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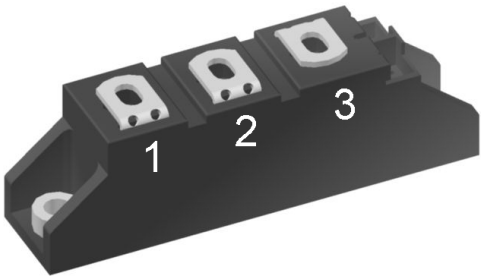
High Voltage Standard Rectifier Module

V_{RRM} = 2x 2200 V
I_{FAV} = 50 A
V_F = 1.09 V

Phase leg

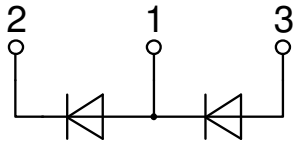
Part number

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*		T_{VJ} = 25°C			2300	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			2200	V
I_R	*reverse current*	V_R = 2200 V	T_{VJ} = 25°C			50	µA
		V_R = 2200 V	T_{VJ} = 150°C			1.5	mA
V_F	*forward voltage drop*	I_F = 50 A	T_{VJ} = 25°C			1.13	V
		I_F = 100 A				1.34	V
		I_F = 50 A	T_{VJ} = 125°C			1.09	V
		I_F = 100 A				1.37	V
I_{FAV}	*average forward current*	T_C = 100°C	T_{VJ} = 150°C			50	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0.80	V
r_F	*slope resistance* }					5.7	mΩ
R_{thJC}	*thermal resistance junction to case*					0.65	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.20		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			190	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°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°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°C			3.62	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			3.52	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			2.63	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			2.53	kA²s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		27		pF

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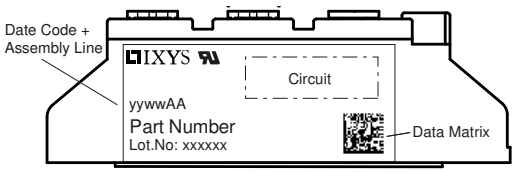
Package TO-240AA					Ratings			
Symbol	Definition	Conditions			min.	typ.	max.	Unit
I_{RMS}	*RMS current*	per terminal					200	A
T_{VJ}	*virtual junction temperature*				-40		150	°C
T_{op}	*operation temperature*				-40		125	°C
T_{stg}	*storage temperature*				-40		125	°C
Weight						76		g
M_D	*mounting 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	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA		4800			V
		t = 1 minute			4000			V



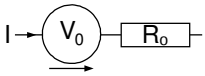
Part description

M = Module
D = Diode
N = High Voltage Standard Rectifier
A = (>= 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	

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150 °C



Rectifier

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

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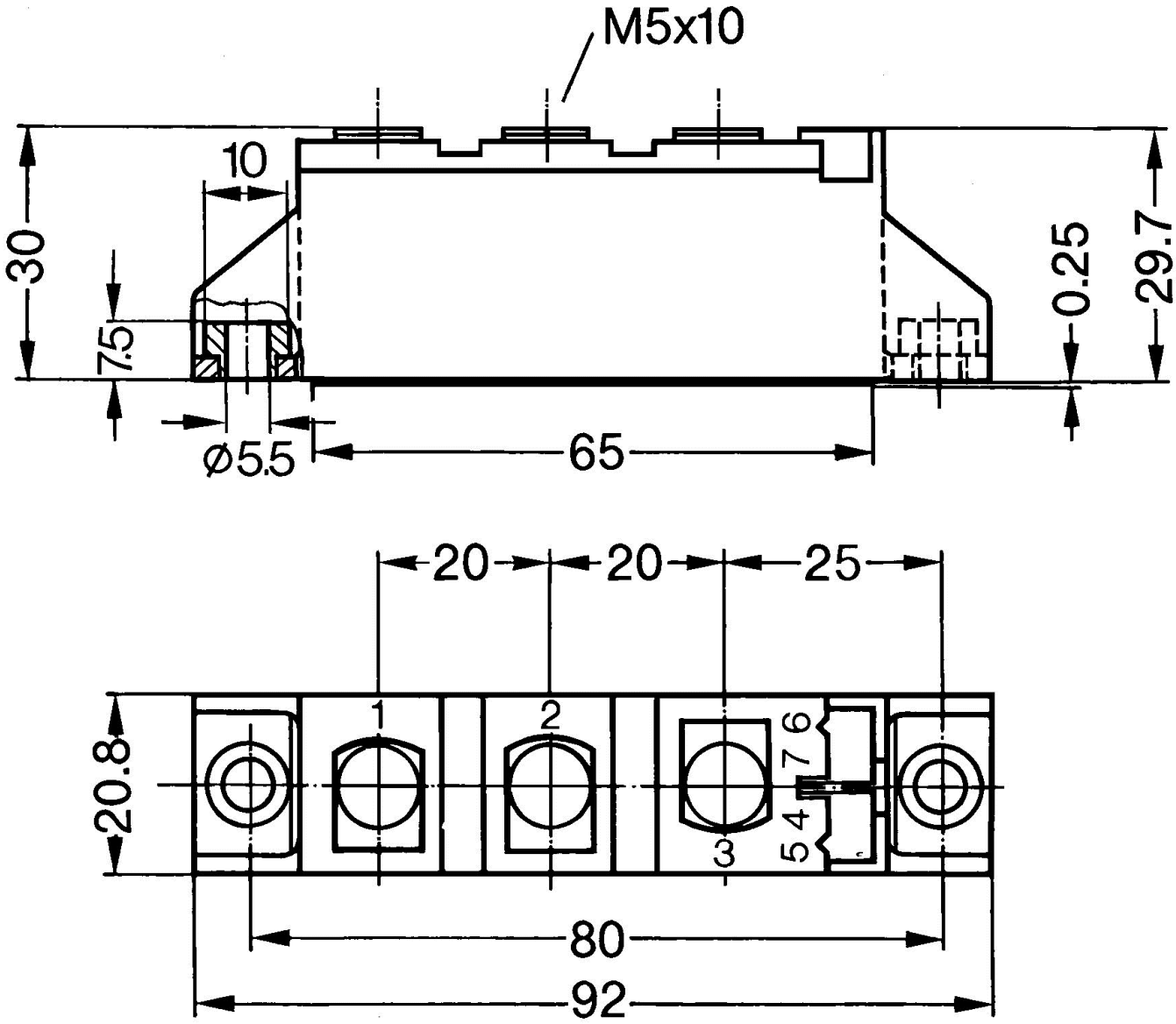
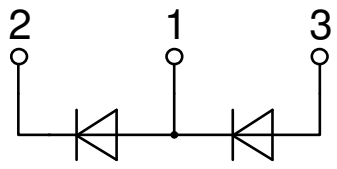
Outlines TO-240AA





Rectifier

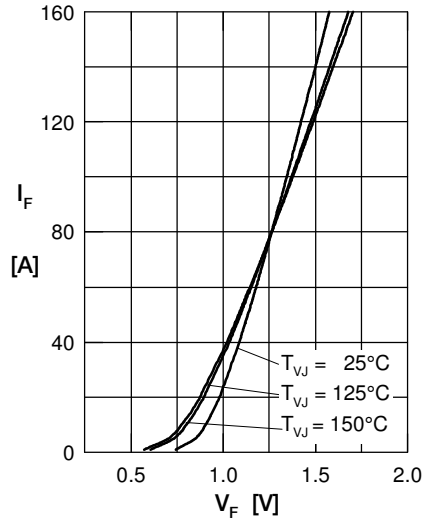


Fig. 1 Forward current versus voltage drop per diode

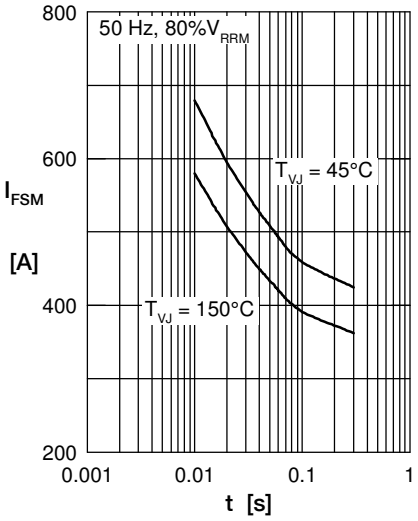


Fig. 2 Surge overload current vs. time per diode

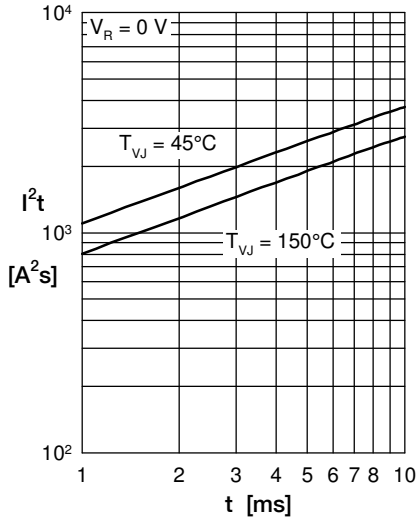


Fig. 3 I^2t versus time per diode

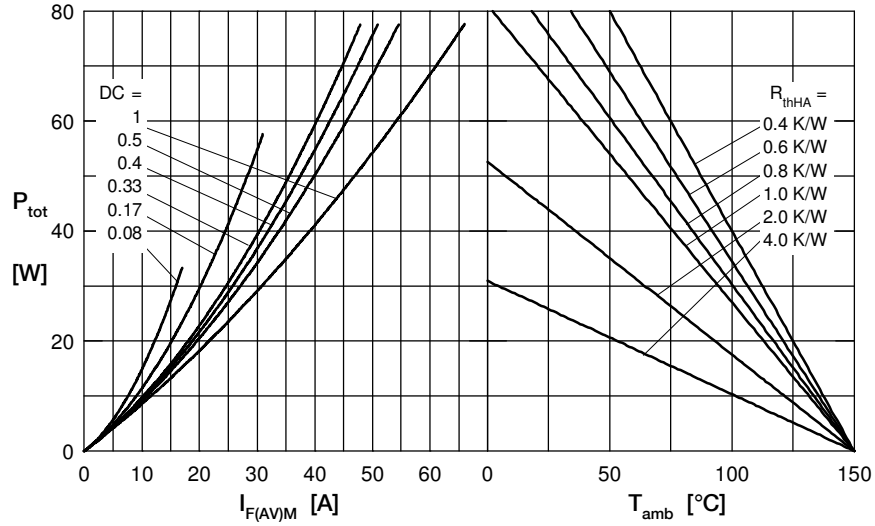


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

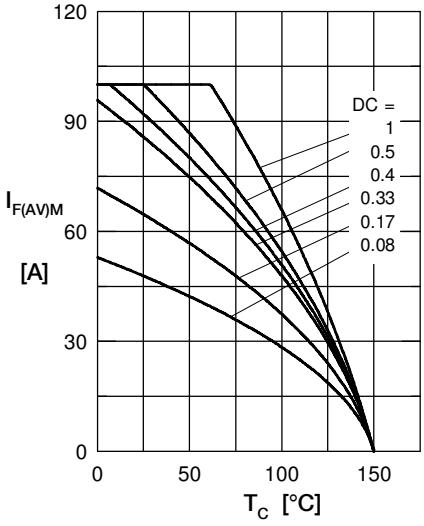


Fig. 5 Max. forward current vs. case temperature per diode

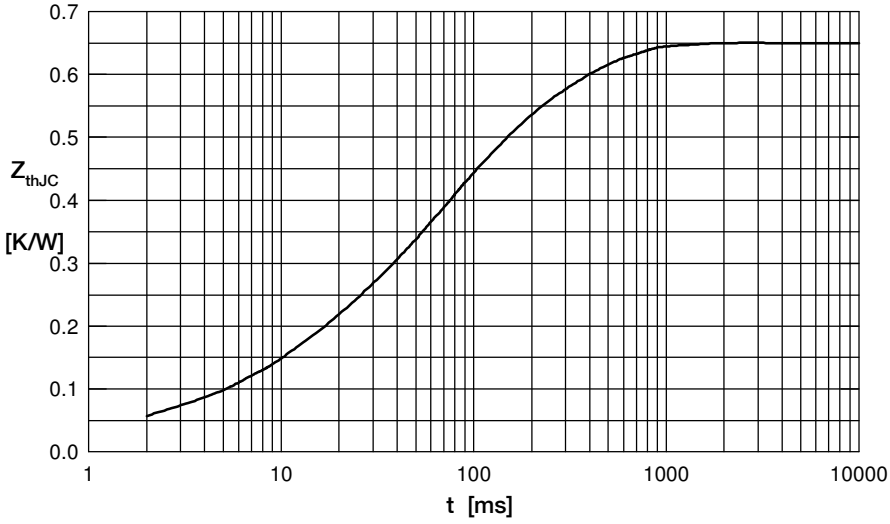


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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