

Standard Rectifier Module

$$V_{RRM} = 2 \times 1200 \text{ V}$$

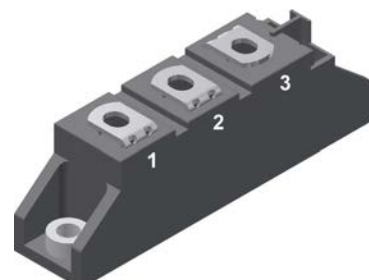
$$I_{FAV} = 36 \text{ A}$$

$$V_F = 1,05 \text{ V}$$

Phase leg

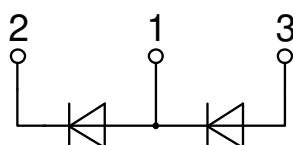
Part number

MDD26-12N1B



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

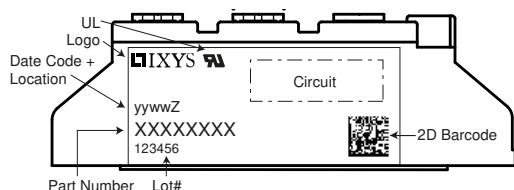
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	<i>max. non-repetitive reverse blocking voltage</i>	$T_{VJ} = 25^{\circ}\text{C}$				1300	V
V_{RRM}	<i>max. repetitive reverse blocking voltage</i>	$T_{VJ} = 25^{\circ}\text{C}$				1200	V
I_R	<i>reverse current</i>	$V_R = 1200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			100	μA
		$V_R = 1200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			1,5	mA
V_F	<i>forward voltage drop</i>	$I_F = 40\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1,13	V
		$I_F = 80\text{ A}$				1,38	V
		$I_F = 40\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1,05	V
		$I_F = 80\text{ A}$				1,27	V
I_{FAV}	<i>average forward current</i>	$T_C = 100^{\circ}\text{C}$	$T_{VJ} = 150^{\circ}\text{C}$			36	A
$I_{F(RMS)}$	<i>RMS forward current</i>	180° sine				60	A
V_{F0}	<i>threshold voltage</i>	} <i>for power loss calculation only</i>	$T_{VJ} = 150^{\circ}\text{C}$			0,80	V
r_F	<i>slope resistance</i>					6,1	m Ω
R_{thJC}	<i>thermal resistance junction to case</i>					1	K/W
R_{thCH}	<i>thermal resistance case to heatsink</i>				0,2		K/W
P_{tot}	<i>total power dissipation</i>		$T_C = 25^{\circ}\text{C}$			125	W
I_{FSM}	<i>max. forward surge current</i>	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			650	A
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			700	A
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			555	A
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			595	A
I^2t	<i>value for fusing</i>	$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 45^{\circ}\text{C}$			2,12	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			2,04	kA ² s
		$t = 10\text{ ms; (50 Hz), sine}$	$T_{VJ} = 150^{\circ}\text{C}$			1,54	kA ² s
		$t = 8,3\text{ ms; (60 Hz), sine}$	$V_R = 0\text{ V}$			1,48	kA ² s
C_J	<i>junction capacitance</i>	$V_R = 400\text{ V; } f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}\text{C}$		27		pF



Package TO-240AA				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I _{RMS}	<i>RMS current</i>	per terminal				200	A
T _{VJ}	<i>virtual junction temperature</i>			-40		150	°C
T _{op}	<i>operation temperature</i>			-40		125	°C
T _{stg}	<i>storage temperature</i>			-40		125	°C
Weight					76		g
M _D	<i>mounting torque</i>			2,5		4	Nm
M _T	<i>terminal torque</i>			2,5		4	Nm
d _{Spp/App}	<i>creepage distance on surface striking distance through air</i>	<i>terminal to terminal</i>	13,0	9,7			mm
d _{Spb/Apb}		<i>terminal to backside</i>	16,0	16,0			mm
V _{ISOL}	<i>isolation voltage</i>	t = 1 second	50/60 Hz, RMS; I _{ISOL} ≤ 1 mA		4800		V
		t = 1 minute			4000		V



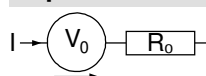
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD26-12N1B	MDD26-12N1B	Box	36	453021

Similar Part	Package	Voltage class
MDD26-08N1B	TO-240AA	800
MDD26-14N1B	TO-240AA	1400
MDD26-16N1B	TO-240AA	1600
MDD26-18N1B	TO-240AA	1800

Equivalent Circuits for Simulation

* on die level

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

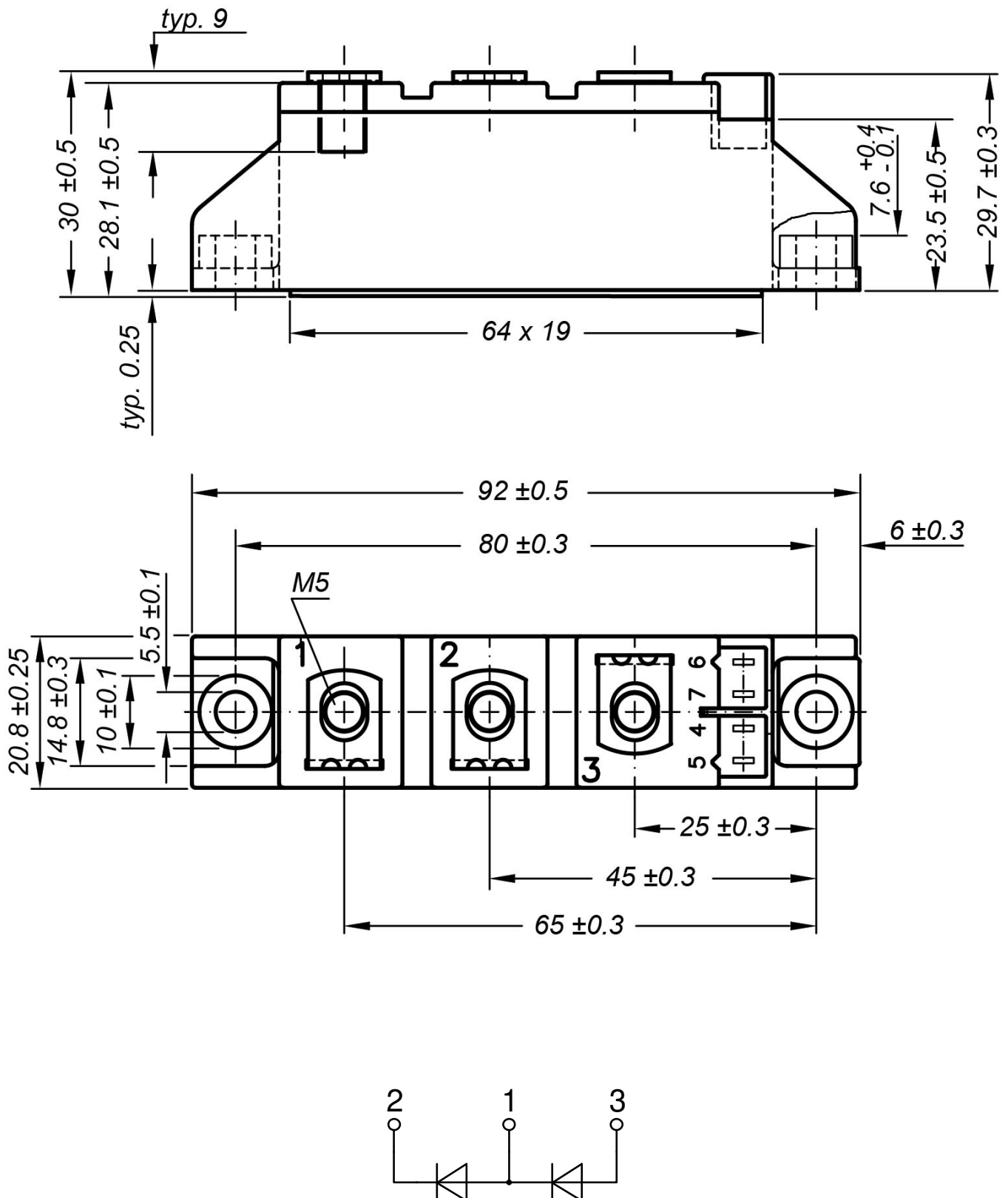


Rectifier

$V_{0\max}$	<i>threshold voltage</i>	0,8	V
$R_{0\max}$	<i>slope resistance *</i>	4,9	mΩ



Outlines TO-240AA



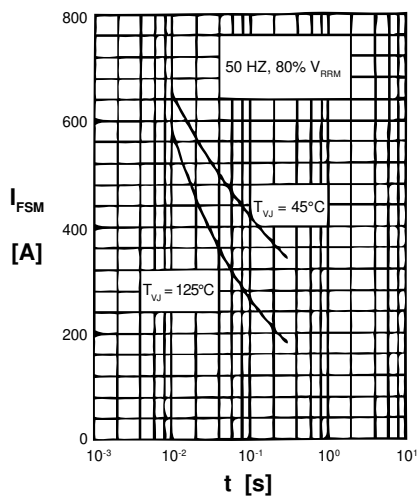
Rectifier


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

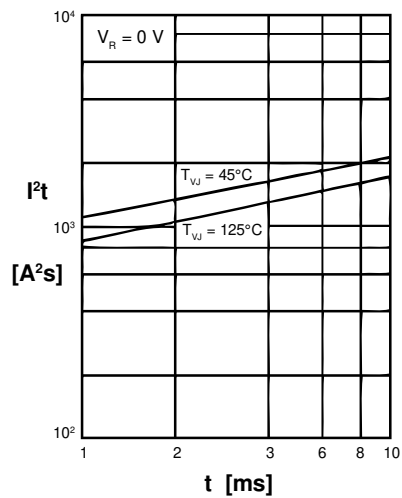


Fig. 2 I^2t versus time (1-10 ms)

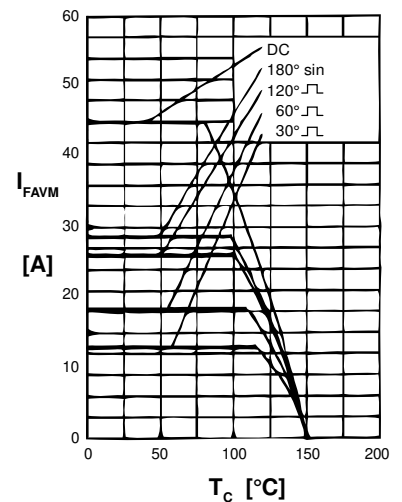


Fig. 3 Max. forward current
 at case temperature

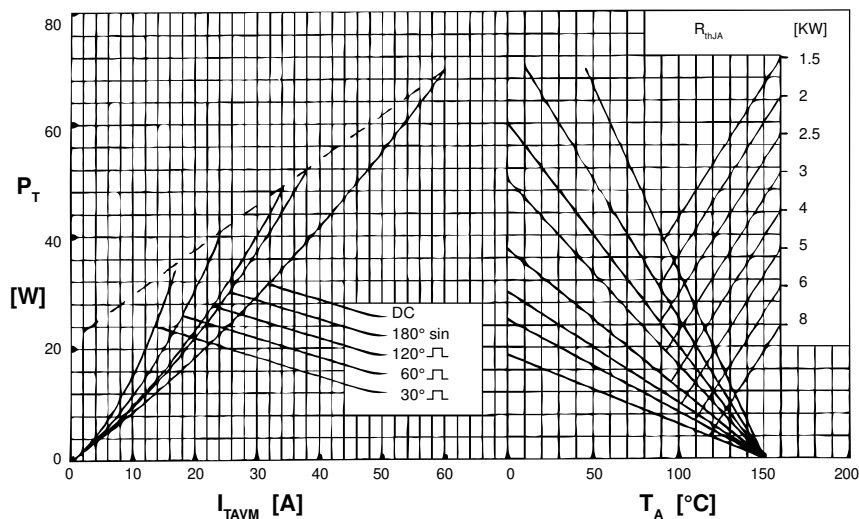


Fig. 4 Power dissipation versus onstate current & ambient temperature (per diode)

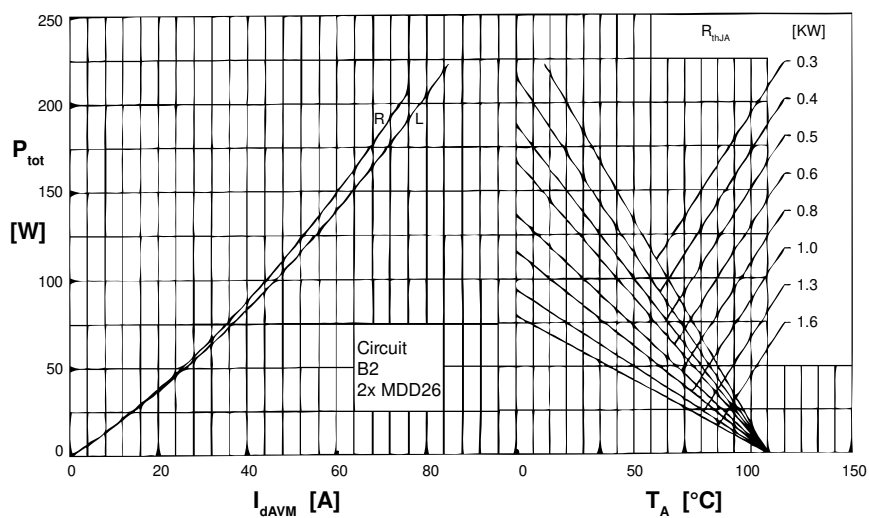


Fig. 6 Single phase rectifier bridge: Power dissipation vs. direct output current & ambient temperature; R = resistive load, L = inductive load

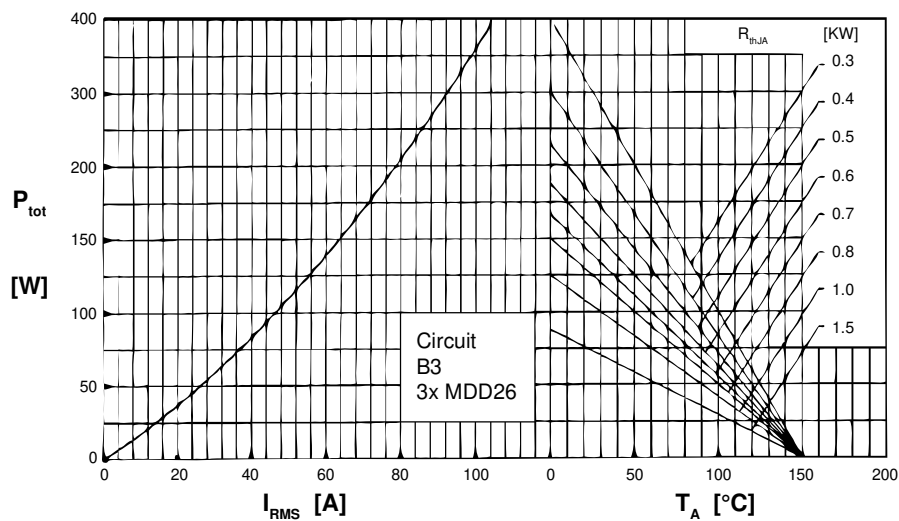
Rectifier


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

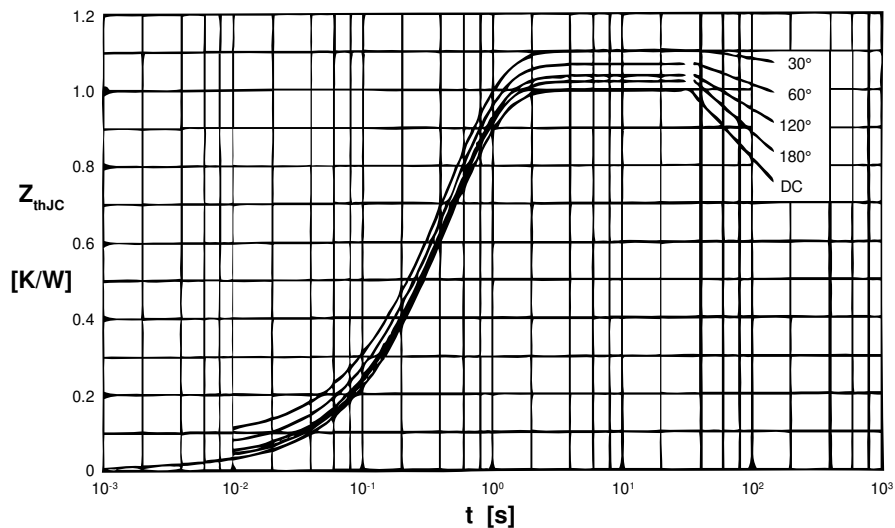


Fig. 7 Transient thermal impedance junction to case (per diode)

R_{thJC} for various conduction angles d:

d	R_{thJC} [K/W]
DC	1.00
180°	1.02
120°	1.04
60°	1.07
30°	1.10

Constants for Z_{thJC} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.01	0.0012
2	0.03	0.0950
3	0.96	0.4550

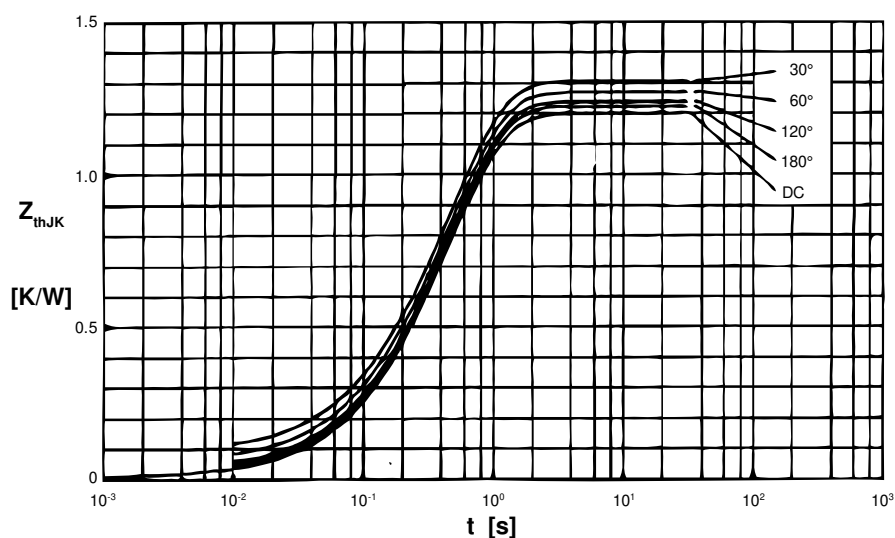


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor)

R_{thJK} for various conduction angles d:

d	R_{thJK} [K/W]
DC	1.20
180°	1.22
120°	1.24
60°	1.27
30°	1.30

Constants for Z_{thJK} calculation:

i	R_{thi} [K/W]	t_i [s]
1	0.01	0.0012
2	0.03	0.0950
3	0.96	0.4550
4	0.20	0.4950