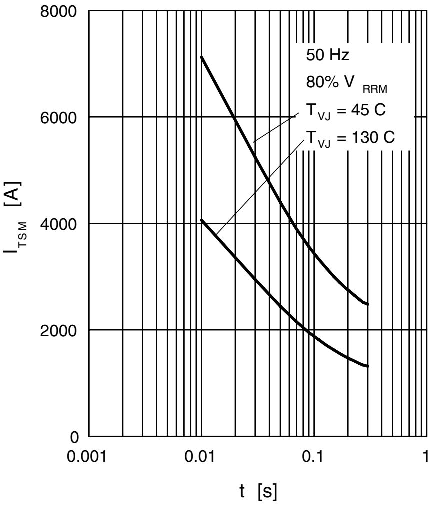

Fig. 4 Surge overload current
I_{TSM}: Crest value, t: duration

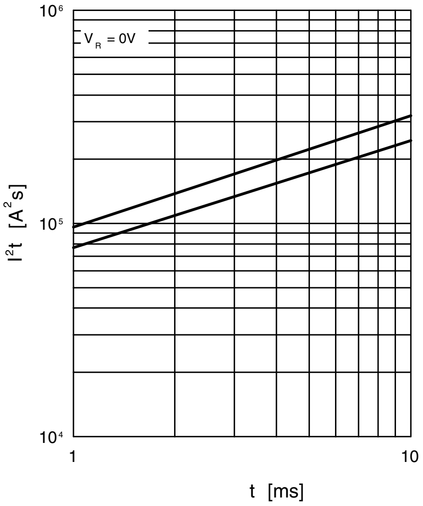

Fig. 5 i²t versus time (1-10 ms)

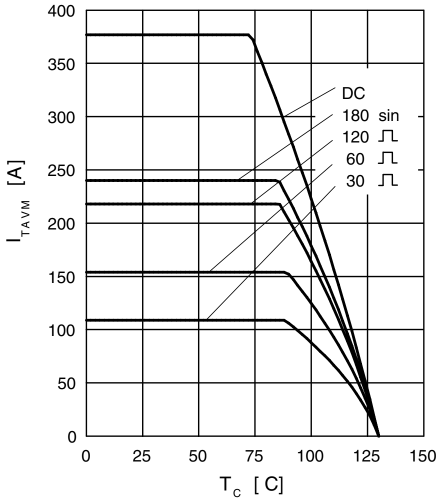

Fig. 5a Maximum forward current at case temperature

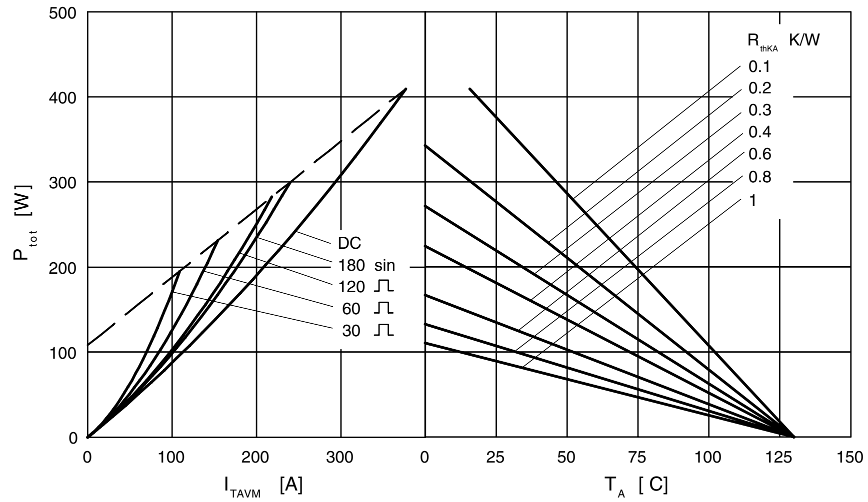

Fig. 6 Power dissipation vs. on-state current and ambient temperature

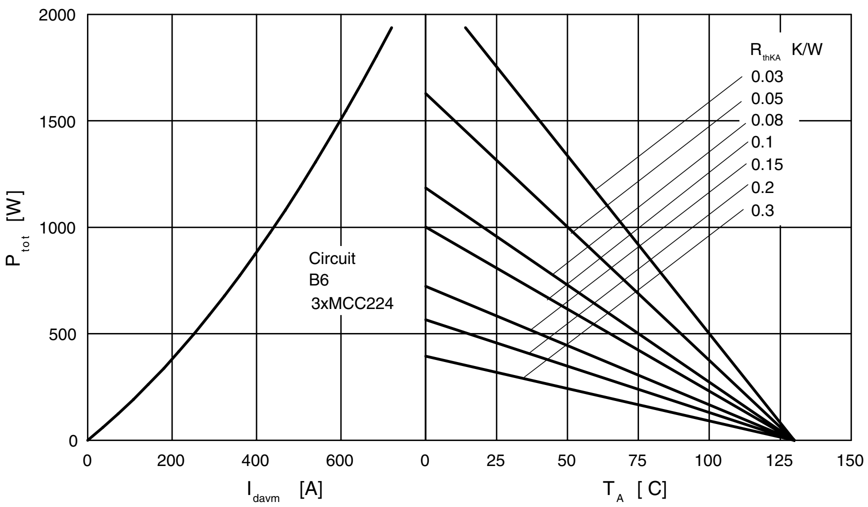

Fig. 7 Three phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature

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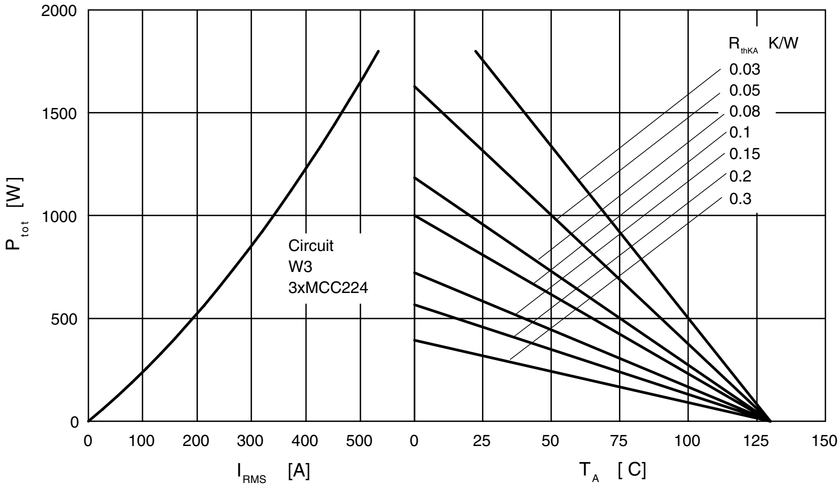

Fig. 8 3~ AC-controller: Power dissipation vs. RMS output current & ambient temperature

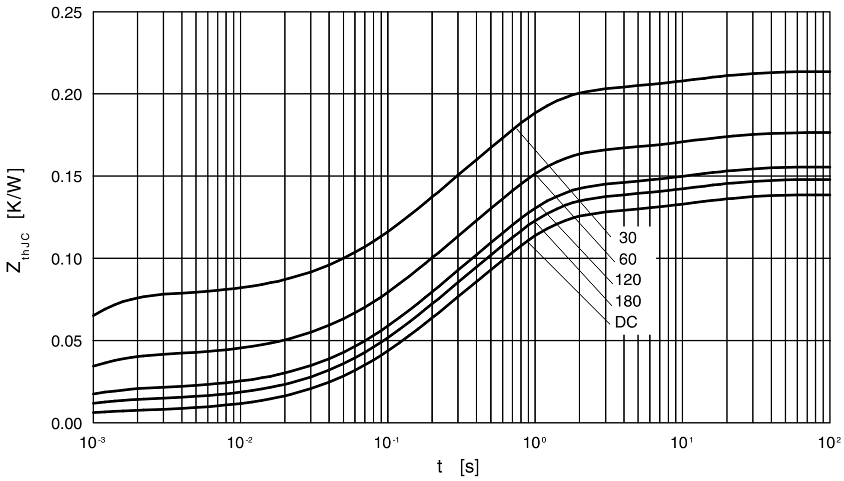

Fig. 9 Transient thermal impedance junction to case

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

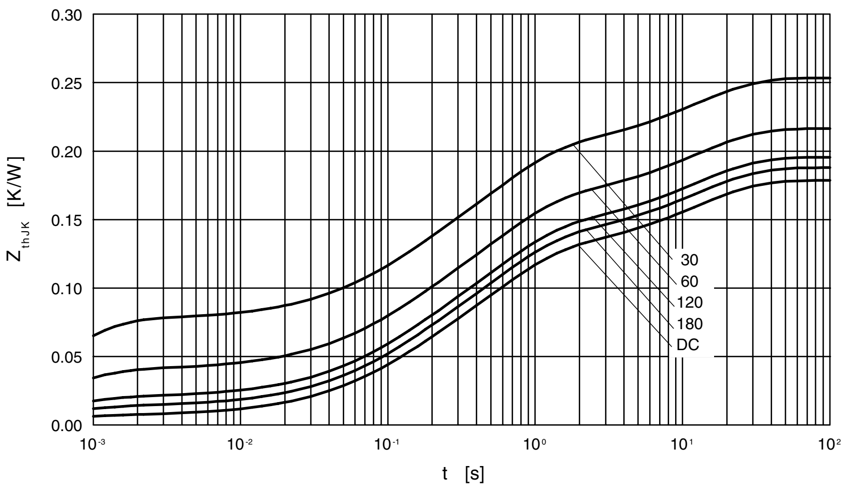

Fig. 10 Transient thermal impedance junction to heatsink

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	0.001
2	0.0358	0.08
3	0.0832	0.20
4	0.0129	1.0
5	0.04	