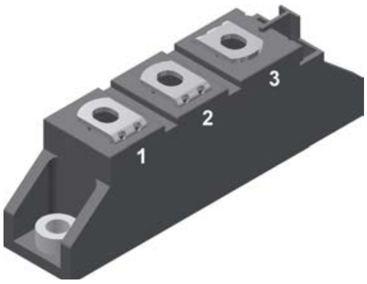
Standard Rectifier Module

V_{RRM} = 2x 1200 V
I_{FAV} = 59 A
V_F = 1,26 V

Phase leg

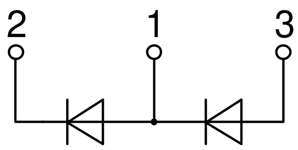
Part number

MDD44-12N1B



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

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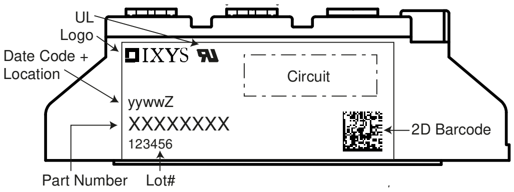
Rectifier				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			1300	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			1200	V
I_R	*reverse current*	V_R = 1200 V	T_{VJ} = 25°C			100	µA
		V_R = 1200 V	T_{VJ} = 150°C			10	mA
V_F	*forward voltage drop*	I_F = 100 A	T_{VJ} = 25°C			1,30	V
		I_F = 200 A				1,60	V
		I_F = 100 A	T_{VJ} = 125°C			1,26	V
		I_F = 200 A				1,67	V
I_{FAV}	*average forward current*	T_C = 100°C	T_{VJ} = 150°C			59	A
$I_{F(RMS)}$	*RMS forward current*	180° sine				100	A
V_{F0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 150°C			0,80	V
r_F	*slope resistance*					4,3	mΩ
R_{thJC}	*thermal resistance junction to case*					0,59	K/W
R_{thCH}	*thermal resistance case to heatsink*				0,2		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			212	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1,15	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1,24	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			980	A
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1,06	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			6,62	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			6,40	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			4,80	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			4,63	kA²s
C_J	*junction capacitance*	V_R = 400 V; f = 1 MHz	T_{VJ} = 25°C		27		pF

Package TO-240AA

Symbol	Definition	Conditions		Ratings 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; $I_{ISOL} \le 1$ mA		4800			V
		t = 1 minute		4000			V



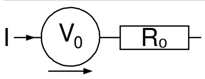
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD44-12N1B	MDD44-12N1B	Box	36	458023

Similar Part	Package	Voltage class
MDD44-08N1B	TO-240AA	800
MDD44-14N1B	TO-240AA	1400
MDD44-16N1B	TO-240AA	1600
MDD44-18N1B	TO-240AA	1800

Equivalent Circuits for Simulation

** on die level*

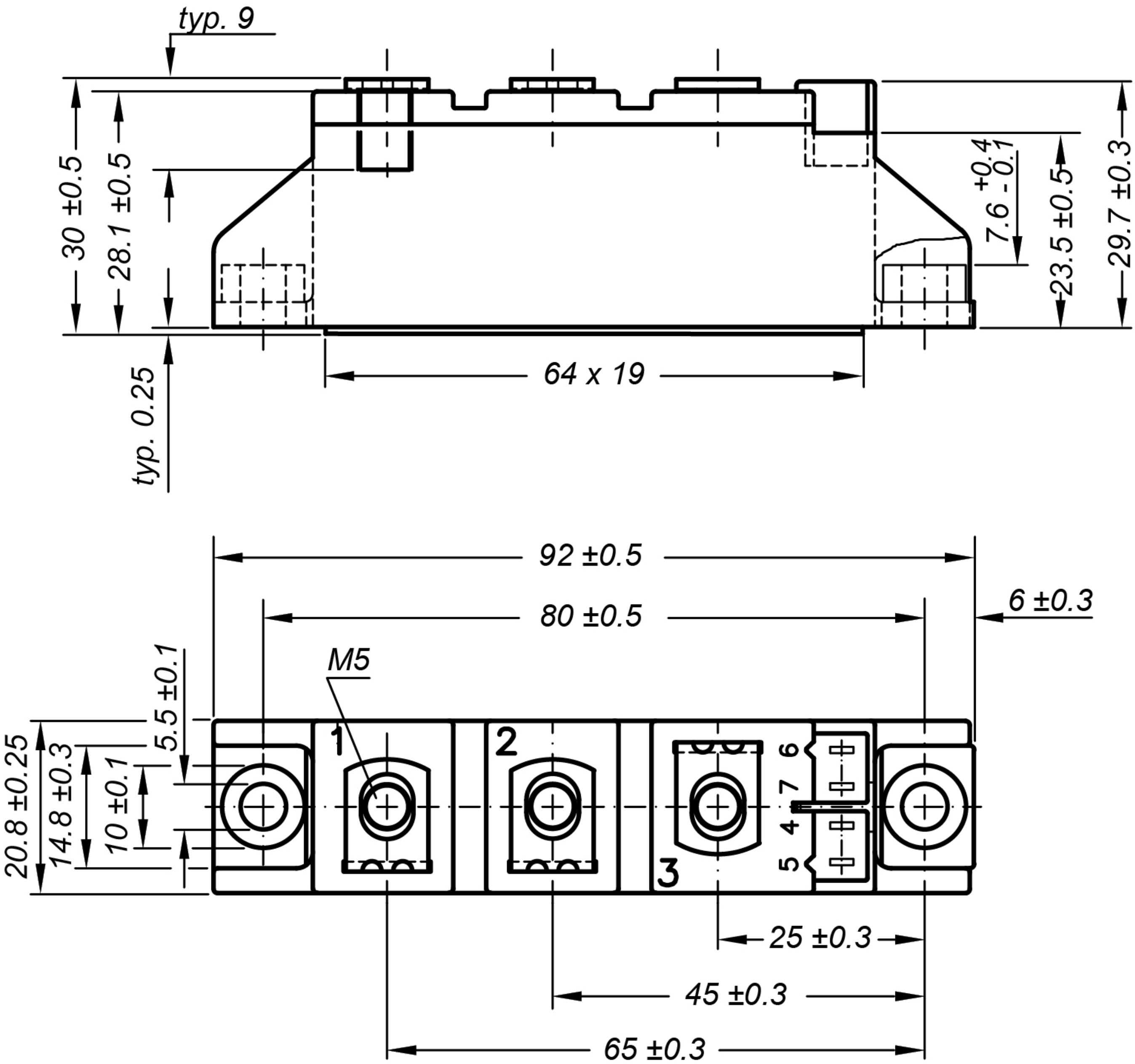
$T_{VJ} = 150°C$

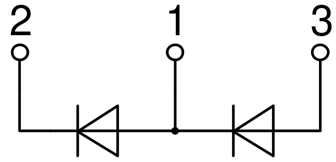


Rectifier

$V_{0\ max}$	*threshold voltage*	0,8	V
$R_{0\ max}$	*slope resistance **	3,1	mΩ

Outlines TO-240AA





Rectifier

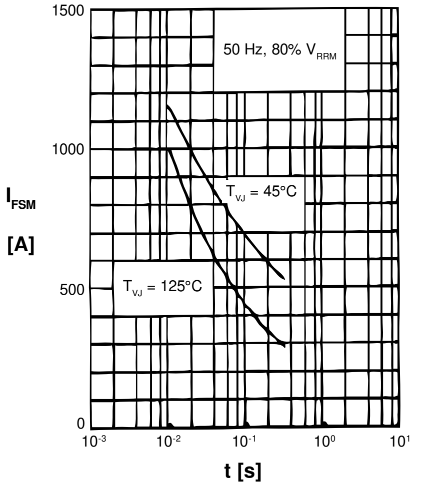


Fig. 1 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

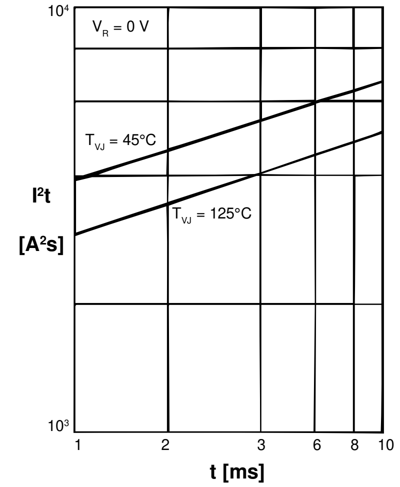


Fig. 2 I^2t versus time (1-10 ms)

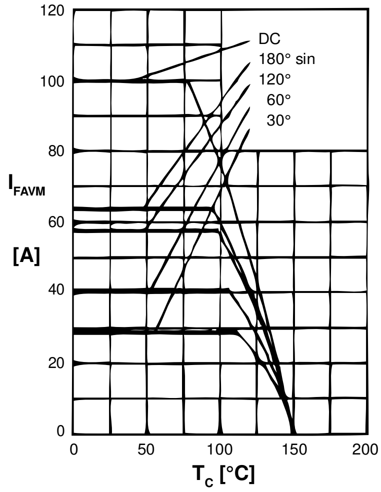


Fig. 3 Maximum forward current at case temperature

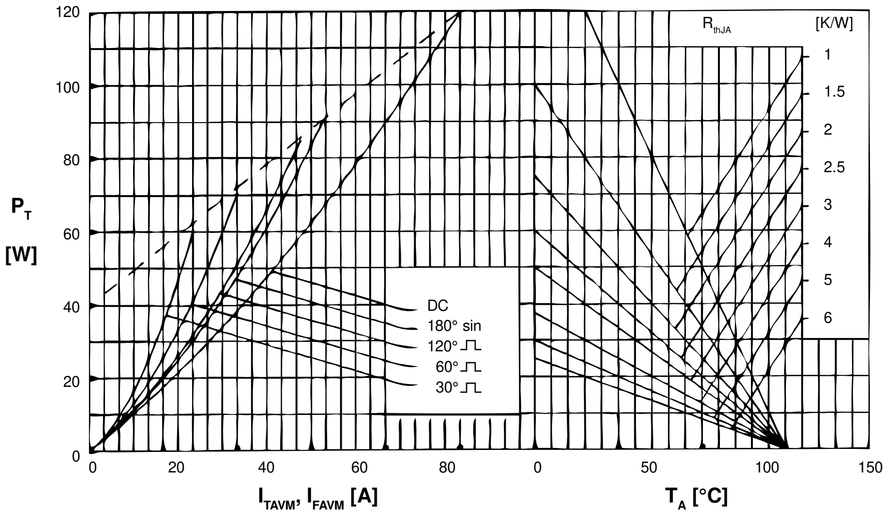


Fig. 4 Power dissipation vs. onstate current and ambient temperature (per diode)

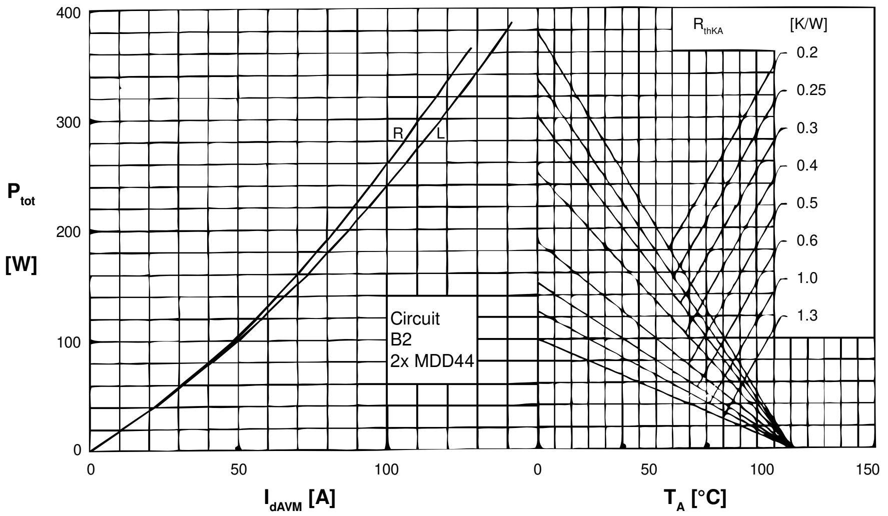


Fig. 6 Single phase rectifier bridge: Power dissipation versus direct output current and ambient temperature; R = resistive load, L = inductive load

Rectifier

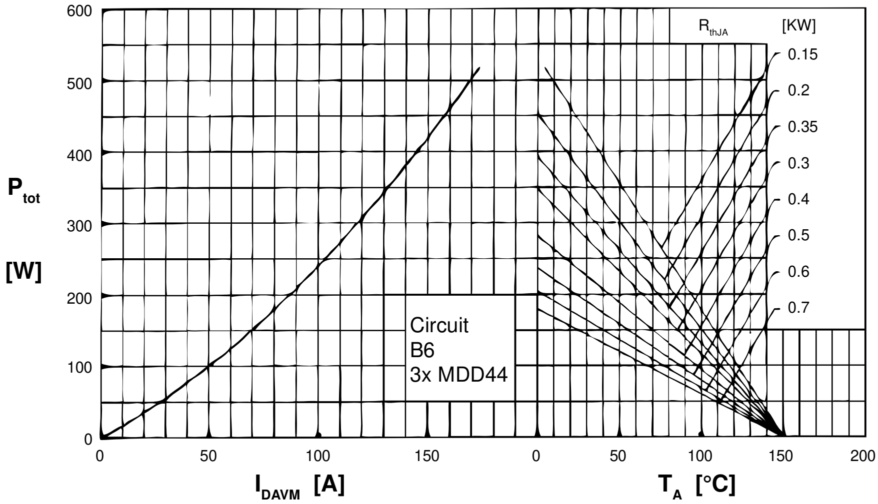


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

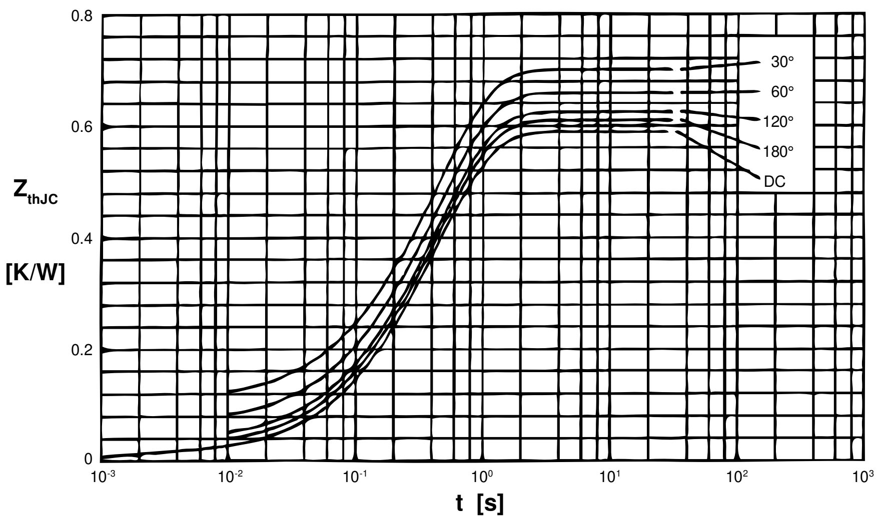


Fig. 7 Transient thermal impedance junction to case (per diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} [K/W]
DC	0.59
180°	0.61
120°	0.63
60°	0.66
30°	0.70

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.012	0.0012
2	0.045	0.0950
3	0.533	0.4550

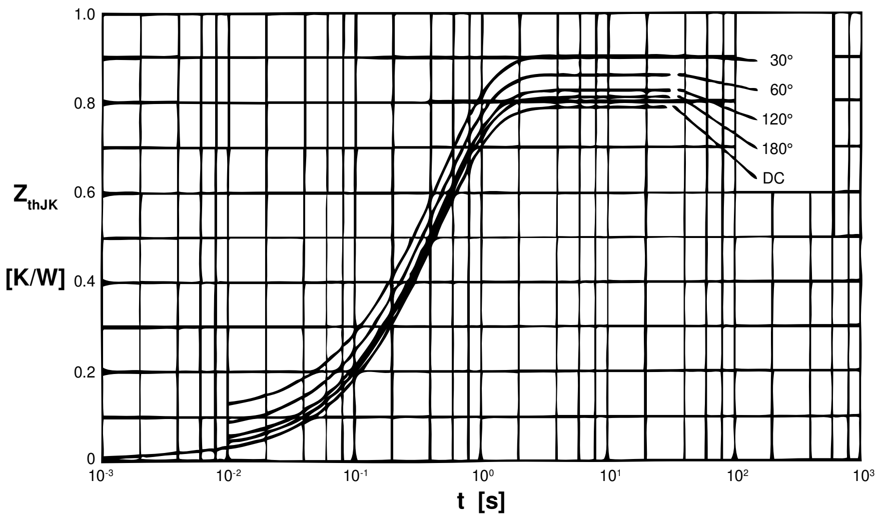


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} [K/W]
DC	0.79
180°	0.81
120°	0.83
60°	0.86
30°	0.90

Constants for Z_{thJK} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.012	0.0012
2	0.045	0.0950
3	0.533	0.4550
4	0.200	0.4950