imall

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!



Contact us

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MCD132-14io1

=

=

 V_{RRM}

I TAV

Vτ

 $= 2 \times 1400 \text{ V}$

130 A

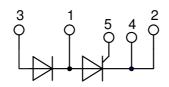
1.08 V

Thyristor \ Diode Module

Part number MCD132-14io1



Backside: isolated **E**72873



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: Y4

- 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 60747and per semiconductor unless otherwise specified

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MCD132-14io1

Rectifier				1	Ratings	>	1
Symbol	Definition	Conditions		min.	typ.	max.	Uni
V _{RSM/DSM}	max. non-repetitive reverse/forwa	ard blocking voltage	$T_{vJ} = 25^{\circ}C$			1500	١
V _{RRM/DRM}	max. repetitive reverse/forward b		$T_{vJ} = 25^{\circ}C$			1400	١
R/D	reverse current, drain current	$V_{R/D} = 1400 V$	$T_{vJ} = 25^{\circ}C$			200	μA
		$V_{R/D} = 1400 V$	$T_{vJ} = 125^{\circ}C$			10	mA
V _T	forward voltage drop	$I_{T} = 150 \text{ A}$	$T_{vJ} = 25^{\circ}C$			1.14	V
		$I_{T} = 300 \text{ A}$				1.36	V
		$I_{T} = 150 \text{ A}$	$T_{vJ} = 125^{\circ}C$			1.08	V
		$I_{T} = 300 \text{ A}$				1.36	V
ITAV	average forward current	$T_c = 85^{\circ}C$	T _{vJ} = 125°C			130	A
T(RMS)	RMS forward current	180° sine				300	A
V _{T0}	threshold voltage		T _{vJ} = 125°C			0.80	V
r _T	slope resistance } for power l	oss calculation only				1.5	mΩ
R _{thJC}	thermal resistance junction to cas	Se				0.23	K/W
R _{thCH}	thermal resistance case to heatsi				0.100		K/W
P _{tot}	total power dissipation		$T_c = 25^{\circ}C$			435	W
ITSM	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{v,l} = 45^{\circ}C$			4.75	kА
		t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			5.13	kА
		t = 10 ms; (50 Hz), sine	T _{v.i} = 125°C			4.04	kА
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			4.36	kА
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{\rm VJ} = 45^{\circ}\rm C$			112.8	kA ² s
	C C	t = 8,3 ms; (60 Hz), sine	$V_{R} = 0 V$			109.5	kA ² s
		t = 10 ms; (50 Hz), sine	T _{v.i} = 125°C			81.6	kA ² s
		t = 8,3 ms; (60 Hz), sine	$V_{\rm R} = 0 V$			79.1	kA ² s
C	junction capacitance	$V_{\rm B} = 400 V f = 1 \text{ MHz}$	$\frac{T_{\rm H}}{T_{\rm VJ}} = 25^{\circ}\rm C$		211		pF
P _{GM}	max. gate power dissipation	$t_{\rm P} = 30\mu{\rm s}$	$T_c = 125^{\circ}C$			120	W
• GM		t _P = 500 μs				60	w
P _{GAV}	average gate power dissipation	ι,= 000 μο				8	w
(di/dt) _{cr}	critical rate of rise of current	T _{v.I} = 125°C; f = 50 Hz re	epetitive, $I_{T} = 500 \text{ A}$			150	A/μs
(ui/ut) _{cr}		$t_{P} = 200 \mu s; di_{G}/dt = 0.5 A/\mu s; -$	•			150	πμε
			pn-repet., $I_{\tau} = 160 \text{ A}$			500	A/μs
(d) (d+)	critical rate of rise of voltage	$V = \frac{2}{3} V_{\text{DRM}}$	$T_{v_1} = 125^{\circ}C$				i
(dv/dt) _{cr}	Childai fale of fise of voltage	5111				1000	ν/με
<u></u>	gate trigger voltage	$R_{GK} = \infty$; method 1 (linear volta				0.5	v
V _{GT}	gale ingger vollage	$V_{\rm D} = 6 V$	$T_{vJ} = 25^{\circ}C$			2.5	-
		N/ 0.1/	$T_{VJ} = -40 ^{\circ}C$			2.6	V
I _{GT}	gate trigger current	$V_D = 6 V$	$T_{VJ} = 25^{\circ}C$			150	mA
			$T_{VJ} = -40^{\circ}C$			200	mA
V _{gd}	gate non-trigger voltage	$V_{D} = \frac{2}{3} V_{DRM}$	$T_{vJ} = 125^{\circ}C$			0.2	V
	gate non-trigger current					10	mA
I.	latching current	$t_p = 30 \ \mu s$	$T_{vJ} = 25 \degree C$			300	mA
	haldbar and	$I_{\rm g} = 0.5 \rm{A}; di_{\rm g}/dt = 0.5 \rm{A}/\mu s$				000	-
I _H	holding current	$V_{\rm D} = 6 \ V \ R_{\rm GK} = \infty$	$T_{VJ} = 25 \degree C$			200	mA
t _{gd}	gate controlled delay time	$V_D = \frac{1}{2} V_{DRM}$	$T_{vJ} = 25 \degree C$			2	μs
		$I_{\rm G} = 0.5 \text{A}; di_{\rm G}/dt = 0.5 \text{A}/\mu \text{s}$					1 1 1
tq	turn-off time	$V_{R} = 100 \text{ V}; I_{T} = 160 \text{ A}; \text{ V} = \frac{2}{3}$			150		μs
		$di/dt = 10 \text{ A}/\mu \text{s} dv/dt = 20 \text{ V}.$	/μs_t _p = 200 μs				1

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MCD132-14io1

Package Y4			Ratings		6			
Symbol	Definition	Conditions			min.	typ.	max.	Unit
	RMS current	per terminal					300	Α
T _{vj}	virtual junction temperature				-40		125	°C
T _{op}	operation temperature				-40		100	°C
T _{stg}	storage temperature				-40		125	°C
Weight						150		g
M _D	mounting torque				2.25		2.75	Nm
M _T	terminal torque				4.5		5.5	Nm
d _{Spp/App}	creenade distance on surfa	ce / striking distance through air	terminal to terminal	14.0	10.0			mm
d _{Spb/Apb}	creepage distance on surface striking distance through air		terminal to backside	16.0	16.0			mm
V	isolation voltage	t = 1 second			3600			V
	t = 1 min		50/60 Hz, RMS; liso∟ ≤ 1 mA		3000			V

<u> </u>			
Date Code (DC) + Production Index (PI)	UXYS N yywwAA Part Number Lot.No: xxxxxx	Circuit	

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	MCD132-14io1	MCD132-14io1	Box	6	430617

Equiv	alent Circuits for	Simulation	* on die level	T _{vj} = 125 °C
) R	Thyristor		
V _{0 max}	threshold voltage	0.8		V
$\mathbf{R}_{0 \max}$	slope resistance *	0.8		mΩ

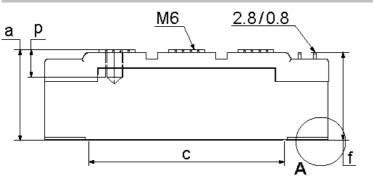
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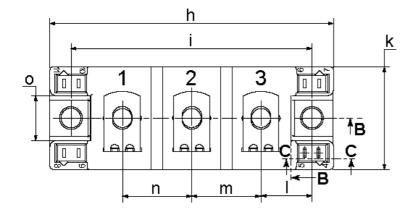
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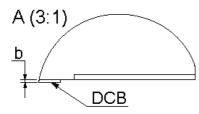
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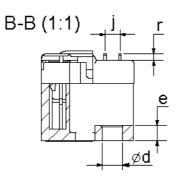
Outlines Y4





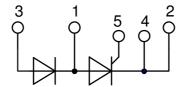
	MIN	MAX	MIN	MAX
Dim.	[mm]	[mm]	[inch]	[inch]
а	30.0	30.6	1.181	1.205
b	typ.	0.25	typ. (0.010
с	64.0	65.0	2.520	2.559
d	6.5	7.0	0.256	0.275
е	4.9	5.1	0.193	0.201
f	28.6	29.2	1.126	1.150
g	7.3	7.7	0.287	0.303
h	93.5	94.5	3.681	3.720
i	79.5	80.5	3.130	3.169
j	4.8	5.2	0.189	0.205
k	33.4	34.0	1.315	1.339
	16.7	17.3	0.657	0.681
m	22.7	23.3	0.894	0.917
n	22.7	23.3	0.894	0.917
0	14.0	15.0	0.551	0.591
р	typ.	10.5	typ. (0.413
r	1.8	2.4	0.071	0.041





C-C (1:1)





Thyristor

MCD132-14io1

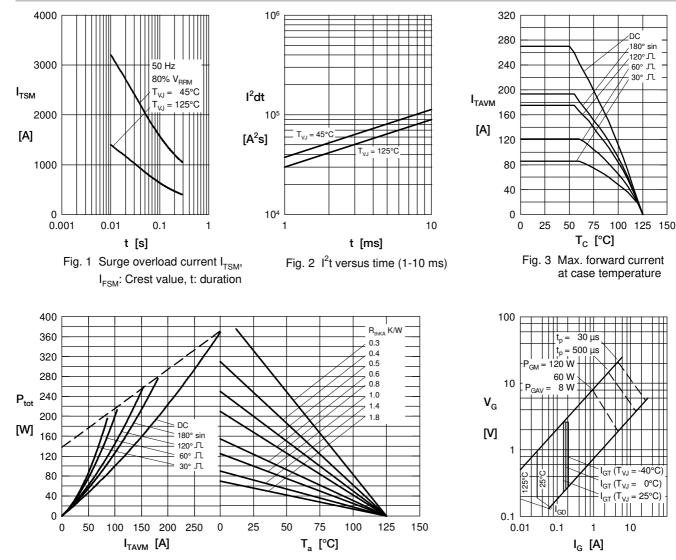


Fig. 4 Power dissipation vs. on-state current & ambient temperature (per thyristor or diode)

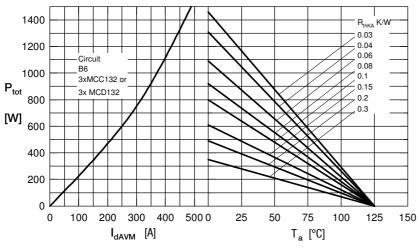


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

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10

40°C

Fig. 5 Gate trigger characteristics

100

10

0.1

0.01

0.1

1 I_G [A]

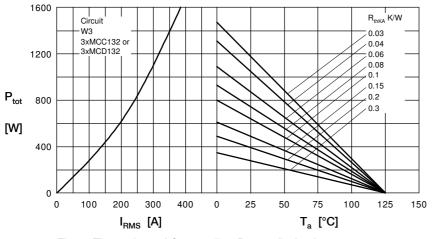
Fig. 7 Gate trigger delay time

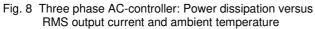
 t_{gd}

[µs] 1

MCD132-14io1

Rectifier





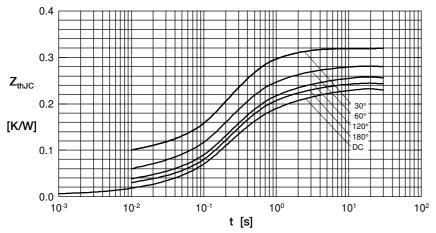
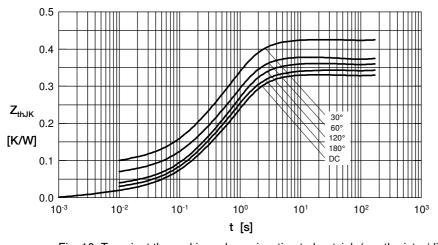


Fig. 9 Transient thermal impedance junction to case (per thyristor/diode)



 R_{thJK} for various conduction angles d: d R_{thJK} [K/W]

 $\mathsf{R}_{\mathsf{thJC}}$ for various conduction angles d:

d

DC

180°

120°

60°

30°

i R_{thi} [K/W]

1 2

3

0.0095

0.0175

0.2030

R_{thJC} [K/W]

0.230

0.244

0.255

0.283

0.321

t_i [s]

0.001

0.065

0.400

Constants for Z_{thJC} calculation:

DC	0.330	
180°	0.344	
120°	0.355	
60°	0.383	
30°	0.421	

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

i	R _{thi} [K/W]	t _i [s]
1	0.0095	0.001
2	0.0175	0.065
3	0.2030	0.400
4	0.1000	1.290

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

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