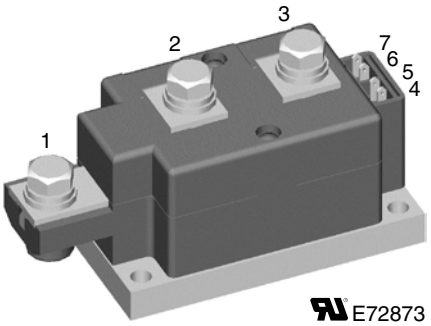
Thyristor Modules
Thyristor/Diode Modules

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

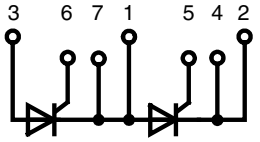
V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type	
1300	1200	MCC 312-12io1	MCD 312-12io1
1500	1400	MCC 312-14io1	MCD 312-14io1
1700	1600	MCC 312-16io1	MCD 312-16io1
1900	1800	MCC 312-18io1	MCD 312-18io1



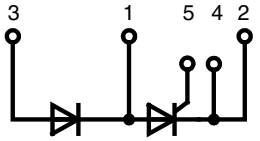
Symbol	Conditions			Maximum Ratings	
I_{TRMS}, I_{FRMS}	$T_{VJ} = T_{VJM}$			520	A
I_{TAVM}, I_{FAVM}	T_C = 85°C; 180° sine			320	A
I_{TSM}, I_{FSM}	T_{VJ} = 45°C;	t = 10 ms	(50 Hz)	9200	A
	V_R = 0	t = 8.3 ms	(60 Hz)	10100	A
	$T_{VJ} = T_{VJM}$;	t = 10 ms	(50 Hz)	8000	A
	V_R = 0	t = 8.3 ms	(60 Hz)	8800	A
I^2t	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
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f = 50 Hz; t_p = 200 µs;		repetitive, I_T = 960 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} = ∞; 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...+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 (M6)			4.5 - 7	Nm
	Terminal connection torque (M8)			11 - 13	Nm
Weight	Typical including screws			750	g

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

MCC



MCD



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	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, V_F	I_T; I_F = 600 A	T_{VJ} = 25°C		1.32	V
V_{T0}	For power-loss calculations only			0.8	V
r_t		T_{VJ} = T_{VJM}		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}	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			0.12	K/W
	per module			0.06	K/W
R_{thJK}	per thyristor; 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

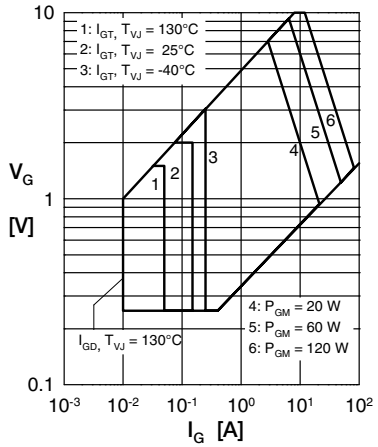


Fig. 3 Surge overload current
$I_{TSM/FSM}$: Crest value, t: duration

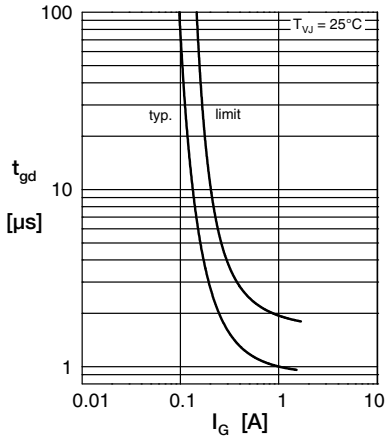
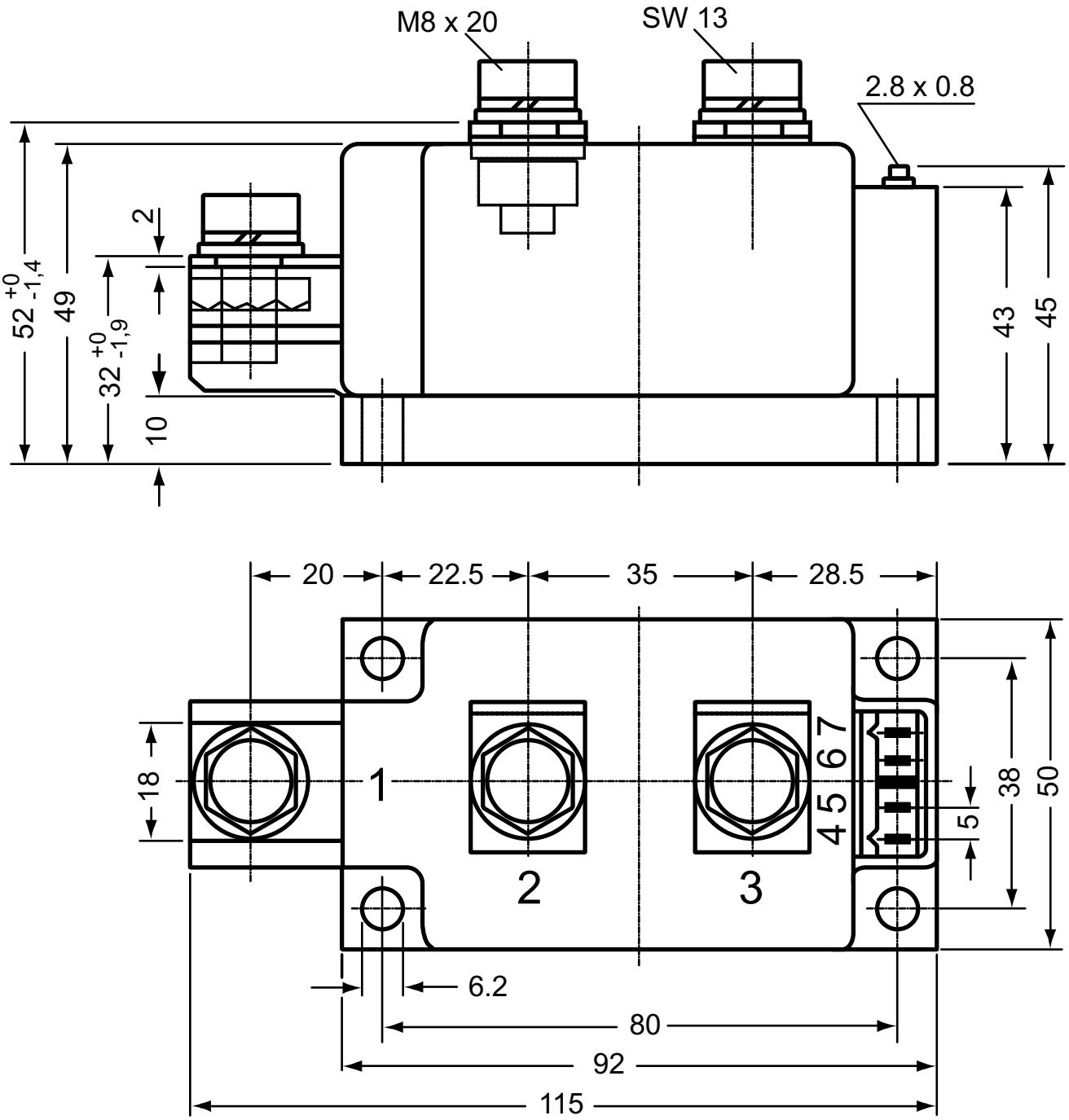


Fig. 2 Gate trigger delay time

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Dimensions in mm (1 mm = 0.0394“)



Optional accessories for modules
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red
Type ZY 180L (L = Left for pin pair 4/5)
Type ZY 180R (R = Right for pin pair 6/7)
} UL 758, style 3751

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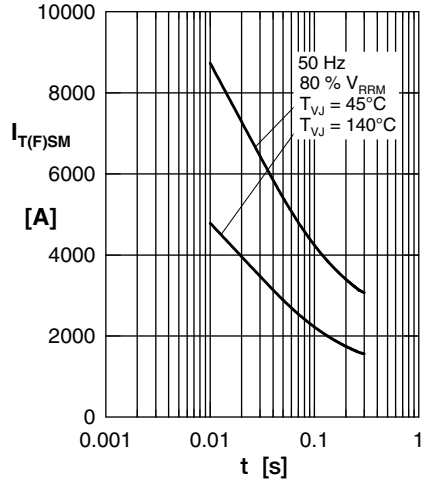


Fig. 3 Surge overload current
$I_{T(F)SM}$:Crest value, t: duration

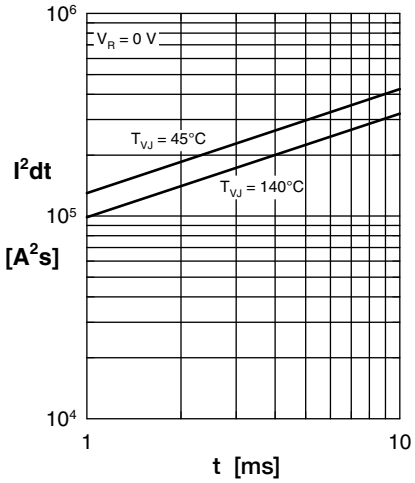


Fig. 4 I^2dt versus time

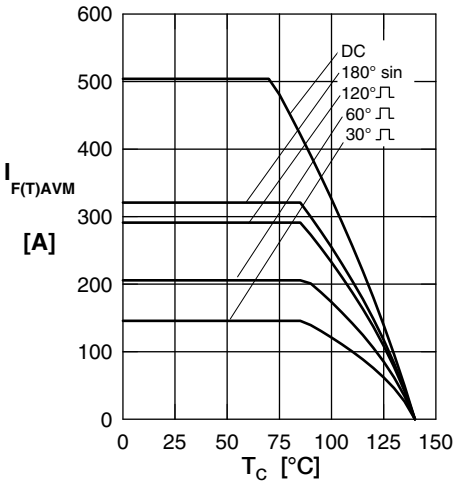


Fig. 4a Max. forward current at case temperature

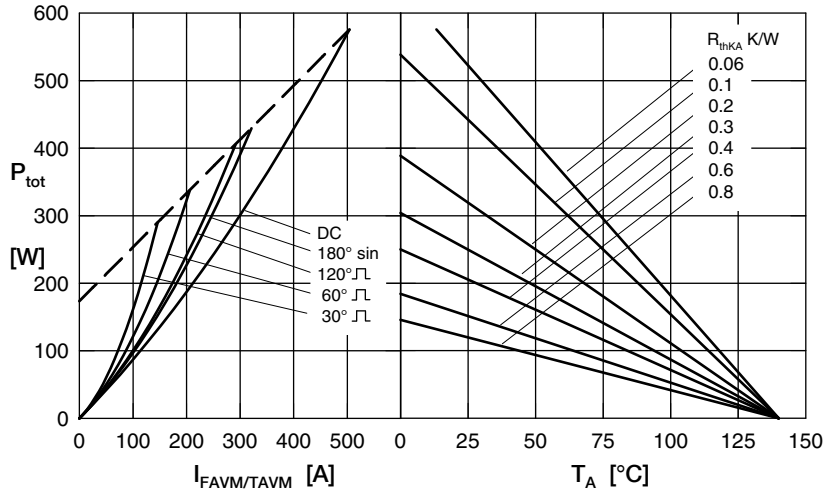


Fig. 5 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

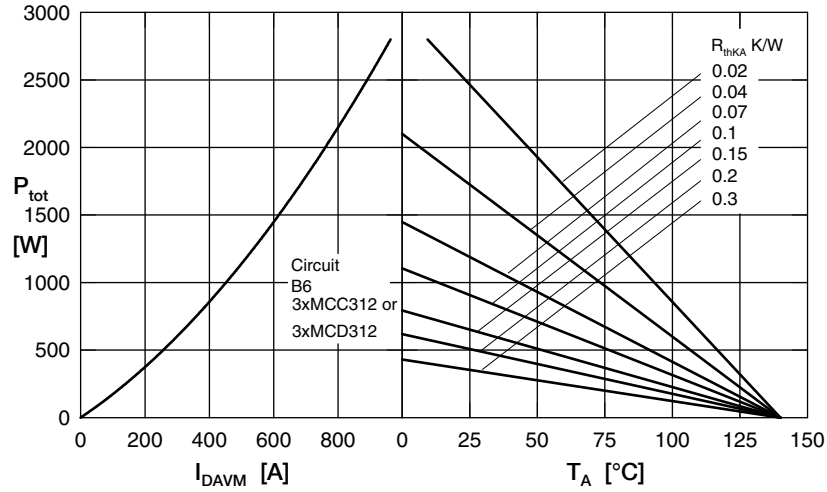


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

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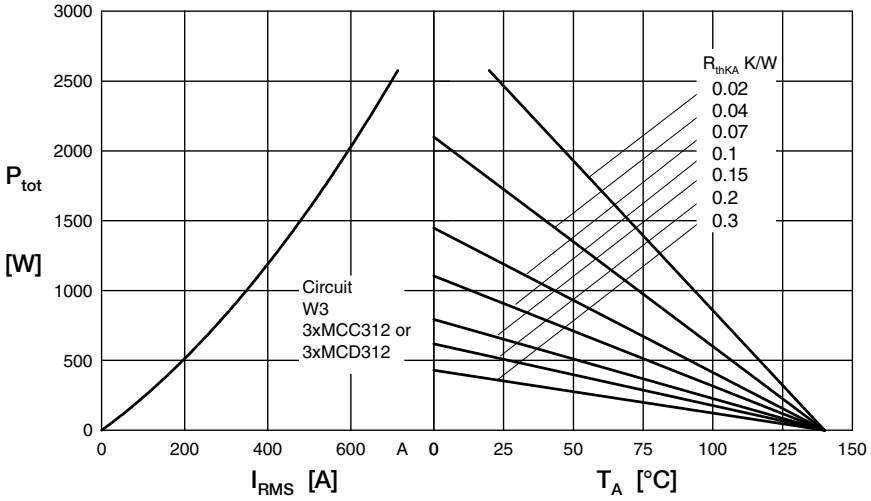


Fig. 7 Three phase AC-controller: Power dissipation versus R_{MS} output current and ambient temperature

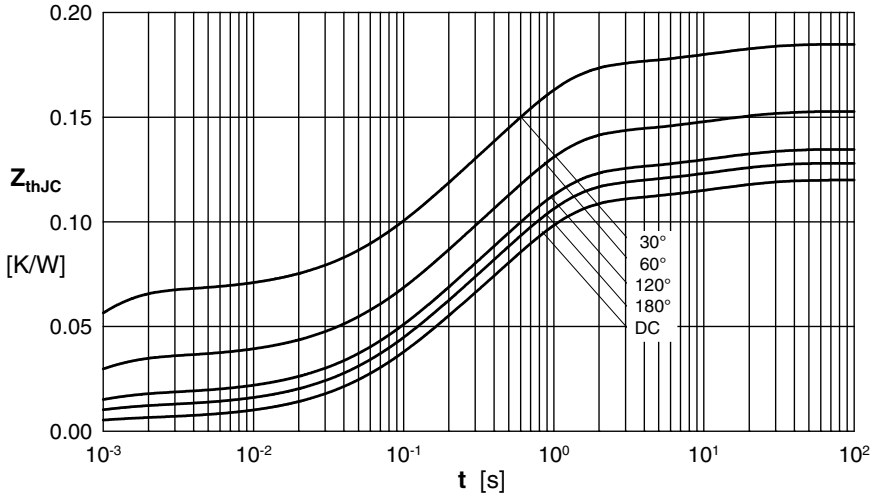


Fig. 8 Transient thermal impedance junction to case (per thyristor/diode)

R_{thJC} for various conduct. 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

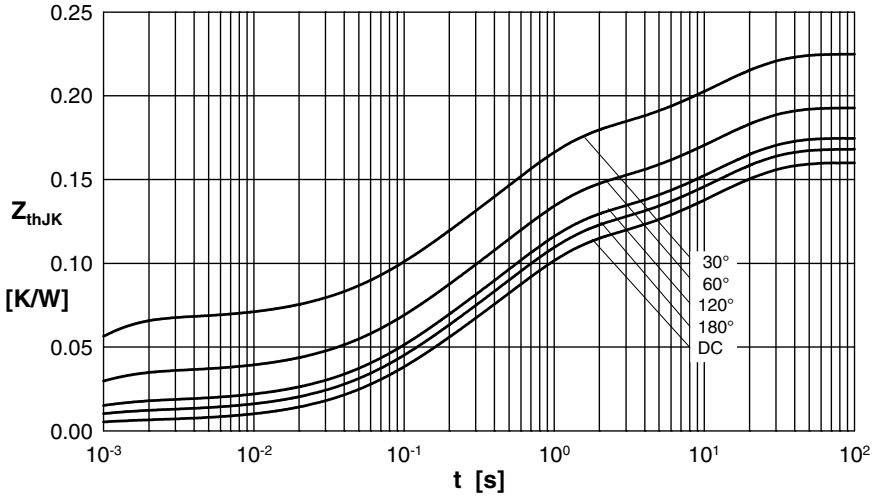


Fig. 9 Transient thermal impedance junction to heatsink (per thyristor/diode)

R_{thJK} for various conduct. 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

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