

High Voltage Standard Rectifier Module

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

$$I_{FAV} = 380 \text{ A}$$

$$V_F = 0.93 \text{ V}$$

Phase leg

Part number

MDNA380P2200KC



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

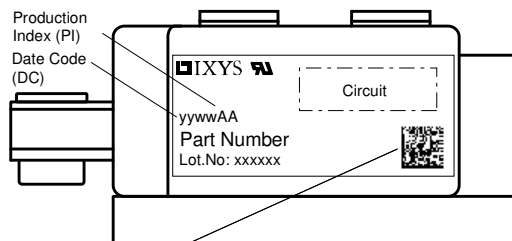
Disclaimer Notice

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					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	μA
		$V_R = 2200$ V	$T_{VJ} = 150^\circ\text{C}$			20	mA
V_F	forward voltage drop	$I_F = 300$ A	$T_{VJ} = 25^\circ\text{C}$			1.05	V
		$I_F = 600$ A				1.18	V
		$I_F = 300$ A	$T_{VJ} = 125^\circ\text{C}$			0.93	V
		$I_F = 600$ A				1.10	V
I_{FAV}	average forward current	$T_C = 100^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$ d = 0.5			380	A
V_{FO}	threshold voltage	} for power loss calculation only				0.75	V
r_F	slope resistance					0.53	m Ω
R_{thJC}	thermal resistance junction to case					0.11	K/W
R_{thCH}	thermal resistance case to heatsink				0.04		K/W
P_{tot}	total power dissipation			$T_C = 25^\circ\text{C}$		1140	W
I_{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			11.0	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			11.9	kA
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			9.35	kA
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			10.1	kA
I^2t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			605.0	kA ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			587.1	kA ² s
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			437.1	kA ² s
		t = 8,3 ms; (60 Hz), sine	$V_R = 0$ V			424.4	kA ² s
C_J	junction capacitance	$V_R = 400$ V; f = 1 MHz		$T_{VJ} = 25^\circ\text{C}$		27	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)

Part description

- M = Module
- D = Diode
- N = High Voltage Standard Rectifier
- A = (>= 2000V)
- 380 = Current Rating [A]
- P = Phase leg
- 2200 = Reverse Voltage [V]
- KC = Y1-CU

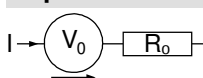
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDNA380P2200KC	MDNA380P2200KC	Box	3	517449

Similar Part	Package	Voltage class
MDMA380P1600KC	Y1-CU	1600

Equivalent Circuits for Simulation

* on die level

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

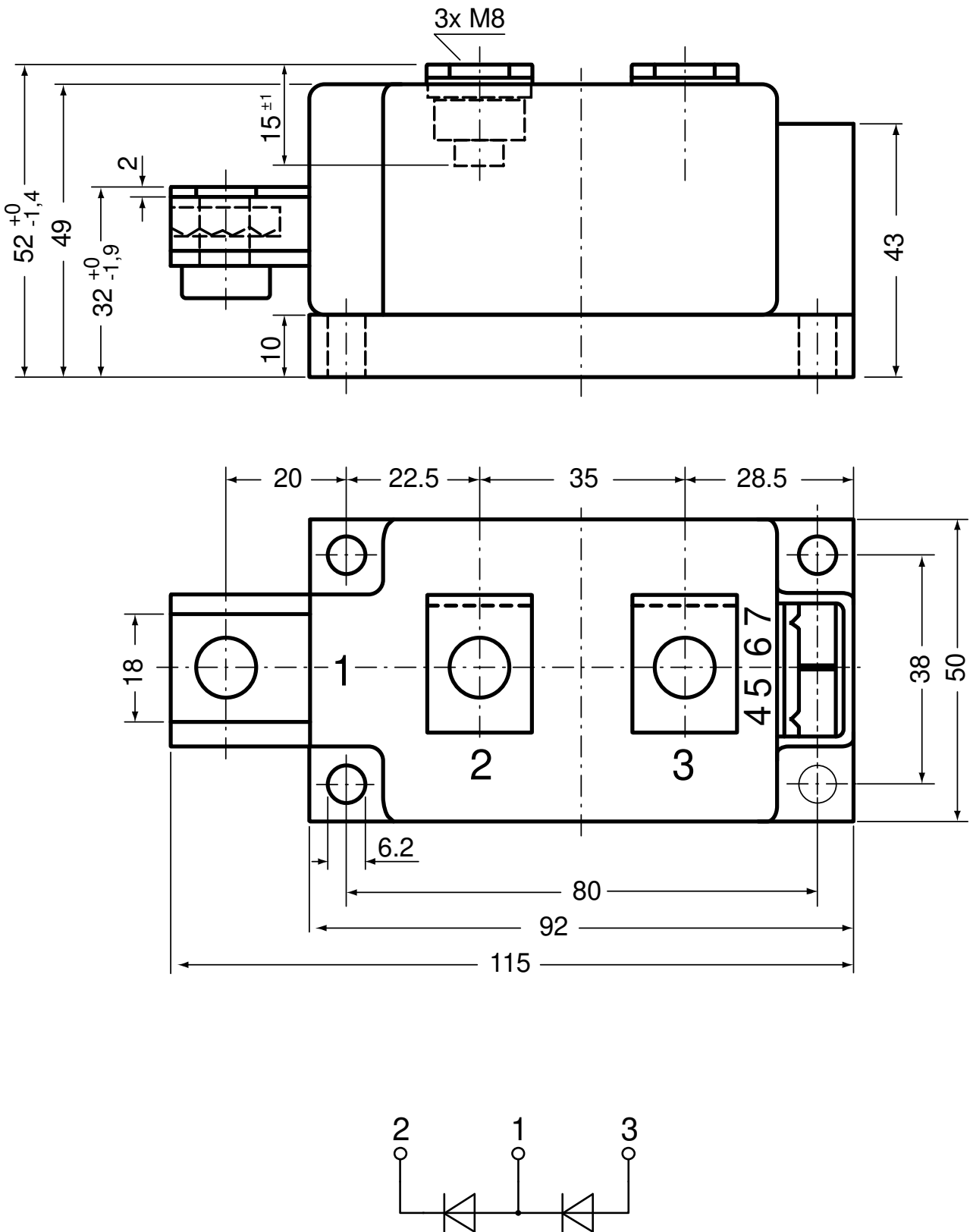


Rectifier

$V_{0 \max}$	threshold voltage	0.75	V
$R_{0 \max}$	slope resistance *	0.34	mΩ



Outlines Y1



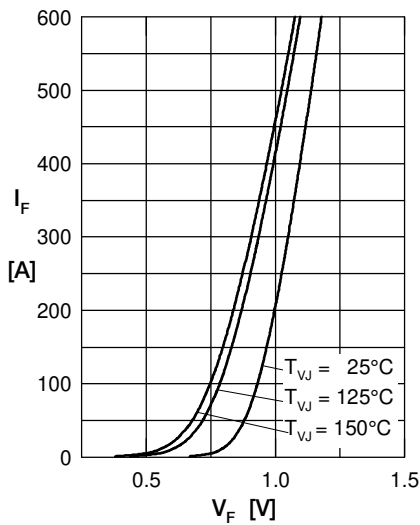
Rectifier


Fig. 1 Forward current versus voltage drop per diode

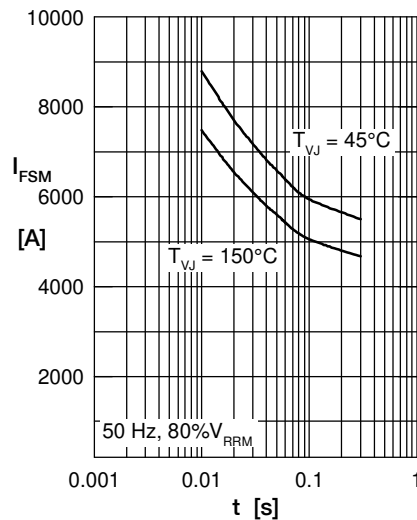


Fig. 2 Surge overload current vs. time per diode

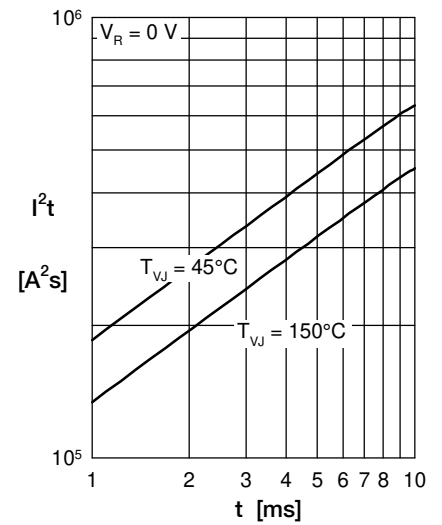
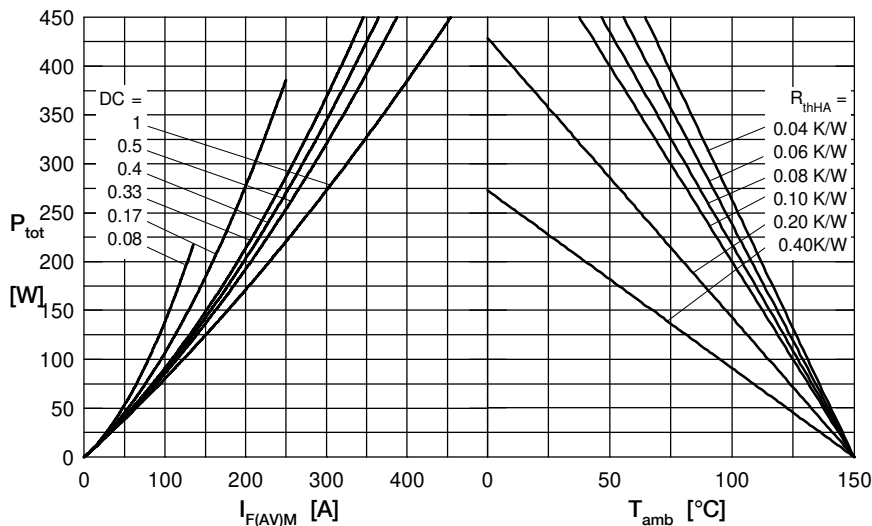

 Fig. 3 I^2t versus time per diode


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

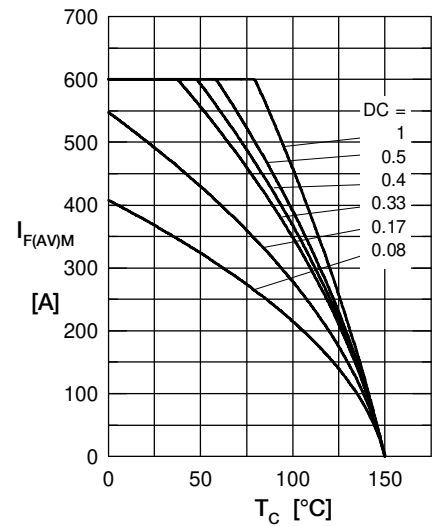


Fig. 5 Max. forward current vs. case temperature per diode

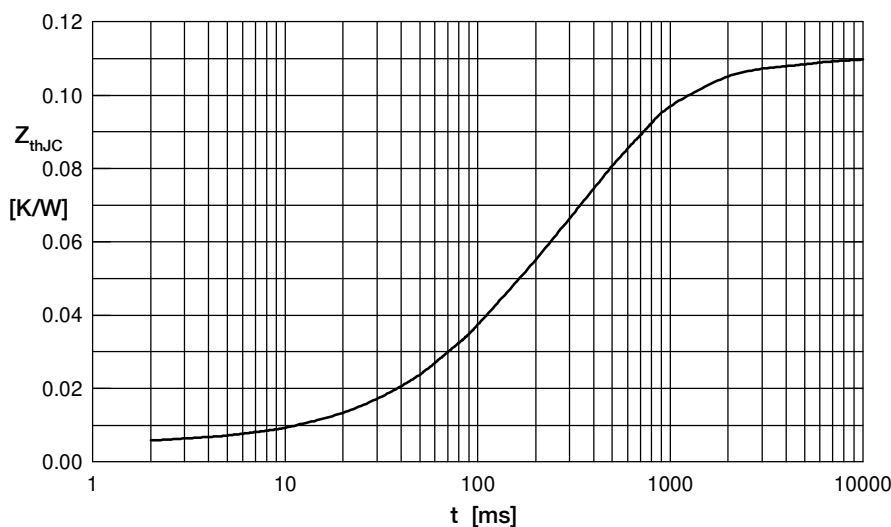


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.005	0.0005
2	0.029	0.0980
3	0.068	0.4500
4	0.008	3.0000