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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!



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Thyristor \ Diode Module

= 2x 1800 V

60 A

 V_{τ} 1.24 V

Phase leg

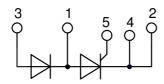
Part number

MCD56-18io1B



Backside: isolated

F1 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

Terms _Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

to perform joint risk and quality assessments;
the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

IXYS reserves the right to change limits, conditions and dimensions.

Data according to IEC 60747 and per semiconductor unless otherwise specified

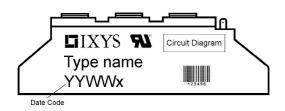
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Rectifier				 	Ratings	•	1
Symbol	Definition	Conditions		min.	typ.	max.	Un
V _{RSM/DSM}	max. non-repetitive reverse/forwa	rd blocking voltage	$T_{VJ} = 25^{\circ}C$			1900	
V _{RRM/DRM}	max. repetitive reverse/forward bl	ocking voltage	$T_{VJ} = 25^{\circ}C$			1800	
I _{R/D}	reverse current, drain current	$V_{R/D} = 1800 \text{ V}$	$T_{VJ} = 25^{\circ}C$			200	μ
		$V_{R/D} = 1800 \text{ V}$	$T_{VJ} = 125^{\circ}C$			5	m
V _T	forward voltage drop	I _T = 100 A	$T_{VJ} = 25^{\circ}C$			1.26	
		$I_{T} = 200 \text{ A}$				1.57	,
		$I_T = 100 \text{ A}$	T _{VJ} = 125°C			1.24	
		$I_{T} = 200 \text{ A}$				1.62	
I _{TAV}	average forward current	T _C = 85°C	T _{vJ} = 125°C			60	
I _{T(RMS)}	RMS forward current	180° sine				94	
V _{T0}	threshold voltage		T _{v.i} = 125°C			0.85	
r _T	slope resistance	oss calculation only	VO			3.7	m!
R _{thJC}	thermal resistance junction to cas	e				0.45	K/V
R _{thCH}	thermal resistance case to heatsi				0.20		K/V
P _{tot}	total power dissipation		T _C = 25°C		0.20	222	٧
l _{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{V.I} = 45^{\circ}C$			1.50	<u> </u>
*TSM	maxi terwara barge barrent	t = 8.3 ms; (60 Hz), sine	$V_R = 0 V$			1.62	k
		t = 0.5 ms; (50 Hz), sine	$T_{VJ} = 125^{\circ}C$			1.28	1
		, , , , , , , , , , , , , , , , , , , ,	$V_{\rm N} = 0 \text{ V}$			1.38	k
124	value for fusing	t = 8,3 ms; (60 Hz), sine t = 10 ms; (50 Hz), sine	$V_R = 0 V$ $T_{VJ} = 45^{\circ}C$!
l²t	value for fusing					11.3	1
		t = 8,3 ms; (60 Hz), sine	V _R = 0 V			10.9	<u>. </u>
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 125$ °C			8.13	į
	to a strong a superficient	t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$		7.4	7.87	!
C ,	junction capacitance	$V_R = 400 V f = 1 MHz$	$T_{VJ} = 25^{\circ}C$		74		р
P_{GM}	max. gate power dissipation	$t_P = 30 \mu s$	$T_{C} = 125^{\circ}C$			10	į
		t _P = 300 μs				5	٧
P _{GAV}	average gate power dissipation					0.5	٧
(di/dt) _{cr}	critical rate of rise of current	,	epetitive, $I_T = 150 A$			150	A/μ
	$t_P = 200 \mu s; di_G/dt = 0.45 A/\mu s;$						
		$I_{G} = 0.45 \text{ A}; V = \frac{2}{3} V_{DRM}$ no	on-repet., $I_T = 60 \text{ A}$			500	A/μ
$(dv/dt)_{cr}$	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{VJ} = 125$ °C			1000	V/μ
		R _{GK} = ∞; method 1 (linear volta	ge rise)				
V _{GT}	gate trigger voltage	V _D = 6 V	$T_{VJ} = 25^{\circ}C$			1.5	١
			$T_{VJ} = -40$ °C			1.6	١
I _{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			100	m
			$T_{VJ} = -40$ °C			200	m
V _{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	T _{vJ} = 125°C			0.2	١
I _{GD}	gate non-trigger current					10	m
I _L	latching current	t _p = 10 μs	$T_{VJ} = 25$ °C			450	m
·L	· ·	$I_{\rm G} = 0.45 \text{A}; \text{di}_{\rm G}/\text{dt} = 0.45 \text{A}/\mu \text{s}$					
I _H	holding current	$V_D = 6 \text{ V } R_{GK} = \infty$	T _{vJ} = 25°C			200	m
•н t _{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$			2	μ
∙gd	gate controlled delay tille	$I_{G} = 0.45 \text{ A}; \text{ di}_{G}/\text{dt} = 0.45 \text{ A}/\mu\text{s}$				_	μ
	turn-off time				150		
t _q	turn-on time	$V_R = 100 \text{ V}; I_T = 150 \text{ A}; V = \frac{2}{3}$			150		μ
		$di/dt = 10 \text{ A/}\mu\text{s} \text{ dv/dt} = 20 \text{ V}$	$/\mu s$ $t_p = 200 \mu s$				1 1 1



Package TO-240AA			Ratings					
Symbol	Definition	Conditions			min.	typ.	max.	Unit
RMS	RMS current	per terminal					200	Α
T _{VJ}	virtual junction temperature				-40		125	°C
Top	operation temperature				-40		100	°C
T _{stg}	storage temperature				-40		125	°C
Weight						81		g
M _D	mounting torque				2.5		4	Nm
$\mathbf{M}_{_{T}}$	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}	creepage distance on surface	Striking distance through an	terminal to backside 16.0		16.0			mm
V _{ISOL}	isolation voltage	t = 1 second	50/60 Hz. RMS: IIsoL ≤ 1 mA		3600			V
.002		t = 1 minute			3000			٧

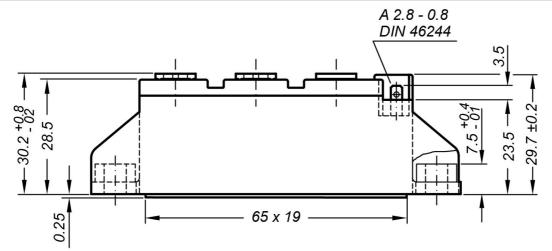


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCD56-18io1B	MCD56-18io1B	Box	36	494216

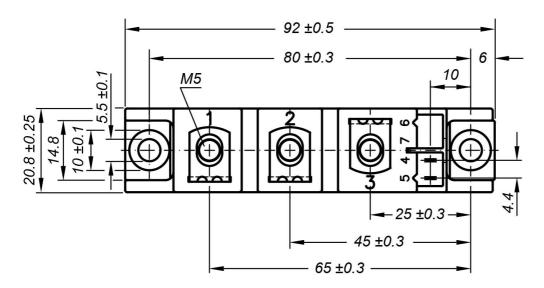
Equiva	alent Circuits for	Simulation	* on die level	$T_{VJ} = 125 ^{\circ}\text{C}$
$I \rightarrow V_0$	R _o	Thyristor		
V _{0 max}	threshold voltage	0.85		V
$R_{0 \; \text{max}}$	slope resistance *	2.5		$m\Omega$



Outlines TO-240AA

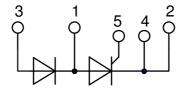


General tolerance: DIN ISO 2768 class "c"



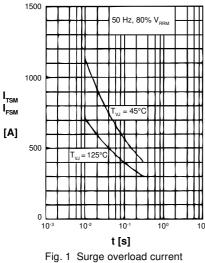
Optional accessories: Keyed gate/cathode twin plugs Wire length: 350 mm, gate = white, cathode = red UL 758, style 3751

Type **ZY 200L** (L = Left for pin pair 4/5)



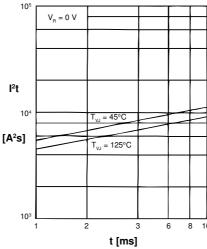


Thyristor





 I_{TSM} , I_{FSM} : Crest value, t: duration



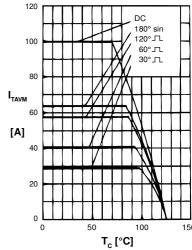
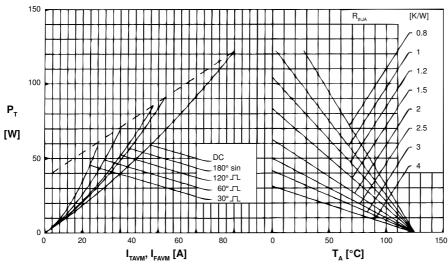
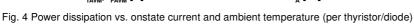


Fig. 2 I2t versus time (1-10 ms)

Fig. 3 Maximum forward current at case temperature





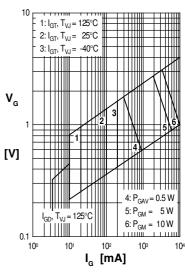
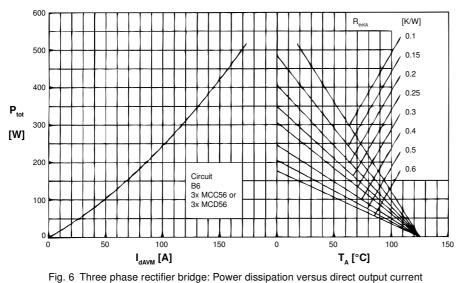


Fig. 5 Gate trigger charact.



and ambient temperature

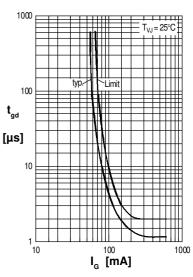


Fig. 7 Gate trigger delay time



Rectifier

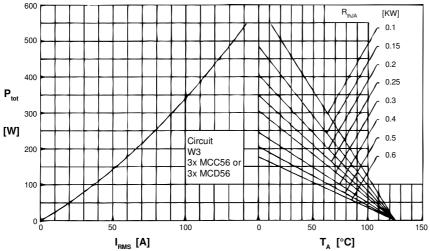


Fig. 8 Three phase AC-controller: Power dissipation vs. RMS output current and ambient temperature

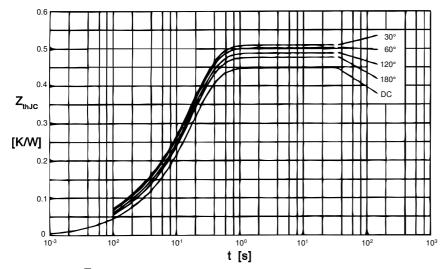


Fig. 9 Transient thermal impedance junction to case (per thyristor)

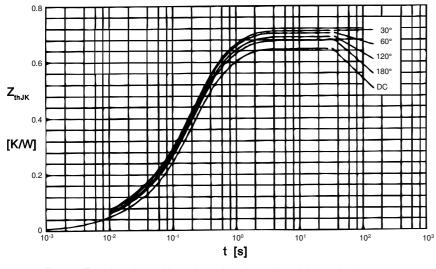


Fig. 10 Transient thermal impedance junction to heatsink (per thyristor)

 R_{thJC} for various conduction angles d:

thJC	a
d	R _{thJC} [K/W
DC	0.450
180°	0.470
120°	0.490
60°	0.505
30°	0.520

Constants for Z_{thJC} calculation:

i F	R _{thi} [K/W]	t, [s]
1	0.014	0.0150
2	0.026	0.0095
3	0.410	0.1750

 R_{thJK} for various conduction angles d:

d	R _{thJK} [K/W
DC	0.650
180°	0.670
120°	0.690
60°	0.705
30°	0.720

Constants for $\mathbf{Z}_{_{\text{thJK}}}$ calculation:

i F	R _{thi} [K/W]	t _, [s]
1	0.014	0.0150
2	0.026	0.0095
3	0.410	0.1750
4	0.200	0.6700