



# High Voltage Standard Rectifier Module

$V_{RRM} = 2 \times 2800 \text{ V}$

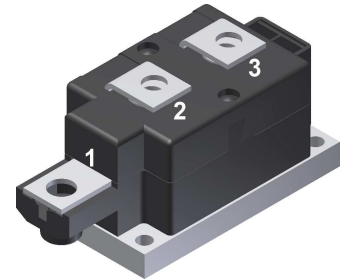
$I_{FAV} = 240 \text{ A}$

$V_F = 1.01 \text{ V}$

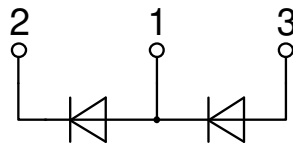
Phase leg

Part number

**MDD175-28N1**



Backside: isolated



### Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

### 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: Y1

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

### Disclaimer Notice

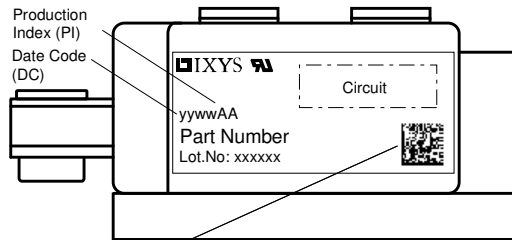
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					2900	V
$V_{RRM}$	max. repetitive reverse blocking voltage					2800	V
$I_R$	reverse current	$V_R = 2800$ V		$T_{VJ} = 25^\circ\text{C}$		1	mA
		$V_R = 2800$ V		$T_{VJ} = 150^\circ\text{C}$		5	mA
$V_F$	forward voltage drop	$I_F = 200$ A		$T_{VJ} = 25^\circ\text{C}$		1.07	V
		$I_F = 400$ A				1.26	V
		$I_F = 200$ A		$T_{VJ} = 125^\circ\text{C}$		1.01	V
		$I_F = 400$ A				1.26	V
$I_{FAV}$	average forward current	$T_C = 100^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		240	A
		180° sine	d = 0.5				
$V_{FO}$	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.74	V
$r_F$	slope resistance					1.27	mΩ
						} for power loss calculation only	
$R_{thJC}$	thermal resistance junction to case					0.14	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.04		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		900	W
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		8.50	kA
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		9.18	kA
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		7.23	kA
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		7.81	kA
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		361.3	kA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		350.6	kA <sup>2</sup> s
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		261.0	kA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		253.4	kA <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 1100$ V; f = 1 MHz		$T_{VJ} = 25^\circ\text{C}$		182	pF



Package Y1			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			600	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>				680		g
$M_D$	mounting torque		4.5		7	Nm
$M_T$	terminal torque		11		13	Nm
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	16.0			mm
$d_{Spb/Apb}$		terminal to backside	16.0			mm
$V_{ISOL}$	isolation voltage	t = 1 second	4800			V
		t = 1 minute	4000			V



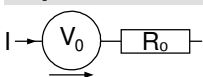
Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD175-28N1	MDD175-28N1	Box	3	504295

**Equivalent Circuits for Simulation**

\* on die level

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

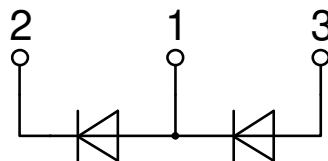
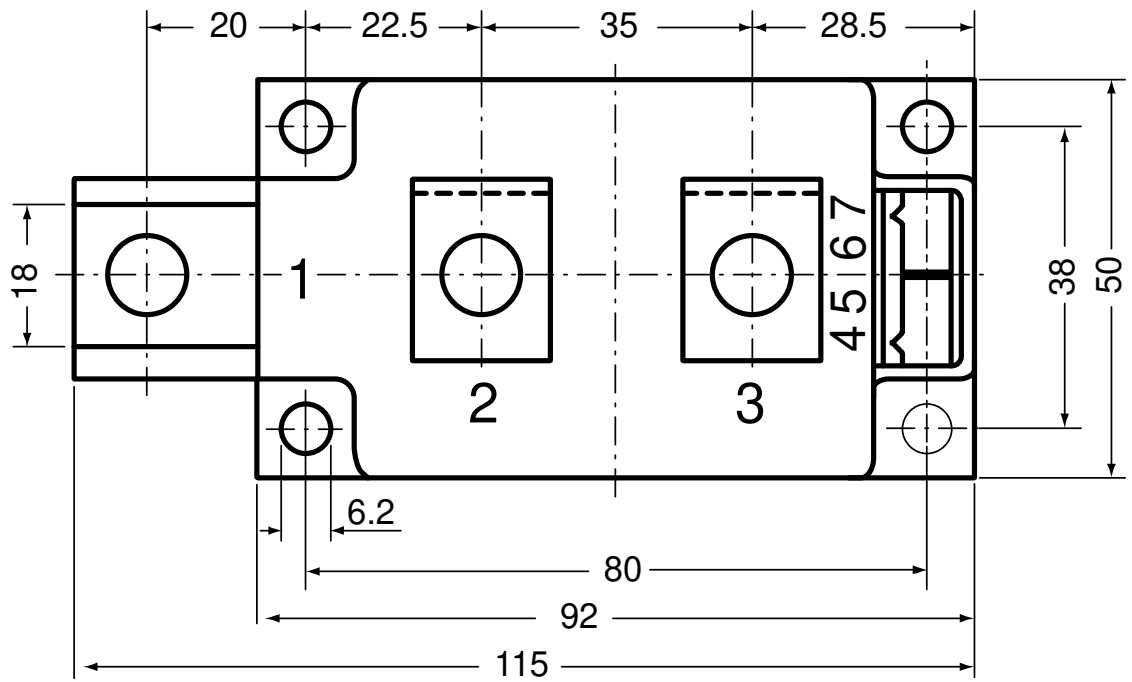
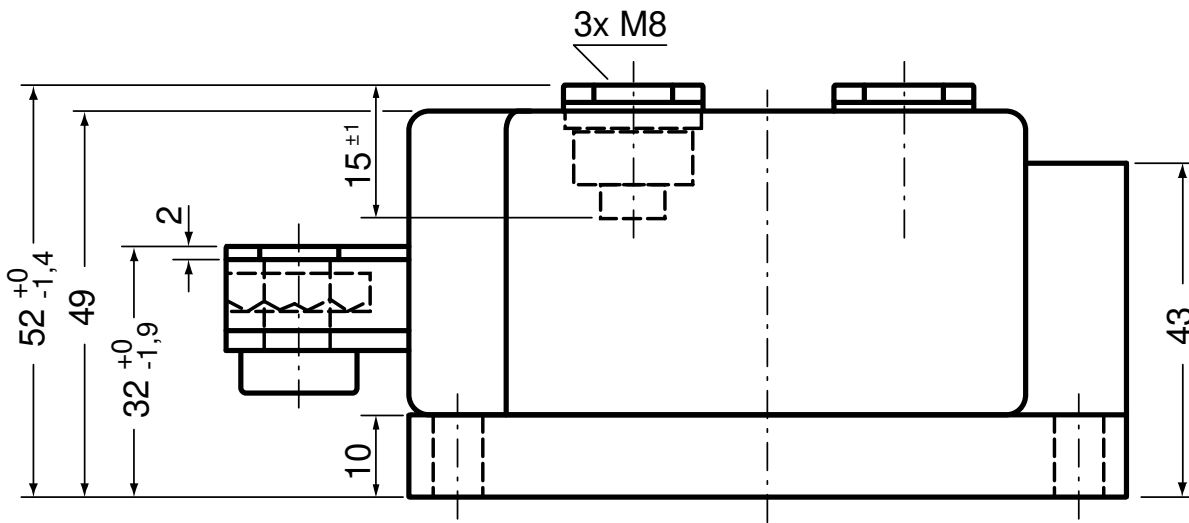


**Rectifier**

$V_{0\ max}$	threshold voltage	0.74	V
$R_{0\ max}$	slope resistance *	0.75	mΩ



Outlines Y1



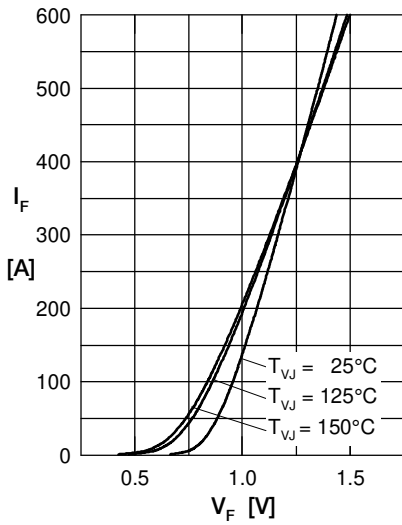
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

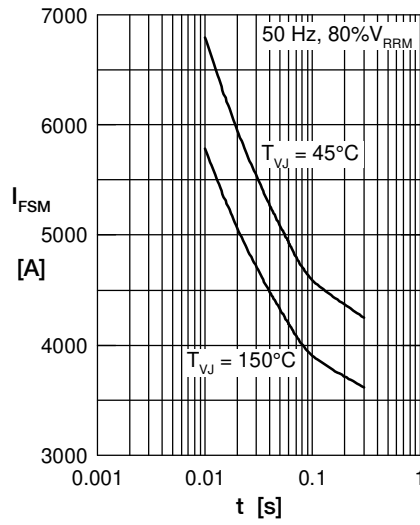


Fig. 2 Surge overload current

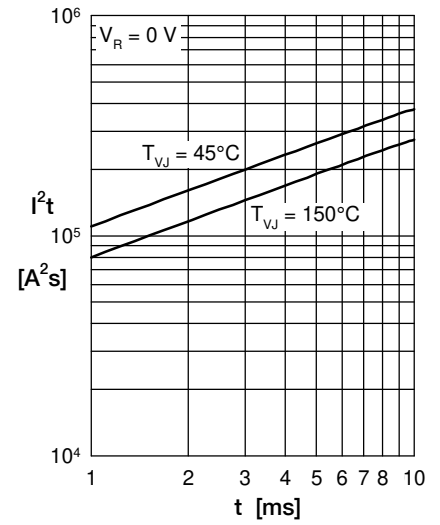
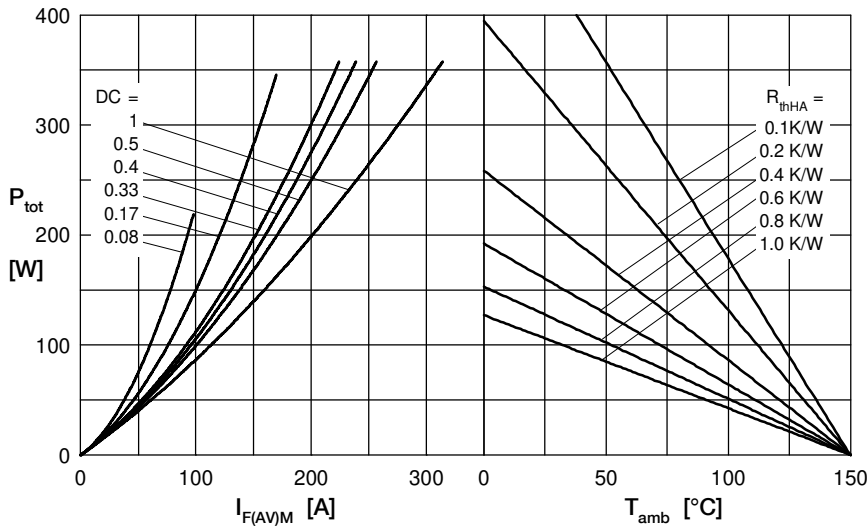

 Fig. 3  $I^2t$  versus time per diode


Fig. 4 Power dissipation vs. direct output current and ambient temperature

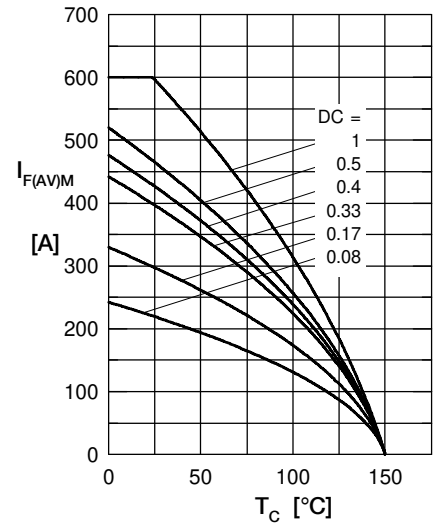


Fig. 5 Max. forward current vs. case temperature

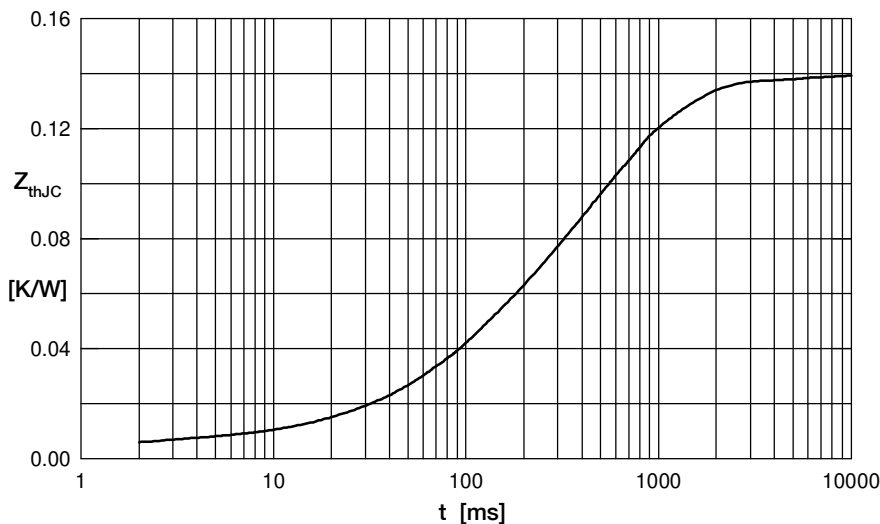


Fig. 6 Transient thermal impedance junction to case

 Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.155	0.0005
2	0.332	0.0095
3	0.713	0.17
4	0.3	0.8
5	0.00001	0.00001