

High Voltage Standard Rectifier Module

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

$$I_{FAV} = 140 \text{ A}$$

$$V_F = 1.11 \text{ V}$$

Phase leg

Part number

MDNA140P2200TG



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		$T_{VJ} = 25^\circ\text{C}$		100	μA
		$V_R = 2200$ V		$T_{VJ} = 150^\circ\text{C}$		3.5	mA
V_F	forward voltage drop	$I_F = 140$ A		$T_{VJ} = 25^\circ\text{C}$		1.18	V
		$I_F = 280$ A				1.43	V
		$I_F = 140$ A		$T_{VJ} = 125^\circ\text{C}$		1.11	V
		$I_F = 280$ A				1.41	V
I_{FAV}	average forward current	$T_C = 100^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		140	A
		rectangular	d = 0.5				
V_{FO}	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.78	V
r_F	slope resistance	} for power loss calculation only				2.2	m Ω
R_{thJC}	thermal resistance junction to case					0.23	K/W
R_{thCH}	thermal resistance case to heatsink				0.2		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		540	W
I_{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		2.80	kA
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		3.03	kA
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		2.38	kA
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		2.57	kA
I^2t	value for fusing	t = 10 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		39.2	kA ² s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		38.1	kA ² s
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		28.3	kA ² s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		27.5	kA ² s
C_J	junction capacitance	$V_R = 400$ V; f = 1 MHz		$T_{VJ} = 25^\circ\text{C}$		116	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	
Weight					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 = ($\geq 2000V$)
- 140 = 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	MDNA140P2200TG	MDNA140P2200TG	Box	36	512934

Equivalent Circuits for Simulation

* on die level

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



Rectifier

$V_{0\ max}$	threshold voltage	0.78	V
$R_{0\ max}$	slope resistance *	1	mΩ



Outlines TO-240AA



General tolerance: DIN ISO 2768 class „c“



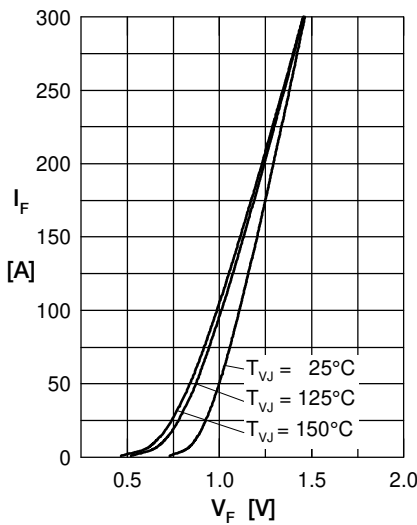
Rectifier


Fig. 1 Forward current versus voltage drop per diode



Fig. 2 Surge overload current vs. time per diode

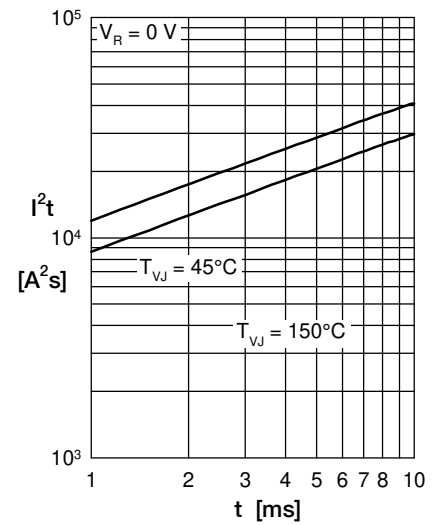
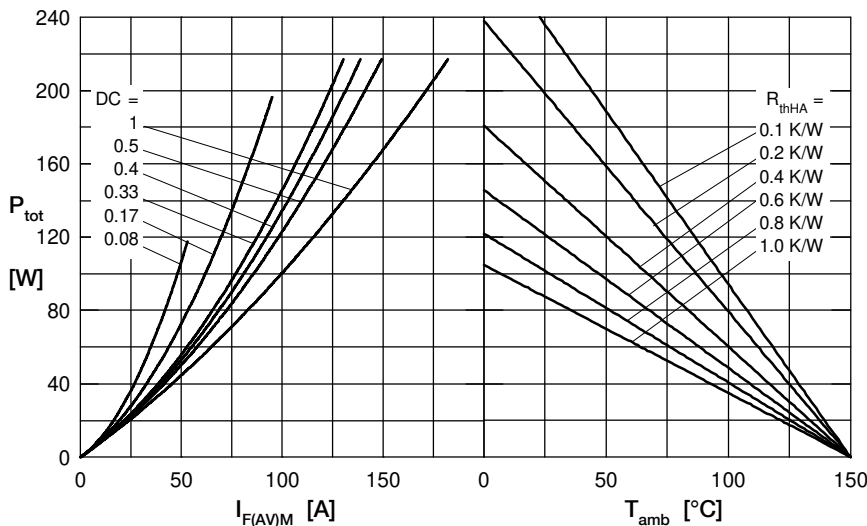

 Fig. 3 I^2t versus time per diode


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

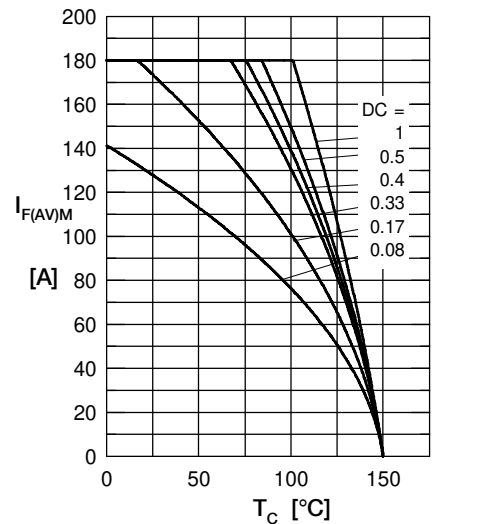


Fig. 5 Max. forward current vs. case temperature per diode

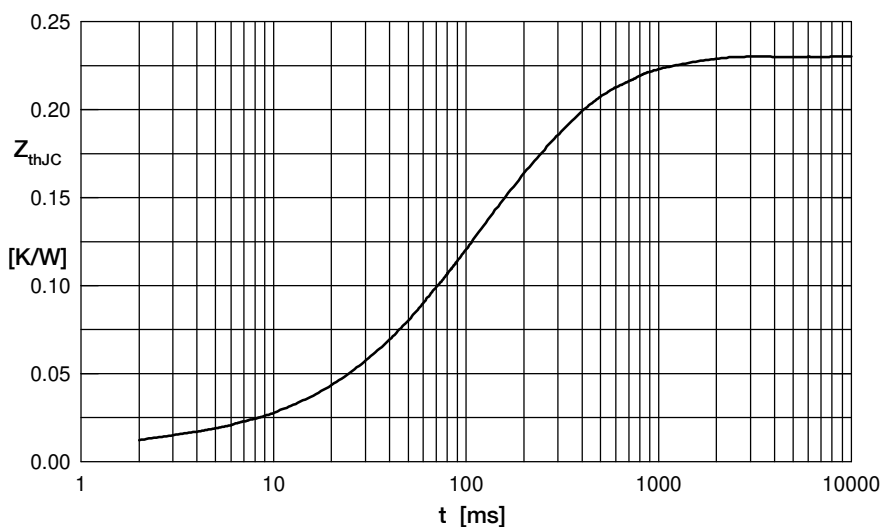


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.01	0.001
2	0.05	0.050
3	0.12	0.150
4	0.05	0.500