Standard Rectifier Module

V_{RRM} = 2x 1600 V
I_{FAV} = 380 A
V_F = 0.93 V

Phase leg

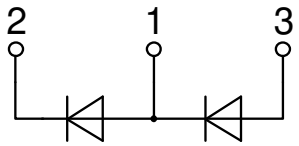
Part number

MDMA380P1600KC



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.

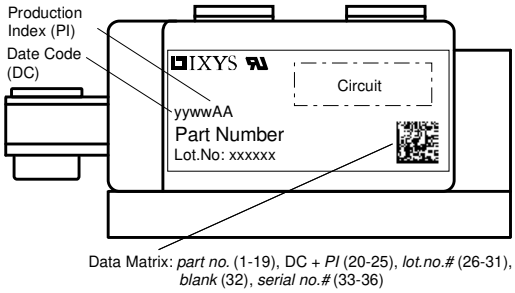
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Rectifier

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1700	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1600	V
I_R	*reverse current*	V_R = 1600 V	T_{VJ} = 25°C			500	µA
		V_R = 1600 V	T_{VJ} = 150°C			20	mA
V_F	*forward voltage drop*	I_F = 300 A	T_{VJ} = 25°C			1.05	V
		I_F = 600 A				1.18	V
		I_F = 300 A	T_{VJ} = 125°C			0.93	V
		I_F = 600 A				1.10	V
I_{FAV}	*average forward current*	T_C = 100°C	T_{VJ} = 150°C			380	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0.75	V
r_F	*slope resistance* }					0.53	mΩ
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°C			1140	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°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°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°C			605.0	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			587.1	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			437.1	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			424.4	kA²s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		27		pF

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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	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	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

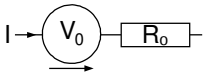
M = Module
D = Diode
M = Standard Rectifier
A = (up to 1800V)
380 = Current Rating [A]
P = Phase leg
1600 = Reverse Voltage [V]
KC = Y1-CU

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDMA380P1600KC	MDMA380P1600KC	Box	3	512611

Similar Part	Package	Voltage class
MDNA380P2200KC	Y1-CU	2200

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150°C

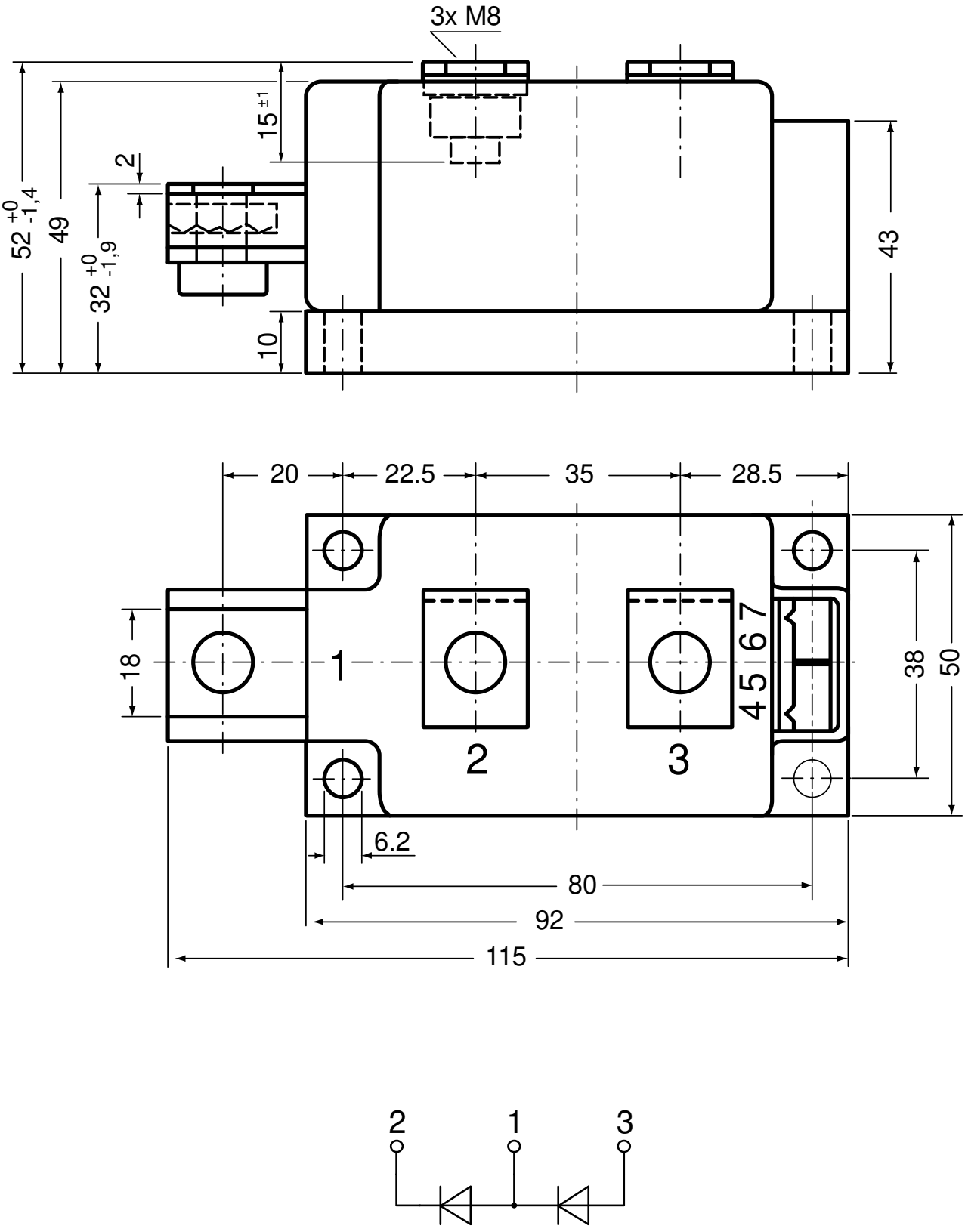


Rectifier

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

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Outlines Y1



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Rectifier

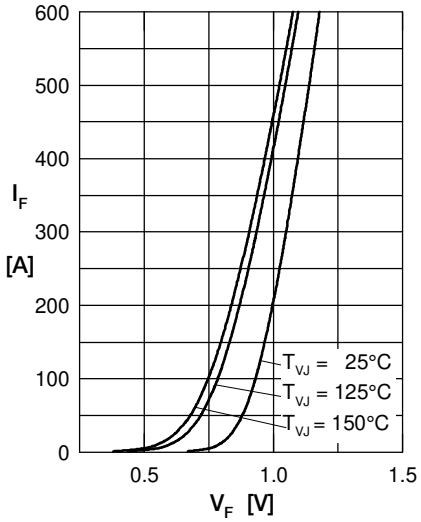


Fig. 1 Forward current versus voltage drop per diode

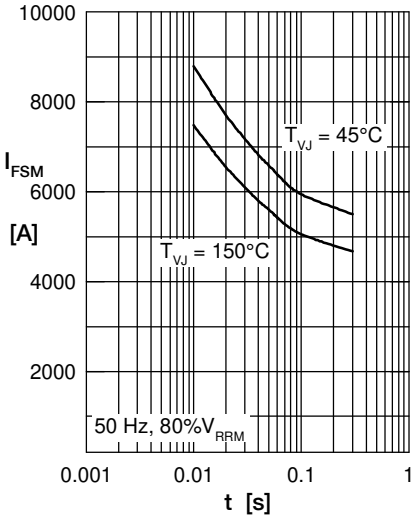


Fig. 2 Surge overload current vs. time per diode

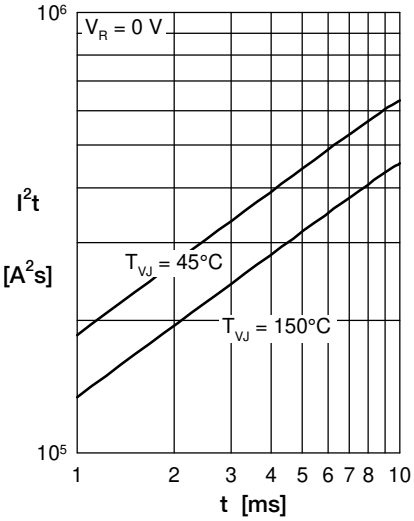


Fig. 3 I^2t versus time per diode

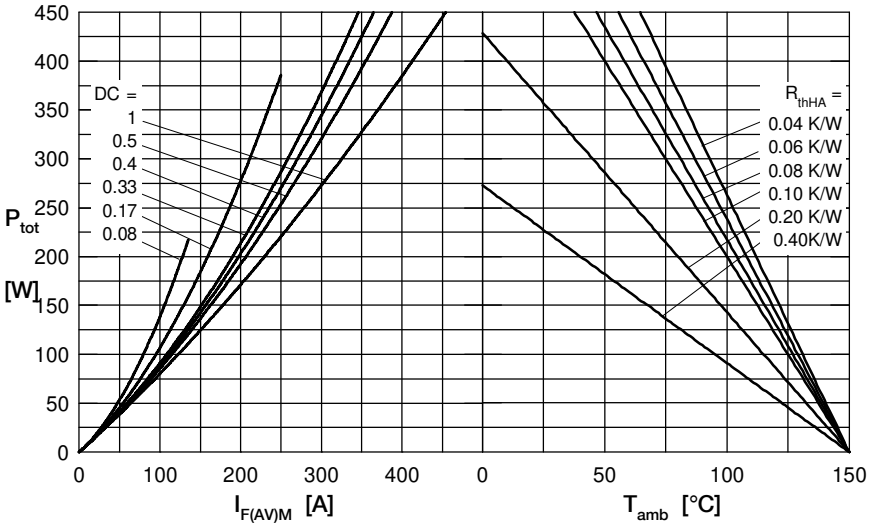


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

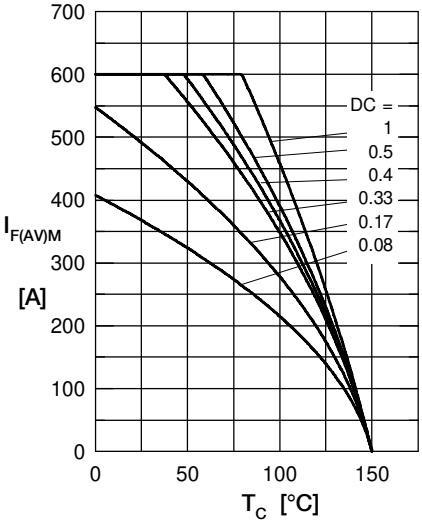


Fig. 5 Max. forward current vs. case temperature per diode

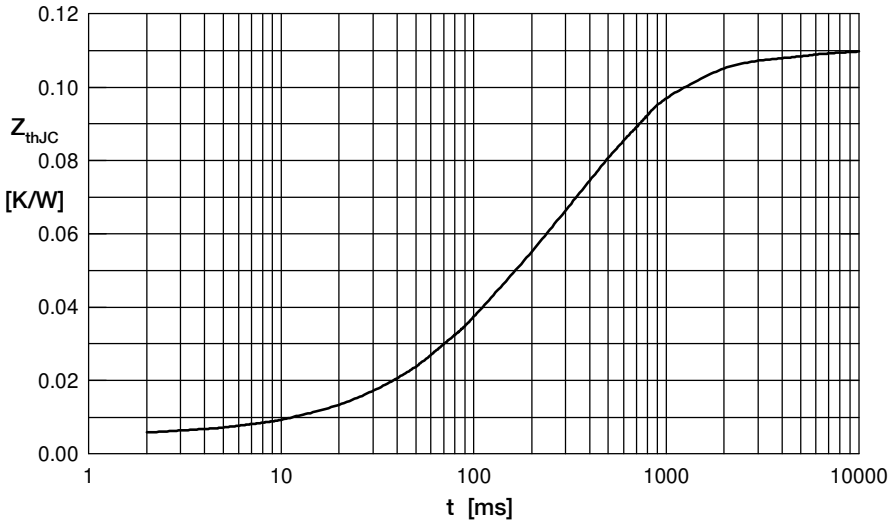


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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

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