

## Standard Rectifier Module

$$V_{RRM} = 2 \times 1600 \text{ V}$$

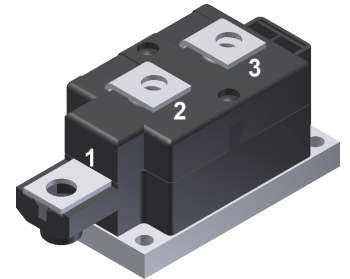
$$I_{FAV} = 380 \text{ A}$$

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

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

### Terms Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact your local sales office.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact your local sales office.

Should you intend to use the product in aviation, in health or life endangering or life support applications, please notify. For any such application we urgently recommend

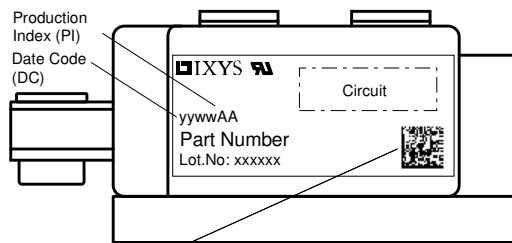
- to perform joint risk and quality assessments;

- the conclusion of quality agreements;

- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage			$T_{VJ} = 25^{\circ}\text{C}$		1700	V
$V_{RRM}$	max. repetitive reverse blocking voltage			$T_{VJ} = 25^{\circ}\text{C}$		1600	V
$I_R$	reverse current	$V_R = 1600\text{ V}$		$T_{VJ} = 25^{\circ}\text{C}$		500	$\mu\text{A}$
		$V_R = 1600\text{ V}$		$T_{VJ} = 150^{\circ}\text{C}$		20	mA
$V_F$	forward voltage drop	$I_F = 300\text{ A}$		$T_{VJ} = 25^{\circ}\text{C}$		1.05	V
		$I_F = 600\text{ A}$				1.18	V
		$I_F = 300\text{ A}$		$T_{VJ} = 125^{\circ}\text{C}$		0.93	V
		$I_F = 600\text{ A}$				1.10	V
$I_{FAV}$	average forward current	$T_C = 100^{\circ}\text{C}$		$T_{VJ} = 150^{\circ}\text{C}$		380	A
		rectangular	$d = 0.5$				
$V_{FO}$	threshold voltage			$T_{VJ} = 150^{\circ}\text{C}$		0.75	V
$r_F$	slope resistance					0.53	$\text{m}\Omega$
						} for power loss calculation only	
$R_{thJC}$	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	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$		$T_{VJ} = 45^{\circ}\text{C}$		11.0	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$		$V_R = 0\text{ V}$		11.9	kA
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$		$T_{VJ} = 150^{\circ}\text{C}$		9.35	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$		$V_R = 0\text{ V}$		10.1	kA
$I^2t$	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$		$T_{VJ} = 45^{\circ}\text{C}$		605.0	$\text{kA}^2\text{s}$
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$		$V_R = 0\text{ V}$		587.1	$\text{kA}^2\text{s}$
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$		$T_{VJ} = 150^{\circ}\text{C}$		437.1	$\text{kA}^2\text{s}$
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$		$V_R = 0\text{ V}$		424.4	$\text{kA}^2\text{s}$
$C_J$	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$		$T_{VJ} = 25^{\circ}\text{C}$		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
<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)

### 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

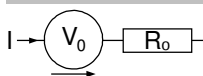
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDMA380P1600KC	MDMA380P1600KC	Box	3	512611

Similar Part	Package	Voltage class
MDNA380P2200KC	Y1-CU	2200

### Equivalent Circuits for Simulation

\* on die level

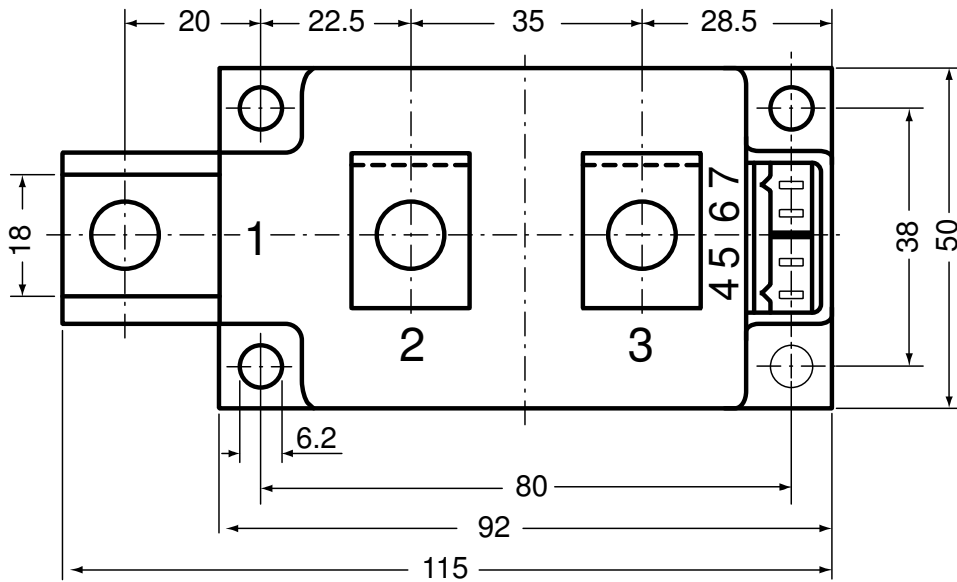
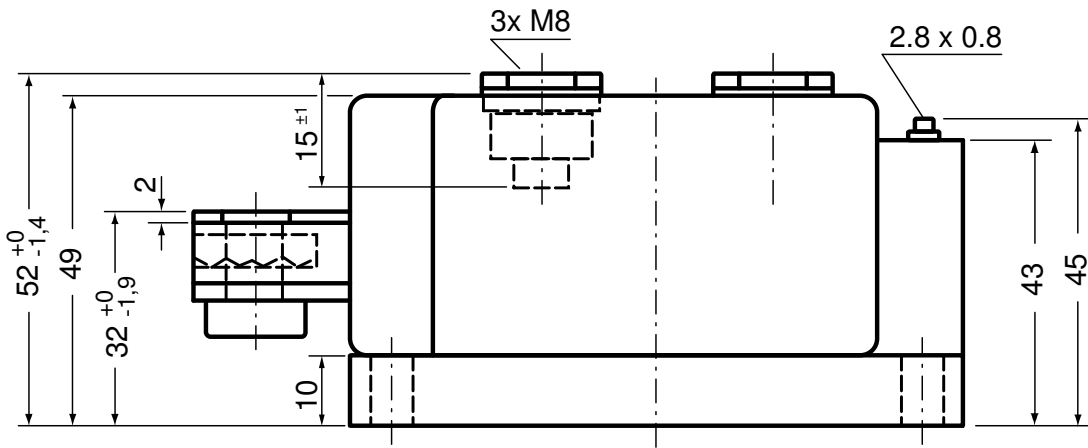
$T_{VJ} = 150\text{ °C}$



Rectifier

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

**Outlines Y1**



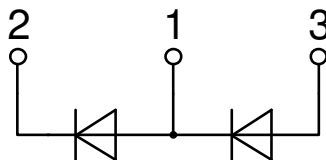
**Optional accessories for modules**

Keyed gate/cathode twin plugs with wire length = 350 mm, gate = white, cathode = red

Type ZY 180L (L = Left for pin pair 4/5)

Type ZY 180R (R = Right for pin pair 6/7)

UL 758, style 3751



**Rectifier**

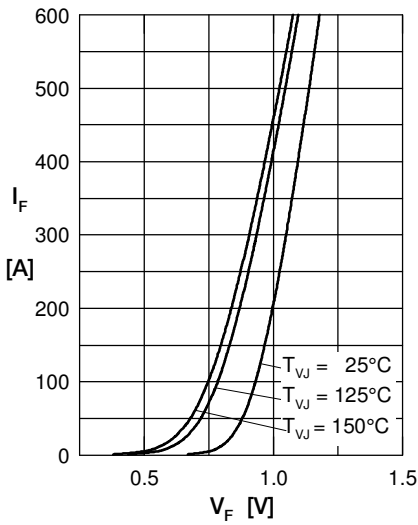


Fig. 1 Forward current versus voltage drop per diode

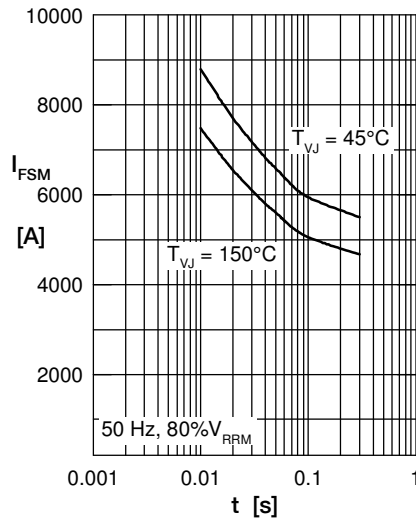


Fig. 2 Surge overload current vs. time per diode

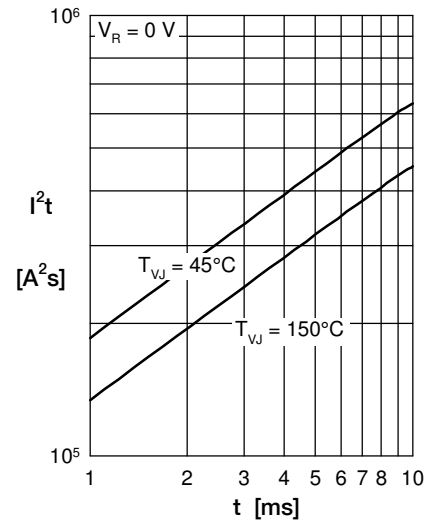


Fig. 3  $I^2t$  versus time per diode

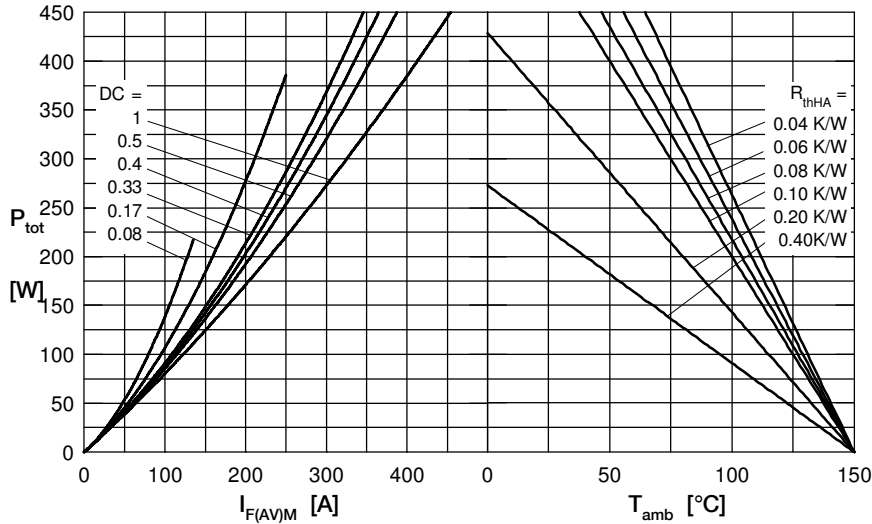


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

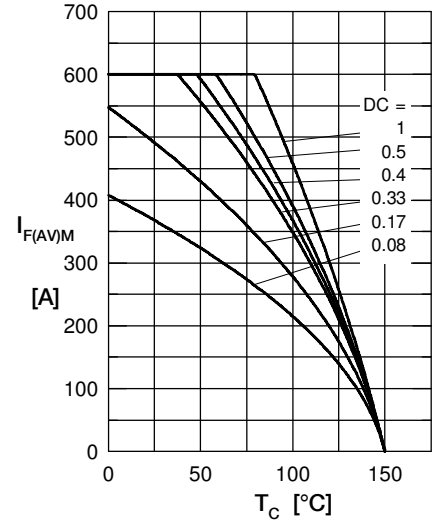


Fig. 5 Max. forward current vs. case temperature per diode

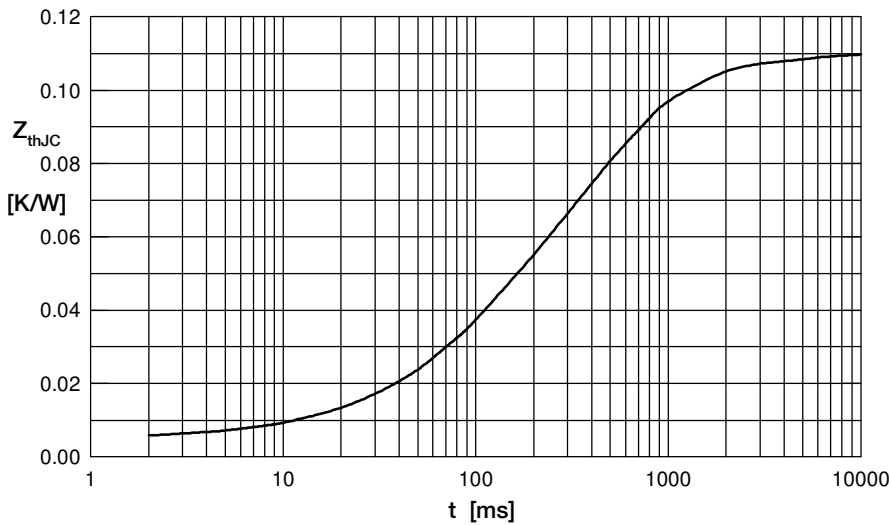


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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