

## Standard Rectifier Module

$$V_{RRM} = 2 \times 1200 \text{ V}$$

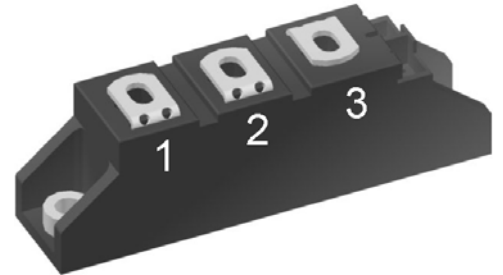
$$I_{FAV} = 140 \text{ A}$$

$$V_F = 1.11 \text{ V}$$


Phase leg

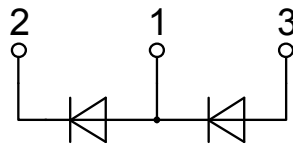
Part number

MDMA140P1200TG



Backside: isolated

 E72873



### Features / Advantages:

- Package with DCB ceramic
- Improved temperature and power cycling
- Planar passivated chips
- Very low forward voltage drop
- Very low leakage current

### Applications:

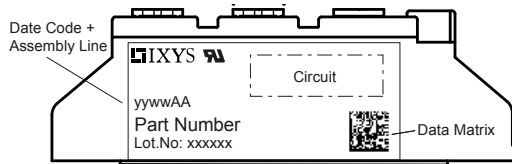
- Diode for main rectification
- For single and three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

### Package: TO-240AA

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Height: 30 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

Rectifier				Ratings		
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1300	V
$V_{RRM}$	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$			1200	V
$I_R$	reverse current	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$		100	$\mu\text{A}$
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$		3.5	mA
$V_F$	forward voltage drop	$I_F = 140\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$		1.18	V
		$I_F = 280\text{ A}$			1.43	V
		$I_F = 140\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$		1.11	V
		$I_F = 280\text{ A}$			1.41	V
$I_{FAV}$	average forward current	$T_C = 100^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$		140	A
$V_{FO}$	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}\text{C}$		0.78	V
$r_F$	slope resistance				2.2	m $\Omega$
$R_{thJC}$	thermal resistance junction to case				0.23	K/W
$R_{thCH}$	thermal resistance case to heatsink			0.20		K/W
$P_{tot}$	total power dissipation		$T_C = 25^{\circ}\text{C}$		540	W
$I_{FSM}$	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$		2.80	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		3.03	kA
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$		2.38	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		2.57	kA
$I^2t$	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$		39.2	kA <sup>2</sup> s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		38.1	kA <sup>2</sup> s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$		28.3	kA <sup>2</sup> s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		27.5	kA <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		116	pF

Package TO-240AA			Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			200	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>				90		g
$M_D$	mounting torque		2.5		4	Nm
$M_T$	terminal torque		2.5		4	Nm
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	13.0	9.7		mm
$d_{Spb/Apb}$		terminal to backside	16.0	16.0		mm
$V_{ISOL}$	isolation voltage	t = 1 second			4800	V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA		4000	V



### Part number

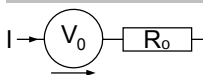
- M = Module
- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 140 = Current Rating [A]
- P = Phase leg
- 1200 = Reverse Voltage [V]
- TG = TO-240AA

Ordering	Part Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDMA140P1200TG	MDMA140P1200TG	Box	6	512703

### Equivalent Circuits for Simulation

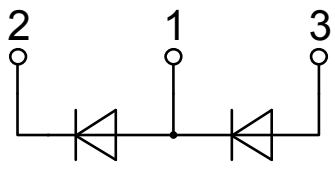
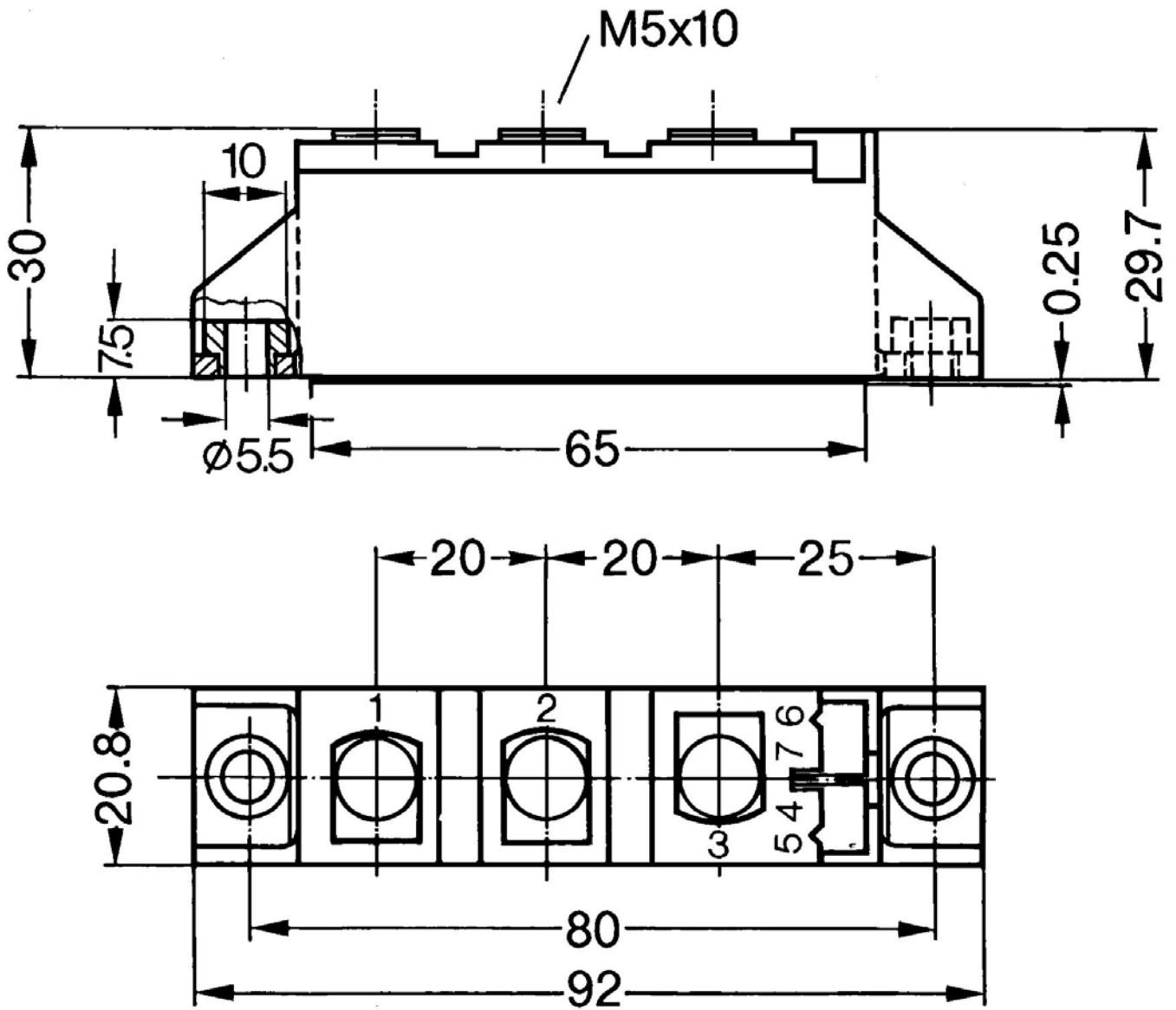
\* on die level

$T_{VJ} = 150$  °C



Rectifier

$V_{0\ max}$	threshold voltage	0.78	V
$R_{0\ max}$	slope resistance *	1	mΩ



**Rectifier**

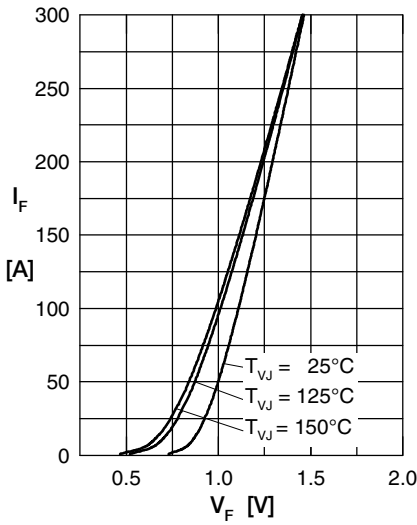


Fig. 1 Forward current versus voltage drop per diode

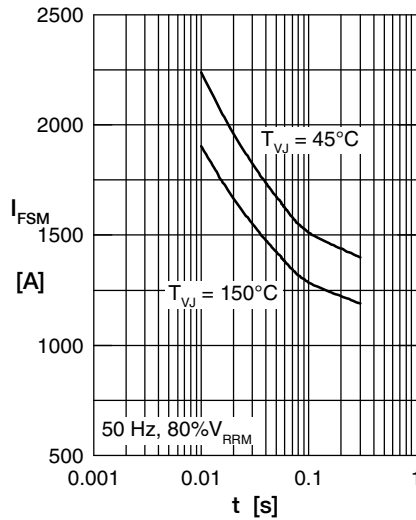


Fig. 2 Surge overload current vs. time per diode

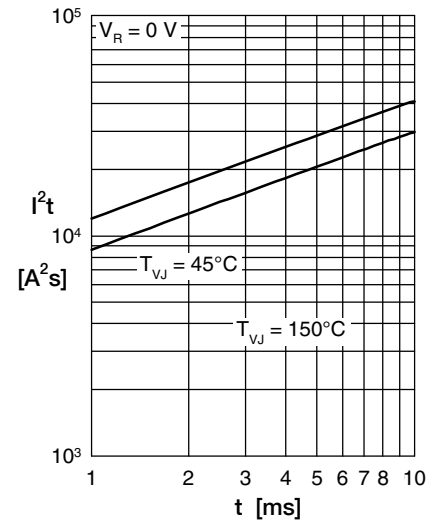


Fig. 3  $I^2t$  versus time per diode

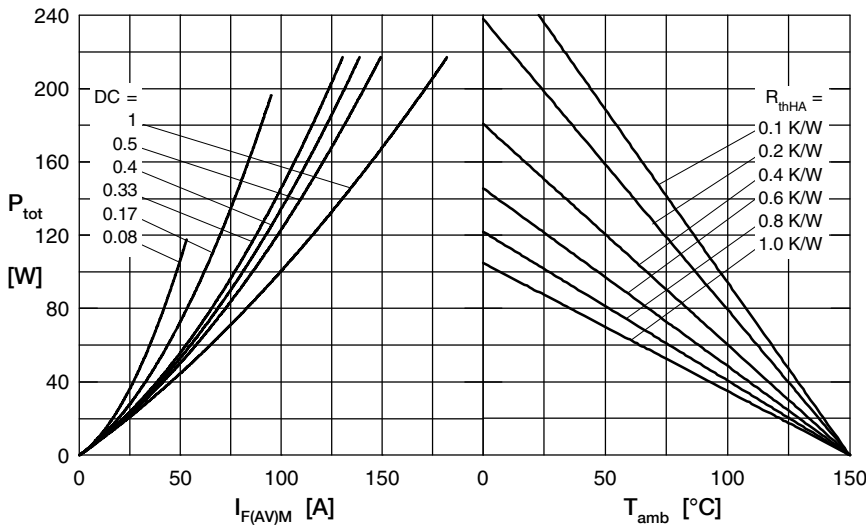


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

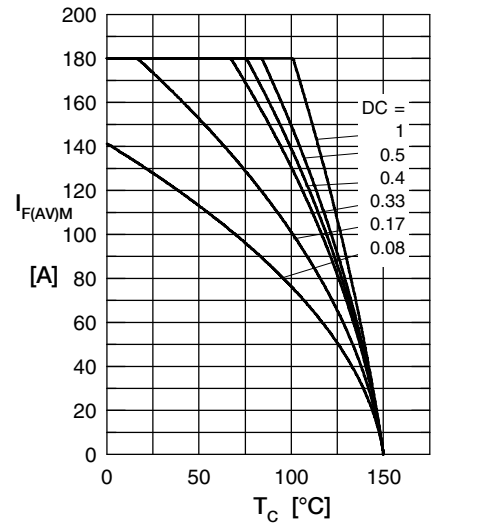


Fig. 5 Max. forward current vs. case temperature per diode

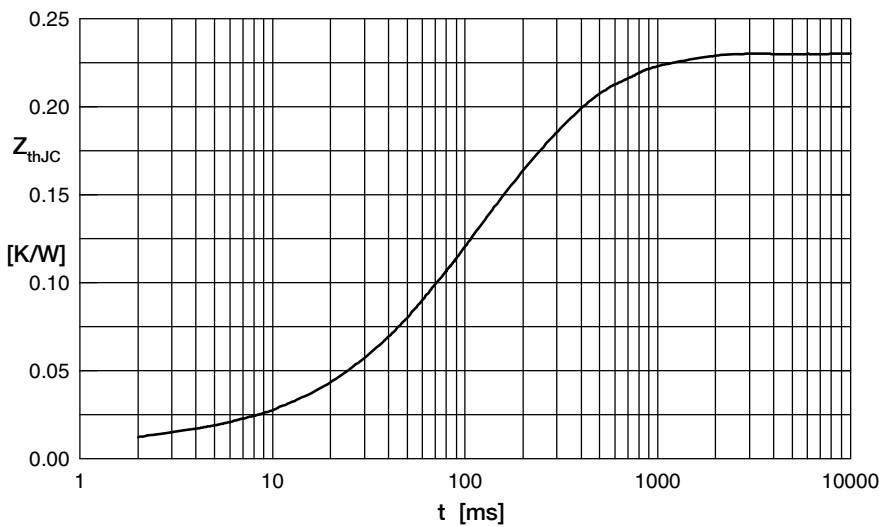


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.01	0.001
2	0.05	0.050
3	0.12	0.150
4	0.05	0.500

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