

# High Voltage Standard Rectifier Module

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

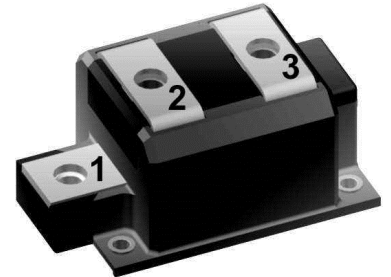
$$I_{FAV} = 700 \text{ A}$$

$$V_F = 1.05 \text{ V}$$

Phase leg

Part number

**MDNA700P2200CC**



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: ComPack

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

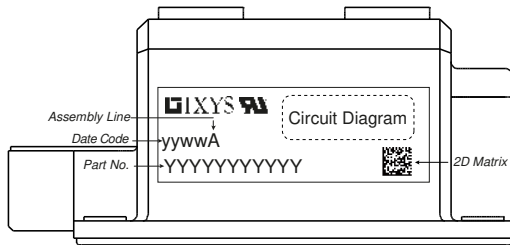
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					2300	V
$V_{RRM}$	max. repetitive reverse blocking voltage					2200	V
$I_R$	reverse current	$V_R = 2200$ V	$T_{VJ} = 25^\circ\text{C}$			500	$\mu\text{A}$
		$V_R = 2200$ V	$T_{VJ} = 150^\circ\text{C}$			20	mA
$V_F$	forward voltage drop	$I_F = 700$ A	$T_{VJ} = 25^\circ\text{C}$			1.14	V
		$I_F = 1400$ A				1.35	V
		$I_F = 700$ A	$T_{VJ} = 125^\circ\text{C}$			1.05	V
		$I_F = 1400$ A				1.30	V
$I_{FAV}$	average forward current	$T_C = 100^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$ d = 0.5			700	A
$V_{FO}$	threshold voltage	} for power loss calculation only				0.78	V
$r_F$	slope resistance					0.35	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					0.055	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.02		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		2270	W
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			20.0	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			21.6	kA
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			17.0	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			18.4	kA
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			2.00	MA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1.94	MA <sup>2</sup> s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			1.45	MA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			1.40	MA <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400$ V; f = 1 MHz		$T_{VJ} = 25^\circ\text{C}$		781	pF



Package ComPack		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			1200	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>				500		g
$M_D$	mounting torque		3		5	Nm
$M_T$	terminal torque		12		14	Nm
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	21.0			mm
$d_{Spb/Apb}$		terminal to backside	18.0			mm
$V_{ISOL}$	isolation voltage	t = 1 second	4800			V
		t = 1 minute	4000			V



**Part description**

- M = Module
- D = Diode
- N = High Voltage Standard Rectifier
- A = (>= 2000V)
- 700 = Current Rating [A]
- P = Phase leg
- 2200 = Reverse Voltage [V]
- CC = ComPack

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDNA700P2200CC	MDNA700P2200CC	Box	3	526027

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 150\text{ °C}$

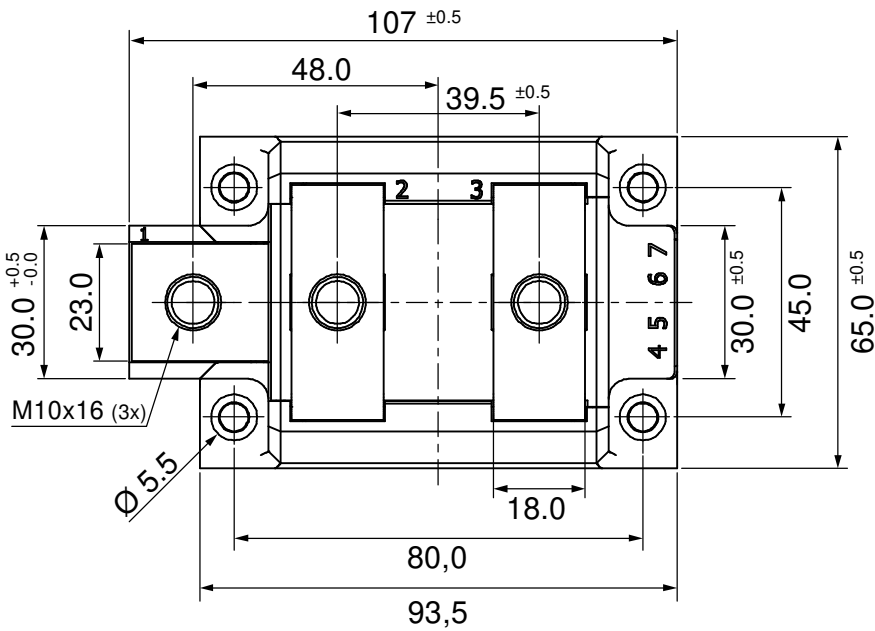
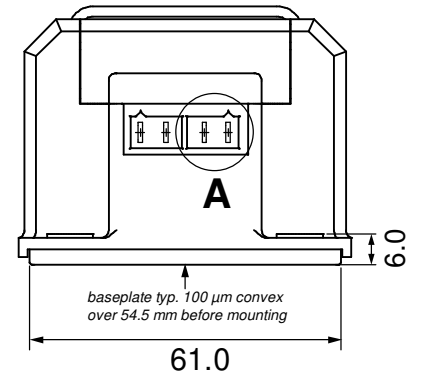
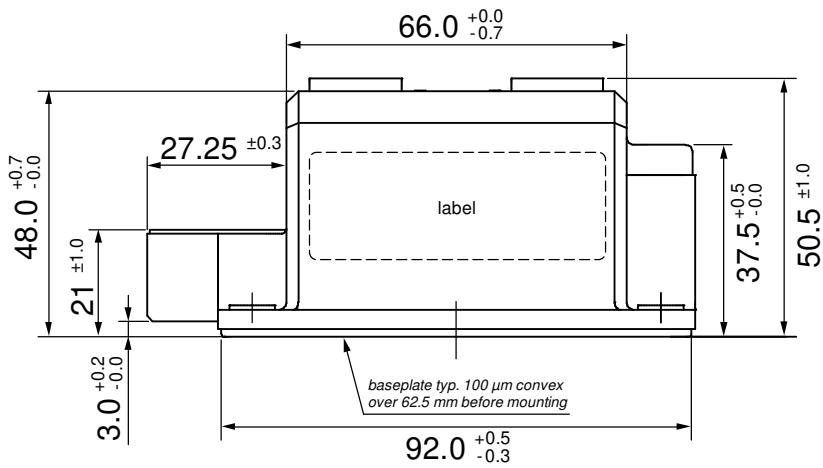


**Rectifier**

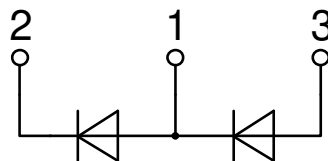
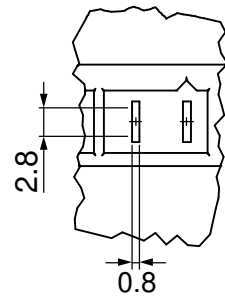
$V_{0\ max}$	threshold voltage	0.78	V
$R_{0\ max}$	slope resistance *	0.16	mΩ



**Outlines ComPack**



**A (2:1)**





**Rectifier**

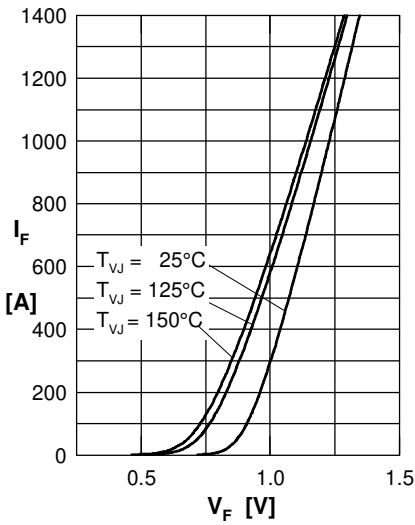


Fig. 1 Forward current versus voltage drop per diode

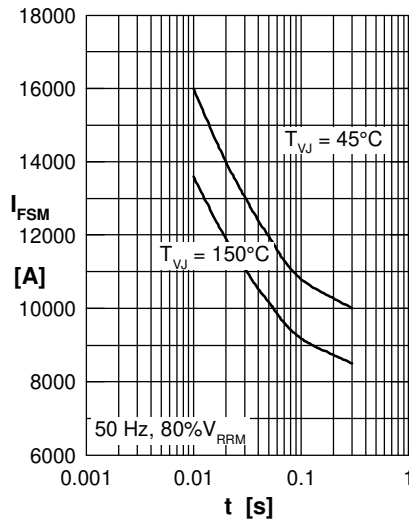


Fig. 2 Surge overload current vs. time per diode

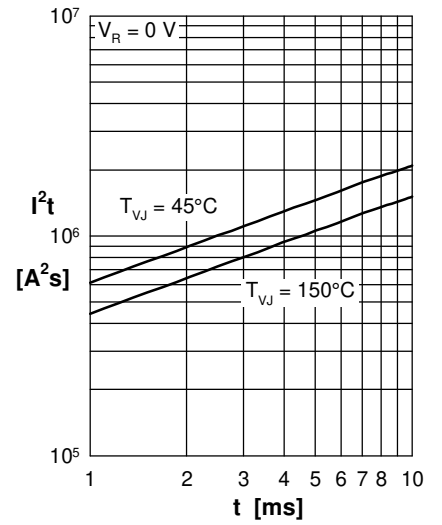


Fig. 3  $I^2t$  versus time per diode

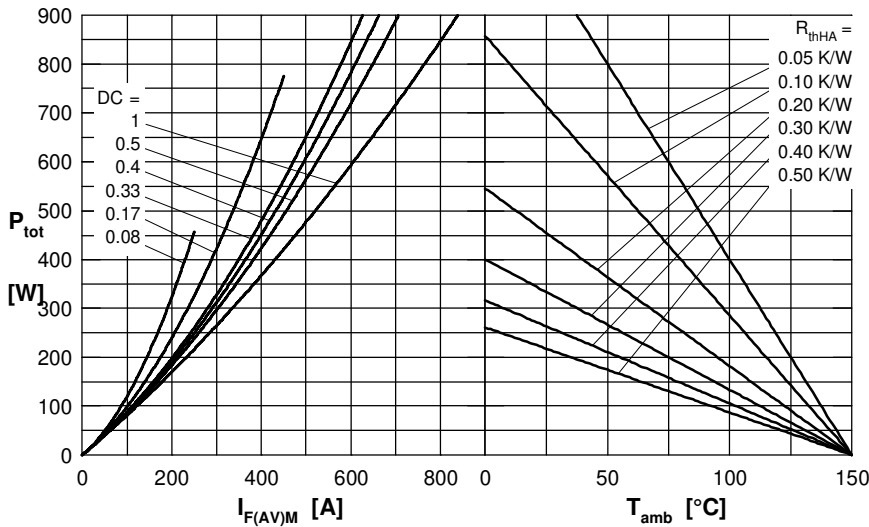


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

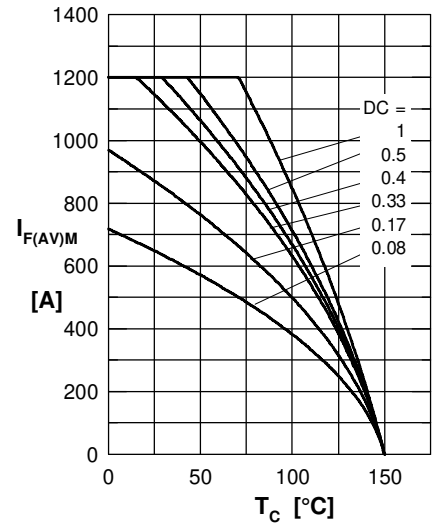


Fig. 5 Max. forward current vs. case temperature per diode

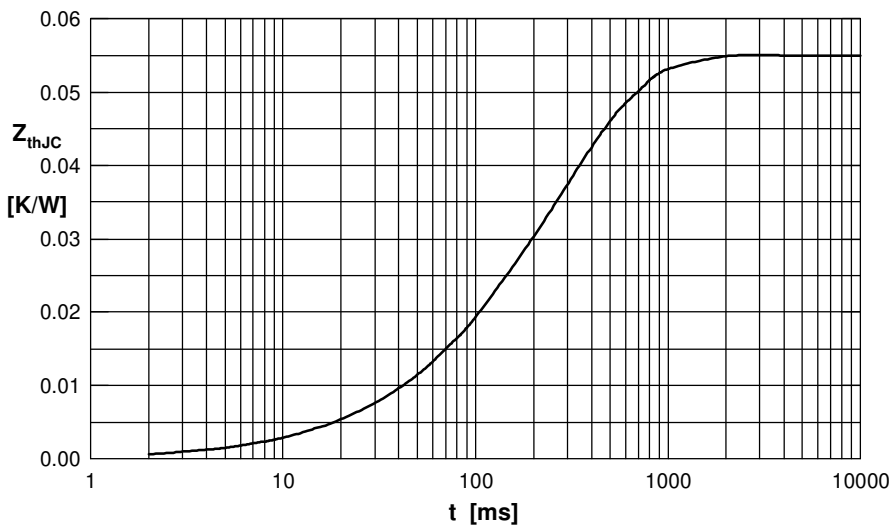


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.001	0.0150
2	0.004	0.0600
3	0.017	0.2000
4	0.033	0.3400