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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**

 $V_{RRM}$ 1200 V

40 A

1,29 V

**AC Controlling** 1~ full-controlled

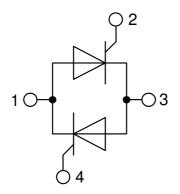
Part number

MMO74-12io6



Backside: isolated

**F1** E72873



## Features / Advantages:

- Thyristor for line frequency
- Planar passivated chip
- Long-term stability

### **Applications:**

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

Package: SOT-227B (minibloc)

- Isolation Voltage: 3000 V~ • Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper
- internally DCB isolated
- 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 the sales office, which is responsible for you.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the product in aviation, in health or live 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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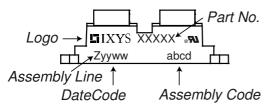


Cymah - I	Pofinition	Conditions		main-	41.70	may	11
Symbol	Definition	Conditions	$T_{VJ} = 25^{\circ}C$	min.	typ.	<b>max.</b> 1300	Un
V <sub>RSM/DSM</sub>	max. non-repetitive reverse/forwar						í I
V <sub>RRM/DRM</sub>	max. repetitive reverse/forward blo		$T_{VJ} = 25^{\circ}C$			1200	
I <sub>R/D</sub>	reverse current, drain current	$V_{R/D} = 1200 \text{ V}$	$T_{VJ} = 25^{\circ}C$			100	μ
		$V_{R/D} = 1200 \text{ V}$	$T_{VJ} = 125^{\circ}C$			6	m
V <sub>T</sub>	forward voltage drop	$I_T = 40 \text{ A}$	$T_{VJ} = 25^{\circ}C$			1,29	,
		$I_{T} = 80 \text{ A}$				1,61	,
		$I_T = 40 \text{ A}$	$T_{VJ} = 125$ °C			1,29	
		I <sub>T</sub> = 80 A				1,70	
I <sub>TAV</sub>	average forward current	$T_{C} = 95^{\circ}C$	$T_{VJ} = 150$ °C			40	
I <sub>RMS</sub>	RMS forward current per phase	180° sine				88	
V <sub>T0</sub>	threshold voltage		T <sub>vJ</sub> = 150°C			0,87	,
r <sub>T</sub>	slope resistance	ss calculation only				10,5	m!
R <sub>thJC</sub>	thermal resistance junction to case	Y				0,7	K/V
R <sub>thCH</sub>	thermal resistance case to heatsin				0,10	· ·	K/V
P <sub>tot</sub>	total power dissipation		$T_{C} = 25^{\circ}C$		,	180	٧
I <sub>TSM</sub>	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{V,I} = 45^{\circ}C$			600	
•ISM		t = 8,3  ms; (60 Hz), sine	$V_R = 0 V$			650	
		t = 0.0  ms; (50 Hz), sine	$T_{V,I} = 150$ °C			510	
		t = 10  ms, (50  Hz),  sine t = 8.3  ms; (60  Hz),  sine	$V_{R} = 0 \text{ V}$			550	
124	value for fueing						!
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			1,80	i .
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			1,76	<u>.                                    </u>
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150$ °C			1,30	į
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			1,26	-
C,	junction capacitance	$V_R = 400 V$ f = 1 MHz	$T_{VJ} = 25^{\circ}C$		22		pl
$P_{GM}$	max. gate power dissipation	$t_P = 30  \mu s$	$T_C = 150$ °C			10	٧
		t <sub>P</sub> = 300 μs				5	٧
$P_{GAV}$	average gate power dissipation					0,5	٧
(di/dt) <sub>cr</sub>	critical rate of rise of current	$T_{VJ} = 150 ^{\circ}\text{C}; f = 50 \text{Hz}$ re	petitive, $I_T = 120 A$			100	Α/μ
		$t_P = 200 \mu s; di_G/dt = 0.3 A/\mu s;$					1
		$I_{G} = 0.3 \text{ A}; V = \frac{2}{3} V_{DRM}$ no	on-repet., $I_T = 40 \text{ A}$			500	Α/μ
(dv/dt) <sub>cr</sub>	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	T <sub>v,i</sub> = 150°C			1000	<u> </u>
( ) Ci	· ·	R <sub>GK</sub> = ∞; method 1 (linear voltag					'
V <sub>GT</sub>	gate trigger voltage	$V_D = 6 \text{ V}$	$T_{VJ} = 25^{\circ}C$			1,5	١
• GI	3 33		$T_{VJ} = -40$ °C			1,6	١
	gate trigger current	$V_D = 6 \text{ V}$	$T_{VJ} = 40^{\circ} \text{C}$ $T_{VJ} = 25^{\circ} \text{C}$			100	m
I <sub>GT</sub>	gate trigger current	$\mathbf{v}_{D} = \mathbf{o} \ \mathbf{v}$					
		\/ 2/\/	$T_{VJ} = -40^{\circ}C$			150	1
V <sub>GD</sub>	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 150^{\circ}C$			0,2	,
I <sub>GD</sub>	gate non-trigger current	10				5	m
I <sub>L</sub>	latching current	$t_p = 10 \mu s$	$T_{VJ} = 25$ °C			450	m
		$I_G = 0.3 A; di_G/dt = 0.3 A/\mu s$					
I <sub>H</sub>	holding current	$V_D = 6 V R_{GK} = \infty$	$T_{VJ} = 25$ °C			100	m
t <sub>gd</sub>	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25 ^{\circ}C$			2	μ
		$I_G = 0.3 A;  di_G/dt = 0.3 A/\mu s$					
tq	turn-off time	$V_R = 100 \text{ V}; I_T = 20 \text{ A}; V = \frac{2}{3}$			150		μ
			J	i e			, ,



Package SOT-227B (minibloc)			Ratings					
Symbol	Definition	Conditions			min.	typ.	max.	Unit
RMS	RMS current	per terminal					150	Α
T <sub>vJ</sub>	virtual junction temperature				-40		150	°C
T <sub>op</sub>	operation temperature				-40		125	°C
T <sub>stg</sub>	storage temperature				-40		150	°C
Weight						30		g
M <sub>D</sub>	mounting torque				1,1		1,5	Nm
$\mathbf{M}_{_{T}}$	terminal torque				1,1		1,5	Nm
d <sub>Spp/App</sub>	oroonago distance on surfa	ce   striking distance through air	terminal to terminal	10,5	3,2			mm
$d_{Spb/Apb}$	creepage distance on suna	ce   striking distance through an	terminal to backside	8,6	6,8			mm
V <sub>ISOL</sub>	isolation voltage	t = 1 second	50/00 LL - DMO L		3000			٧
.002	t = 1 minute		50/60 Hz, RMS; IISOL ≤ 1 mA		2500			٧

# **Product Marking**

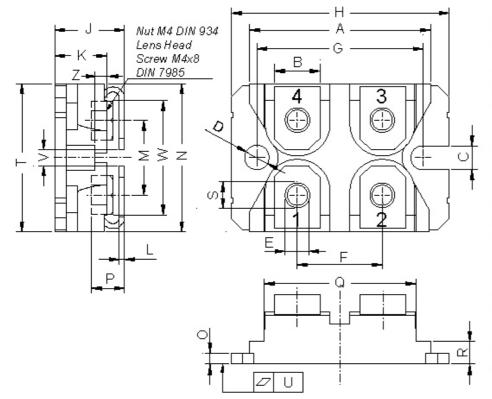


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MMO74-12io6	MMO74-12io6	Tube	10	459380

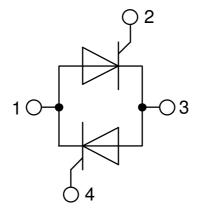
<b>Equivalent Circuits for Simulation</b>			* on die level	$T_{VJ} = 150 ^{\circ}\text{C}$
$I \rightarrow V_0$	$R_0$	Thyristor		
V <sub>0 max</sub>	threshold voltage	0,87		V
$R_{0 \text{ max}}$	slope resistance *	9,7		$m\Omega$



## Outlines SOT-227B (minibloc)



Dim.	Millimeter		Inches		
DIIII.	min	max	min	max	
Α	31.50	31.88	1.240	1.255	
В	7.80	8.20	0.307	0.323	
С	4.09	4.29	0.161	0.169	
D	4.09	4.29	0.161	0.169	
Е	4.09	4.29	0.161	0.169	
F	14.91	15.11	0.587	0.595	
G	30.12	30.30	1.186	1.193	
Н	37.80	38.23	1.488	1.505	
J	11.68	12.22	0.460	0.481	
K	8.92	9.60	0.351	0.378	
L	0.74	0.84	0.029	0.033	
M	12.50	13.10	0.492	0.516	
N	25.15	25.42	0.990	1.001	
0	1.95	2.13	0.077	0.084	
Р	4.95	6.20	0.195	0.244	
Q	26.54	26.90	1.045	1.059	
R	3.94	4.42	0.155	0.167	
S	4.55	4.85	0.179	0.191	
Т	24.59	25.25	0.968	0.994	
U	-0.05	0.10	-0.002	0.004	
V	3.20	5.50	0.126	0.217	
W	19.81	21.08	0.780	0.830	
Ζ	2.50	2.70	0.098	0.106	





### **Thyristor**

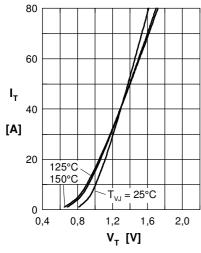


Fig. 1 Forward characteristics

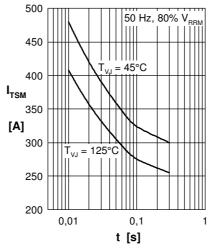


Fig. 2 Surge overload current

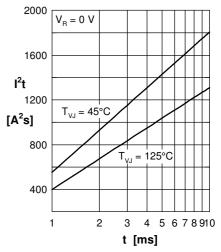


Fig. 3 I<sup>2</sup>t versus time (1-10 ms)

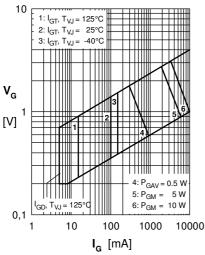


Fig. 4 Gate trigger characteristics

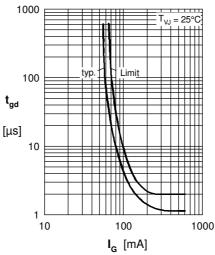


Fig. 5 Gate controlled delay time

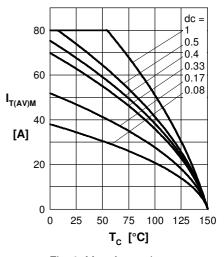


Fig. 6 Max. forward current at case temperature

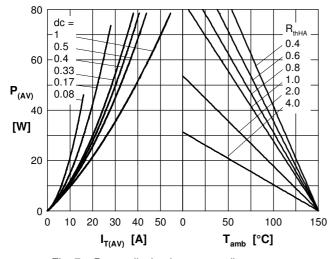


Fig. 7a Power dissipation versus direct output current Fig. 7b and ambient temperature

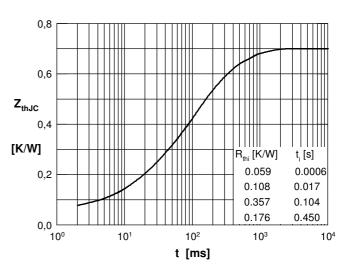


Fig. 8 Transient thermal impedance junction to case