

# High Voltage Standard Rectifier Module

$$V_{RRM} = 2 \times 2200 \text{ V}$$

$$I_{FAV} = 50 \text{ A}$$

$$V_F = 1.09 \text{ V}$$

Phase leg

Part number

**MDNA50P2200TG**



Backside: isolated

 E72873



## Features / Advantages:

- Package with DCB ceramic
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current

## Applications:

- Diode for main rectification
- For single and three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

## Package: TO-240AA

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Height: 30 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

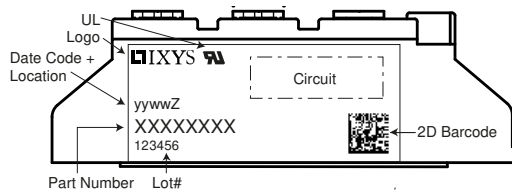
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					2300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					2200	V
$I_R$	reverse current	$V_R = 2200$ V	$T_{VJ} = 25^\circ\text{C}$			50	$\mu\text{A}$
		$V_R = 2200$ V	$T_{VJ} = 150^\circ\text{C}$			1.5	mA
$V_F$	forward voltage drop	$I_F = 50$ A	$T_{VJ} = 25^\circ\text{C}$			1.13	V
		$I_F = 100$ A				1.34	V
		$I_F = 50$ A	$T_{VJ} = 125^\circ\text{C}$			1.09	V
		$I_F = 100$ A				1.37	V
$I_{FAV}$	average forward current	$T_C = 100^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$ d = 0.5			50	A
$V_{FO}$	threshold voltage	} for power loss calculation only				0.80	V
$r_F$	slope resistance					5.7	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					0.65	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.2		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		190	W
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			850	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			920	A
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			725	A
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			780	A
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			3.62	kA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			3.52	kA <sup>2</sup> s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			2.63	kA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			2.53	kA <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400$ V; f = 1 MHz		$T_{VJ} = 25^\circ\text{C}$		27	pF



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		150	°C	
$T_{op}$	operation temperature		-40		125	°C	
$T_{stg}$	storage temperature		-40		125	°C	
<b>Weight</b>					76	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		4800		V	
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	4000		V	



**Part description**

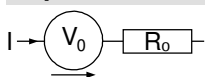
- M = Module
- D = Diode
- N = High Voltage Standard Rectifier
- A = ( $\geq 2000V$ )
- 50 = Current Rating [A]
- P = Phase leg
- 2200 = Reverse Voltage [V]
- TG = TO-240AA

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDNA50P2200TG	MDNA50P2200TG	Box	36	525439

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 150^{\circ}C$



**Rectifier**

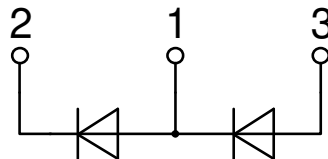
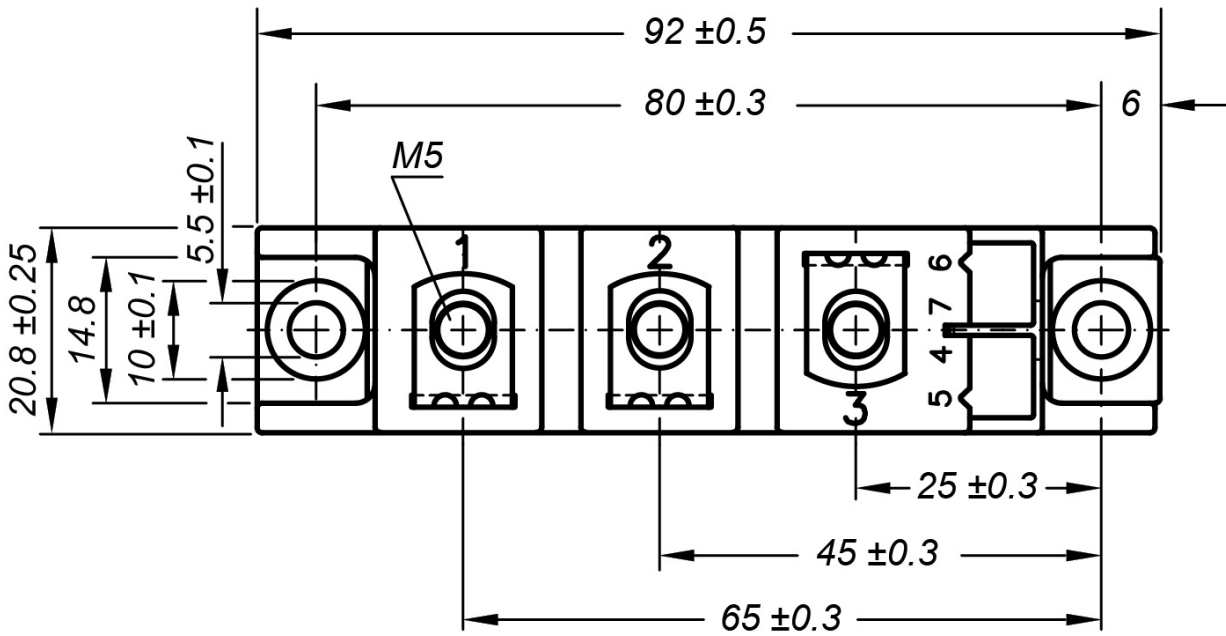
$V_{0\ max}$	threshold voltage	0.8	V
$R_{0\ max}$	slope resistance *	4.5	mΩ



Outlines TO-240AA



General tolerance: DIN ISO 2768 class „c“



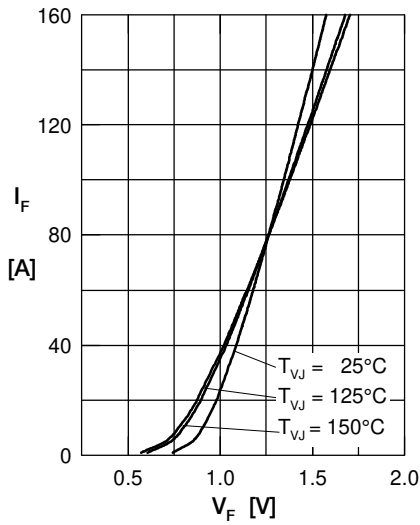
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

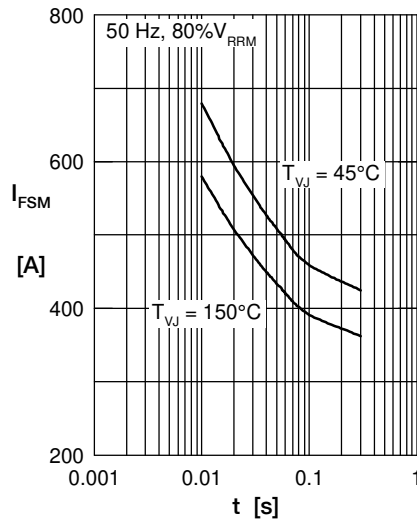


Fig. 2 Surge overload current vs. time per diode

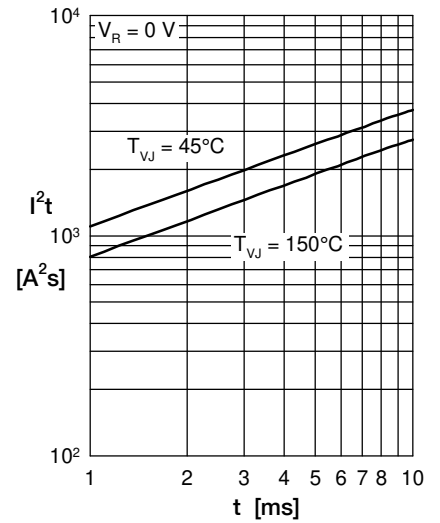
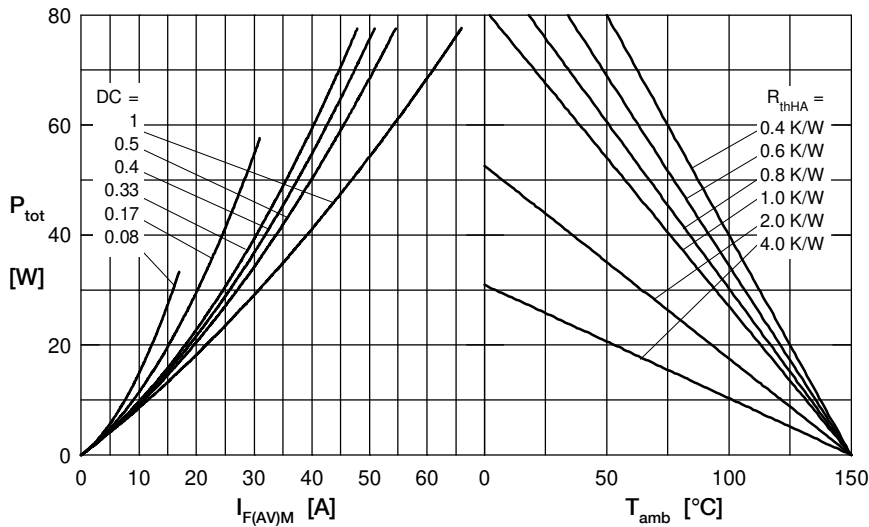

 Fig. 3  $I^2t$  versus time per diode


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

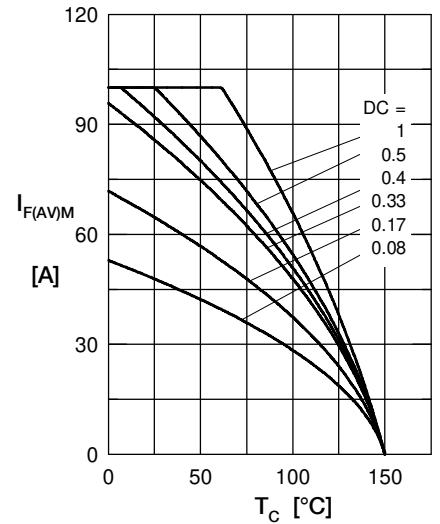


Fig. 5 Max. forward current vs. case temperature per diode

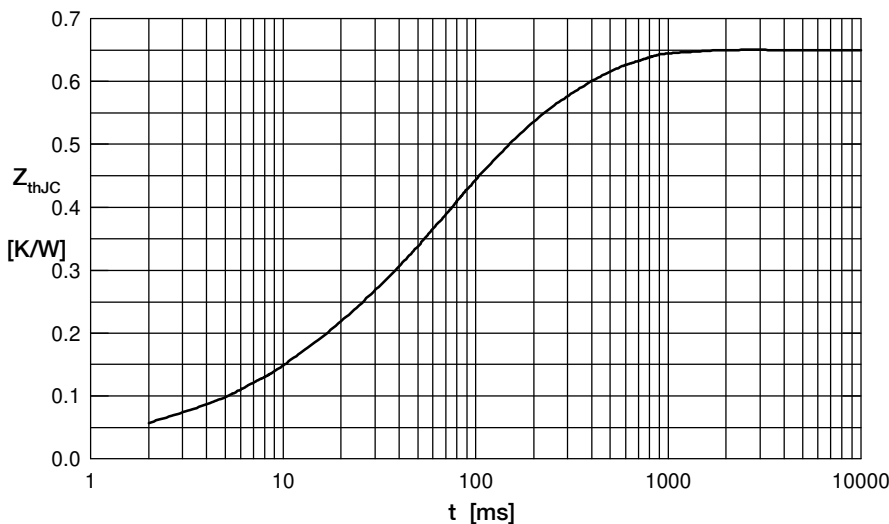


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.032	0.001
2	0.098	0.010
3	0.305	0.060
4	0.215	0.270