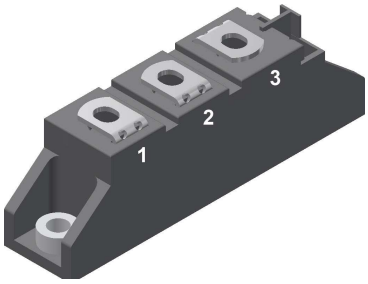
Standard Rectifier Module

V_{RRM} = 2x 1200 V
I_{FAV} = 99 A
V_F = 1.22 V

Phase leg

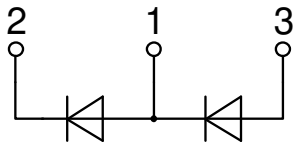
Part number

MDD72-12N1B



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

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.

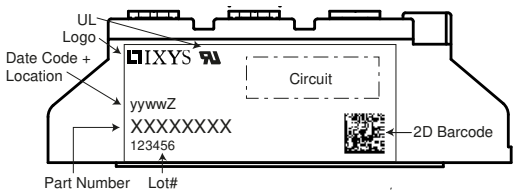
© 2020 IXYS all rights reserved

Rectifier

Symbol	Definition	Conditions		Ratings min.	typ.	max.	Unit
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1300	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1200	V
I_R	*reverse current*	V_R = 1200 V	T_{VJ} = 25°C			200	µA
		V_R = 1200 V	T_{VJ} = 150°C			15	mA
V_F	*forward voltage drop*	I_F = 150 A	T_{VJ} = 25°C			1.27	V
		I_F = 300 A				1.60	V
		I_F = 150 A	T_{VJ} = 125°C			1.22	V
		I_F = 300 A				1.60	V
I_{FAV}	*average forward current*	T_C = 100°C	T_{VJ} = 150°C			99	A
$I_{F(RMS)}$	*RMS forward current*	180° sine				180	A
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0.80	V
r_F	*slope resistance* }					2.3	mΩ
R_{thJC}	*thermal resistance junction to case*					0.35	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.2		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			357	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1.70	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.84	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			1.45	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.56	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			14.5	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			14.0	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			10.4	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			10.1	kA²s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		116		pF

© 2020 IXYS all rights reserved

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

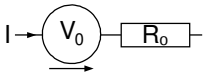


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD72-12N1B	MDD72-12N1B	Box	36	453188

Similar Part	Package	Voltage class
MDD72-08N1B	TO-240AA	800
MDD72-14N1B	TO-240AA	1400
MDD72-16N1B	TO-240AA	1600
MDD72-18N1B	TO-240AA	1800

Equivalent Circuits for Simulation

** on die level* T_{VJ} = 150°C

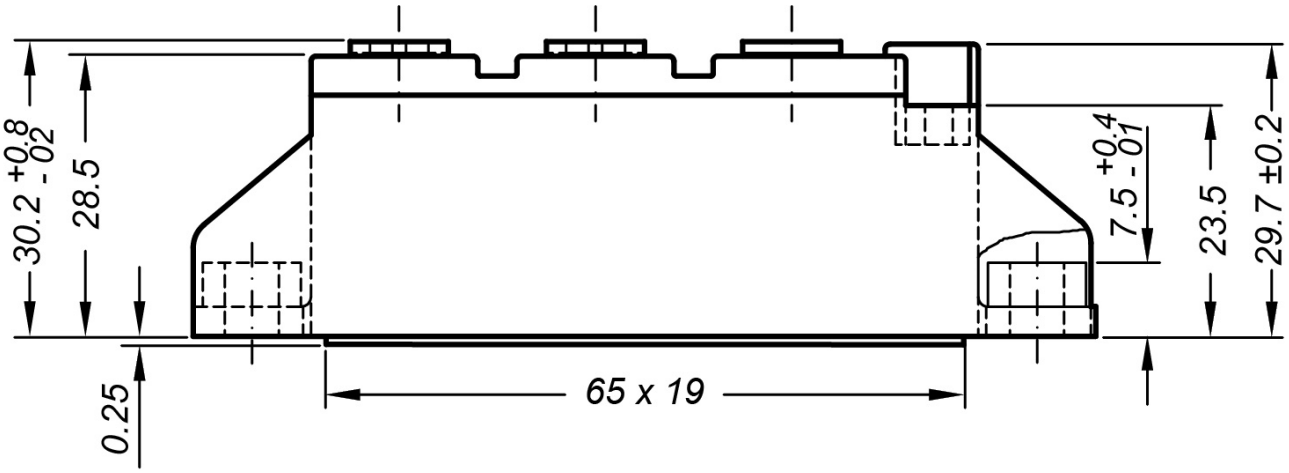


Rectifier

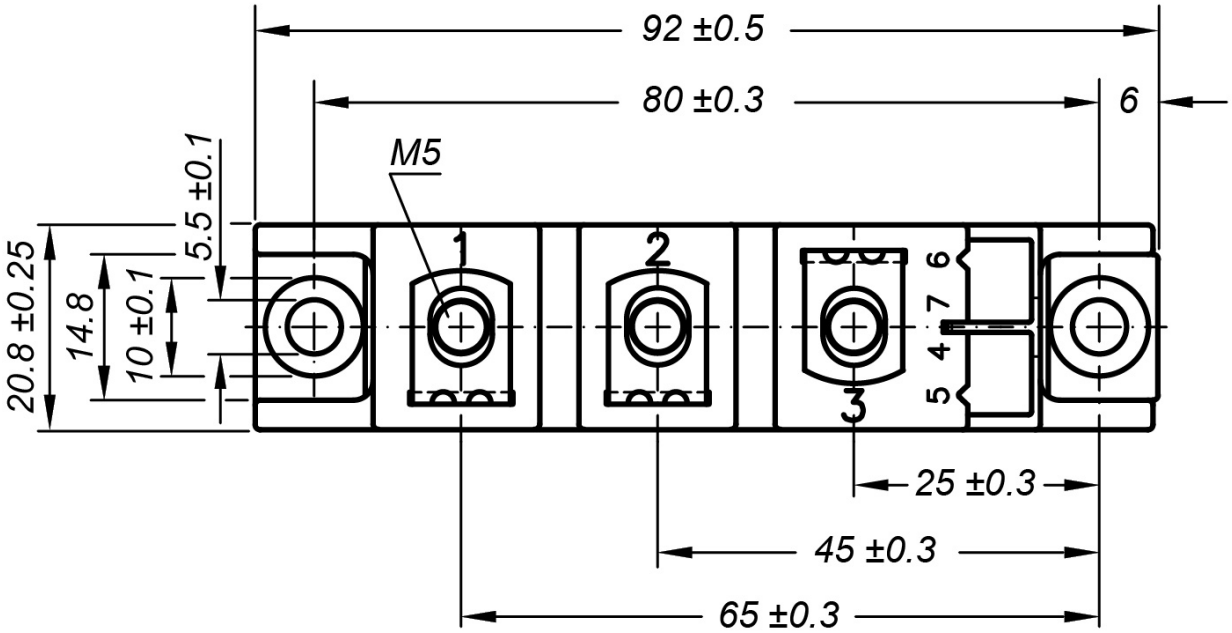
$V_{0\ max}$	*threshold voltage*	0.8	V
$R_{0\ max}$	*slope resistance **	1.1	mΩ

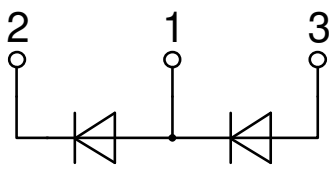
© 2020 IXYS all rights reserved

Outlines TO-240AA



General tolerance: DIN ISO 2768 class „c“





© 2020 IXYS all rights reserved

Rectifier

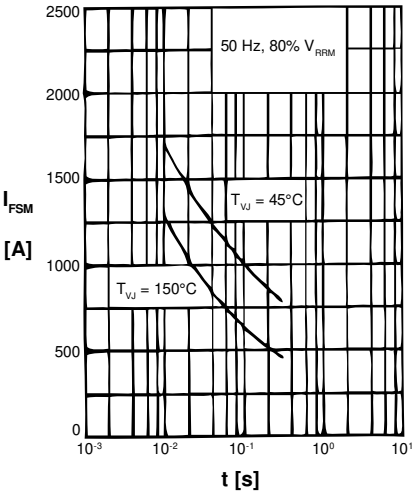


Fig. 1 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

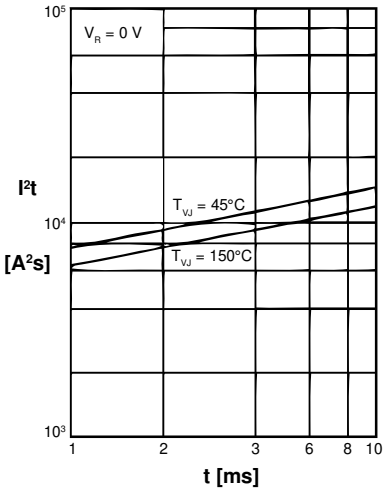


Fig. 2 I^2t versus time (1-10 ms)

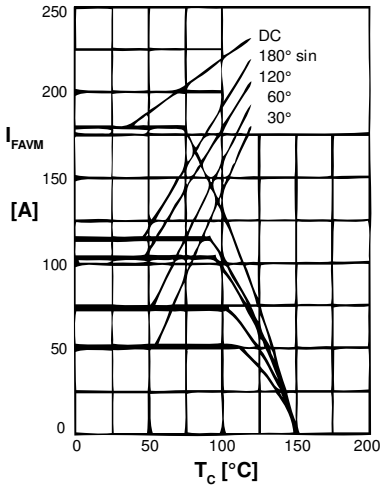


Fig. 3 Maximum forward current at case temperature

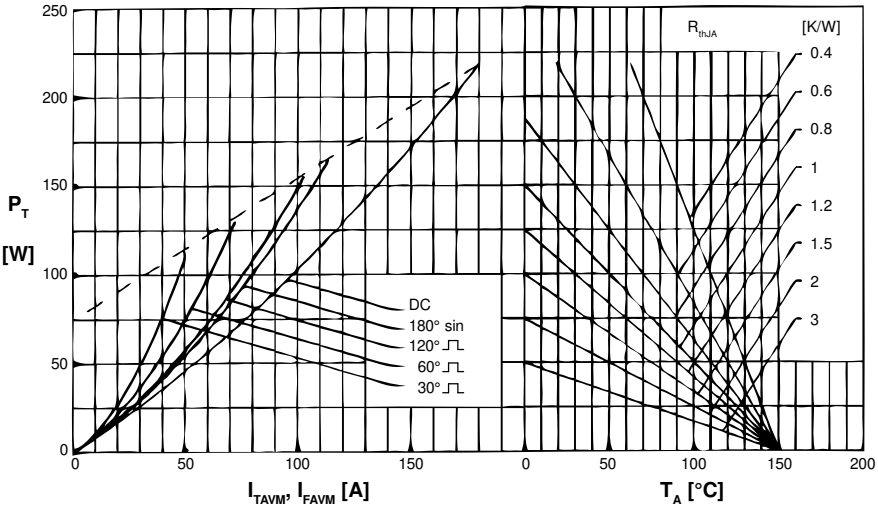


Fig. 4 Power dissipation vs. onstate current and ambient temperature (per diode)

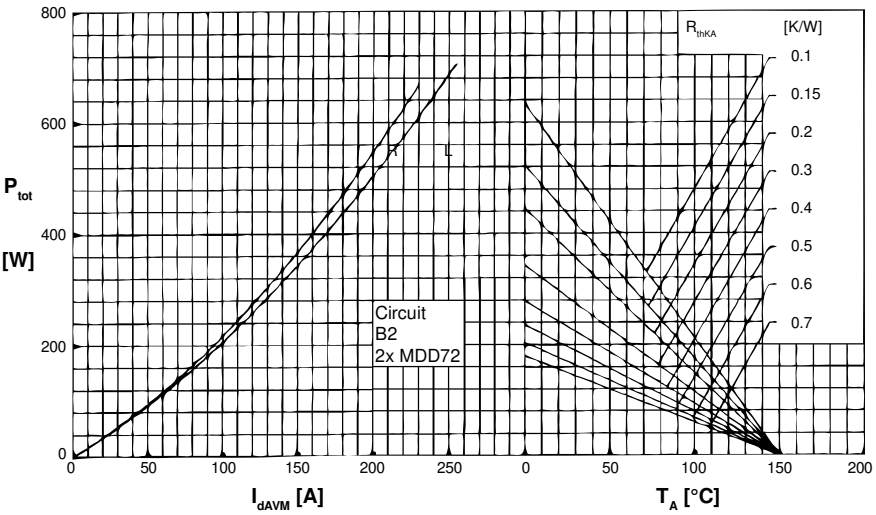


Fig. 6 Single phase rectifier bridge: Power dissipation versus direct output current and ambient temperature; R = resistive load,L = inductive load

© 2020 IXYS all rights reserved

Rectifier

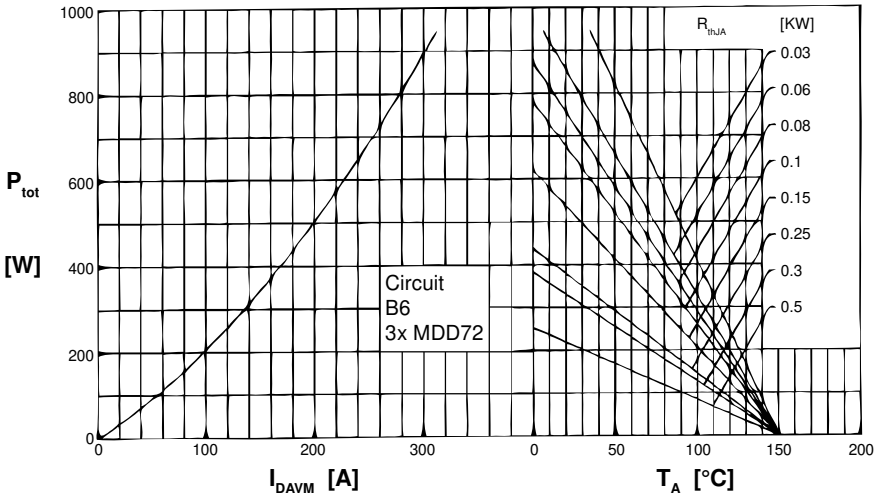


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

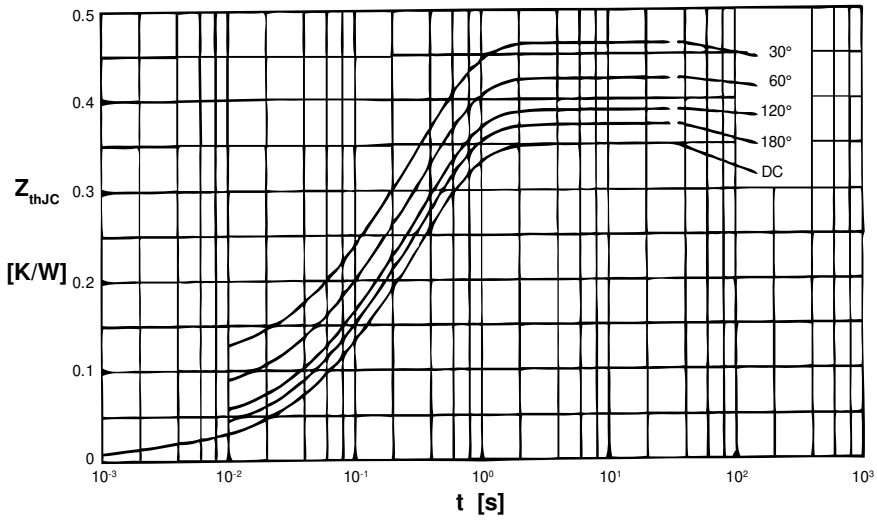


Fig. 7 Transient thermal impedance junction to case (per diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} [K/W]
DC	0.35
180°	0.37
120°	0.39
60°	0.43
30°	0.47

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.013	0.0014
2	0.072	0.0620
3	0.265	0.3750

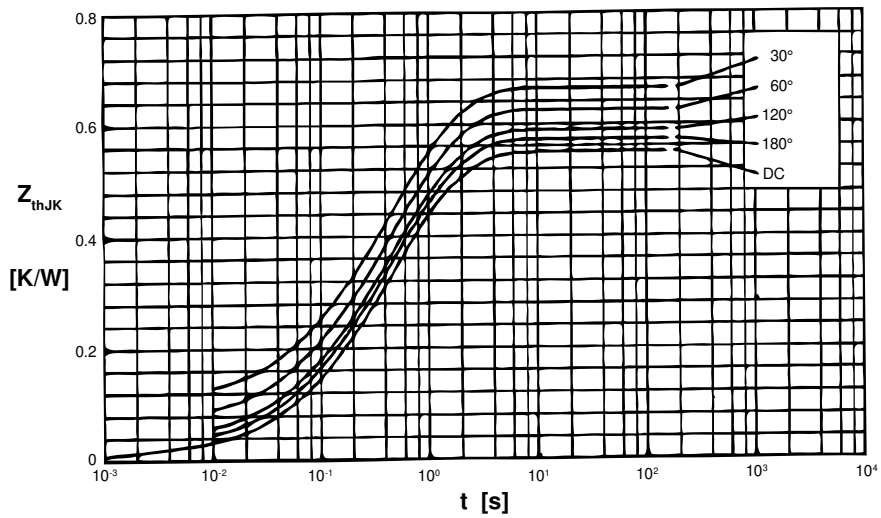


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} [K/W]
DC	0.55
180°	0.57
120°	0.59
60°	0.63
30°	0.67

Constants for Z_{thJK} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.013	0.0014
2	0.072	0.0620
3	0.265	0.3750
4	0.200	1.3200

© 2020 IXYS all rights reserved