

Standard Rectifier Module

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

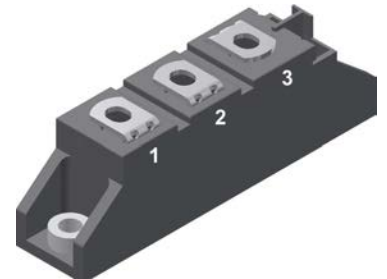
$$I_{FAV} = 140 \text{ A}$$

$$V_F = 1,11 \text{ V}$$

Phase leg

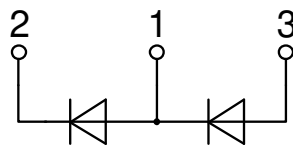
Part number

MDMA140P1600TG



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

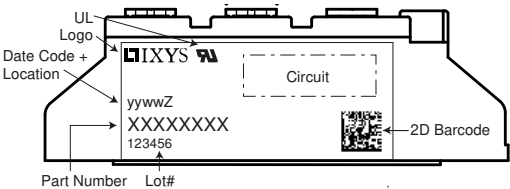
- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Height: 30 mm
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

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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	$V_R = 1600\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			100	μA
		$V_R = 1600\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			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_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0,78	V
r_F	slope resistance					2,2	m Ω
R_{thJC}	thermal resistance junction to case					0,23	K/W
R_{thCH}	thermal resistance case to heatsink				0,2		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				540	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			2,80	kA
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			3,03	kA
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			2,38	kA
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			2,57	kA
I^2t	value for fusing	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			39,2	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			38,1	kA ² s
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			28,3	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			27,5	kA ² s
C_J	junction capacitance	$V_R = 400\text{ V; } f = 1\text{ MHz}$			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	
Weight					76		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	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA		4800			V
		t = 1 minute			4000			V



Part description

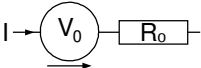
- M = Module
- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 140 = Current Rating [A]
- P = Phase leg
- 1600 = Reverse Voltage [V]
- TG = TO-240AA

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDMA140P1600TG	MDMA140P1600TG	Box	36	512788

Equivalent Circuits for Simulation

* on die level

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



Rectifier

$V_{0\text{ max}}$

threshold voltage

0,78

V

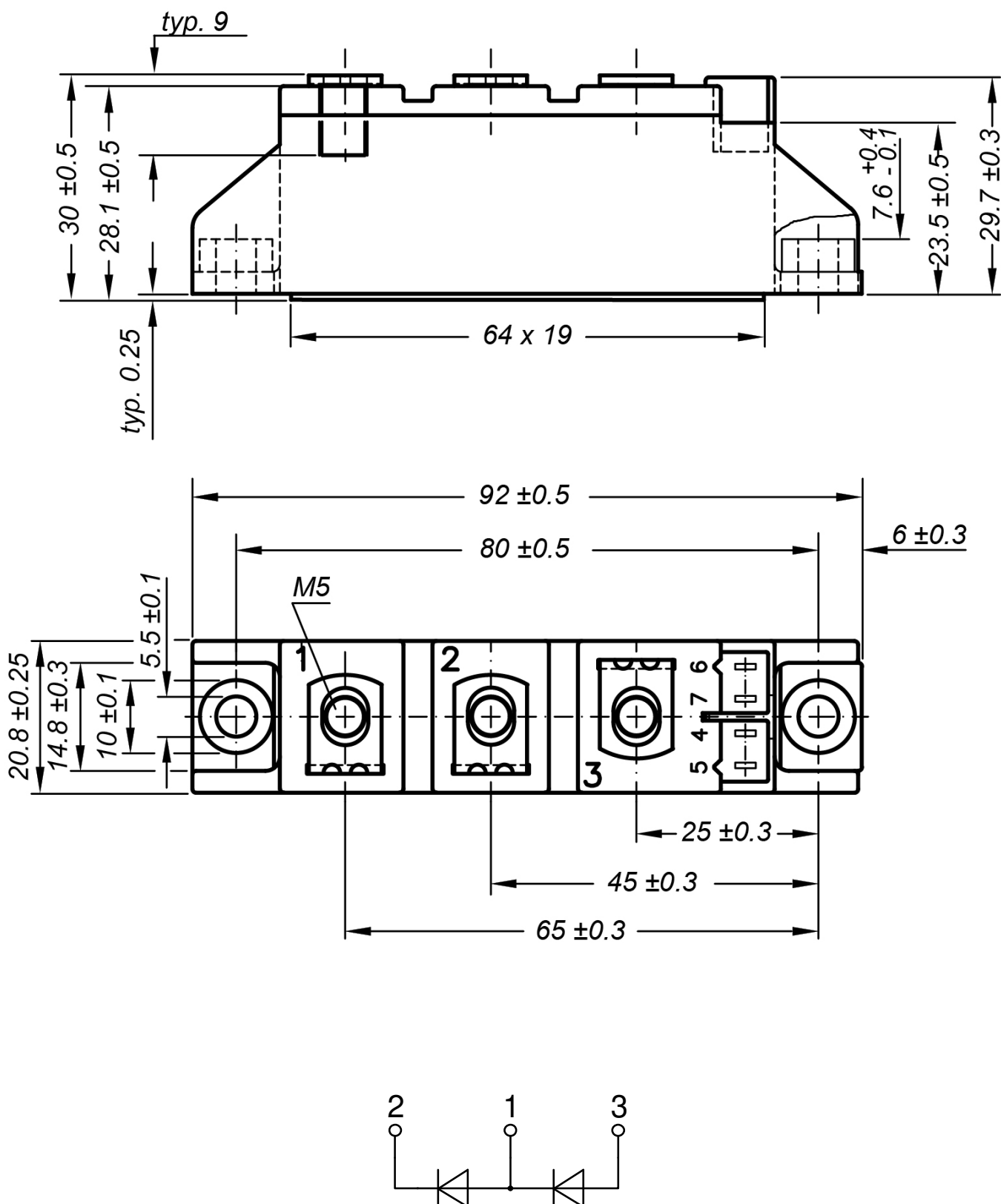
$R_{0\text{ max}}$

*slope resistance **

1

mΩ

Outlines TO-240AA



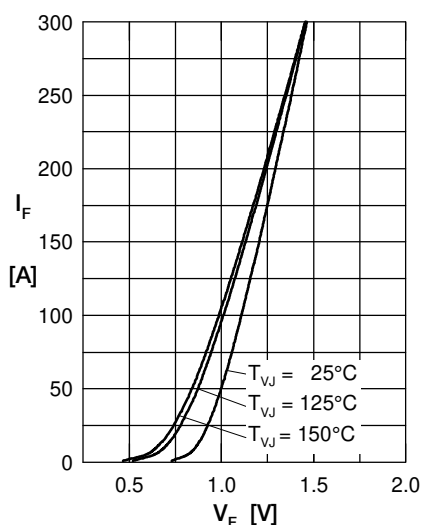
Rectifier


Fig. 1 Forward current versus voltage drop per diode

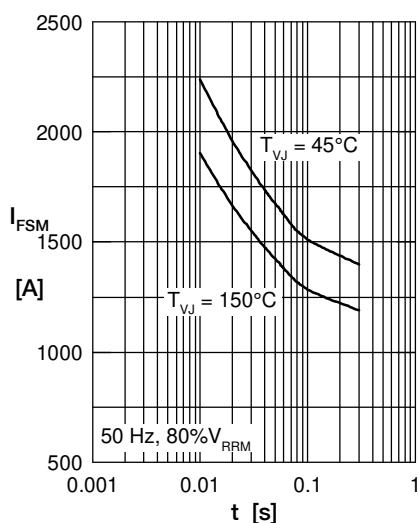


Fig. 2 Surge overload current vs. time per diode

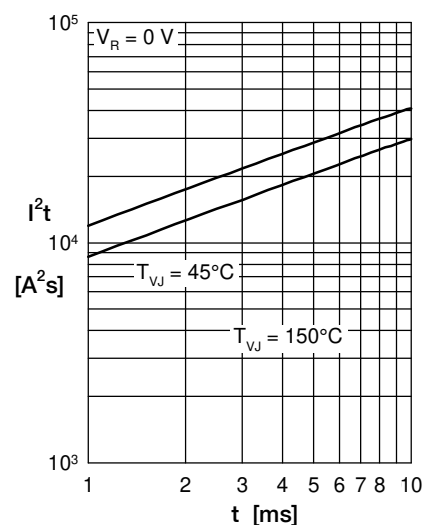
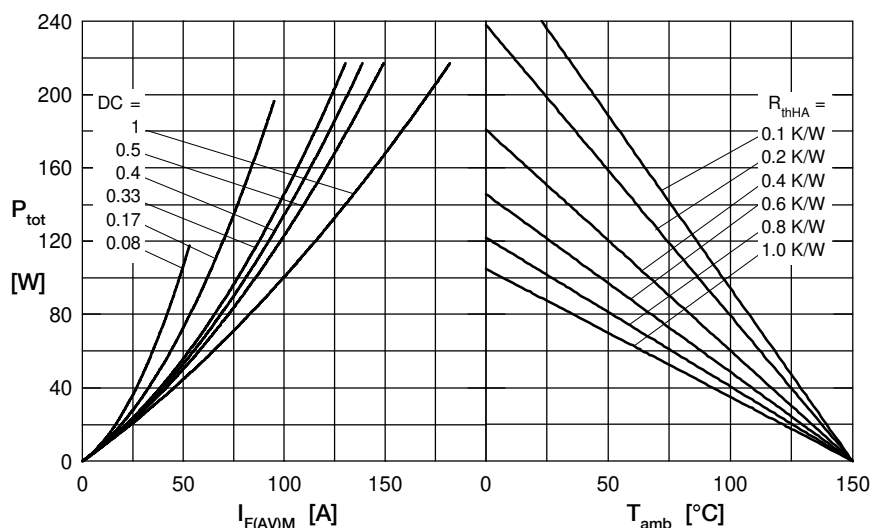

 Fig. 3 I^2t versus time per diode


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

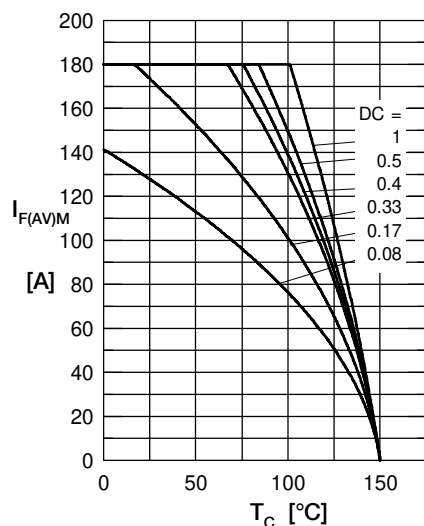


Fig. 5 Max. forward current vs. case temperature per diode

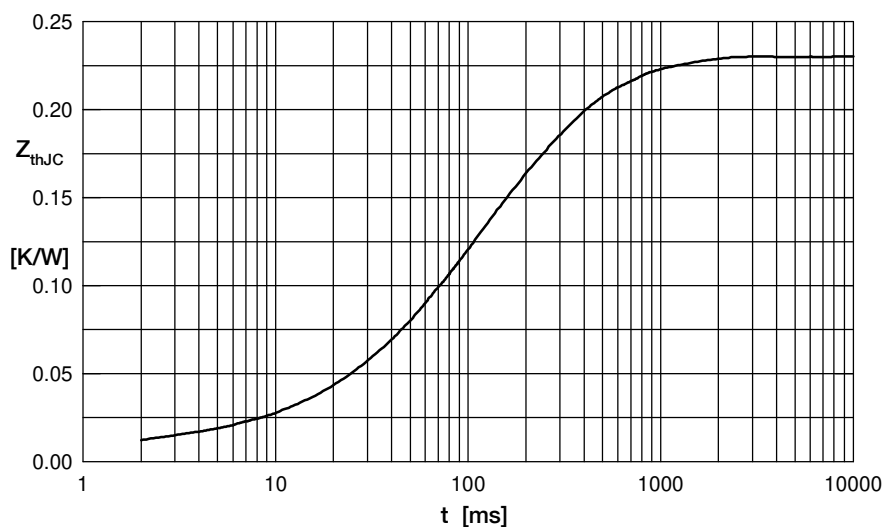


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 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