

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from, Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

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

250 A

 V_{T} 1.08 V

Phase leg

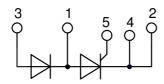
Part number

MCD255-18io1



Backside: isolated

F1 E72873



Features / Advantages:

- International standard package
- Direct copper bonded Al2O3-ceramic with copper base plate
- Planar passivated chip
- Isolation voltage 3600 V~
- Keyed gate/cathode twin pins

Applications:

- Motor control, softstarter
- Power converter
- · Heat and temperature control for industrial furnaces and chemical processes
- Lighting control
- Solid state switches

Package: Y1

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- 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 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

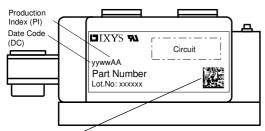
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Rectifier				İ	Ratings	>	1
Symbol	Definition	Conditions		min.	typ.	max.	Uni
V _{RSM/DSM}	max. non-repetitive reverse/forward	d blocking voltage	$T_{VJ} = 25^{\circ}C$			1900	٧
V _{RRM/DRM}	max. repetitive reverse/forward blo	cking voltage	$T_{VJ} = 25^{\circ}C$			1800	٧
I _{R/D}	reverse current, drain current	$V_{\text{R/D}} = 1800 \text{ V}$	$T_{VJ} = 25^{\circ}C$			1	m <i>P</i>
		$V_{R/D} = 1800 V$	$T_{VJ} = 140$ °C			40	m <i>P</i>
V _T	forward voltage drop	I _T = 300 A	$T_{VJ} = 25^{\circ}C$			1.14	٧
		$I_{T} = 600 \text{ A}$				1.36	٧
		I _T = 300 A	T _{VJ} = 125°C			1.08	٧
		$I_{T} = 600 \text{ A}$				1.33	V
I _{TAV}	average forward current	T _C = 85°C	T _{vJ} = 140°C			250	A
I _{T(RMS)}	RMS forward current	180° sine				450	A
V _{T0}	threshold voltage		T _{v.i} = 140°C			0.80	٧
r _T	slope resistance	ss calculation only				0.68	mΩ
R _{thJC}	thermal resistance junction to case)				0.14	K/W
R _{thCH}	thermal resistance case to heatsing				0.040		K/W
P _{tot}	total power dissipation		$T_{C} = 25^{\circ}C$			820	W
I _{TSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			9.20	k/
- 1 3 M	ū	t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			9.94	k/
		t = 10 ms; (50 Hz), sine	T _{v.i} = 140°C			7.82	k/
		t = 8.3 ms; (60 Hz), sine	$V_R = 0 V$			8.45	k.A
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			423.2	kA ² s
	value ter teening	t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			410.6	kA ² s
		t = 3.3 ms; (50 Hz), sine t = 10 ms; (50 Hz), sine	$T_{VJ} = 140^{\circ}C$			305.8	kA ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			296.7	kA ² s
<u> </u>	junction capacitance	$V_{\rm B} = 400 \text{V} \text{f} = 1 \text{MHz}$	$V_R = 0 V$ $T_{VJ} = 25^{\circ}C$		438	290.7	
C _J	· · · · · · · · · · · · · · · · · · ·		$T_{VJ} = 25 \text{ C}$ $T_{C} = 140 ^{\circ}\text{C}$		430	120	pF W
P_{GM}	max. gate power dissipation	t _P = 30 μs	1 _C = 140 C			60	W
D		$t_{P} = 500 \mu s$					ļ
P _{GAV}	average gate power dissipation	T 44000 f 50 Hz				20	W
(di/dt) _{cr}	critical rate of rise of current	$T_{VJ} = 140 ^{\circ}\text{C}; f = 50 \text{Hz}$ repetitive, $I_{T} = 860 \text{A}$ $t_{P} = 200 \mu\text{s}; di_{G}/dt = 1 \text{A/}\mu\text{s};$				100	A/µs
						500	
			on-repet., $I_T = 250 \text{ A}$				A/µs
(dv/dt) _{cr}	critical rate of rise of voltage	$V = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140$ °C			1000	V/μs
		R _{GK} = ∞; method 1 (linear volta					<u> </u>
V_{GT}	gate trigger voltage	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			2	٧
			$T_{VJ} = -40$ °C			3	٧
I _{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			150	m <i>P</i>
			$T_{VJ} = -40$ °C			220	m <i>P</i>
V_{GD}	gate non-trigger voltage	$V_D = \frac{2}{3} V_{DRM}$	$T_{VJ} = 140^{\circ}C$			0.25	٧
I_{GD}	gate non-trigger current					10	m <i>P</i>
I _L	latching current	t _p = 30 μs	$T_{VJ} = 25 \degree C$			200	m <i>P</i>
		$I_G = 0.45 A; di_G/dt = 0.45 A/\mu s$	S				
I _H	holding current	V _D = 6 V R _{GK} = ∞	$T_{VJ} = 25 ^{\circ}C$			150	m <i>P</i>
t _{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{VJ} = 25^{\circ}C$			2	με
		$I_G = 1 \text{ A}; \text{ di}_G/\text{dt} = 1 \text{ A}/\mu \text{s}$					
t _q	turn-off time	$V_R = 100 \text{ V}; I_T = 300 \text{ A}; V = \frac{2}{3}$			200		με
•	$di/dt = 10 \text{ A/}\mu\text{s} \text{ dv/dt} = 50 \text{ V/}\mu\text{s} \text{ t}_p = 200 \mu\text{s}$						



Package Y1			Ratings				
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I _{RMS}	RMS current	per terminal				600	Α
T _{VJ}	virtual junction temperature			-40		140	°C
T _{op}	operation temperature			-40		125	°C
T _{stg}	storage temperature		-40		125	°C	
Weight					680		g
M _D	mounting torque			4.5		7	Nm
$\mathbf{M}_{\scriptscriptstyleT}$	terminal torque			11		13	Nm
d _{Spp/App}	creepage distance on surface striking distance through a	terminal to terminal	16.0			mm	
d _{Spb/Apb}	creepage distance on surface s	unking distance unough an	terminal to backside	16.0			mm
V _{ISOL}	isolation voltage	t = 1 second		3600			٧
1002	t = 1 minute		50/60 Hz, RMS; IsoL ≤ 1 mA	3000			٧



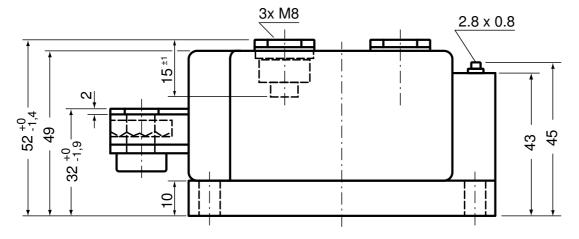
Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

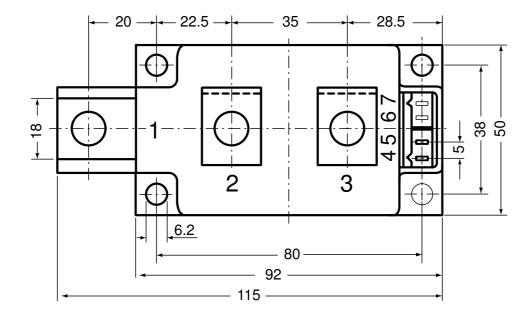
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MCD255-18io1	MCD255-18io1	Box	3	461830

Equiva	alent Circuits for	Simulation	* on die level	$T_{VJ} = 140 ^{\circ}\text{C}$
$I \rightarrow V_0$	R_0	Thyristor		
V _{0 max}	threshold voltage	8.0		V
$R_{0 \text{ max}}$	slope resistance *	0.5		$m\Omega$



Outlines Y1



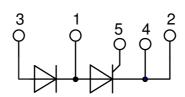


Optional accessories for modules

. Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red

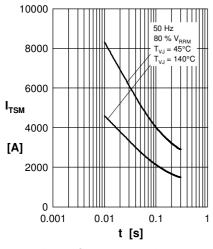
Type ZY 180L (L = Left for pin pair 4/5) Type ZY 180R (R = Right for pin pair 6/7)

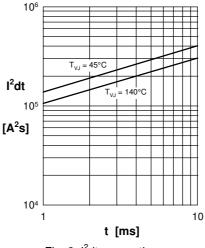
UL 758, style 3751





Thyristor





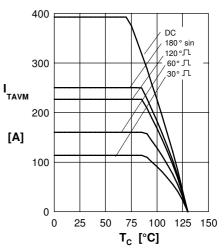
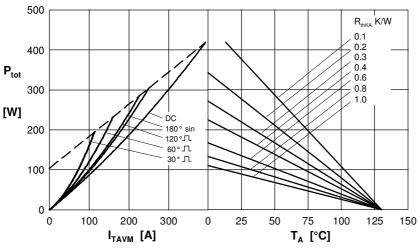


Fig. 1 Surge overload current $I_{T(F)SM}$: Crest value, t: duration

Fig. 2 I²dt versus time

Fig. 3 Max. forward current at case temperature



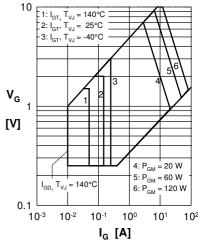
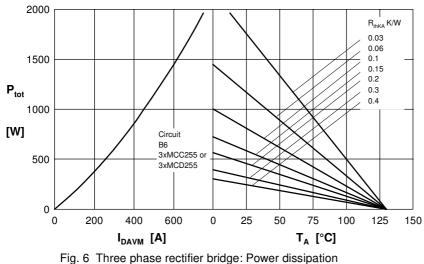
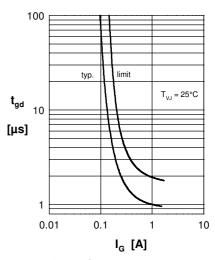


Fig. 4 Power dissipation versus on-state current and ambient temperature (per thyristor or diode)

Fig. 5 Surge overload current $I_{T(F)SM}$: Crest value, t: duration





vs. direct output current and ambient temperature

Fig. 7 Gate trigger delay time



Rectifier

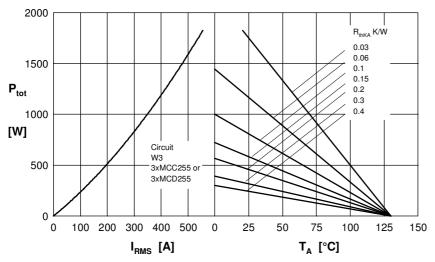


Fig. 8 Three phase AC-controller: Power dissipation versus $R_{\rm MS}$ output current and ambient temperature

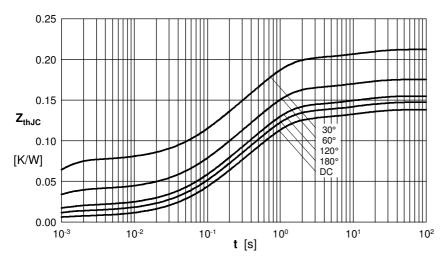
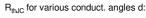


Fig. 9 Transient thermal impedance junction to case (per thyristor/diode)



d	R _{thJC} [K/W]
DC	0.139
180°	0.148
120°	0.156
60°	0.176
30°	0.214

Constants for $Z_{th,JC}$ calculation:

i	R _{thi} [K/W]	t _i [s]
1	0.0066	0.0005
2	0.0358	0.098
3	0.0831	0.54
4	0.0129	12

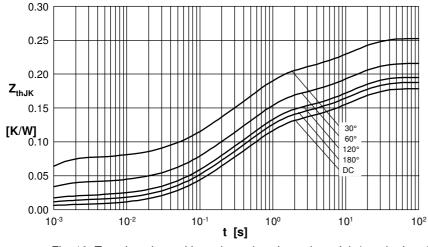


Fig. 10 Transient thermal impedance junction to heatsink (per thyristor/diode)

 $\boldsymbol{R}_{\text{thJK}}$ for various conduct. angles d:

d	R _{thJK} [K/W]
DC	0.179
180°	0.188
120°	0.196
60°	0.216
30°	0.254

Constants for Z_{thJK} calculation:

i	R _{thi} [K/W]	t _i [s]
1	0.0066	0.00054
2	0.0358	0.098
3	0.0831	0.54
4	0.0129	12
5	0.04	12