

Standard Rectifier Module

 $V_{RRM} = 2x 1600 V$

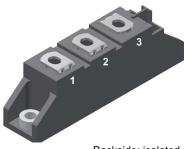
 $I_{\text{FAV}} = 59 \,\text{A}$

 $V_{\rm F} = 1.26 \, \rm V$

Phase leg

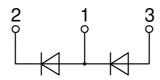
Part number

MDD44-16N1B



Backside: isolated





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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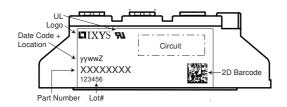


Rectifier					Ratings	s	
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V _{RSM}	max. non-repetitive reverse bloc	cking voltage	$T_{VJ} = 25^{\circ}C$			1700	V
V_{RRM}	max. repetitive reverse blocking	voltage	$T_{VJ} = 25^{\circ}C$			1600	V
I _R	reverse current	V _R = 1600 V	$T_{VJ} = 25^{\circ}C$			100	μΑ
		$V_R = 1600 \text{ V}$	$T_{VJ} = 150$ °C			10	mA
V _F	forward voltage drop	I _F = 100 A	$T_{VJ} = 25^{\circ}C$			1.30	٧
		$I_{F} = 200 \text{ A}$				1.60	٧
		$I_F = 100 \text{ A}$	T _{VJ} = 125°C			1.26	V
		$I_F = 200 \text{ A}$				1.67	٧
I _{FAV}	average forward current	T _C = 100°C	$T_{VJ} = 150$ °C			59	Α
I _{F(RMS)}	RMS forward current	180° sine				100	Α
V _{F0}	threshold voltage $T_{vJ} = 150$ °C					0.80	V
r _F	slope resistance } for power	loss calculation only				4.3	mΩ
R _{thJC}	thermal resistance junction to ca	ase				0.59	K/W
R _{thCH}	thermal resistance case to heats	sink			0.2		K/W
P _{tot}	total power dissipation		$T_{C} = 25^{\circ}C$			212	W
I _{FSM}	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			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	Α
		t = 8,3 ms; (60 Hz), sine	$V_R = 0 V$			1.06	kA
l²t	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^{\circ}C$			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
CJ	junction capacitance	$V_R = 400 \text{ V}; f = 1 \text{ MHz}$	$T_{VJ} = 25^{\circ}C$		27		pF





Package	TO-240AA					Ratings		
Symbol	Definition	Conditions			min.	typ.	max.	Unit
RMS	RMS current	per terminal					200	Α
T _{VJ}	virtual junction temperature				-40		150	°C
Top	operation temperature				-40		125	°C
T _{stg}	storage temperature						125	°C
Weight						76		g
M _D	mounting torque				2.5		4	Nm
$\mathbf{M}_{_{\mathrm{T}}}$	terminal torque				2.5		4	Nm
d _{Spp/App}	oroonogo diatanoo on aurtoo	e striking distance through air	terminal to terminal	13.0	9.7			mm
d _{Spb/Apb}	creepage distance on surface	e striking distance through an	terminal to backside	16.0	16.0			mm
V _{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; IsoL ≤ 1 mA		4800			٧
.002		t = 1 minute			4000			٧



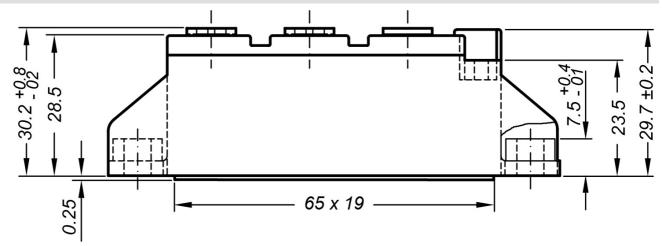
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD44-16N1B	MDD44-16N1B	Box	36	458058

Similar Part	Package	Voltage class
MDD44-08N1B	TO-240AA	800
MDD44-12N1B	TO-240AA	1200
MDD44-14N1B	TO-240AA	1400
MDD44-18N1B	TO-240AA	1800

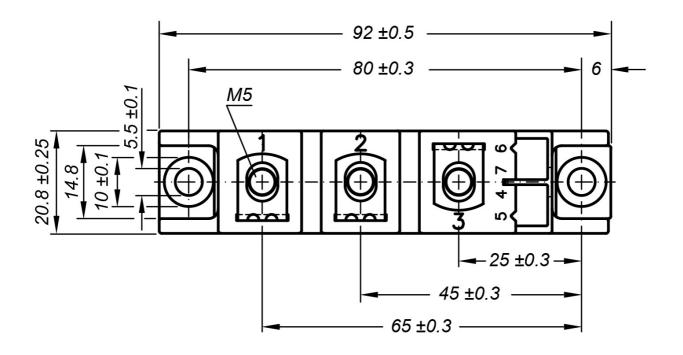
Equiva	alent Circuits for	Simulation	* on die level	$T_{VJ} = 150^{\circ}C$
$I \rightarrow V_0$)—[R_o_]-	Rectifier		
V _{0 max}	threshold voltage	8.0		V
$R_{0 max}$	slope resistance *	3.1		$m\Omega$

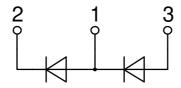


Outlines TO-240AA



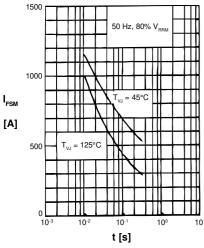
General tolerance: DIN ISO 2768 class "c"

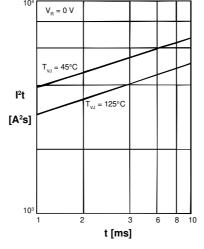






Rectifier





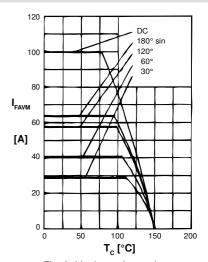


Fig. 1 Surge overload current I_{TSM} , I_{FSM} : Crest value, t: duration

Fig. 2 I²t versus time (1-10 ms)

Fig. 3 Maximum forward current at case temperature

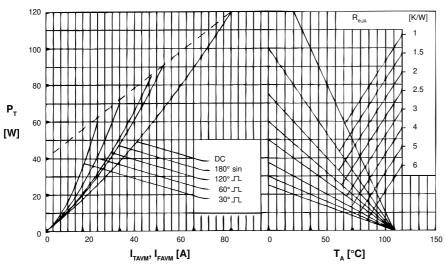


Fig. 4 Power dissipation vs. onstate current and ambient temperature (per diode)

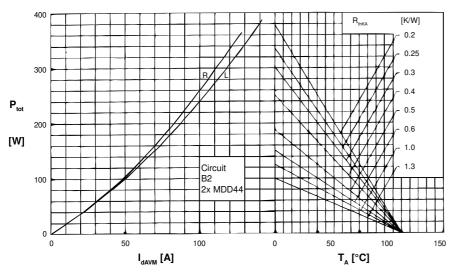


Fig. 6 Single phase rectifier bridge: Power dissipation versus direct output current and ambient temperature; R = resistive load,L = inductive load



Rectifier

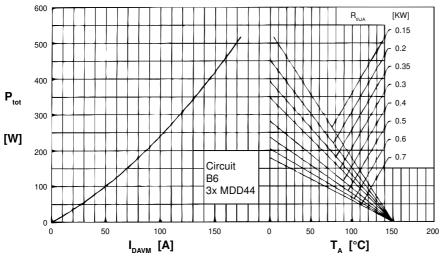


Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature

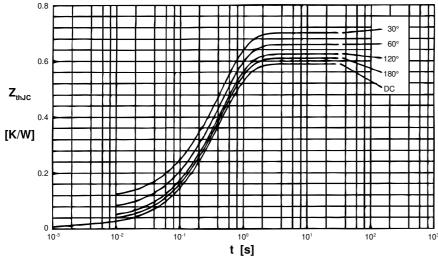


Fig. 7 Transient thermal impedance junction to case (per diode)

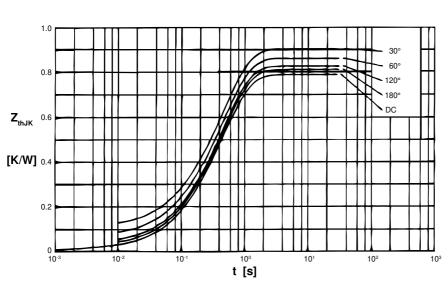


Fig. 8 Transient thermal impedance junction to heatsink (per thyristor)

R_{th,IC} for various conduction angles d:

เทมบ		
	d	$\boldsymbol{R}_{\text{thJC}}\left[\boldsymbol{K}/\boldsymbol{W}\right]$
	DC	0.59
	180°	0.61
	120°	0.63
	60°	0.66
	30°	0.70

Constants for \mathbf{Z}_{thJC} calculation:

i I	R _{thi} [K/W]	t, [s]
1	0.012	0.0012
2	0.045	0.0950
3	0.533	0.4550

 $R_{th,IK}$ for various conduction angles d:

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

Constants for $\mathbf{Z}_{\text{\tiny thJK}}$ calculation:

i	R _{thi} [K/W]	t, [s]
1	0.012	0.0012
2	0.045	0.0950
3	0.533	0.4550
4	0.200	0.4950

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<u>M252511FV</u> <u>DD2</u>	60N12K-A	DD380N16A	DD89N1600K-	\underline{A} $\underline{APT2X21D0}$	C60J <u>APT58M</u>	80J B522F-2-Y	YEC MSTC90-1	<u>16</u> <u>25.163.0653.1</u>
25.163.2453.0 25.3	163.4253.0	25.190.2053.0	25.194.3453.0	25.320.4853.1	25.320.5253.1	25.326.3253.1	25.326.3553.1	25.330.1653.1
25.330.4753.1 25.3	330.5253.1	25.334.3253.1	25.334.3353.1	25.350.2053.0	25.352.4753.1	25.522.3253.0	<u>T483C</u> <u>T484C</u>	<u>T485F</u> <u>T485H</u>
T512F-YEB T513	F T514F T	554 <u>T612FSE</u>	25.161.3453.0	25.179.2253.0	25.194.3253.0	25.325.1253.1	25.326.4253.1	25.330.0953.1
25.332.4353.1 25.3	350.1653.0	25.350.2453.0	25.352.1453.0	25.352.1653.0	25.352.2453.0	25.352.5453.1	25.522.3353.0	25.602.4053.0
25.640.5053.0								