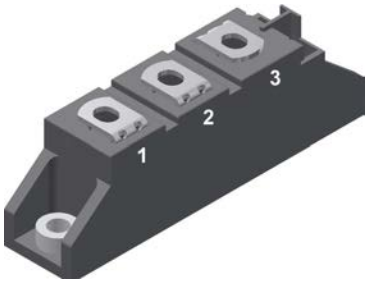
Standard Rectifier Module

V_{RRM} = 2x 1600 V
I_{FAV} = 50 A
V_F = 1,09 V

Phase leg

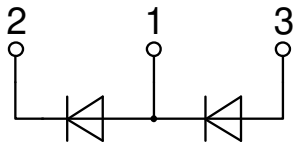
Part number

MDMA50P1600TG



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

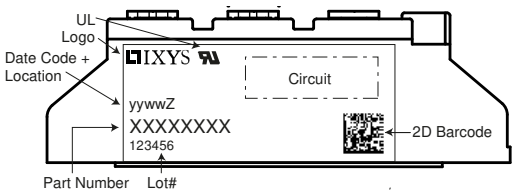
Package: TO-240AA

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

Rectifier

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			50	µA
		V_R = 1600 V	T_{VJ} = 150°C			1,5	mA
V_F	*forward voltage drop*	I_F = 50 A	T_{VJ} = 25°C			1,13	V
		I_F = 100 A				1,34	V
		I_F = 50 A	T_{VJ} = 125°C			1,09	V
		I_F = 100 A				1,37	V
I_{FAV}	*average forward current*	T_C = 100°C	T_{VJ} = 150°C			50	A
		rectangular d = 0.5					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0,80	V
r_F	*slope resistance* }					5,7	mΩ
R_{thJC}	*thermal resistance junction to case*					0,65	K/W
R_{thCH}	*thermal resistance case to heatsink*				0,2		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			190	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			850	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			920	A
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			725	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			780	A
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			3,62	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			3,52	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			2,63	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			2,53	kA²s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		27		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



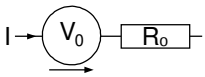
Part description

M = Module
D = Diode
M = Standard Rectifier
A = (up to 1800V)
50 = 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	MDMA50P1600TG	MDMA50P1600TG	Box	36	513022

Equivalent Circuits for Simulation

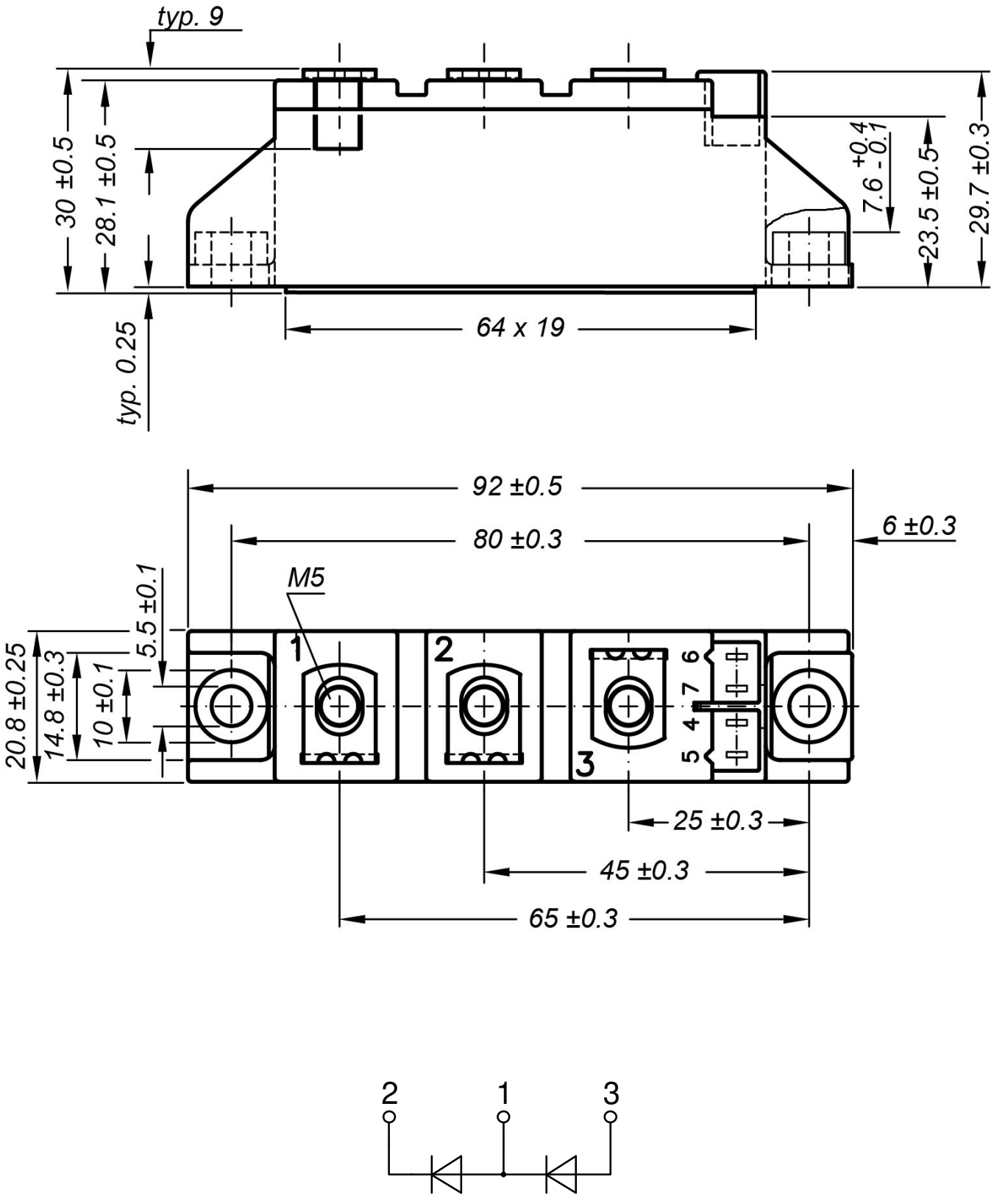
** on die level* T_{VJ} = 150°C



Rectifier

$V_{0\ max}$	*threshold voltage*	0,8	V
$R_{0\ max}$	*slope resistance **	4,5	mΩ

Outlines TO-240AA



Rectifier

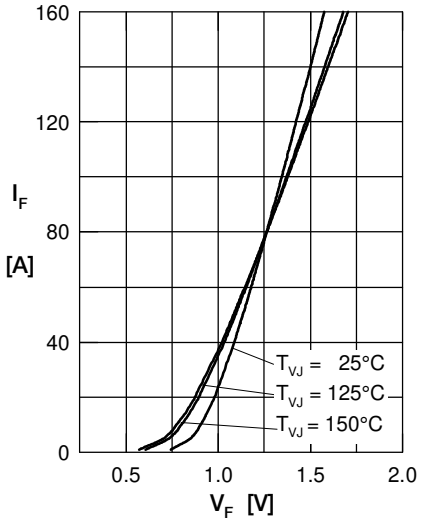


Fig. 1 Forward current versus voltage drop per diode

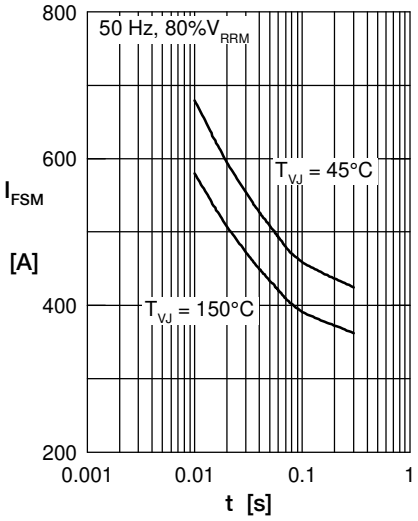


Fig. 2 Surge overload current vs. time per diode

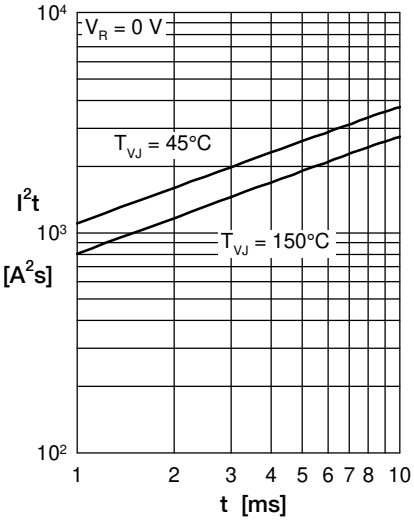


Fig. 3 I^2t versus time per diode

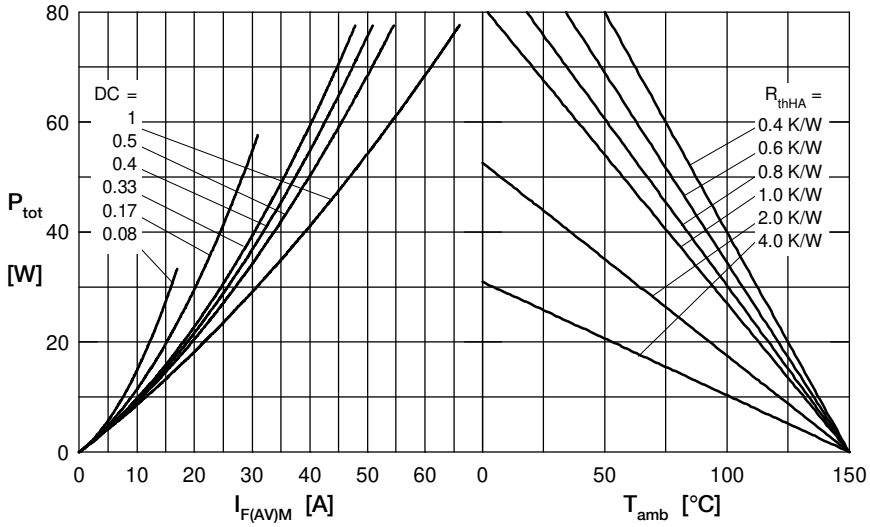


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

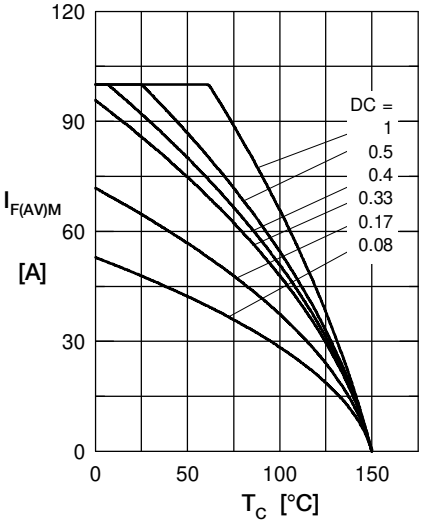


Fig. 5 Max. forward current vs. case temperature per diode

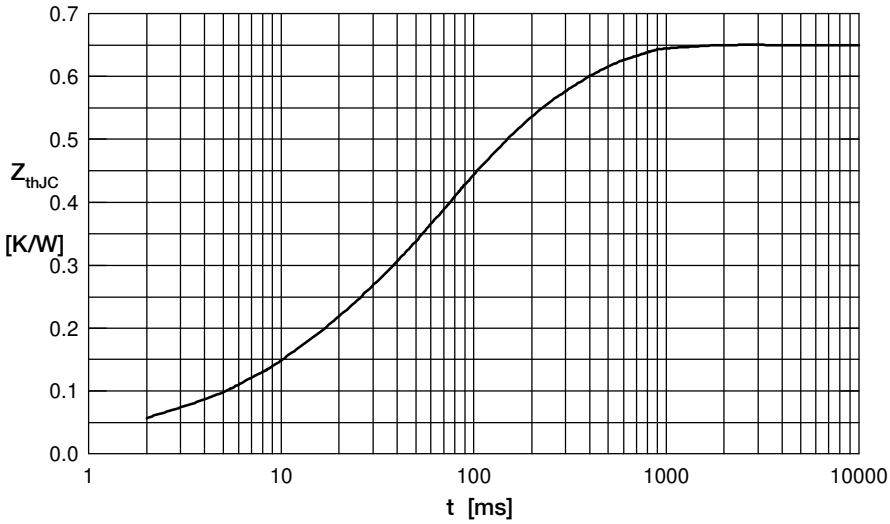


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.032	0.001
2	0.098	0.010
3	0.305	0.060
4	0.215	0.270