Thyristor Modules

I_{TRMS} = 2x 40 A
I_{TAVM} = 2x 25 A
V_{RRM} = 800-1600 V

V_{RSM} V_{DSM}	V_{RRM} V_{DRM}	Type	
V	V	Version 1 B	Version 8 B
900	800	MCC 19-08io1 B	MCC 19-08io8 B
1300	1200	MCC 19-12io1 B	MCC 19-12io8 B
1500	1400	MCC 19-14io1 B	MCC 19-14io8 B
1700	1600	MCC 19-16io1 B	MCC 19-16io8 B

TO-240 AA

Version 1 B

Version 8 B
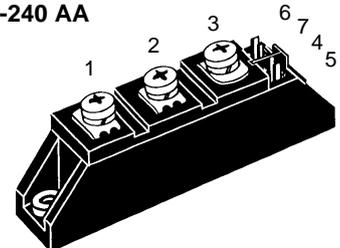
Symbol	Test Conditions		Maximum Ratings	
I_{TRMS}	$T_{VJ} = T_{VJM}$		40	A
I_{TAVM}	$T_C = 58°C$; 180° sine		25	A
	$T_C = 85°C$; 180° sine		18	A
I_{TSM}	$T_{VJ} = 45°C$;	t = 10 ms (50 Hz), sine	400	A
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	420	A
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	350	A
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	370	A
$\int i^2 dt$	$T_{VJ} = 45°C$	t = 10 ms (50 Hz), sine	800	A²s
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	730	A²s
	$T_{VJ} = T_{VJM}$	t = 10 ms (50 Hz), sine	600	A²s
	$V_R = 0$	t = 8.3 ms (60 Hz), sine	570	A²s
$(di/dt)_{cr}$	$T_{VJ} = T_{VJM}$ f =50 Hz, t_P =200 µs $V_D = 2/3 V_{DRM}$	repetitive, I_T = 45 A	150	A/µs
	$I_G = 0.45$ A $di_G/dt = 0.45$ A/µs	non repetitive, $I_T = I_{TAVM}$	500	A/µs
$(dv/dt)_{cr}$	$T_{VJ} = T_{VJM}$; $R_{GK} = \infty$; method 1 (linear voltage rise)	$V_{DR} = 2/3 V_{DRM}$	1000	V/µs
P_{GM}	$T_{VJ} = T_{VJM}$	t_P = 30 µs	10	W
	$I_T = I_{TAVM}$	t_P = 300 µs	5	W
P_{GAV}			0.5	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)		2.5-4.0/22-35	Nm/lb.in.
	Terminal connection torque (M5)		2.5-4.0/22-35	Nm/lb.in.
Weight	Typical including screws		90	g
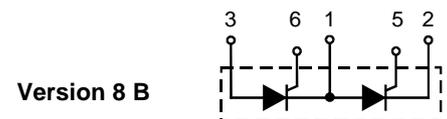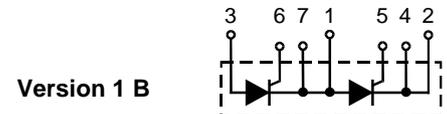
Features

- International standard package, JEDEC TO-240 AA
- Direct copper bonded Al_2O_3 -ceramic base plate
- Planar passivated chips
- Isolation voltage 3600 V~
- UL registered, E 72873
- Gate-cathode twin pins for version 1B

Applications

- DC motor control
- Softstart AC motor controller
- Light, heat and temperature control

Advantages

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

Data according to IEC 60747 and refer to a single thyristor unless otherwise stated.
IXYS reserves the right to change limits, test conditions and dimensions

Symbol	Test Conditions		Characteristic Values	
I_{RRM}, I_{DRM}	$T_{VJ} = T_{VJM}$; $V_R = V_{RRM}$; $V_D = V_{DRM}$		3	mA
V_T	$I_T = 80$ A; $T_{VJ} = 25°C$		2.05	V
V_{T0}	For power-loss calculations only ($T_{VJ} = 125°C$)		0.85	V
r_T			18	$m\Omega$
V_{GT}	$V_D = 6$ V;	$T_{VJ} = 25°C$	1.5	V
		$T_{VJ} = -40°C$	1.6	V
I_{GT}	$V_D = 6$ V;	$T_{VJ} = 25°C$	100	mA
		$T_{VJ} = -40°C$	200	mA
V_{GD}	$T_{VJ} = T_{VJM}$;	$V_D = 2/3\ V_{DRM}$	0.2	V
I_{GD}			10	mA
I_L	$T_{VJ} = 25°C$; $t_P = 10\ \mu s$; $V_D = 6$ V		450	mA
	$I_G = 0.45$ A; $di_G/dt = 0.45$ A/μs			
I_H	$T_{VJ} = 25°C$; $V_D = 6$ V; $R_{GK} = \infty$		200	mA
t_{gd}	$T_{VJ} = 25°C$; $V_D = 1/2\ V_{DRM}$		2	μs
	$I_G = 0.45$ A; $di_G/dt = 0.45$ A/μs			
t_q	$T_{VJ} = T_{VJM}$; $I_T = 20$ A, $t_P = 200\ \mu s$; $-di/dt = 10$ A/μs typ.		150	μs
	$V_R = 100$ V; $dv/dt = 20$ V/μs; $V_D = 2/3\ V_{DRM}$			
Q_S	$T_{VJ} = T_{VJM}$; $I_T = 25$ A, $-di/dt = 0.64$ A/μs		50	μC
I_{RM}			6	A
R_{thJC}	per thyristor; DC current	other values	1.3	K/W
	per module	see Fig. 8/9	0.65	K/W
R_{thJK}	per thyristor; DC current		1.5	K/W
	per module		0.75	K/W
d_S	Creepage distance on surface		12.7	mm
d_A	Strike distance through air		9.6	mm
a	Maximum allowable acceleration		50	m/s^2

Optional accessories for module-type MCC 19 version 1 B
Keyed gate/cathode twin plugs with wire length = 350 mm, gate = yellow, cathode = red
Type **ZY 200L**   (L = Left for pin pair 4/5) }   UL 758, style 1385,
Type **ZY 200R**   (R = right for pin pair 6/7) }   CSA class 5851, guide 460-1-1
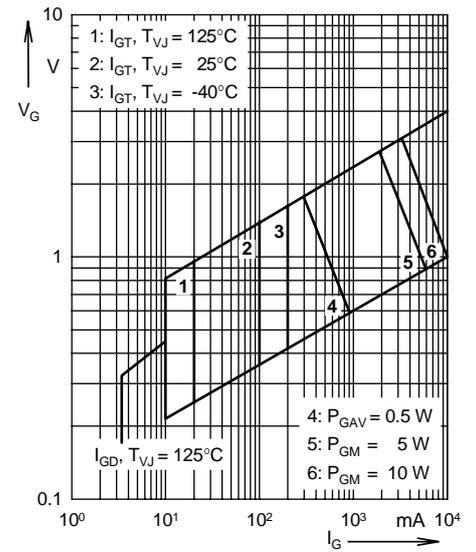
Fig. 1 Gate trigger characteristics
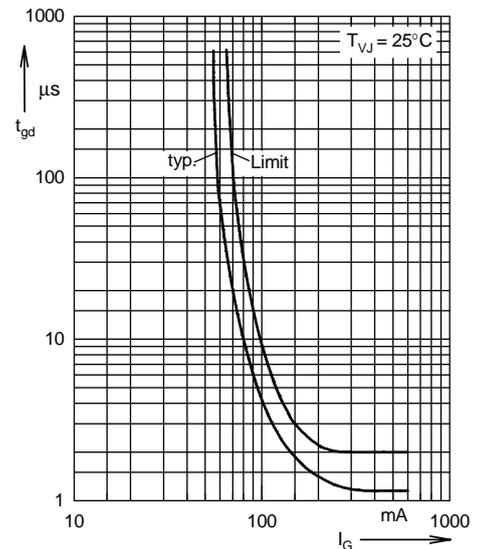
Fig. 2 Gate trigger delay time

Dimensions in mm (1 mm = 0.0394")

Version 1 B

Version 8 B

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

Fig. 4 $\int i^2 dt$ 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)

Fig. 6 Three phase rectifier bridge:
Power dissipation versus direct
output current and ambient
temperature
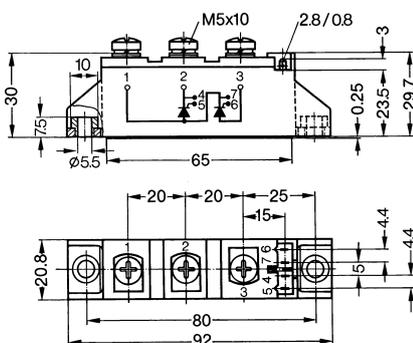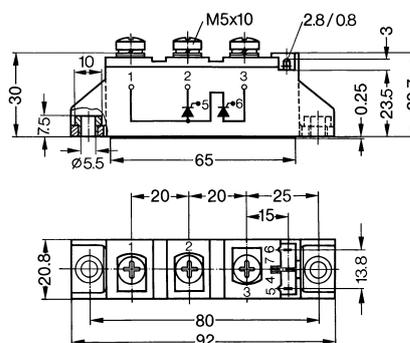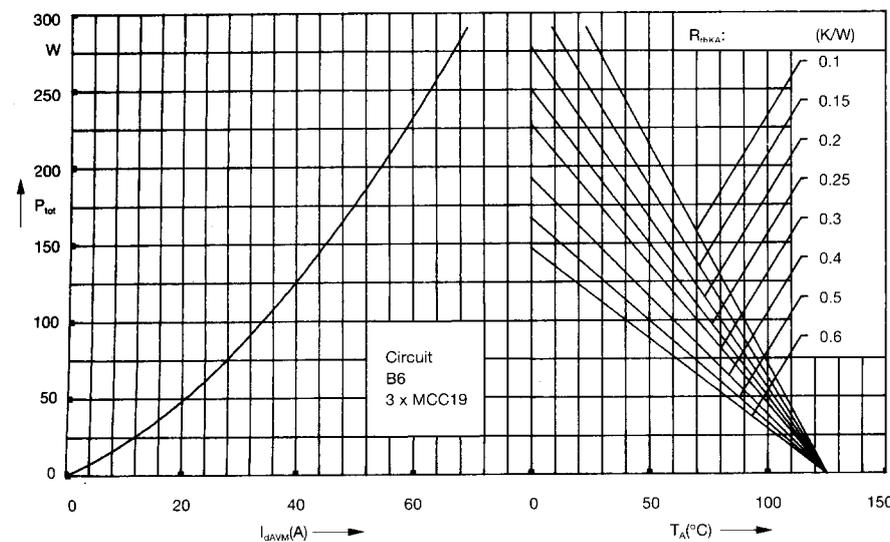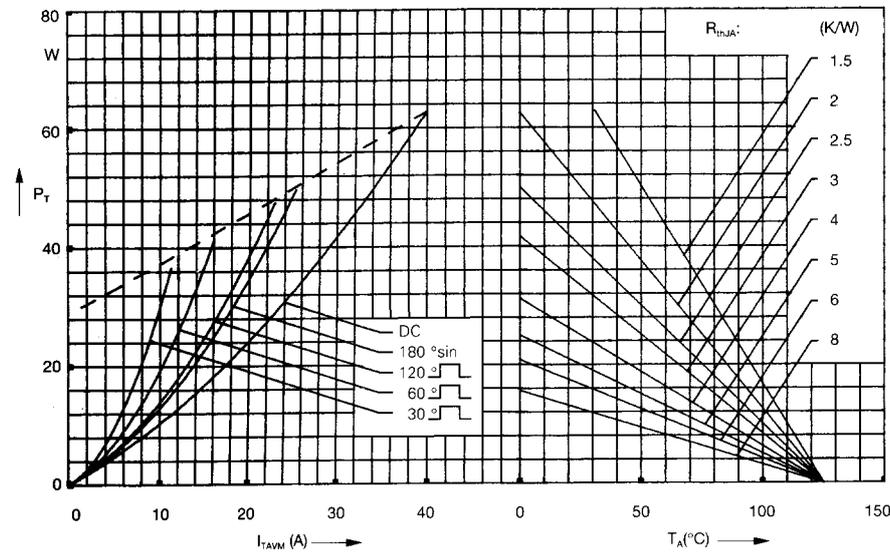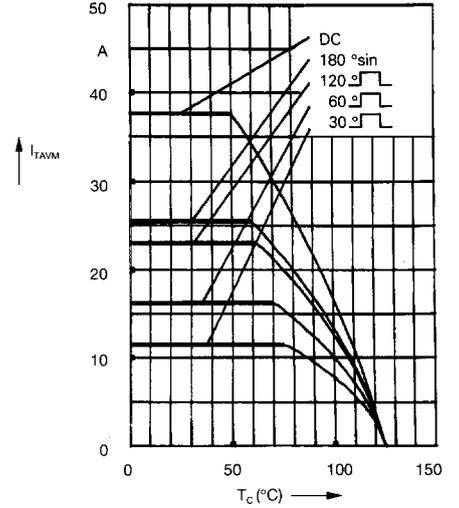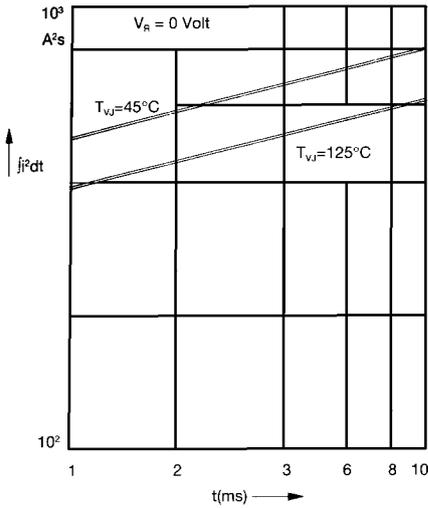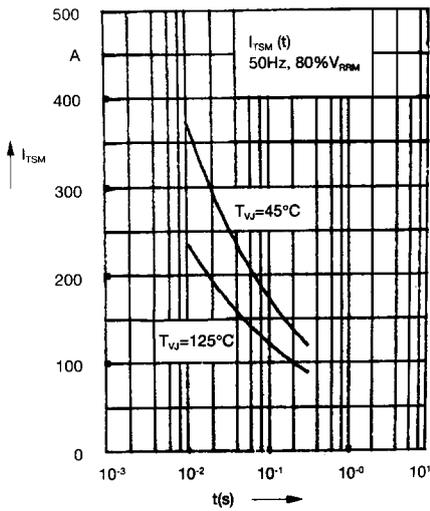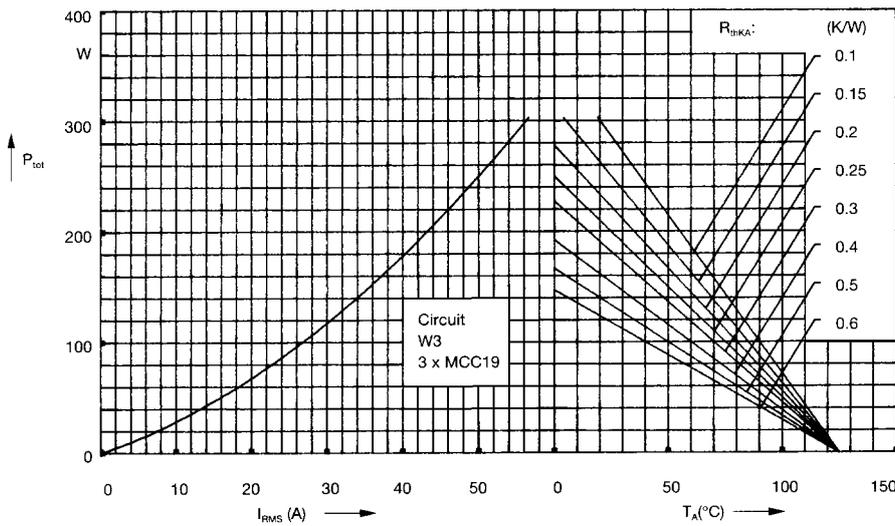
Fig. 7 Three phase AC-controller: Power dissipation versus RMS output current and ambient temperature
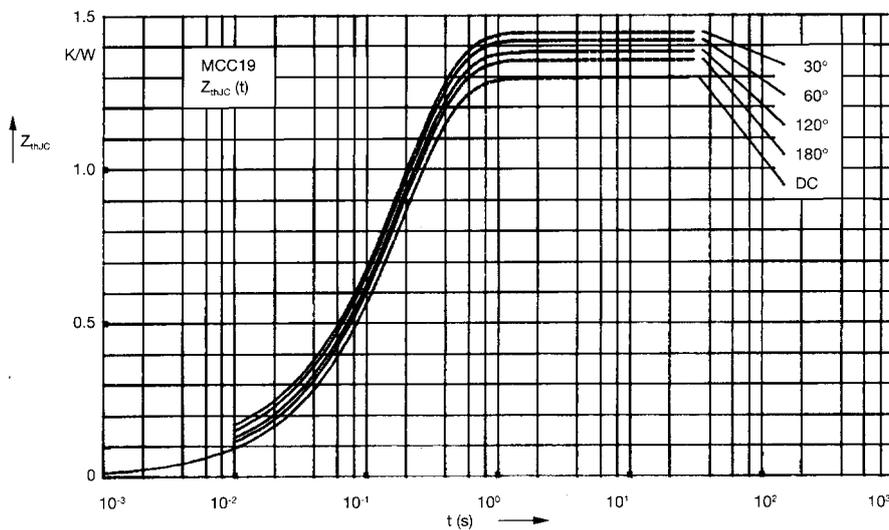

Fig. 8 Transient thermal impedance junction to case (per thyristor)

R_{thJC} for various conduction angles d:

d	R_{thJC} (K/W)
DC	1.3
180°	1.35
120°	1.39
60°	1.42
30°	1.45

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.018	0.0033
2	0.041	0.0216
3	1.241	0.191
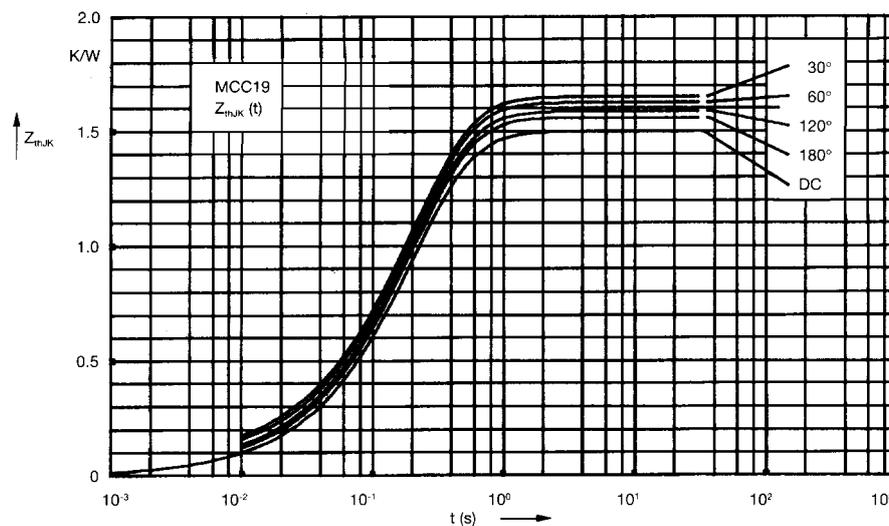

Fig. 9 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} (K/W)
DC	1.5
180°	1.55
120°	1.59
60°	1.62
30°	1.65

Constants for Z_{thJK} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.018	0.0033
2	0.041	0.0216
3	1.241	0.191
4	0.2	0.46