

High Voltage Standard Rectifier Module

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

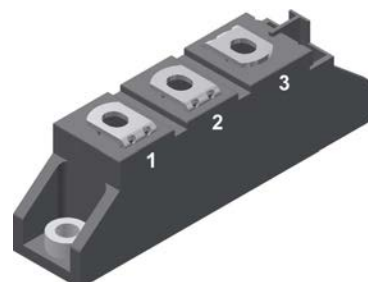
$$I_{FAV} = 140 \text{ A}$$

$$V_F = 1,11 \text{ V}$$

Phase leg

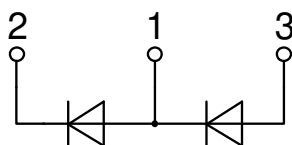
Part number

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

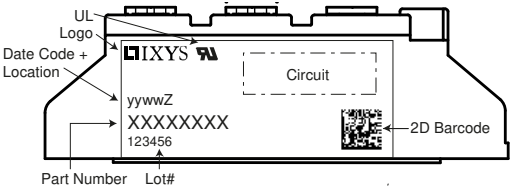
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	<i>max. non-repetitive reverse blocking voltage</i>	$T_{VJ} = 25^{\circ}\text{C}$				2300	V
V_{RRM}	<i>max. repetitive reverse blocking voltage</i>	$T_{VJ} = 25^{\circ}\text{C}$				2200	V
I_R	<i>reverse current</i>	$V_R = 2200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			100	μA
		$V_R = 2200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			3,5	mA
V_F	<i>forward voltage drop</i>	$I_F = 140\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1,18	V
		$I_F = 280\text{ A}$				1,43	V
		$I_F = 140\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1,11	V
		$I_F = 280\text{ A}$				1,41	V
I_{FAV}	<i>average forward current</i>	$T_C = 100^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$			140	A
V_{F0}	<i>threshold voltage</i>	} <i>for power loss calculation only</i>		$T_{VJ} = 150^{\circ}\text{C}$		0,78	V
r_F	<i>slope resistance</i>					2,2	m Ω
R_{thJC}	<i>thermal resistance junction to case</i>					0,23	K/W
R_{thCH}	<i>thermal resistance case to heatsink</i>				0,2		K/W
P_{tot}	<i>total power dissipation</i>	$T_C = 25^{\circ}\text{C}$				540	W
I_{FSM}	<i>max. forward surge current</i>	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			2,80	kA
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			3,03	kA
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			2,38	kA
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			2,57	kA
I^2t	<i>value for fusing</i>	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			39,2	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			38,1	kA ² s
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			28,3	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			27,5	kA ² s
C_J	<i>junction capacitance</i>	$V_R = 400\text{ V; } f = 1\text{ MHz}$			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	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA	4800			V
		t = 1 minute		4000			V



Part description

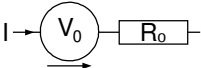
M = Module
D = Diode
N = High Voltage Standard Rectifier
A = ($\geq 2000V$)
140 = Current Rating [A]
P = Phase leg
2200 = Reverse Voltage [V]
TG = TO-240AA

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDNA140P2200TG	MDNA140P2200TG	Box	36	512934

Equivalent Circuits for Simulation

* on die level

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



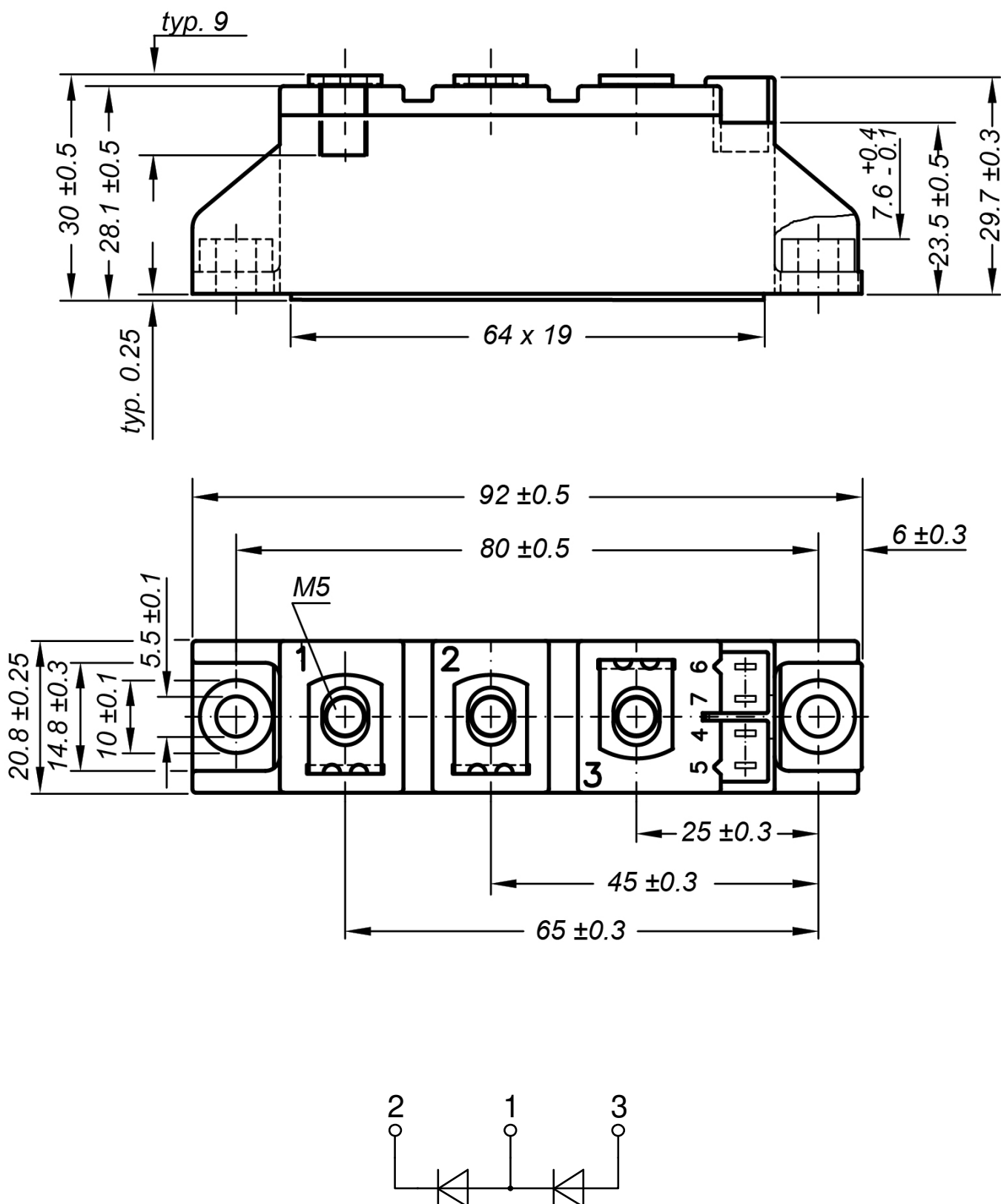
Rectifier

$V_{0\ max}$
threshold voltage
0,78
V

$R_{0\ max}$
*slope resistance **
1
mΩ



Outlines TO-240AA



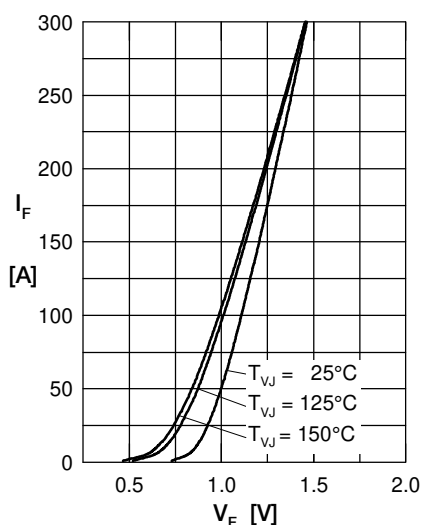
Rectifier


Fig. 1 Forward current versus voltage drop per diode

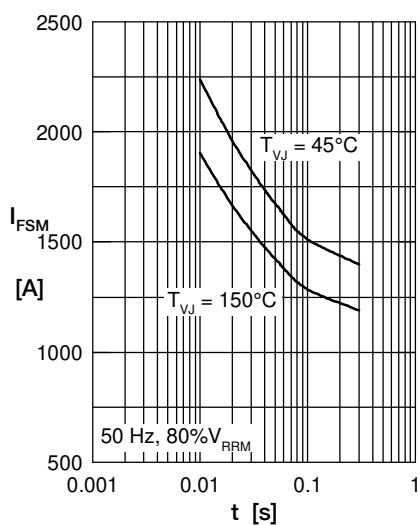


Fig. 2 Surge overload current vs. time per diode

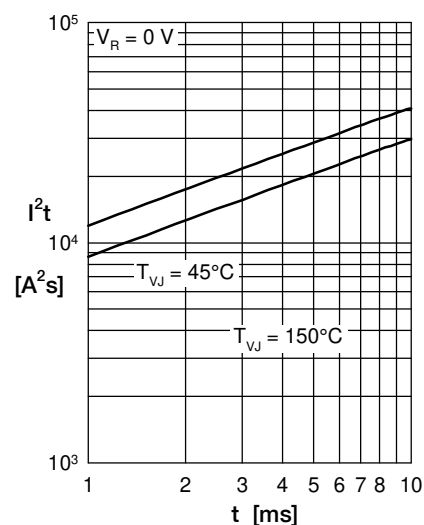
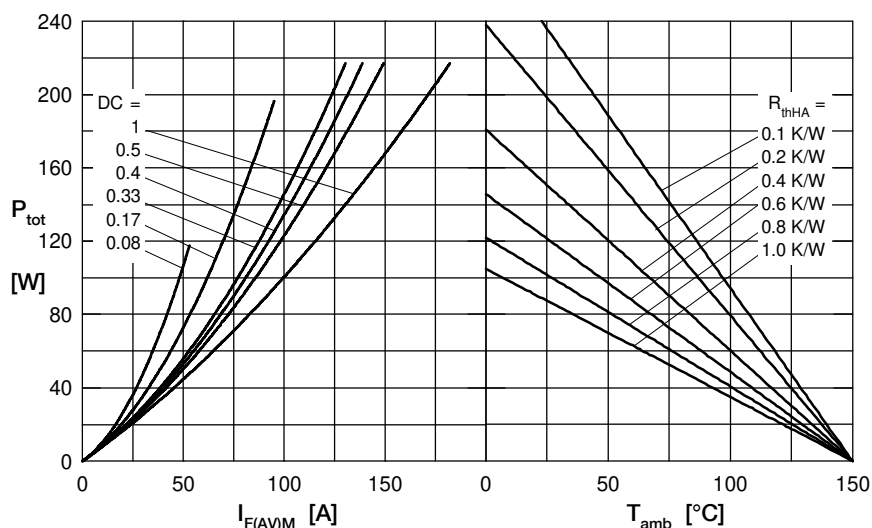

 Fig. 3 I^2t versus time per diode


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

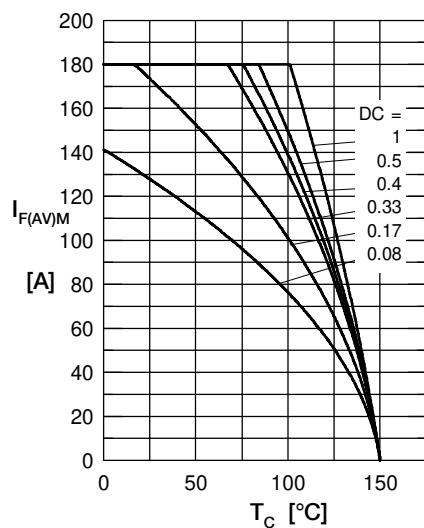


Fig. 5 Max. forward current vs. case temperature per diode

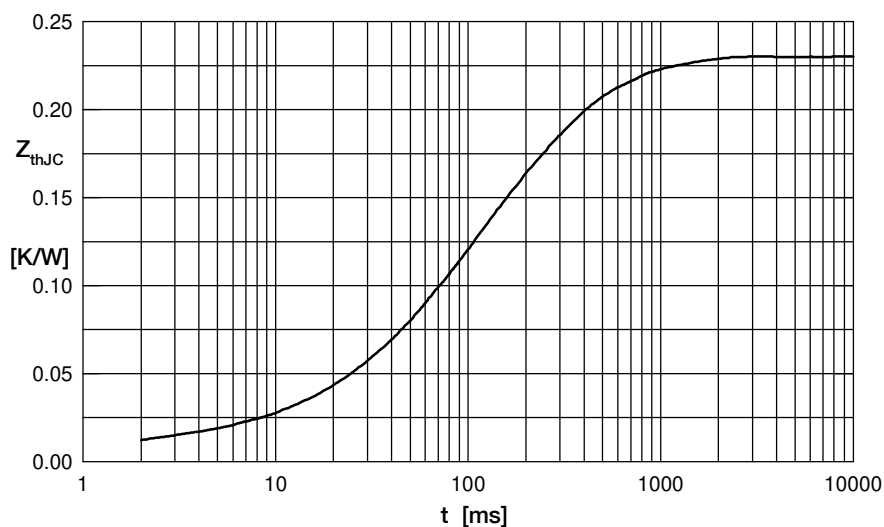


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 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