



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

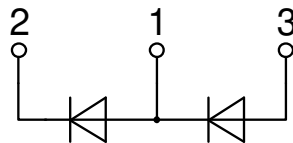
Part number

MDD175-28N1



Backside: isolated

E72873



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

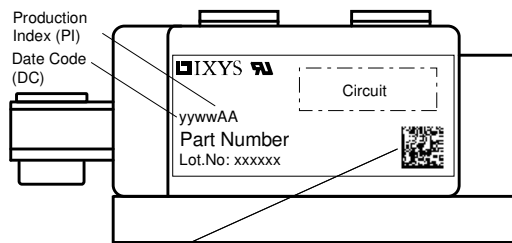
Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

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
		$I_F = 200$ A		$T_{VJ} = 125^\circ\text{C}$		1.01	V
						$I_F = 400$ A	1.26
I_{FAV}	average forward current	$T_C = 100^\circ\text{C}$ 180° sine	d = 0.5	$T_{VJ} = 150^\circ\text{C}$		240	A
V_{FO}	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.74	V
r_F	slope resistance					1.27	mΩ
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 ² s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		350.6	kA ² s
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		261.0	kA ² s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		253.4	kA ² 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
Weight				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



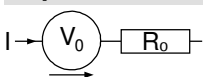
Data Matrix: part no. (1-19), DC + PI (20-25), lot.no.# (26-31), blank (32), serial no.# (33-36)

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

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

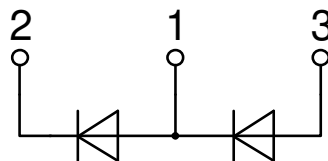
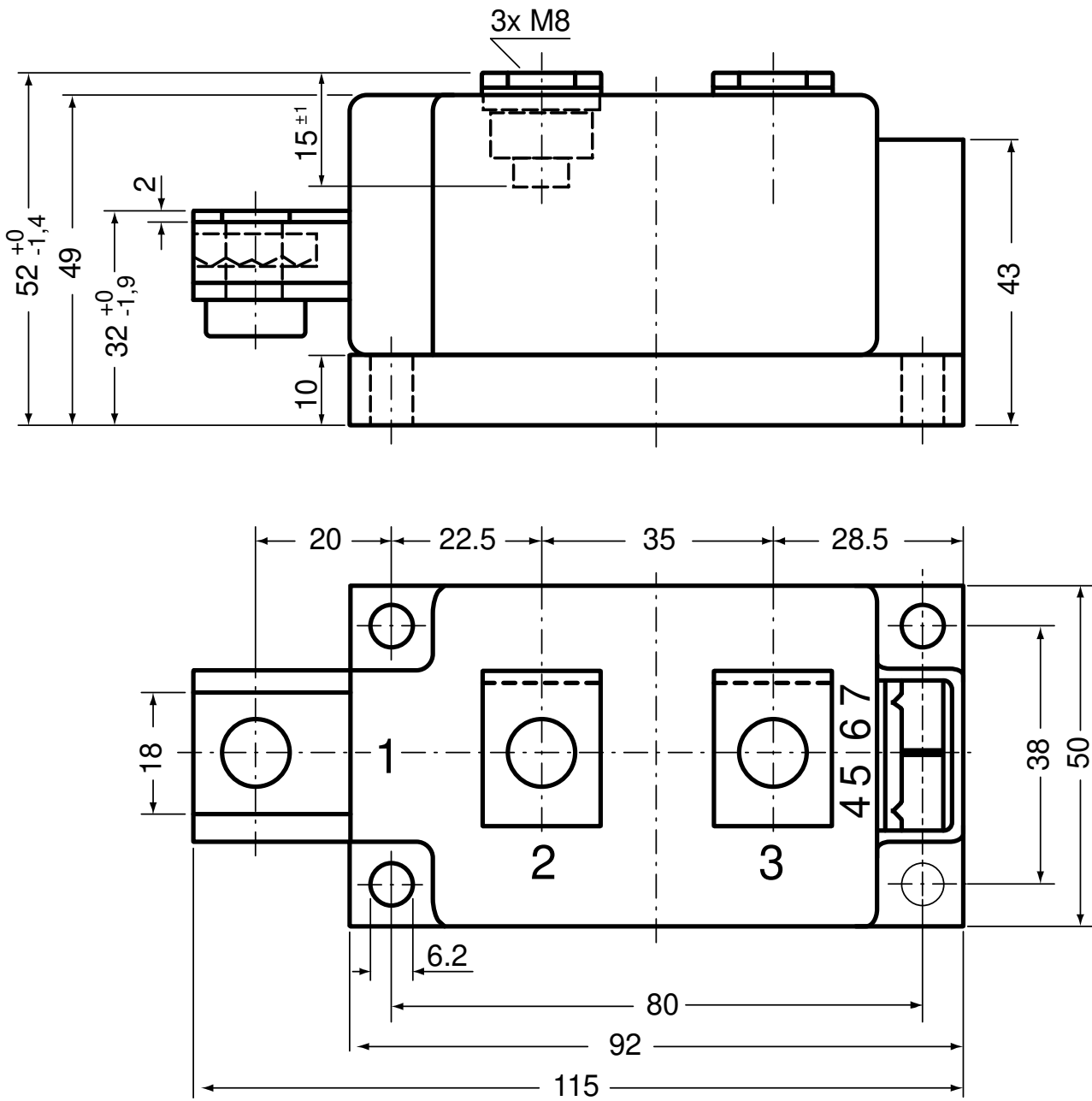


Rectifier

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



Outlines Y1





Rectifier

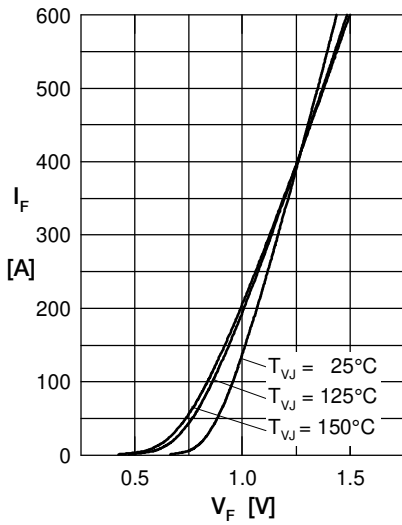


Fig. 1 Forward current versus voltage drop per diode

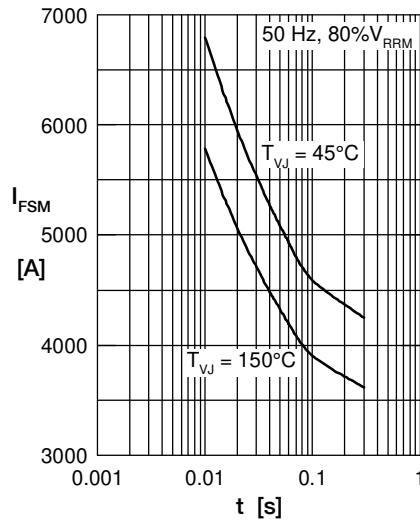


Fig. 2 Surge overload current

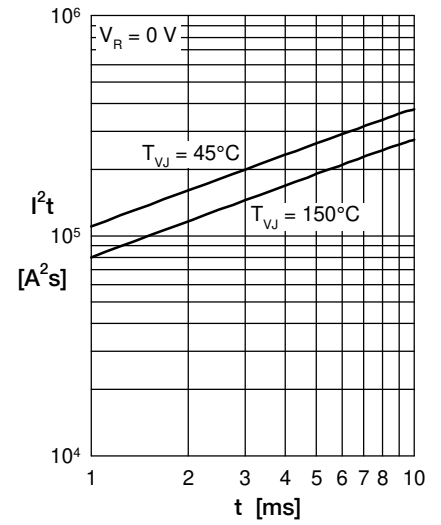


Fig. 3 I^2t versus time per diode

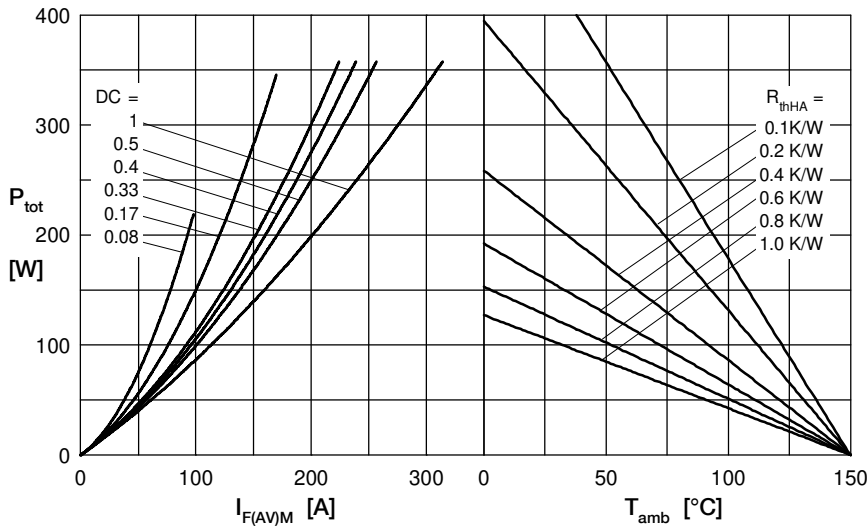


Fig. 4 Power dissipation vs. direct output current and ambient temperature

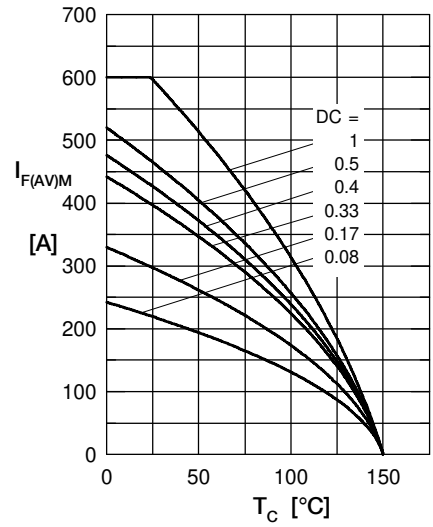


Fig. 5 Max. forward current vs. case temperature

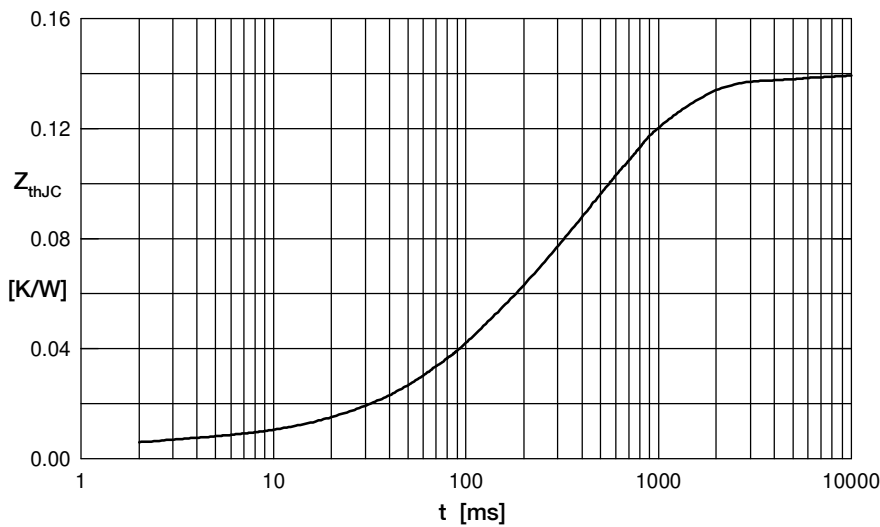


Fig. 6 Transient thermal impedance junction to case

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