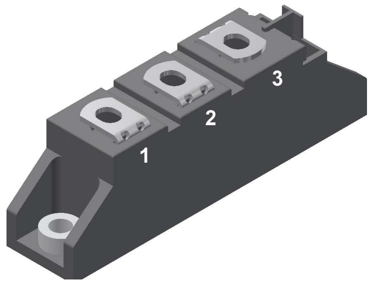
Standard Rectifier Module

V_{RRM} = 2x 1200 V
I_{FAV} = 71 A
V_F = 1.14 V

Phase leg

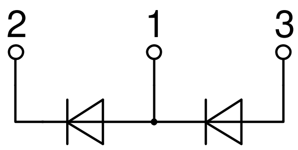
Part number

MDD56-12N1B



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

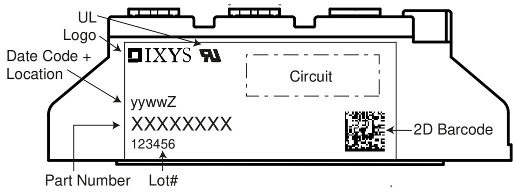
Package: TO-240AA

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

Disclaimer Notice

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			200	µA
		V_R = 1200 V	T_{VJ} = 150°C			10	mA
V_F	*forward voltage drop*	I_F = 100 A	T_{VJ} = 25°C			1.21	V
		I_F = 200 A				1.48	V
		I_F = 100 A	T_{VJ} = 125°C			1.14	V
		I_F = 200 A				1.45	V
I_{FAV}	*average forward current*	T_C = 100°C	T_{VJ} = 150°C			71	A
$I_{F(RMS)}$	*RMS forward current*	180° sine				150	A
V_{F0}	*threshold voltage*	*for power loss calculation only*	T_{VJ} = 150°C			0.80	V
r_F	*slope resistance*					3	mΩ
R_{thJC}	*thermal resistance junction to case*					0.51	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.2		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			245	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			1.40	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.51	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			1.19	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			1.29	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			9.80	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			9.49	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			7.08	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			6.87	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; $I_{ISOL} \le 1$ mA	4800			V
		t = 1 minute		4000			V

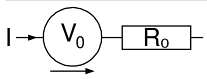


Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD56-12N1B	MDD56-12N1B	Box	36	458066

Similar Part	Package	Voltage class
MDD56-08N1B	TO-240AA	800
MDD56-14N1B	TO-240AA	1400
MDD56-16N1B	TO-240AA	1600
MDD56-18N1B	TO-240AA	1800

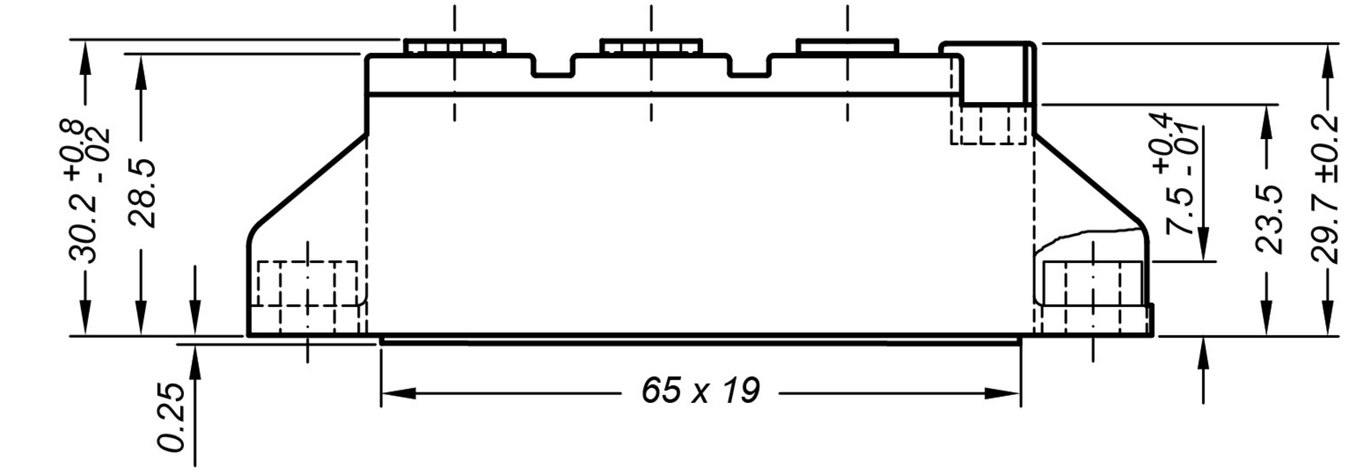
Equivalent Circuits for Simulation

** on die level* $T_{VJ} = 150°C$

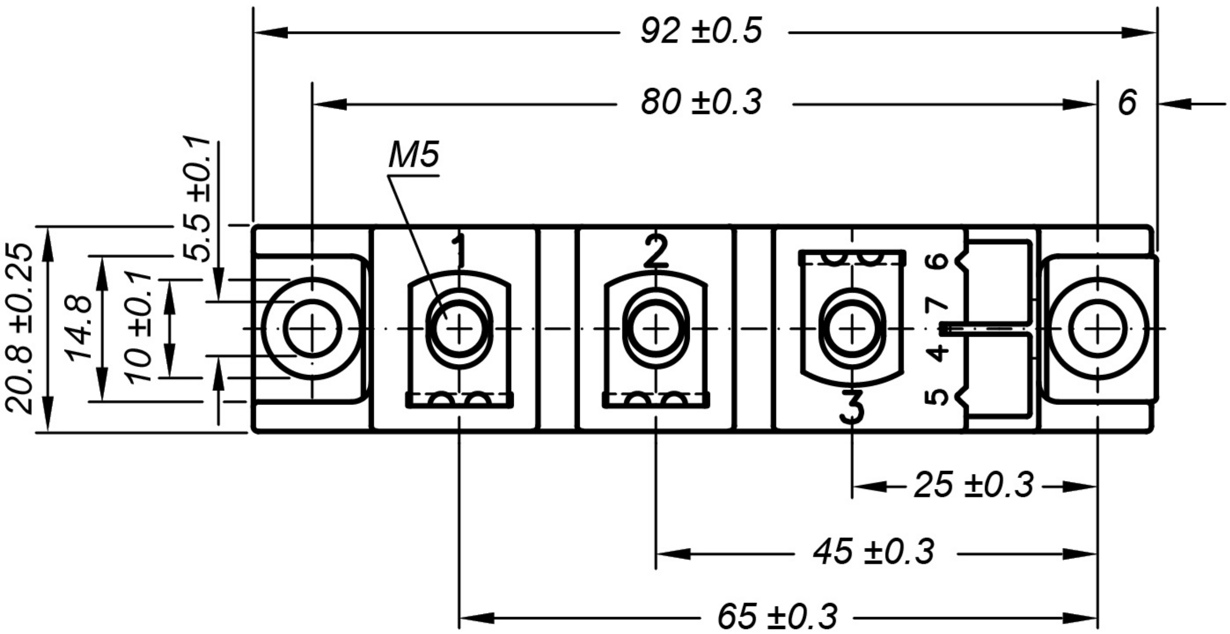


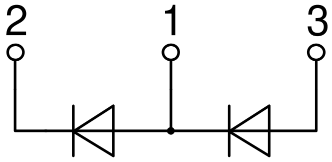
		Rectifier	
$V_{0\,max}$	*threshold voltage*	0.8	V
$R_{0\,max}$	*slope resistance **	1.8	mΩ

Outlines TO-240AA



General tolerance: DIN ISO 2768 class „c“





Rectifier

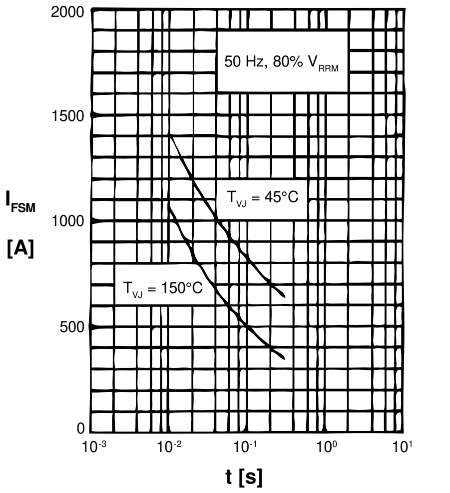


Fig. 1 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration

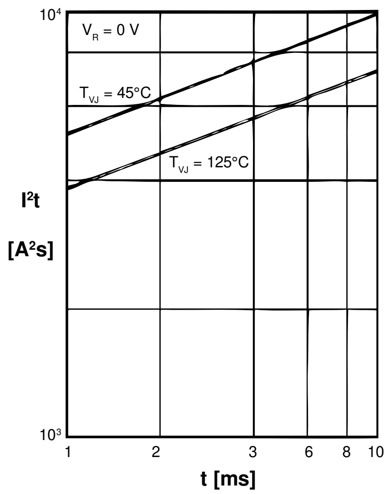


Fig. 2 I^2t versus time (1-10 ms)

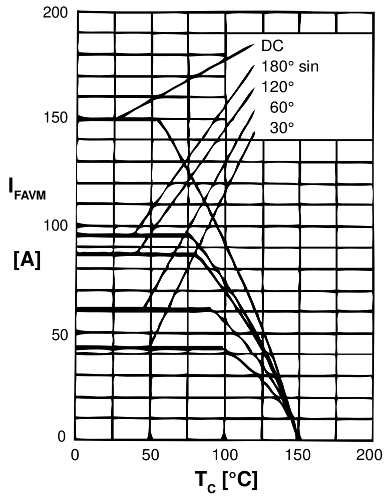


Fig. 3 Maximum forward current at case temperature

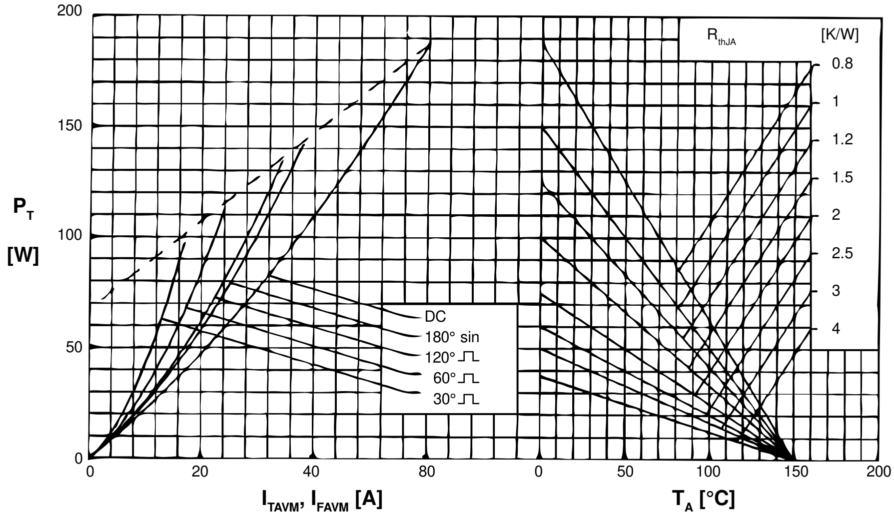


Fig. 4 Power dissipation vs. onstate current and ambient temperature (per diode)

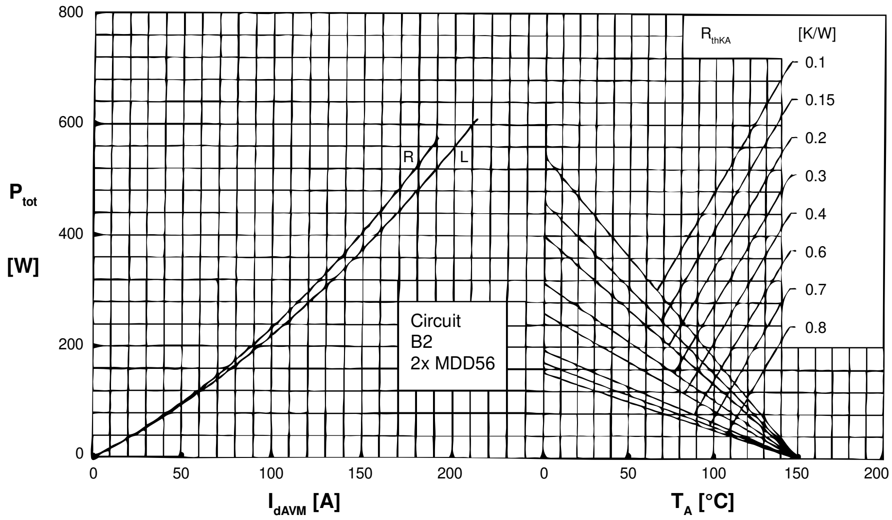


Fig. 6 Single phase rectifier bridge: Power dissipation versus direct output current and ambient temperature; R = resistive load,L = inductive load

Rectifier

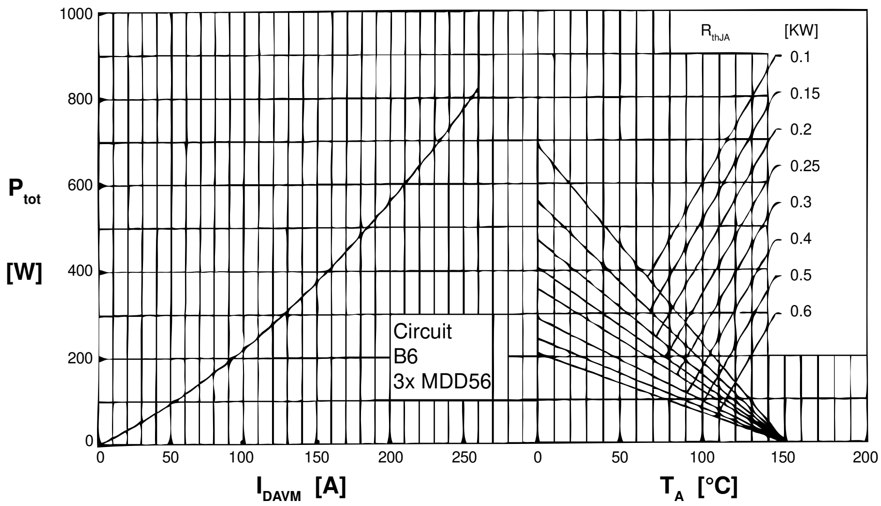


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

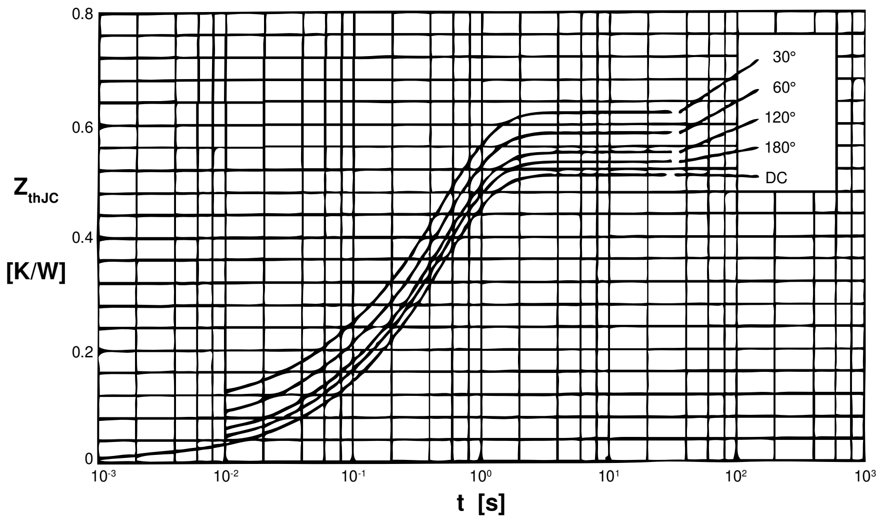


Fig. 7 Transient thermal impedance junction to case (per diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} [K/W]
DC	0.51
180°	0.53
120°	0.55
60°	0.58
30°	0.62

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.013	0.0015
2	0.055	0.0450
3	0.442	0.4850

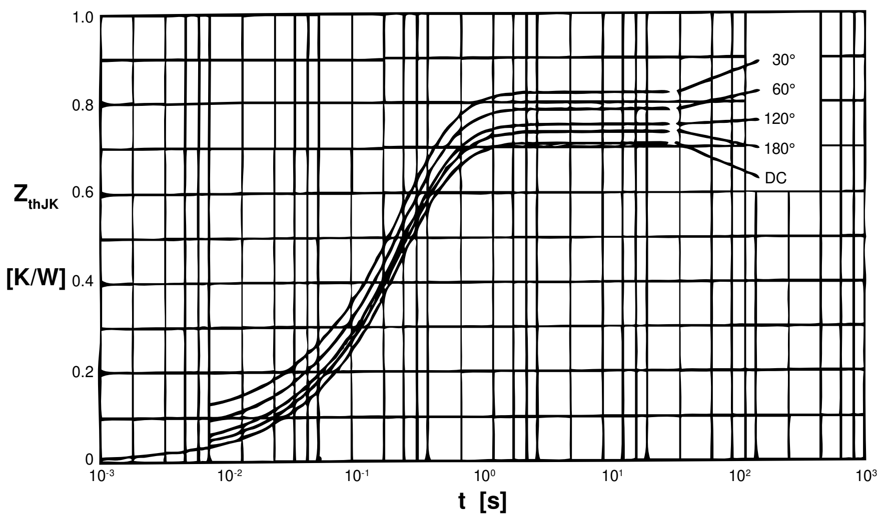


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} [K/W]
DC	0.71
180°	0.73
120°	0.75
60°	0.78
30°	0.82

Constants for Z_{thJK} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.013	0.0015
2	0.055	0.0450
3	0.442	0.4850
4	0.200	1.2500