

# Standard Rectifier Module

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

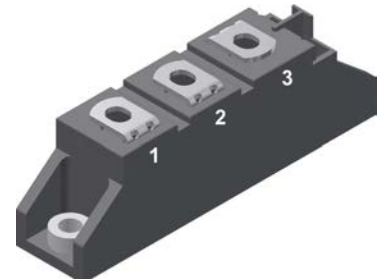
$$I_{FAV} = 36 \text{ A}$$

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

Phase leg

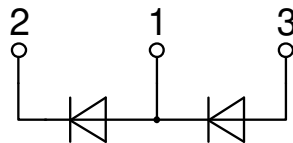
Part number

**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

### Disclaimer Notice

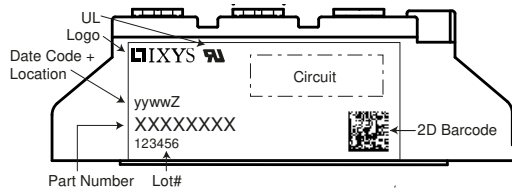
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Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage				1300	V	
$V_{RRM}$	max. repetitive reverse blocking voltage				1200	V	
$I_R$	reverse current	$V_R = 1200\text{ V}$		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



Package TO-240AA				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$I_{RMS}$	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	
<b>Weight</b>					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			4800	V	
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA		4000	V	



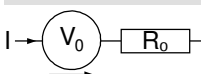
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD26-12N1B	MDD26-12N1B	Box	36	453021

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

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

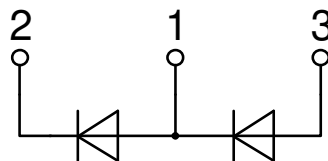
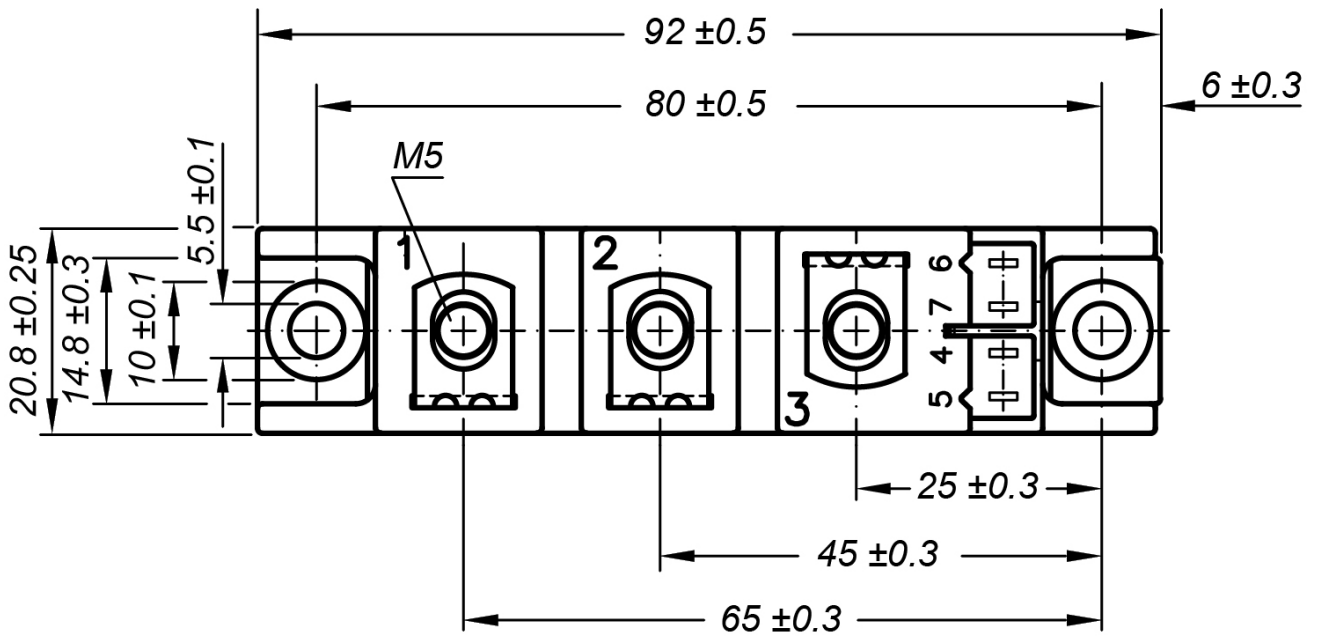
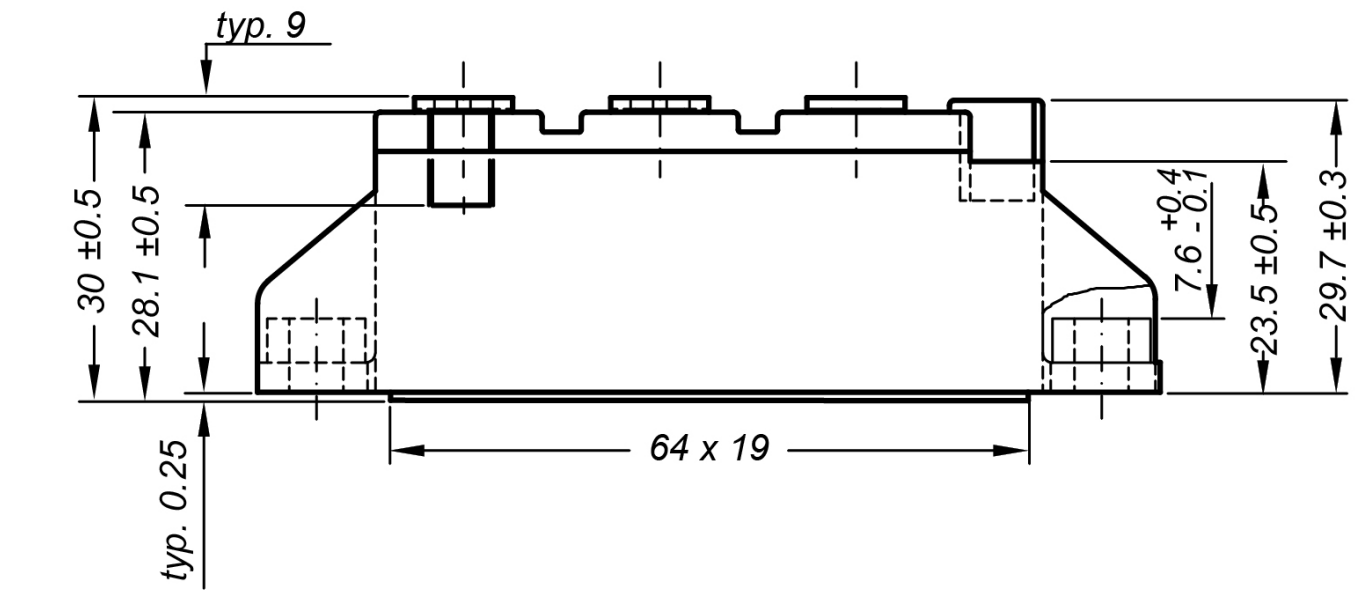


Rectifier

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



Outlines TO-240AA





**Rectifier**

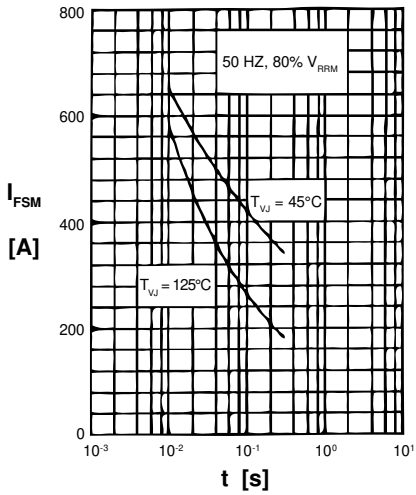


Fig. 1 Surge overload current  
 $I_{TSM}$ : Crest value,  $t$ : duration

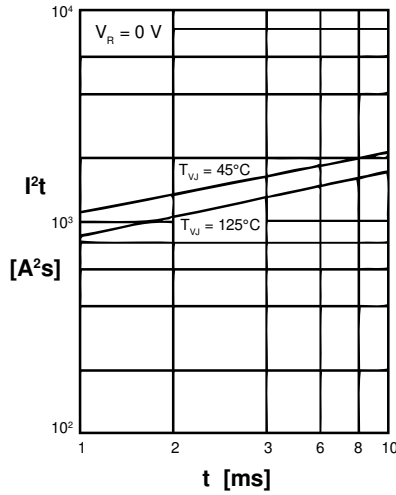


Fig. 2  $I^2t$  versus time (1-10 ms)

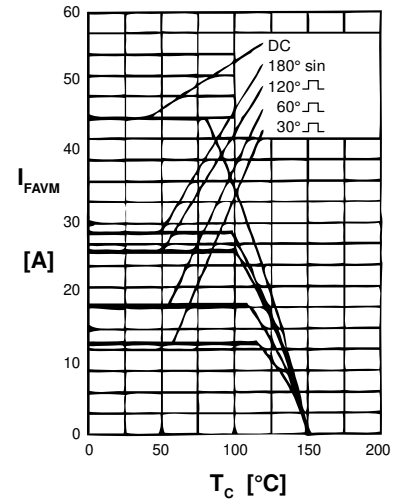


Fig. 3 Max. forward current at case temperature

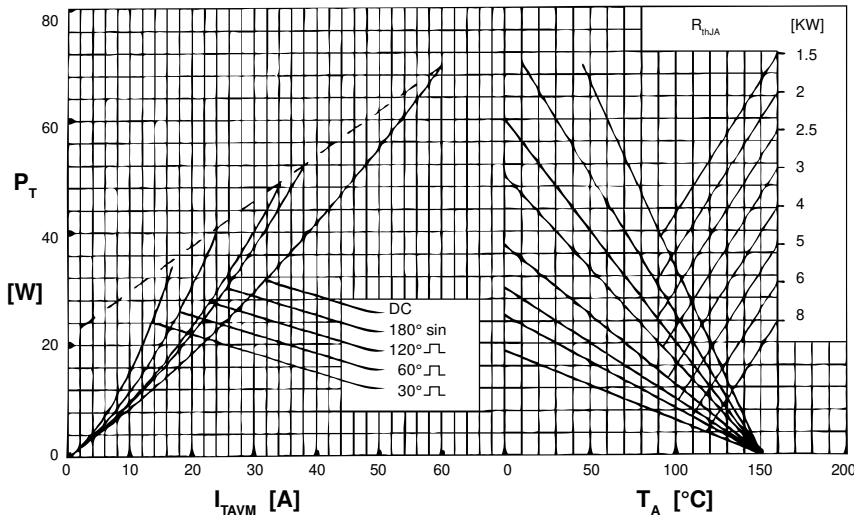


Fig. 4 Power dissipation versus onstate current & ambient temperature (per diode)

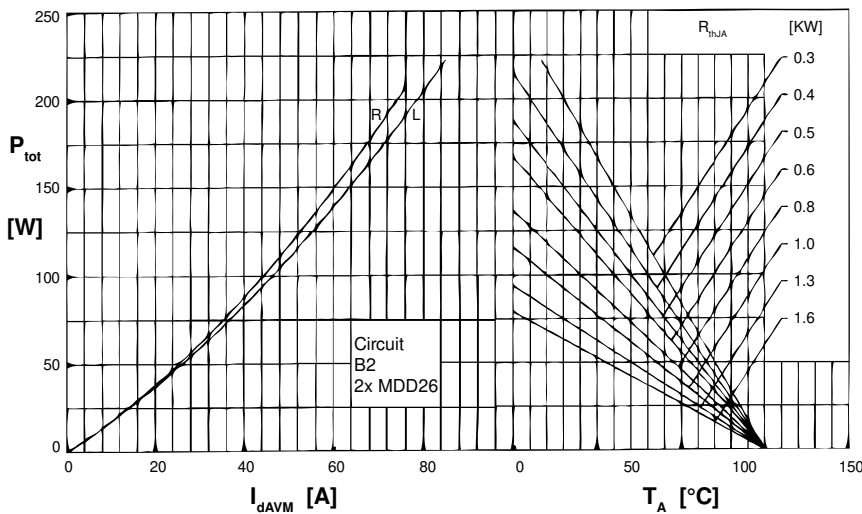


Fig. 6 Single phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature; R = resistive load, L = inductive load



**Rectifier**

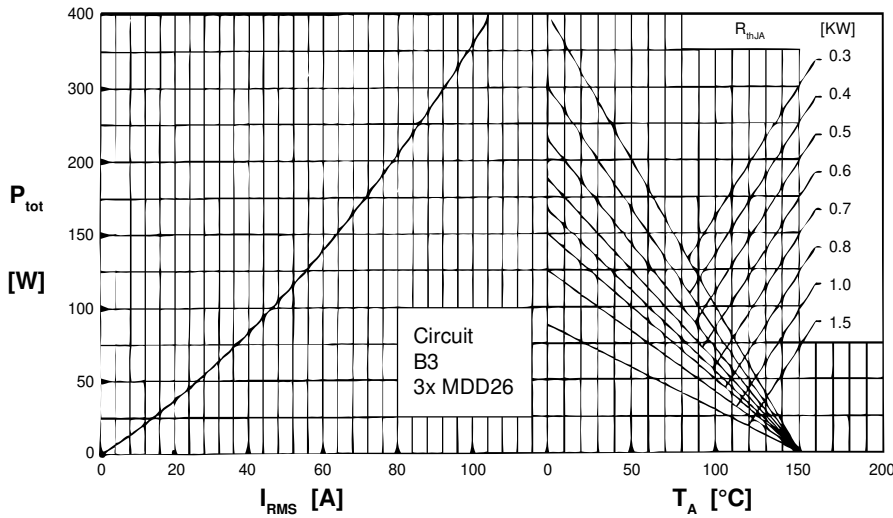


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

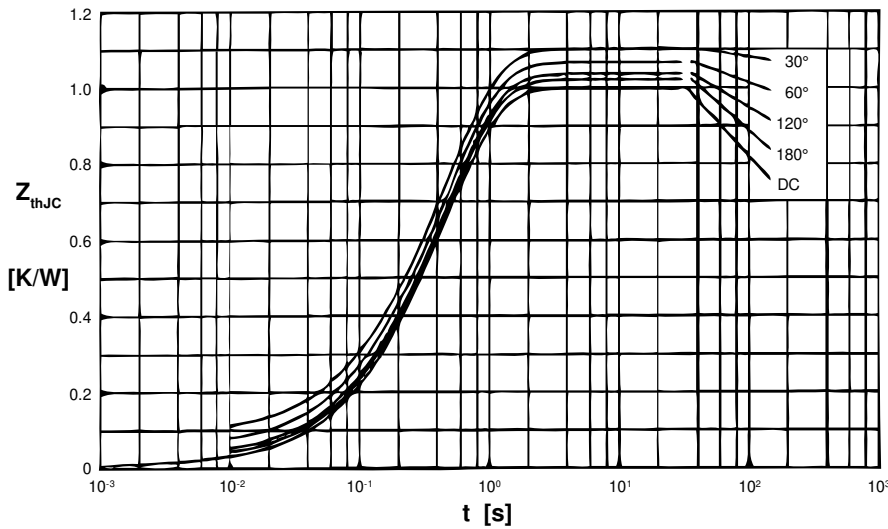


Fig. 7 Transient thermal impedance junction to case (per diode)

$R_{thJC}$  for various conduction angles d:

**d**  $R_{thJC}$  [K/W]

DC	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

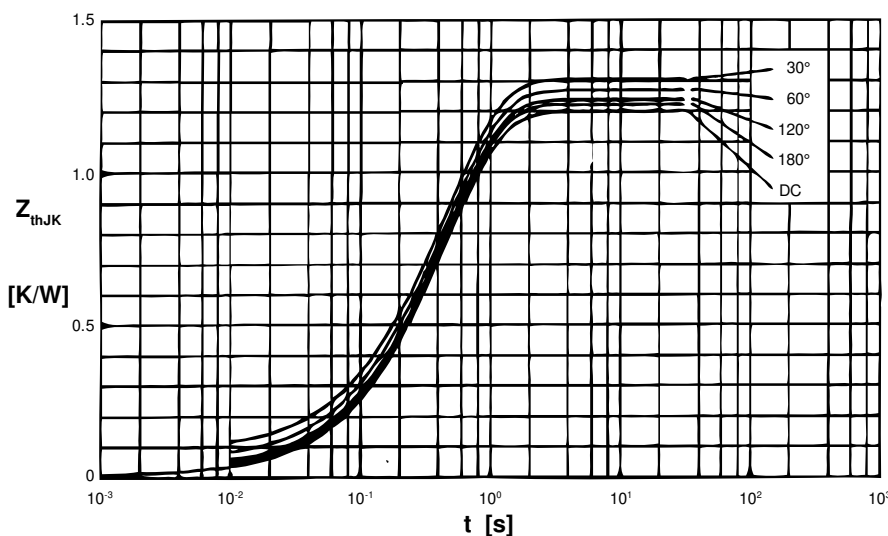


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor)

$R_{thJK}$  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