

High Voltage Standard Rectifier Module

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

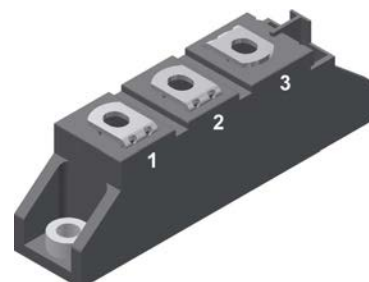
$$I_{FAV} = 50 \text{ A}$$

$$V_F = 1,09 \text{ V}$$

Phase leg

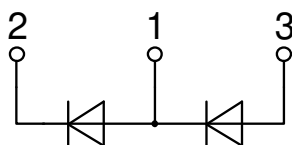
Part number

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

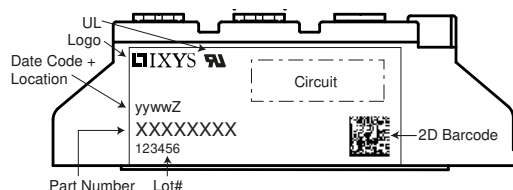
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	<i>max. non-repetitive reverse blocking voltage</i>	$T_{VJ} = 25^{\circ}\text{C}$				2300	V
V_{RRM}	<i>max. repetitive reverse blocking voltage</i>	$T_{VJ} = 25^{\circ}\text{C}$				2200	V
I_R	<i>reverse current</i>	$V_R = 2200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			50	μA
		$V_R = 2200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			1,5	mA
V_F	<i>forward voltage drop</i>	$I_F = 50\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1,13	V
		$I_F = 100\text{ A}$				1,34	V
		$I_F = 50\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1,09	V
		$I_F = 100\text{ A}$				1,37	V
I_{FAV}	<i>average forward current</i>	$T_C = 100^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$			50	A
V_{F0}	<i>threshold voltage</i>	} <i>for power loss calculation only</i>		$T_{VJ} = 150^{\circ}\text{C}$		0,80	V
r_F	<i>slope resistance</i>					5,7	m Ω
R_{thJC}	<i>thermal resistance junction to case</i>					0,65	K/W
R_{thCH}	<i>thermal resistance case to heatsink</i>				0,2		K/W
P_{tot}	<i>total power dissipation</i>	$T_C = 25^{\circ}\text{C}$				190	W
I_{FSM}	<i>max. forward surge current</i>	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			850	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			920	A
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			725	A
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			780	A
I^2t	<i>value for fusing</i>	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			3,62	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			3,52	kA ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			2,63	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			2,53	kA ² s
C_J	<i>junction capacitance</i>	$V_R = 400\text{ V}; f = 1\text{ MHz}$			27		pF



Package TO-240AA				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I _{RMS}	<i>RMS current</i>	per terminal				200	A
T _{VJ}	<i>virtual junction temperature</i>			-40		150	°C
T _{op}	<i>operation temperature</i>			-40		125	°C
T _{stg}	<i>storage temperature</i>			-40		125	°C
Weight					76		g
M _D	<i>mounting torque</i>			2,5		4	Nm
M _T	<i>terminal torque</i>			2,5		4	Nm
d _{Spp/App}	<i>creepage distance on surface striking distance through air</i>	<i>terminal to terminal</i>	13,0	9,7			mm
d _{Spb/Apb}		<i>terminal to backside</i>	16,0	16,0			mm
V _{ISOL}	<i>isolation voltage</i>	t = 1 second	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA		4800		V
		t = 1 minute			4000		V



Part description

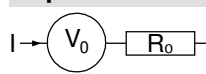
M = Module
D = Diode
N = High Voltage Standard Rectifier
A = ($\geq 2000V$)
50 = Current Rating [A]
P = Phase leg
2200 = Reverse Voltage [V]
TG = TO-240AA

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

Equivalent Circuits for Simulation

* on die level

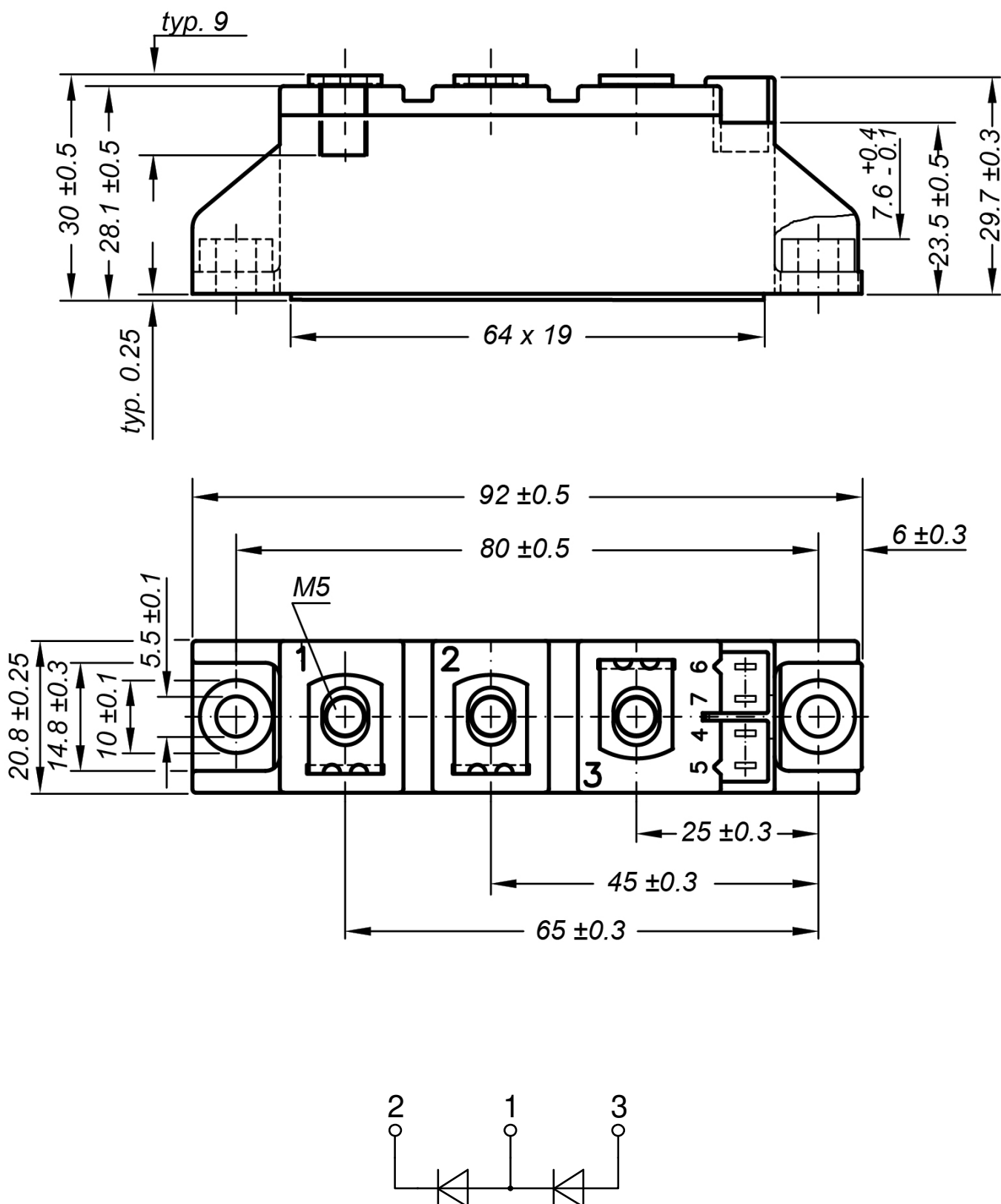
$T_{VJ} = 150^{\circ}C$



Rectifier

$V_{0\ max}$	threshold voltage	0,8	V
$R_{0\ max}$	slope resistance *	4,5	mΩ

Outlines TO-240AA



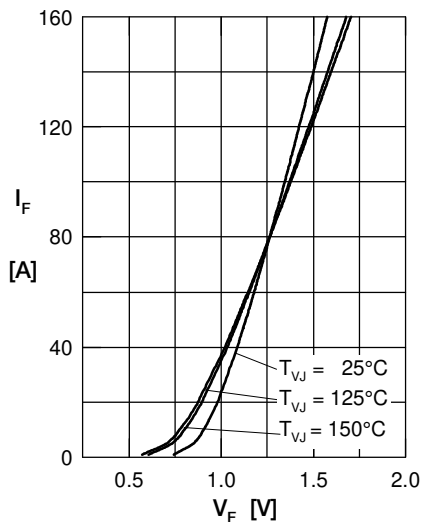
Rectifier


Fig. 1 Forward current versus voltage drop per diode

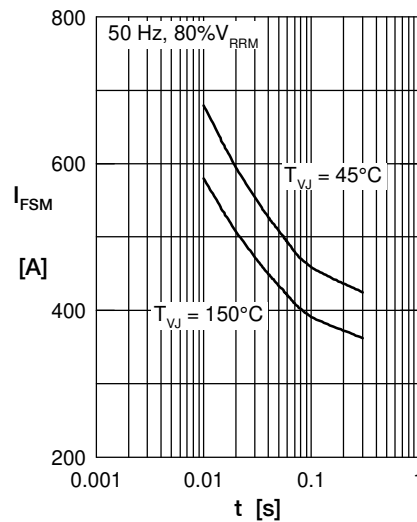


Fig. 2 Surge overload current vs. time per diode

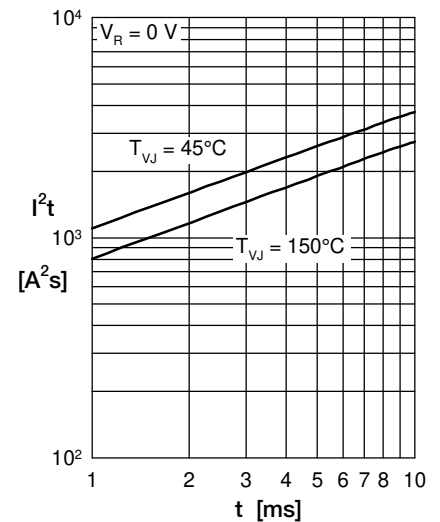
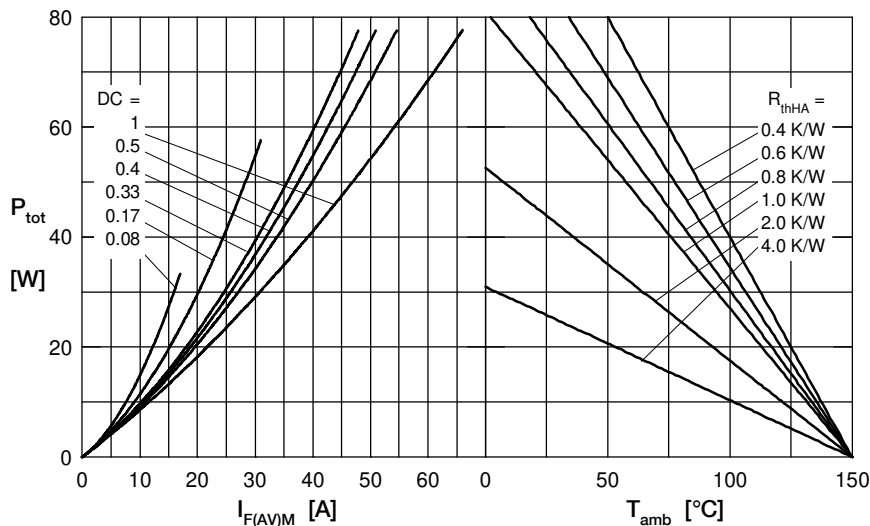

 Fig. 3 I^2t versus time per diode


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

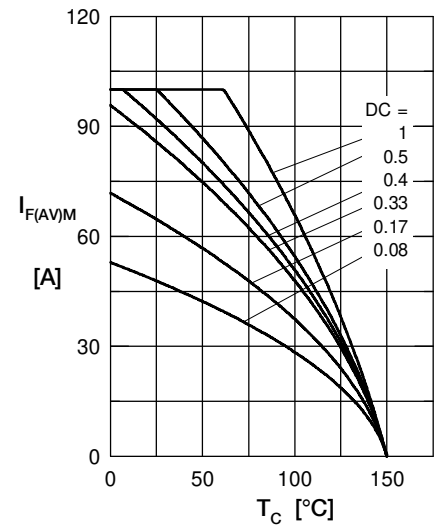


Fig. 5 Max. forward current vs. case temperature per diode

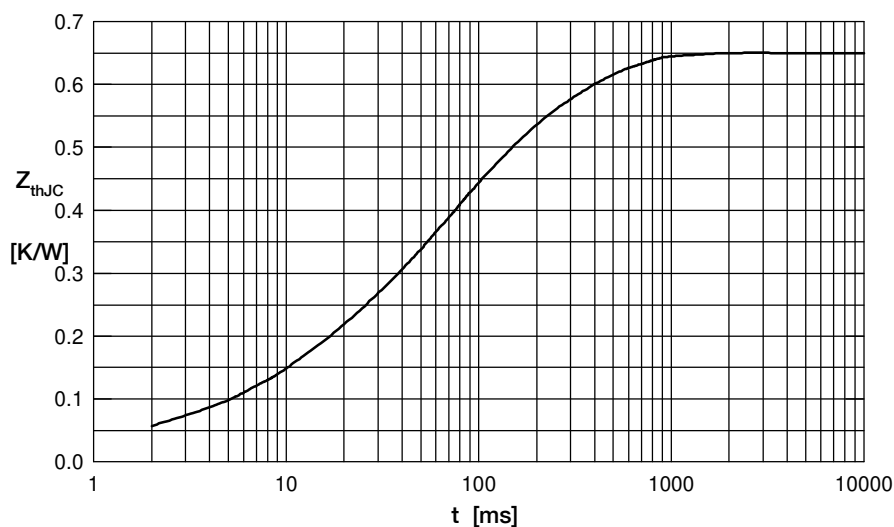


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 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