

## Excellent Integrated System Limited

Stocking Distributor

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[IXYS Corporation](#)

[MDD142-08N1](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)



**MDD142-08N1**

## Standard Rectifier Module

$$V_{RRM} = 2 \times 800 \text{ V}$$

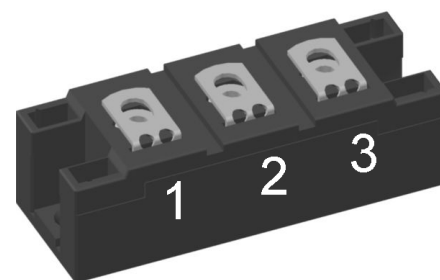
$$I_{FAV} = 165 \text{ A}$$

$$V_F = 1.05 \text{ V}$$

Phase leg

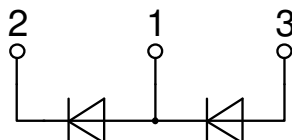
Part number

**MDD142-08N1**



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: Y4

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Soldering pins for PCB mounting
- Base plate: DCB ceramic
- Reduced weight
- Advanced power cycling

### Terms .Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;

- the conclusion of quality agreements;

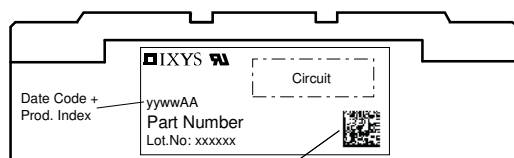
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage				900	V	
$V_{RRM}$	max. repetitive reverse blocking voltage				800	V	
$I_R$	reverse current	$V_R = 800\text{ V}$			1	mA	
		$V_R = 800\text{ V}$			20	mA	
$V_F$	forward voltage drop	$I_F = 150\text{ A}$			1.12	V	
		$I_F = 300\text{ A}$			1.30	V	
		$I_F = 150\text{ A}$	$T_{VJ} = 125^\circ\text{C}$			1.05	V
		$I_F = 300\text{ A}$				1.26	V
$I_{FAV}$	average forward current	$T_C = 100^\circ\text{C}$			165	A	
$I_{F(RMS)}$	RMS forward current	180° sine			300	A	
$V_{F0}$	threshold voltage	} for power loss calculation only			0.80	V	
$r_F$	slope resistance				1.3	mΩ	
$R_{thJC}$	thermal resistance junction to case				0.21	K/W	
$R_{thCH}$	thermal resistance case to heatsink			0.08		K/W	
$P_{tot}$	total power dissipation		$T_C = 25^\circ\text{C}$		600	W	
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$		4.70	kA	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$		5.08	kA	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$		4.00	kA	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$		4.32	kA	
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$		110.5	kA <sup>2</sup> s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$		107.1	kA <sup>2</sup> s	
		t = 10 ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$		79.8	kA <sup>2</sup> s	
		t = 8,3 ms; (60 Hz), sine	$V_R = 0\text{ V}$		77.5	kA <sup>2</sup> s	
$C_J$	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^\circ\text{C}$		238	pF	



MDD142-08N1

Package Y4				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal				300	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>					150		g
$M_D$	mounting torque			2.25		2.75	Nm
$M_T$	terminal torque			4.5		5.5	Nm
$d_{Spp/App}$	creepage distance on surface   striking distance through air	terminal to terminal	14.0	10.0			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



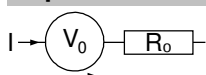
Data Matrix: Typ (1-19), DC+Prod.Index (20-25), FKT# (26-31)  
leer (33), lfd.# (33-36)

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDD142-08N1	MDD142-08N1	Box	6	430641

Equivalent Circuits for Simulation

\* on die level

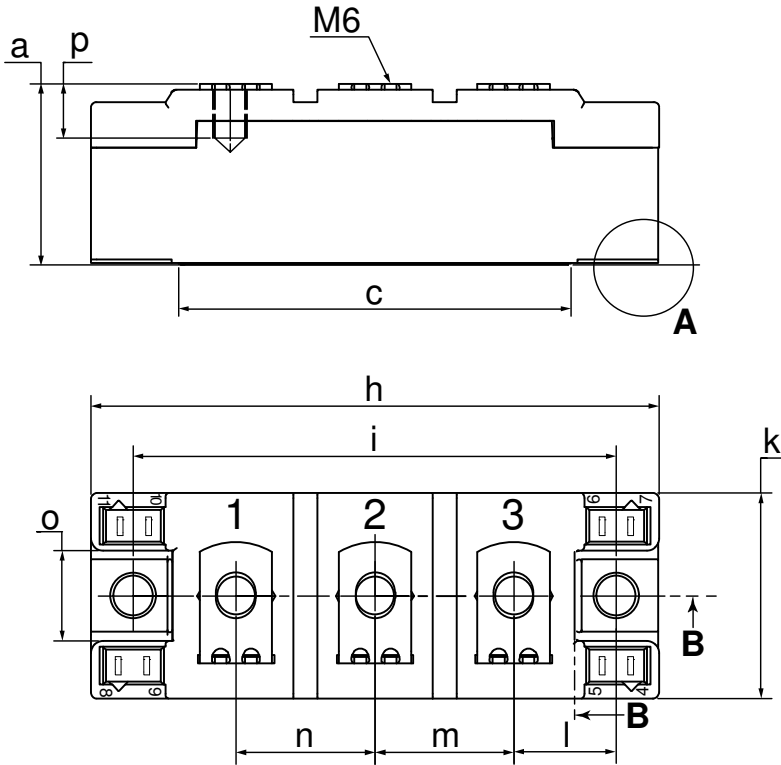
$T_{VJ} = 150$  °C



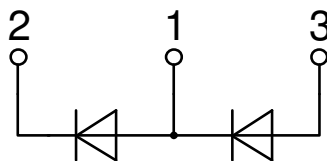
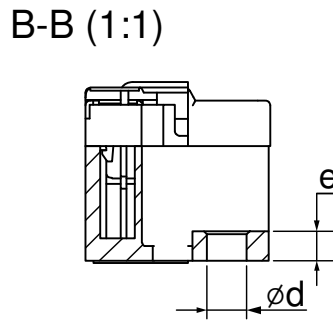
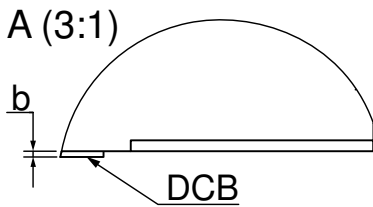
Rectifier

$V_{0\ max}$	threshold voltage	0.8	V
$R_{0\ max}$	slope resistance *	0.7	mΩ

Outlines Y4



Dim.	MIN [mm]	MIN [mm]	MIN [inch]	MIN [inch]
a	30.0	30.6	1.181	1.205
b	typ. 0.25		typ. 0.010	
c	64.0	65.0	2.520	2.559
d	6.5	7.0	0.256	0.275
e	4.9	5.1	0.193	0.201
h	93.5	94.5	3.681	3.720
i	79.5	80.5	3.130	3.169
k	33.4	34.0	1.315	1.339
l	16.7	17.3	0.657	0.681
m	22.7	23.3	0.894	0.917
n	22.7	23.3	0.894	0.917
o	14.0	15.0	0.551	0.591
p	typ. 10.5		typ. 0.413	



**Rectifier**

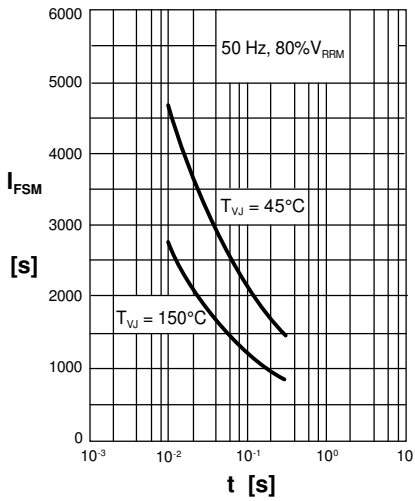


Fig. 1 Surge overload current  $I_{FSM}$ : Crest value, t: duration

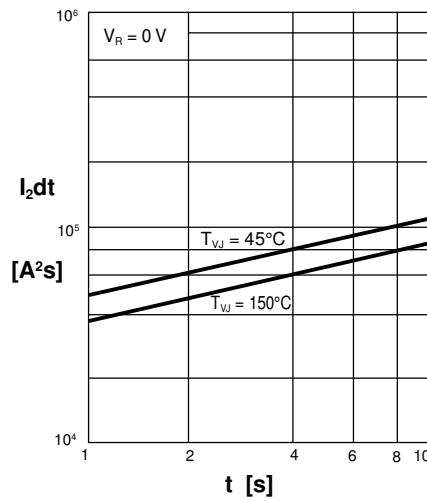


Fig. 2  $I^2dt$  versus time (1-10 ms)

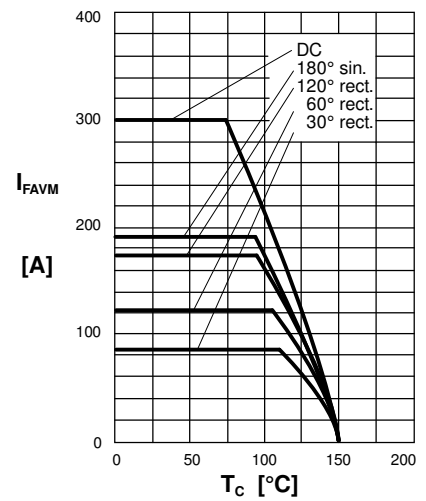


Fig. 2a Maximum forward current at case temperature

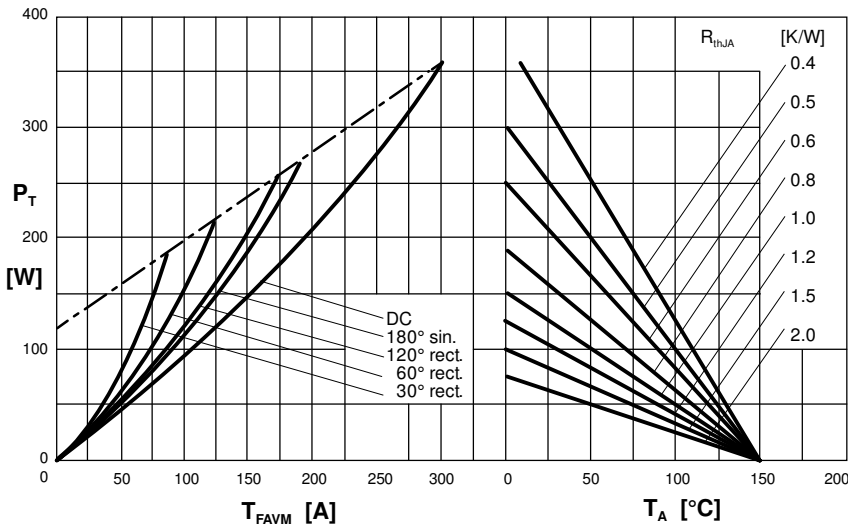
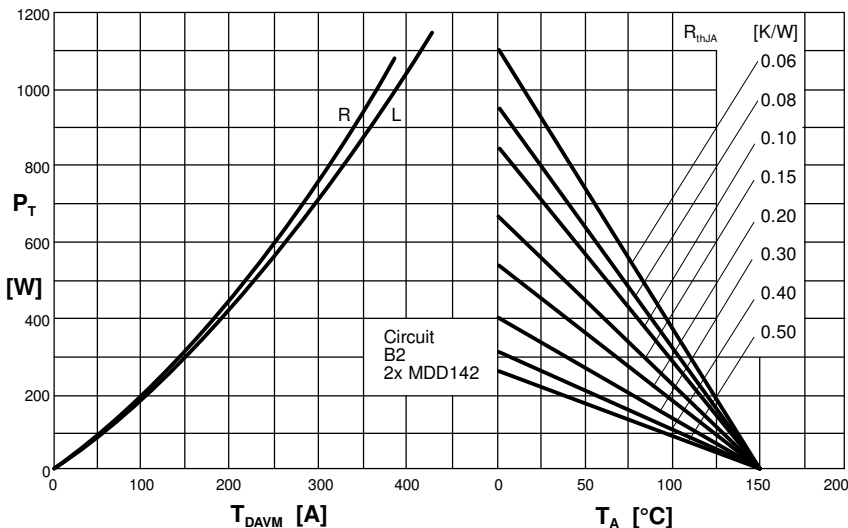


Fig. 3 Power dissipation vs. forward current and ambient temperature (per diode)



R = resistive load  
L = inductive load

Fig. 4 Single phase rectifier bridge: Power dissipation vs. direct output current and ambient

**Rectifier**

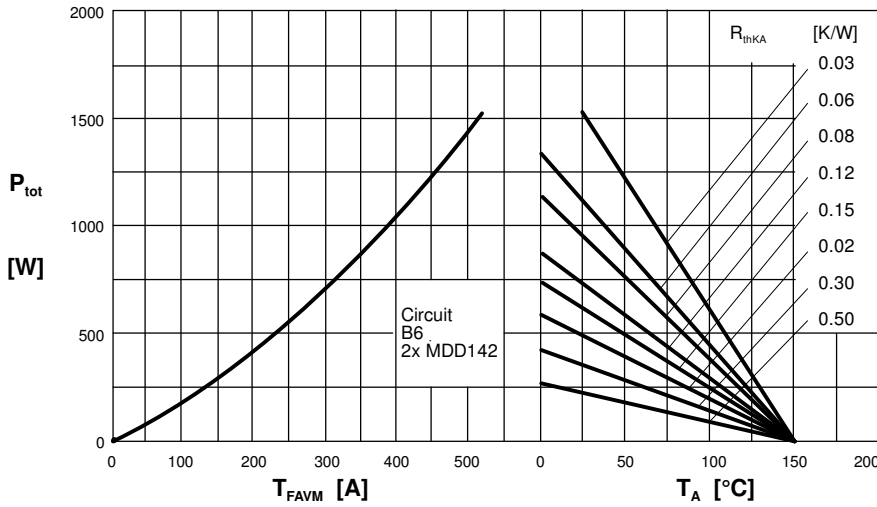


Fig. 5 Three phase rectifier bridge: Power dissipation vs. direct output current and ambient temperature

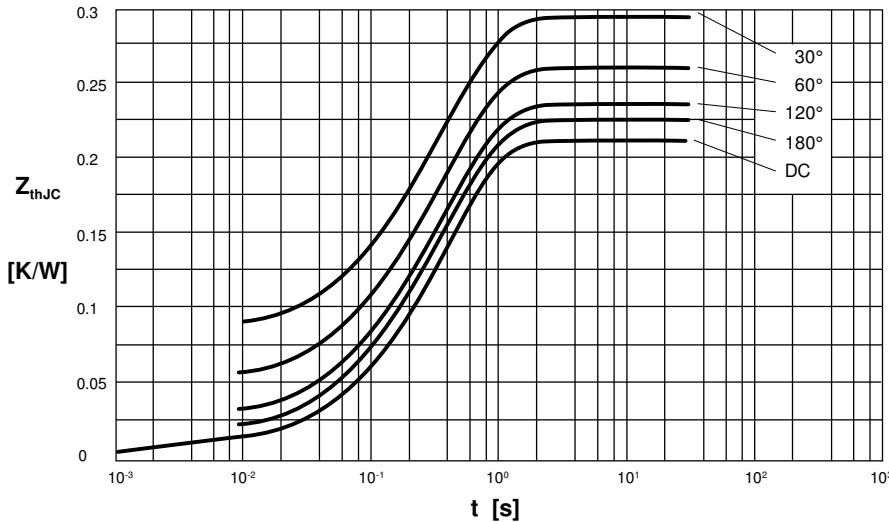


Fig. 6 Transient thermal impedance junction to case (per diode)

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

$d$	$R_{thJC}$ [K/W]
DC	0.210
180°	0.223
120°	0.233
60°	0.260
30°	0.295

Constants for  $Z_{thJC}$  calculation:

$i$	$R_{thi}$ [K/W]	$t_i$ [s]
1	0.0087	0.001
2	0.0163	0.065
3	0.1850	0.400

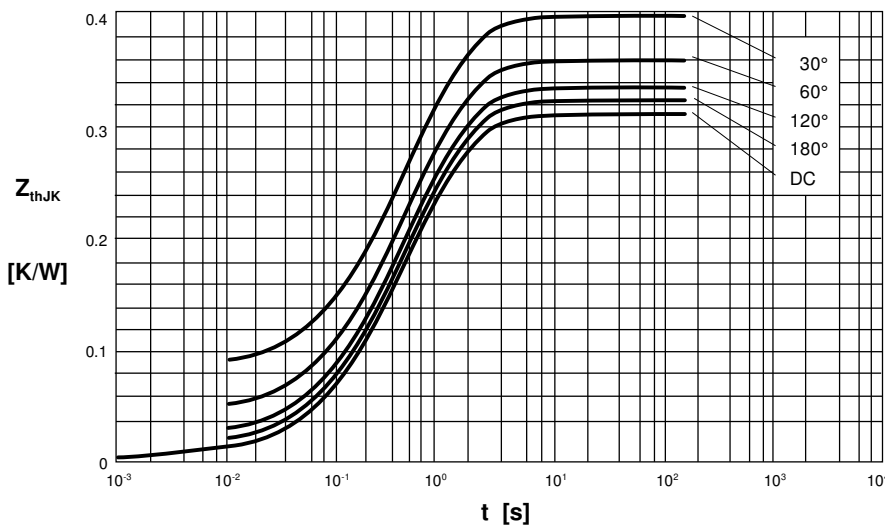


Fig. 7 Transient thermal impedance junction to heatsink (per diode)

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

$d$	$R_{thJK}$ [K/W]
DC	0.310
180°	0.323
120°	0.333
60°	0.360
30°	0.395

Constants for  $Z_{thJK}$  calculation:

$i$	$R_{thi}$ [K/W]	$t_i$ [s]
1	0.0087	0.001
2	0.0163	0.065
3	0.1850	0.400
4	0.1000	1.290