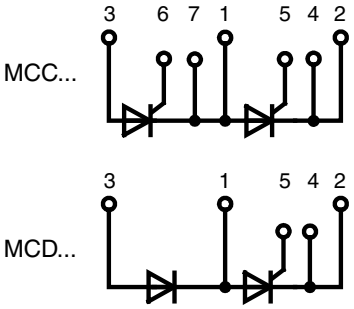
Thyristor Modules

I_{TRMS} = 2x 300 A
I_{TAVM} = 2x 190 A
V_{RRM} = 1400-1800 V

V_{RSM} V_{DSM} V	V_{RRM} V_{DRM} V	Type
1500	1400	MCC 162-14io1B
1700	1600	MCC 162-16io1B
1900	1800	MCC 162-18io1B
1700	1600	MCD 162-16io1B



MCD... version without pins 6 & 7

Symbol	Conditions			Maximum Ratings	
I_{TRMS}	$T_{VJ} = T_{VJM}$			300	A
I_{TAVM}	T_C = 80°C; 180° sine			190	A
	T_C = 85°C; 180° sine			181	A
I_{TSM}	T_{VJ} = 45°C;	t = 10 ms	(50 Hz)	6000	A
	V_R = 0	t = 8.3 ms	(60 Hz)	6400	A
	$T_{VJ} = T_{VJM}$;	t = 10 ms	(50 Hz)	5250	A
	V_R = 0	t = 8.3 ms	(60 Hz)	6500	A
I^2t	T_{VJ} = 45°C;	t = 10 ms	(50 Hz)	180 000	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz)	170 000	A^2s
	$T_{VJ} = T_{VJM}$;	t = 10 ms	(50 Hz)	137 000	A^2s
	V_R = 0	t = 8.3 ms	(60 Hz)	128 000	A^2s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$; f = 50 Hz; t_p = 200 µs;	repetitive, I_T = 500 A		150	A/µs
	$V_D = {}^2/_3 V_{DRM}$; I_G = 0.5 A; di_G/dt = 0.5 A/µs	non repetitive, I_T = 500 A		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}				8	W
V_{RGM}				10	V
T_{VJ}				-40...+125	°C
T_{VJM}				125	°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 (M5)			4 - 5	Nm
	Mounting torque (M6)			4 - 5	Nm
	Terminal connection torque (M6)			4.5 - 5.5	Nm
Weight	Typical including screws			125	g

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

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

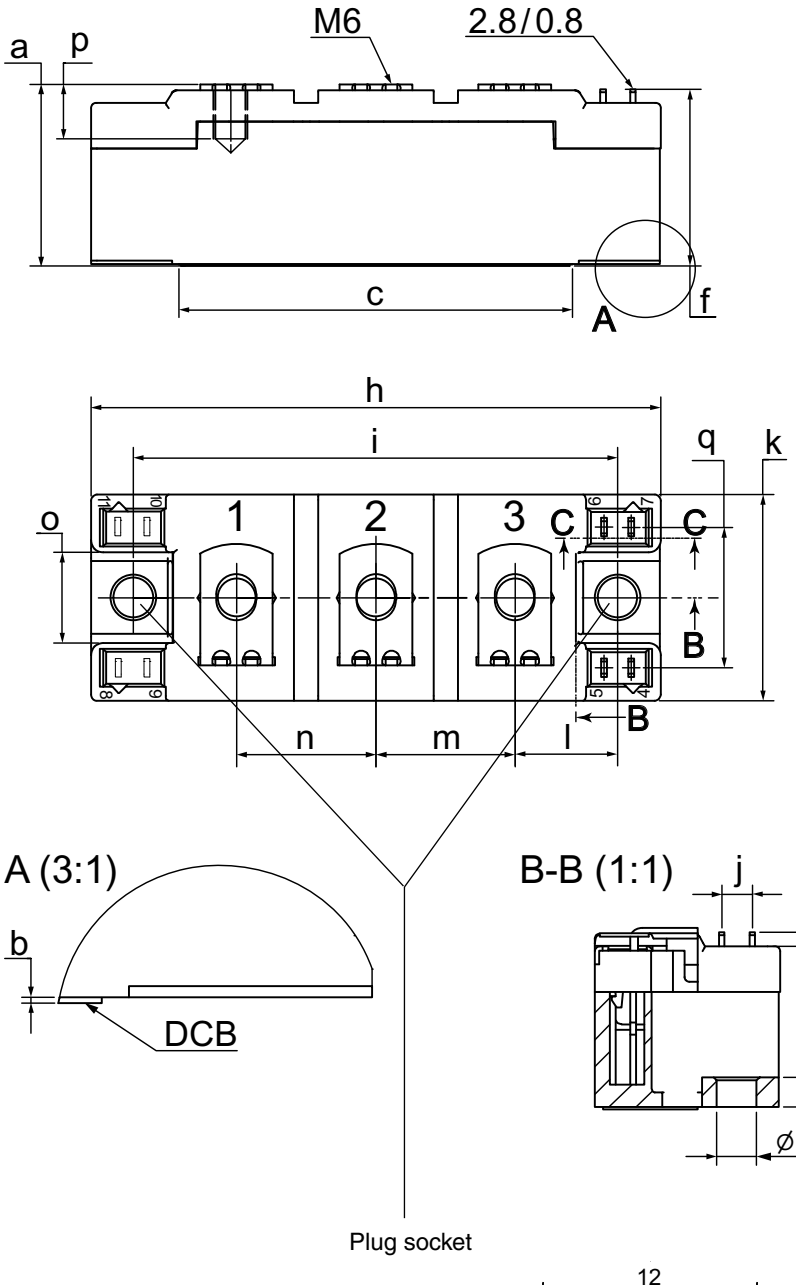
- Space and weight savings
- Simple mounting
- Improved temperature and power cycling
- Reduced protection circuits

Symbol	Conditions		Characteristic Values typ.	max.	
I_{RRM}, I_{DRM}	V_R / V_D = V_{RRM} / V_{DRM}	T_{VJ} = T_{VJM}		10	mA
V_T	I_T = 300 A	T_{VJ} = 25°C		1.25	V
V_{T0}	For power-loss calculations only			0.88	V
r_t		T_{VJ} = T_{VJM}		1.15	mΩ
V_{GT}	V_D = 6 V	T_{VJ} = 25°C		2.5	V
		T_{VJ} = -40°C		2.6	V
I_{GT}	V_D = 6 V	T_{VJ} = 25°C		150	mA
		T_{VJ} = -40°C		200	mA
V_{GD}	V_D = $^2/_3$ V_{DRM};	T_{VJ} = T_{VJM}		0.2	V
I_{GD}				10	mA
I_L	t_p = 30 µs; V_D = 6 V I_G = 0.5 A; di_G/dt = 0.5 A/µs	T_{VJ} = 25°C		300	mA
I_H	V_D = 6 V; R_{GK} = ∞;	T_{VJ} = 25°C		200	mA
t_{gd}	V_D = ½V_{DRM} I_G = 0.5 A; di_G/dt = 20 A/µs	T_{VJ} = 25°C		2	µs
t_q	V_D = $^2/_3$ V_{DRM} dv/dt = 20 V/µs; -di/dt = 10 A/µs I_T = 160 A; V_R = 100 V; t_p = 200 µs	T_{VJ} = T_{VJM}	150		µs
Q_S	I_T = 300 A; -di/dt = 50 A/µs	T_{VJ} = T_{VJM}		550	µC
I_{RM}				235	A
R_{thJC}	per thyristor; DC current	other values see Fig. 8/9		0.155	K/W
	per module			0.0775	K/W
R_{thJK}	per thyristor; DC current			0.255	K/W
	per module			0.1125	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 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

MCC... MCD... w/o pins 6 and 7

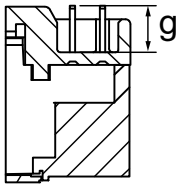


Dim.	MIN [mm]	MIN [mm]	MIN [inch]	MIN [inch]
a	30.0	30.6	1.181	1.205
b	typ. 0.25		typ. 0.010	
c	64.0	65.0	2.520	2.559
d	6.5	7.0	0.256	0.275
e	4.9	5.1	0.193	0.201
f	28.6	29.2	1.126	1.150
g	7.3	7.7	0.287	0.303
h	93.5	94.5	3.681	3.720
i	79.5	80.5	3.130	3.169
j	4.8	5.2	0.189	0.205
k	33.4	34.0	1.315	1.339
l	16.7	17.3	0.657	0.681
m	22.7	23.3	0.894	0.917
n	22.7	23.3	0.894	0.917
o	14.0	15.0	0.551	0.591
p	typ. 10.5		typ. 0.413	
q	22.8	23.3	0.898	0.917
r	1.8	2.4	0.071	0.041

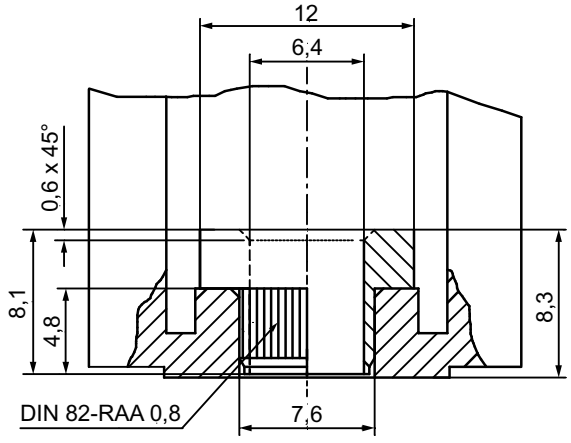
A (3:1)

B-B (1:1)

C-C (1:1)



Plug socket



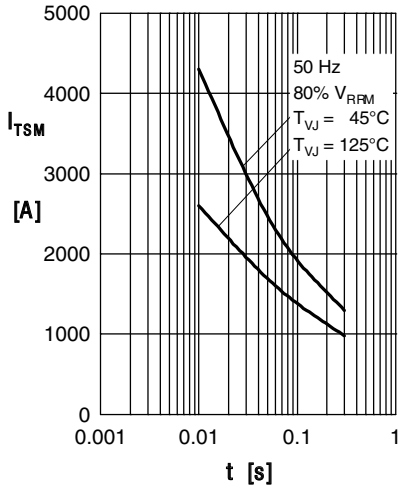


Fig. 1 Surge overload current I_{TSM}, I_{FSM}: Crest value, t: duration

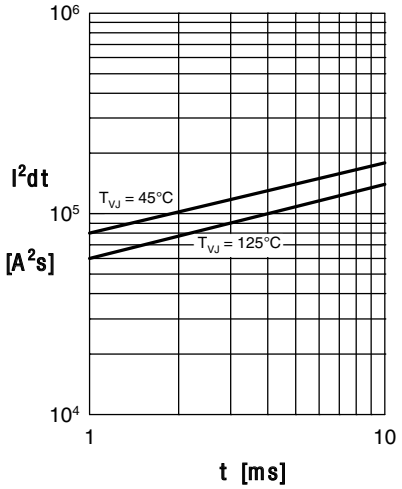


Fig. 2 I^2t versus time (1-10 ms)

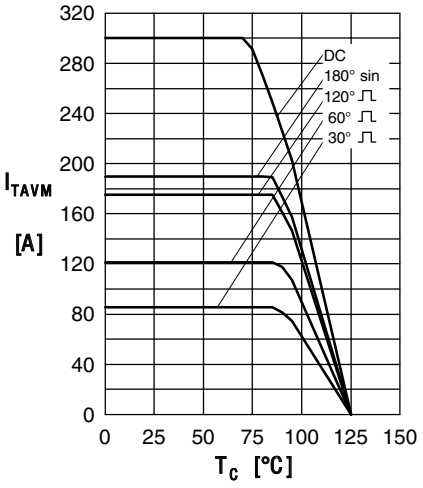


Fig. 3 Max. forward current at case temperature

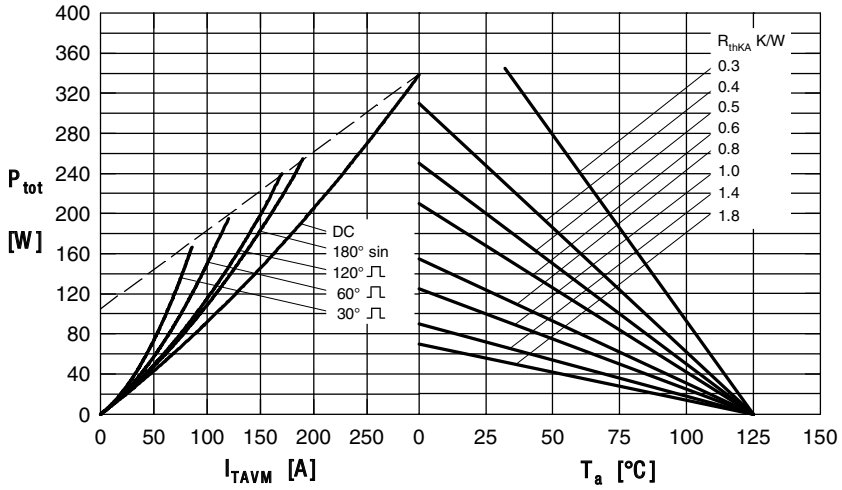


Fig. 4 Power dissipation vs. on-state current & ambient temperature (per thyristor or diode)

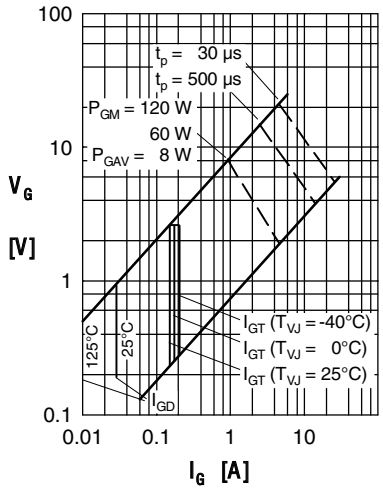


Fig. 5 Gate trigger characteristics

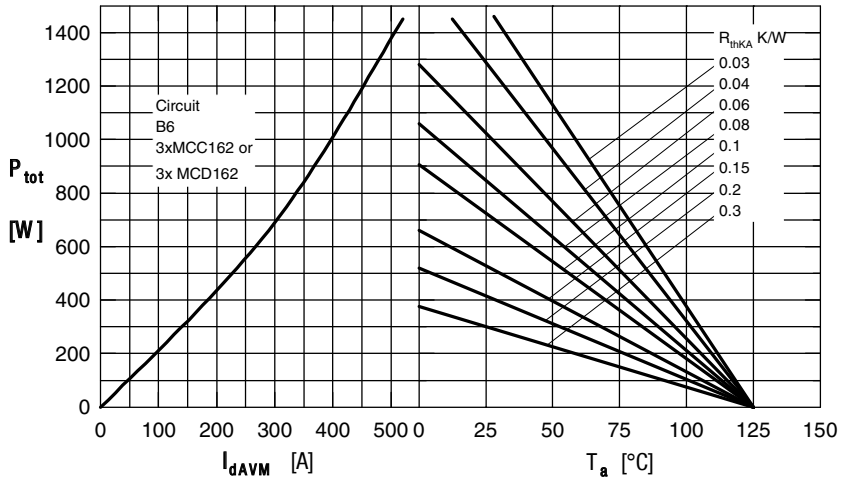


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

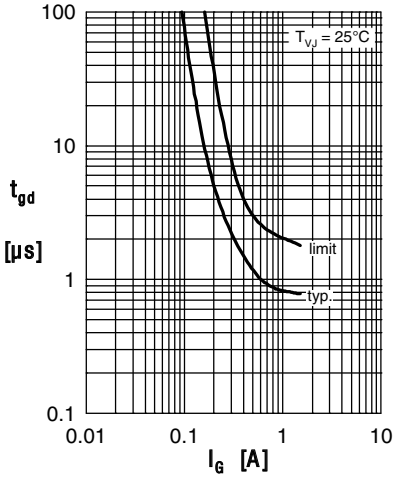


Fig. 7 Gate trigger delay time

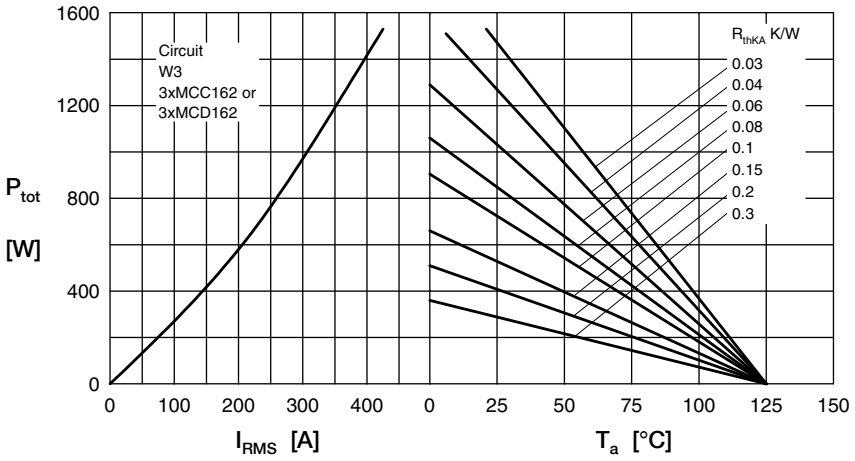


Fig. 8 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature

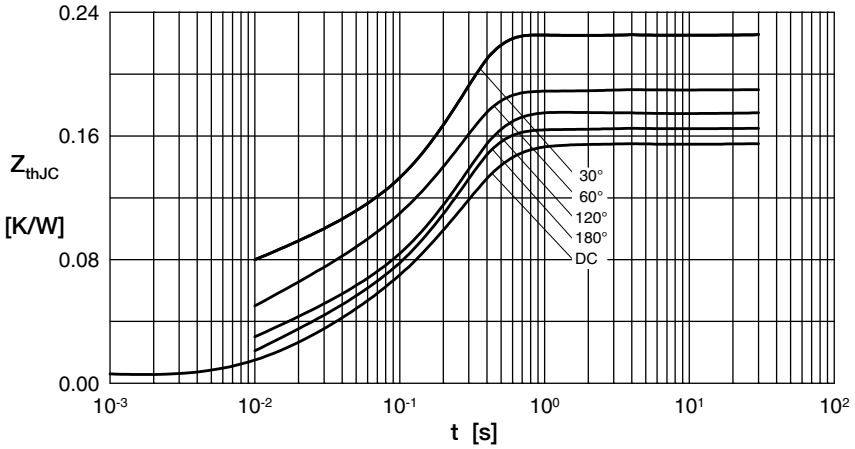


Fig. 9 Transient thermal impedance junction to case (per thyristor/diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} [K/W]
DC	0.155
180°	0.167
120°	0.176
60°	0.197
30°	0.227

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.0072	0.001
2	0.0188	0.080
3	0.1290	0.200

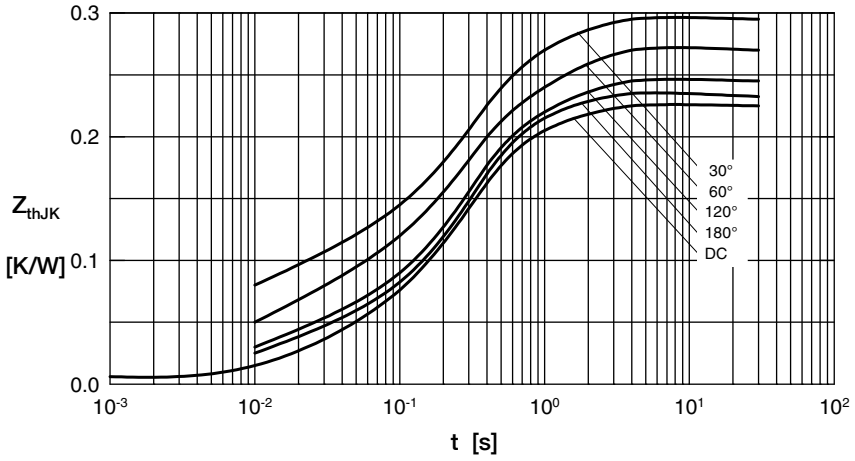


Fig. 10 Transient thermal impedance junction to heatsink (per thyristor/diode)

R_{thJK} for various conduction angles d:

d	R_{thJK} [K/W]
DC	0.225
180°	0.237
120°	0.246
60°	0.267
30°	0.297

Constants for Z_{thJK} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.0072	0.001
2	0.0188	0.080
3	0.1290	0.200
4	0.0700	1.000