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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

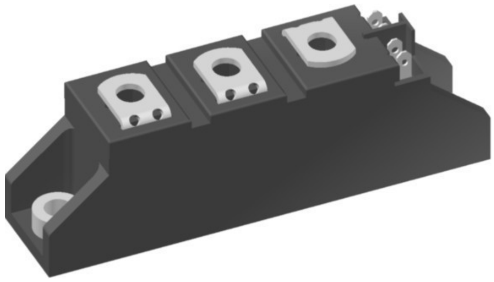
Thyristor Module

V_{RRM} = 2x 1200 V
I_{TAV} = 18 A
V_T = 1.57 V

Phase leg

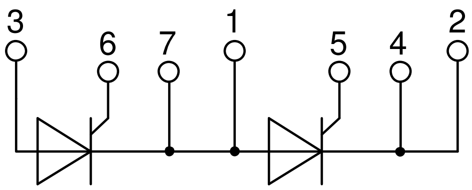
Part number

MCC19-12io1B



Backside: isolated

E72873



Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability
- Direct Copper Bonded Al2O3-ceramic

Applications:

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control

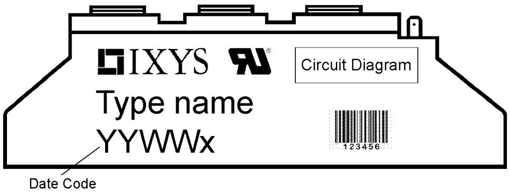
Package: TO-240AA

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Thyristor

Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM/DSM}$	max. non-repetitive reverse/forward blocking voltage		T_{VJ} = 25°C			1300	V
$V_{RRM/DRM}$	max. repetitive reverse/forward blocking voltage		T_{VJ} = 25°C			1200	V
$I_{R/D}$	reverse current, drain current	$V_{R/D}$ = 1200 V	T_{VJ} = 25°C			100	µA
		$V_{R/D}$ = 1200 V	T_{VJ} = 125°C			3	mA
V_T	forward voltage drop	I_T = 40 A	T_{VJ} = 25°C			1.56	V
		I_T = 80 A				2.05	V
		I_T = 40 A	T_{VJ} = 125°C			1.57	V
		I_T = 80 A				2.29	V
I_{TAV}	average forward current	T_C = 85°C	T_{VJ} = 125°C			18	A
$I_{T(RMS)}$	RMS forward current	180° sine				28	A
V_{T0}	threshold voltage	for power loss calculation only	T_{VJ} = 125°C			0.85	V
r_T	slope resistance					18	mΩ
R_{thJC}	thermal resistance junction to case					1.3	K/W
R_{thCH}	thermal resistance case to heatsink				0.20		K/W
P_{tot}	total power dissipation		T_C = 25°C			77	W
I_{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			400	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			430	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			340	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			365	A
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			800	A^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			770	A^2s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 125°C			580	A^2s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			555	A^2s
C_J	junction capacitance	V_R = 400 V f = 1 MHz	T_{VJ} = 25°C		22		pF
P_{GM}	max. gate power dissipation	t_P = 30 µs	T_C = 125°C			10	W
		t_P = 300 µs				5	W
P_{GAV}	average gate power dissipation					0.5	W
$(di/dt)_{cr}$	critical rate of rise of current	T_{VJ} = 125°C; f = 50 Hz	repetitive, I_T = 75 A			150	A/µs
		t_P = 200 µs; di_G/dt = 0.45 A/µs;					
		I_G = 0.45 A; V = ⅔ V_{DRM}	non-repet., I_T = 18 A			500	A/µs
$(dv/dt)_{cr}$	critical rate of rise of voltage	V = ⅔ V_{DRM}	T_{VJ} = 125°C			1000	V/µs
		R_{GK} = ∞; method 1 (linear voltage rise)					
V_{GT}	gate trigger voltage	V_D = 6 V	T_{VJ} = 25°C			1.5	V
			T_{VJ} = -40°C			1.6	V
I_{GT}	gate trigger current	V_D = 6 V	T_{VJ} = 25°C			100	mA
			T_{VJ} = -40°C			200	mA
V_{GD}	gate non-trigger voltage	V_D = ⅔ V_{DRM}	T_{VJ} = 125°C			0.2	V
I_{GD}	gate non-trigger current					5	mA
I_L	latching current	t_p = 10 µs	T_{VJ} = 25°C			450	mA
		I_G = 0.45 A; di_G/dt = 0.45 A/µs					
I_H	holding current	V_D = 6 V R_{GK} = ∞	T_{VJ} = 25°C			200	mA
t_{gd}	gate controlled delay time	V_D = ½ V_{DRM}	T_{VJ} = 25°C			2	µs
		I_G = 0.45 A; di_G/dt = 0.45 A/µs					
t_q	turn-off time	V_R = 100 V; I_T = 20 A; V = ⅔ V_{DRM}	T_{VJ} = 100 °C		150		µs
		di/dt = 10 A/µs dv/dt = 20 V/µs t_p = 200 µs					

Package TO-240AA			Ratings			
Symbol	**Definition**	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal			200	A
T_{VJ}	*virtual junction temperature*		-40		125	°C
T_{op}	*operation temperature*		-40		100	°C
T_{stg}	*storage temperature*		-40		125	°C
Weight				81		g
M_D	*mounting torque*		2.5		4	Nm
M_T	*terminal torque*		2.5		4	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*	*terminal to terminal* 13.0	9.7			mm
$d_{Spb/Apb}$		*terminal to backside* 16.0	16.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second; 50/60 Hz, RMS; $I_{ISOL} \le 1$ mA	3600			V
		t = 1 minute	3000			V

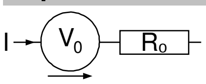


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCC19-12io1B	MCC19-12io1B	Box	36	452831

Similar Part	Package	Voltage class
MCMA25P1200TA	TO-240AA-1B	1200
MCMA35P1200TA	TO-240AA-1B	1200

Equivalent Circuits for Simulation

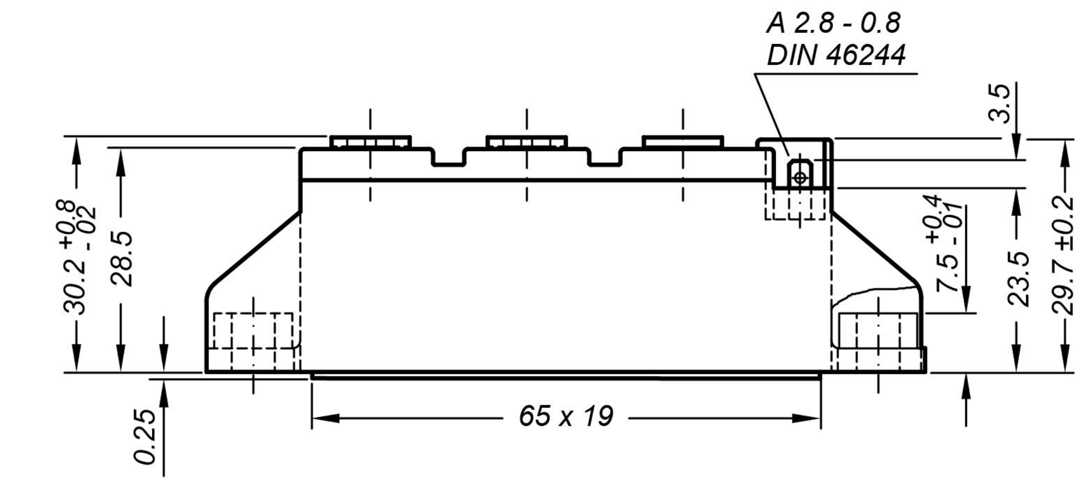
** on die level* $T_{VJ} = 125\,°C$



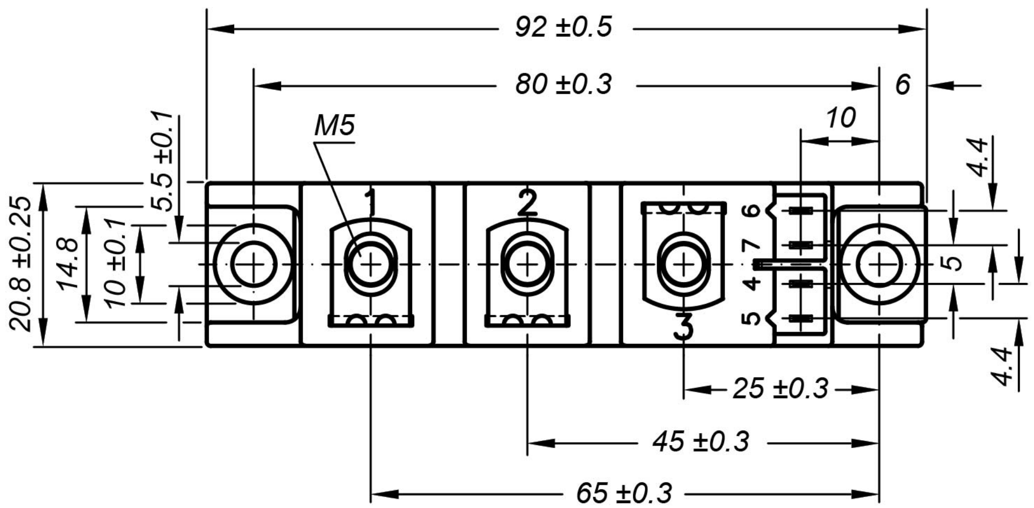
Thyristor

$V_{0\,max}$	*threshold voltage*	0.85	V
$R_{0\,max}$	*slope resistance **	16.8	mΩ

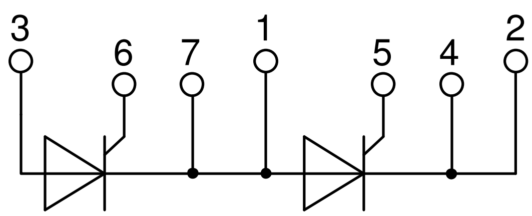
Outlines TO-240AA



General tolerance: DIN ISO 2768 class „c“



Optional accessories: Keyed gate/cathode twin plugs
Wire length: 350 mm, gate = white, cathode = red
UL 758, style 3751
*Type **ZY 200L** (L = Left for pin pair 4/5)*
*Type **ZY 200R** (R = Right for pin pair 6/7)*



Thyristor

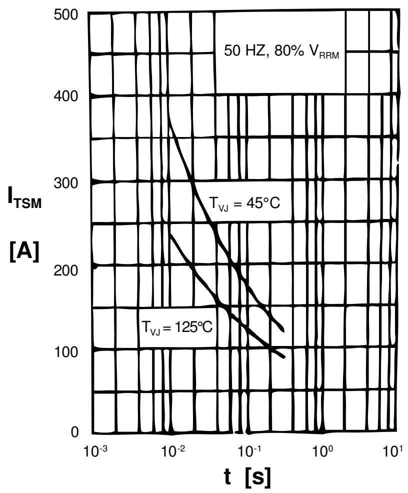


Fig. 1 Surge overload current
I_{TSM}: Crest value, t: duration

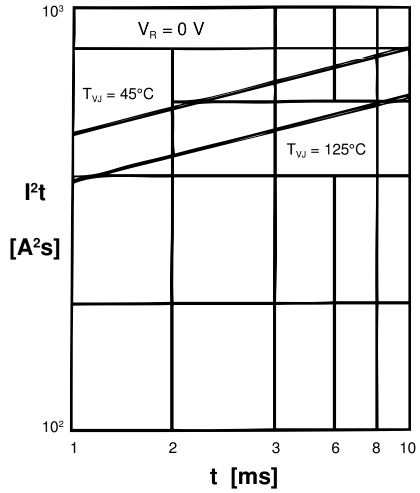


Fig. 2 I^2t versus time (1-10 ms)

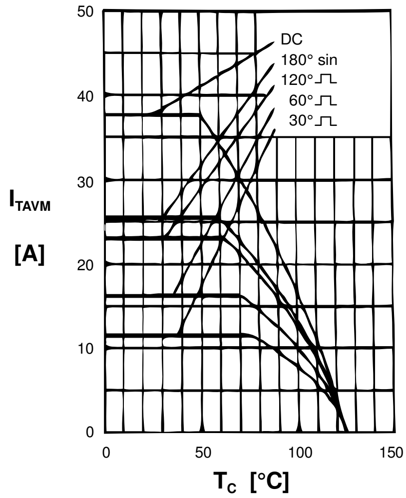


Fig. 3 Max. forward current
at case temperature

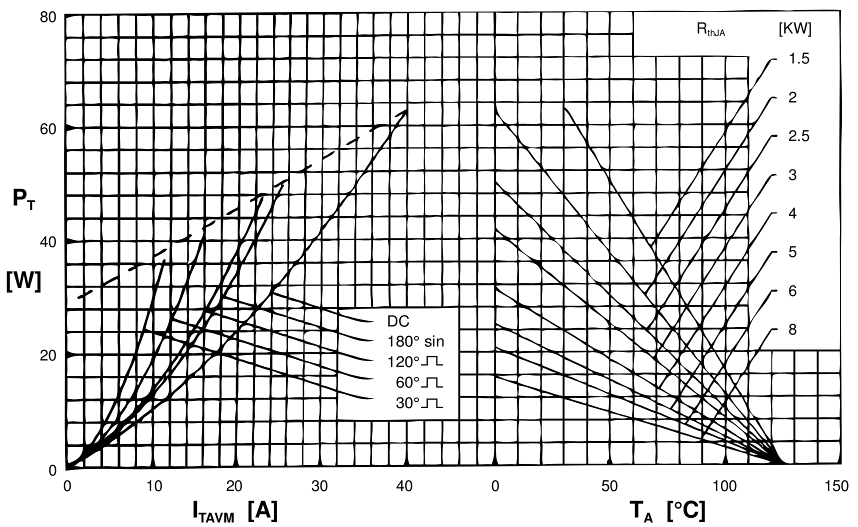


Fig. 4 Power dissipation versus onstate current & ambient temp. (per thyristor)

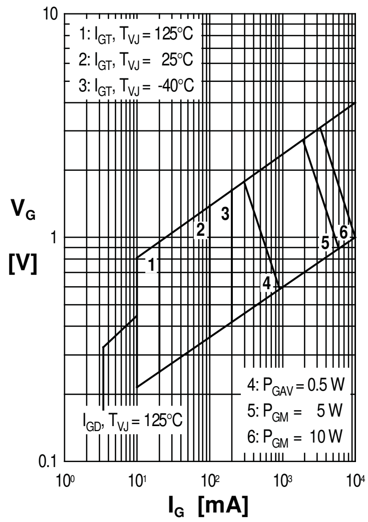


Fig. 5 Gate trigger charact.

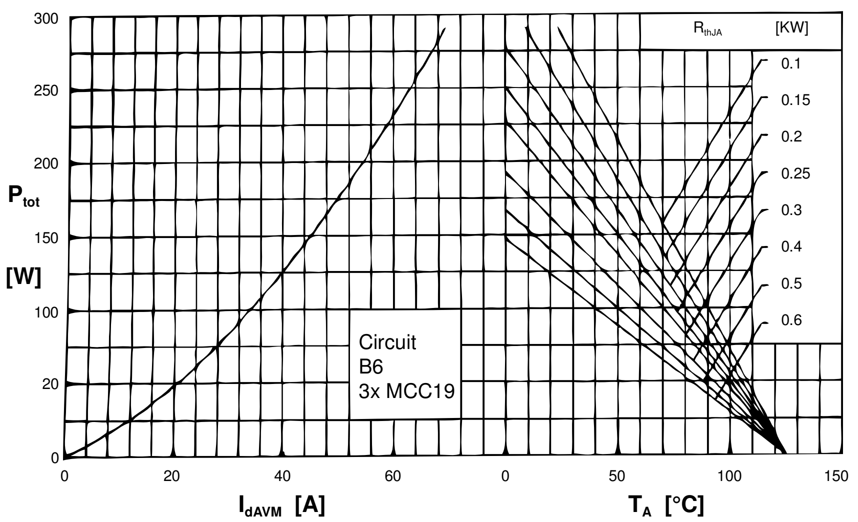


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct
output current and ambient temperature

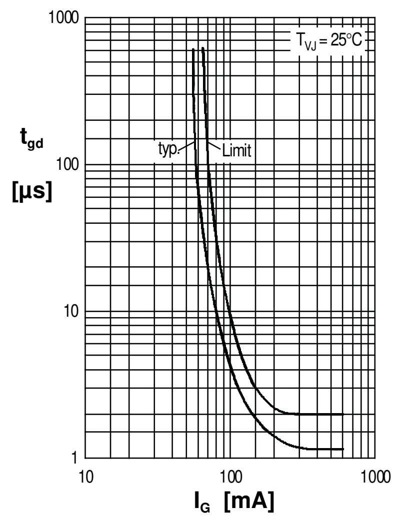


Fig. 7 Gate trigger delay time

Thyristor

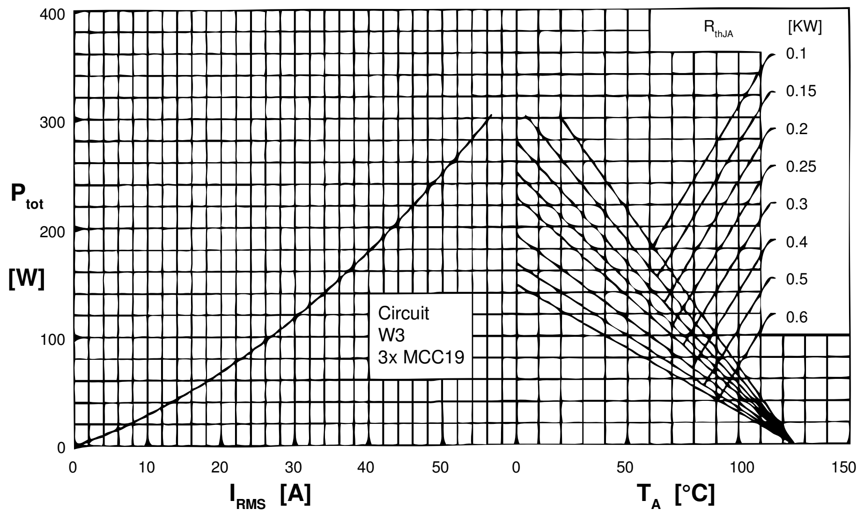


Fig. 8 Three phase AC-controller: Power dissipation vs. RMS output current and ambient temperature

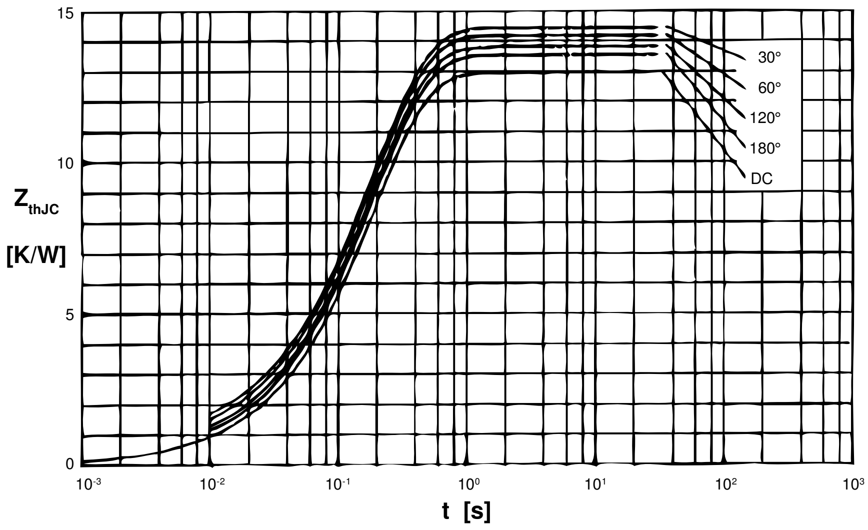


Fig. 9 Transient thermal impedance junction to case (per thyristor)

R_{thJC} for various conduction angles d:

d	R_{thJC} [K/W]
DC	1.30
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	0.1910

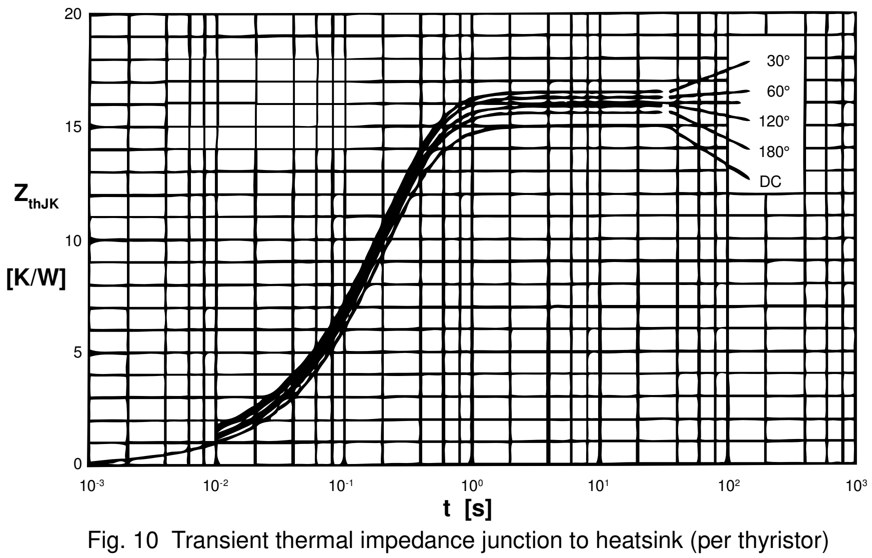


Fig. 10 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} [K/W]
DC	1.50
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	0.1910
4	0.200	0.4600