Standard Rectifier Module

V_{RRM} = 2 x 1600 V

I_{FAV} = 59 A

V_F = 1.26 V

Phase leg

Part number

MDD44-16N1B
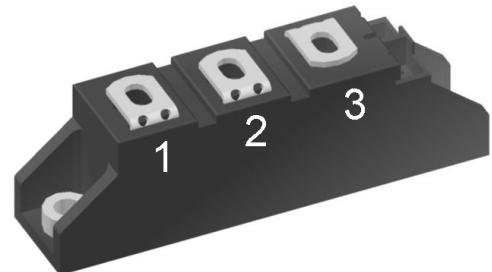
Backside: isolated

E72873
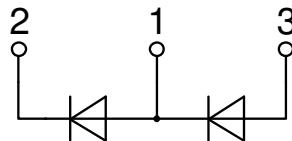
Features / Advantages:

● 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: 3600 V~
● Industry standard outline
● RoHS compliant
● Height: 30 mm
● Base plate: DCB ceramic
● Reduced weight
● Advanced power cycling

Rectifier | | | | Ratings

Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage		$T_{VJ} = 25°C$			1700	V
V_{RRM}	max. repetitive reverse blocking voltage		$T_{VJ} = 25°C$			1600	V
I_R	reverse current	$V_R = 1600$ V	$T_{VJ} = 25°C$			100	µA
		$V_R = 1600$ 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				0.20		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

IXYS reserves the right to change limits, conditions and dimensions.   Data according to IEC 60747and per semiconductor unless otherwise specified   20161222b

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; $I_{ISOL} \leq 1$ mA	3600			V
		t = 1 minute		3000			V

Date Code + Assembly Line

IXYS ℞Ⓤ

Circuit

yywwAA
Part Number
Lot.No: xxxxxx

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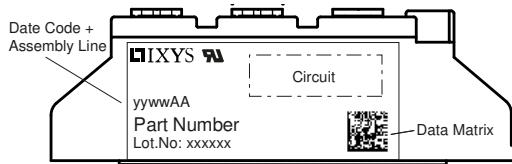
Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD44-16N1B	MDD44-16N1B	Box	36	458058

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

Equivalent Circuits for Simulation   *on die level* T_{VJ} = 150 °C

I → ⓥV_0 → [R_0] —
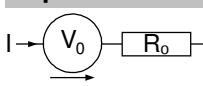
Rectifier

$V_{0\ max}$	threshold voltage	0.8	V
$R_{0\ max}$	slope resistance *	3.1	mΩ

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Outlines   TO-240AA

M5x10

30

10

7.5

Ø5.5

65

0.25

29.7

20 — 20 — 25

20.8

1   2   6   7

5   4   3

80

92

2   1   3
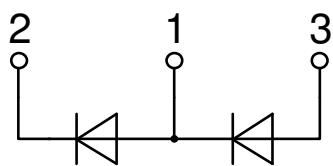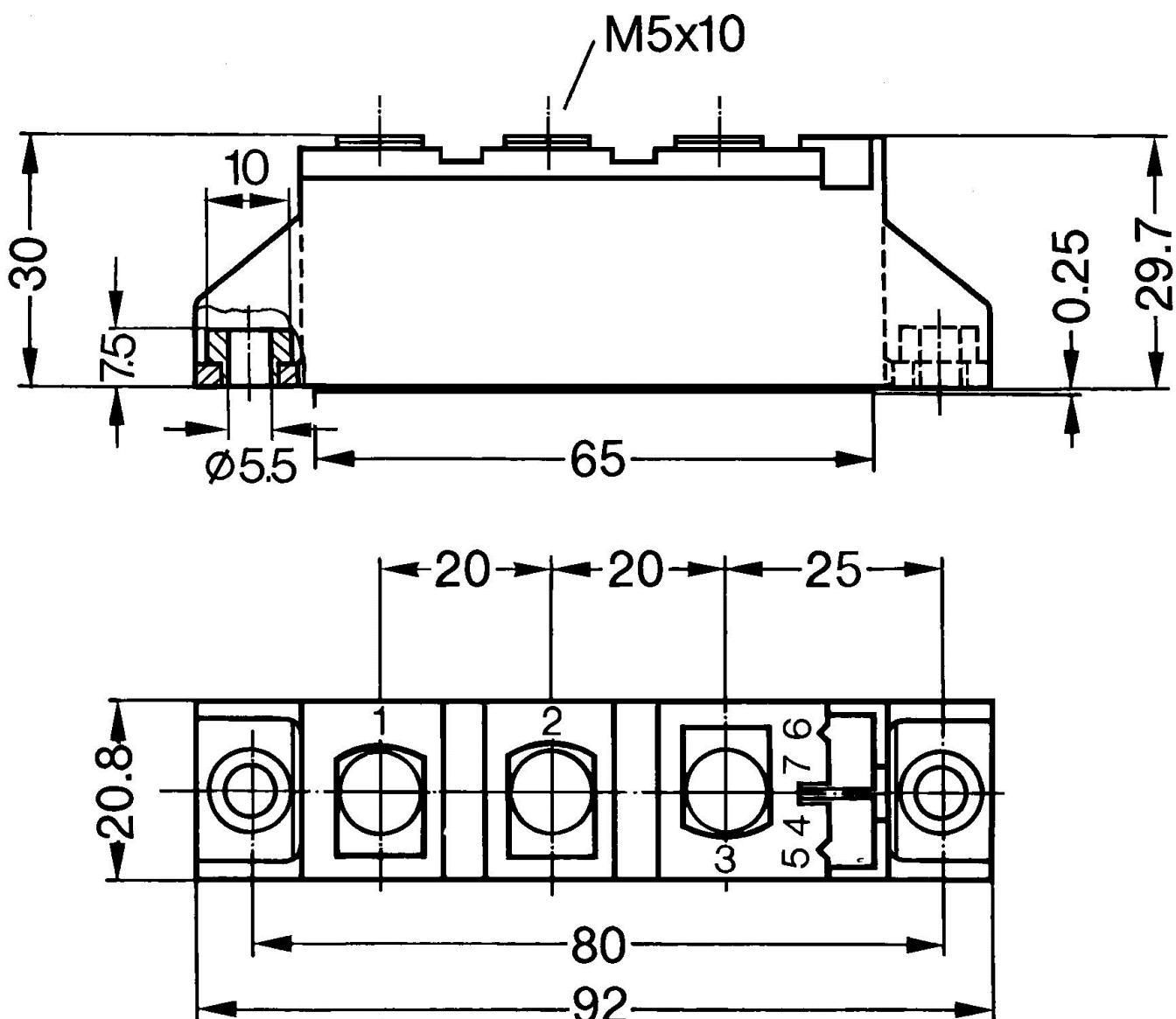
Rectifier
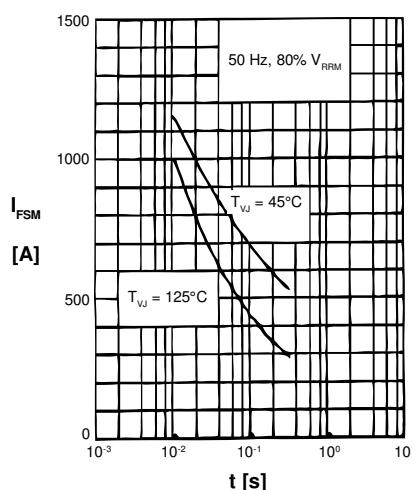
Fig. 1 Surge overload current
I_{TSM}, I_{FSM}: Crest value, t: duration
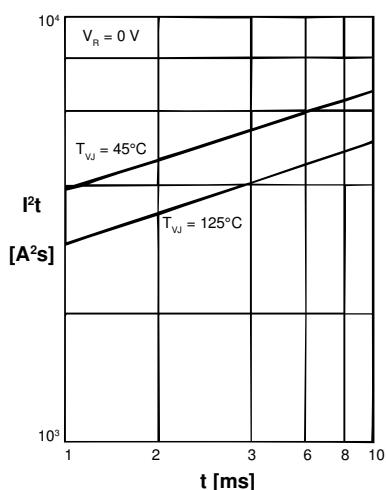
Fig. 2 I²t versus time (1-10 ms)
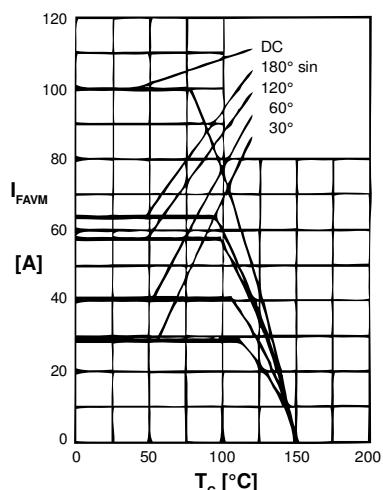
Fig. 3 Maximum forward current
at case temperature
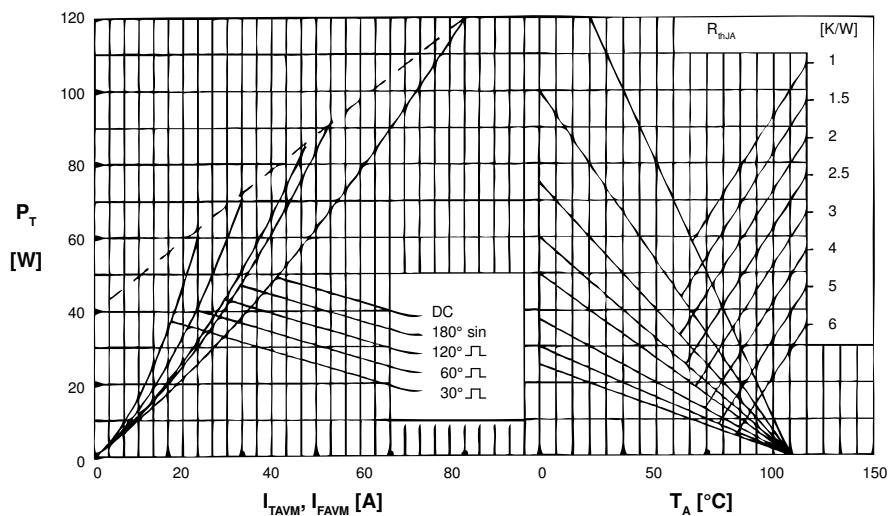
Fig. 4 Power dissipation vs. onstate current and ambient temperature (per diode)
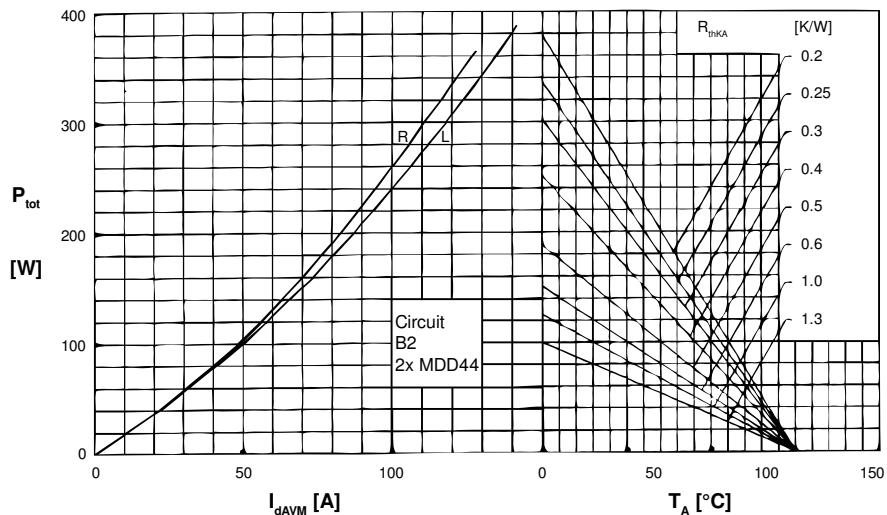

Fig. 6 Single phase rectifier bridge: Power dissipation versus direct output current
and ambient temperature; R = resistive load, L = inductive load

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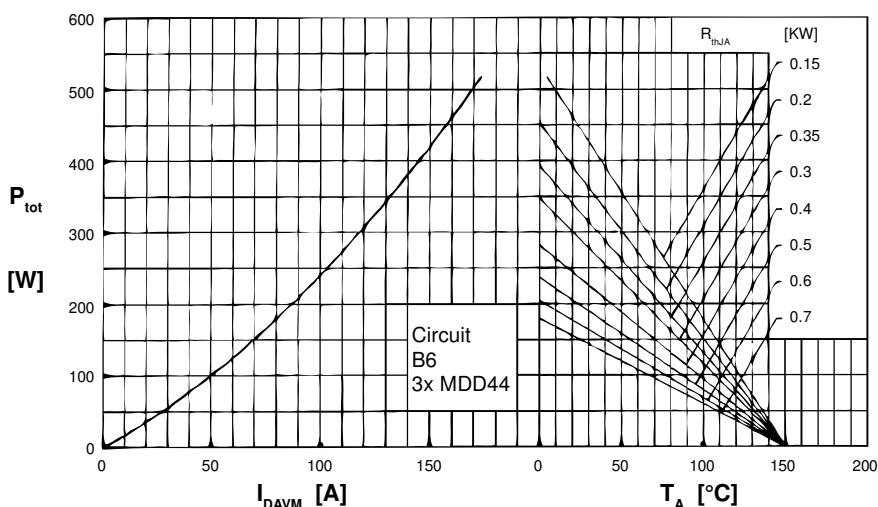
Rectifier

Fig. 6 Three phase rectifier bridge: Power dissipation versus direct output current and ambient temperature
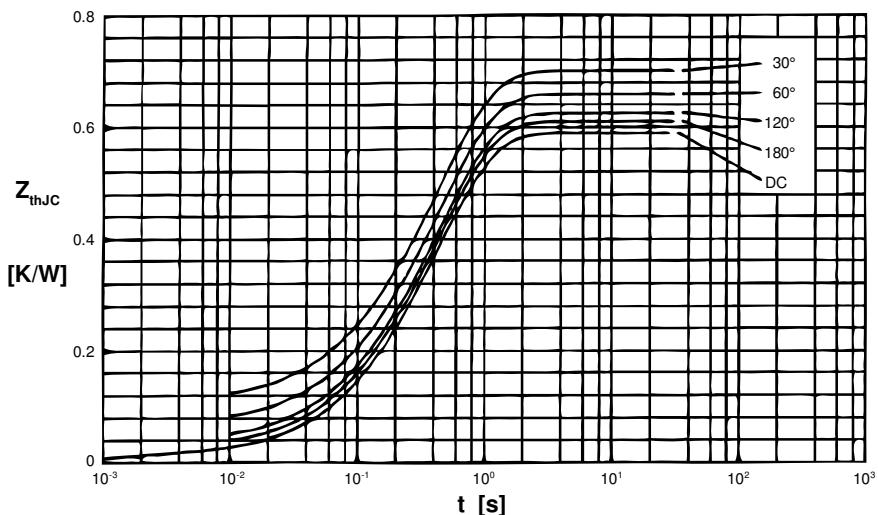
Fig. 7 Transient thermal impedance junction to case (per diode)

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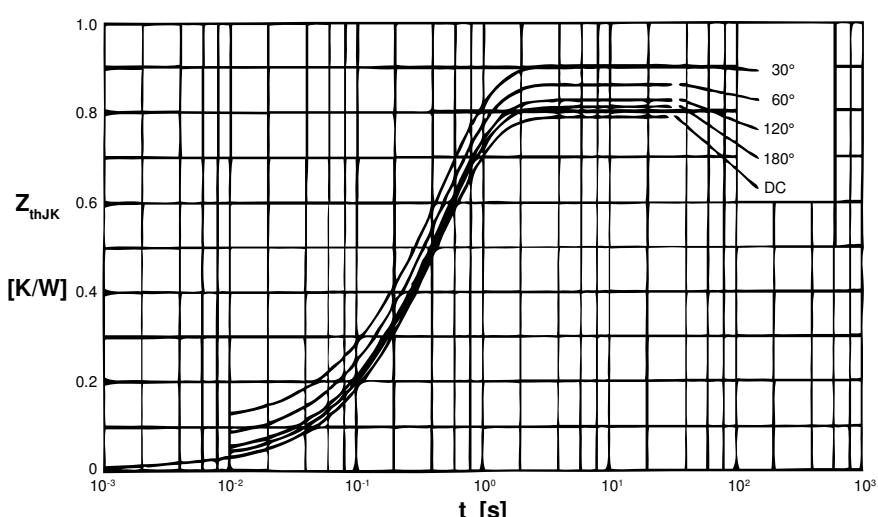
Fig. 8 Transient thermal impedance junction to heatsink (per thyristor)

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