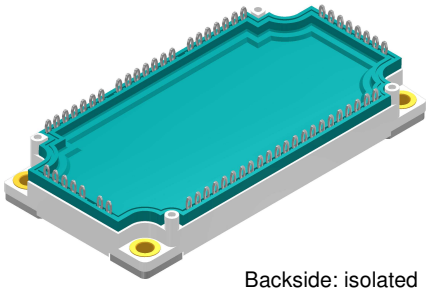
High Voltage Standard Rectifier Module

3~ Rectifier		
V_{RRM}	=	2200 V
I_{DAV}	=	660 A
I_{FSM}	=	5000 A

3~ Rectifier Bridge + NTC

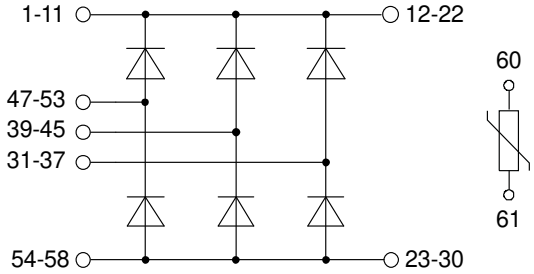
Part number

MDNA660U2200PTEH



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:

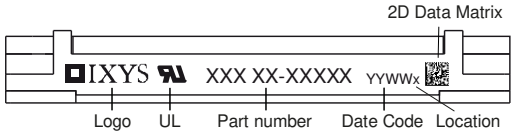
- Diode for main rectification
- For three phase bridge configurations
- Supplies for DC power equipment
- Input rectifiers for PWM inverter
- Battery DC power supplies
- Field supply for DC motors

Package: E3-Pack

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- PressFit-Pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

Rectifier				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
V_{RSM}	*max. non-repetitive reverse blocking voltage*		T_{VJ} = 25°C			2300	V
V_{RRM}	*max. repetitive reverse blocking voltage*		T_{VJ} = 25°C			2200	V
I_R	*reverse current*	V_R = 2200 V	T_{VJ} = 25°C			400	µA
		V_R = 2200 V	T_{VJ} = 150°C			6	mA
V_F	*forward voltage drop*	I_F = 220 A	T_{VJ} = 25°C			1.28	V
		I_F = 660 A				1.95	V
		I_F = 220 A	T_{VJ} = 125°C			1.19	V
		I_F = 660 A				1.95	V
I_{DAV}	*bridge output current*	T_C = 85°C	T_{VJ} = 150°C			660	A
		rectangular d = ⅓					
V_{F0}	*threshold voltage* } *for power loss calculation only*		T_{VJ} = 150°C			0.77	V
r_F	*slope resistance* }					1.8	mΩ
R_{thJC}	*thermal resistance junction to case*					0.15	K/W
R_{thCH}	*thermal resistance case to heatsink*				0.075		K/W
P_{tot}	*total power dissipation*		T_C = 25°C			830	W
I_{FSM}	*max. forward surge current*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			5.00	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			5.40	kA
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			4.25	kA
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			4.59	kA
I^2t	*value for fusing*	t = 10 ms; (50 Hz), sine	T_{VJ} = 45°C			125.0	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			121.3	kA²s
		t = 10 ms; (50 Hz), sine	T_{VJ} = 150°C			90.3	kA²s
		t = 8,3 ms; (60 Hz), sine	V_R = 0 V			87.6	kA²s
C_J	*junction capacitance*	V_R = 700 V; f = 1 MHz	T_{VJ} = 25°C		158		pF

Package E3-Pack				Ratings			
Symbol	**Definition**	**Conditions**		**min.**	**typ.**	**max.**	**Unit**
I_{RMS}	*RMS current*	per terminal				30	A
T_{VJ}	*virtual junction temperature*			-40		150	°C
T_{op}	*operation temperature*			-40		125	°C
T_{stg}	*storage temperature*			-40		125	°C
Weight					270		g
M_D	*mounting torque*			3		6	Nm
$d_{Spp/App}$	*creepage distance on surface | striking distance through air*		*terminal to terminal*	6.0			mm
$d_{Spb/Apb}$			*terminal to backside*	12.0			mm
V_{ISOL}	*isolation voltage*	t = 1 second	50/60 Hz, RMS; I_{ISOL} ≤ 1 mA	3600			V
		t = 1 minute		3000			V



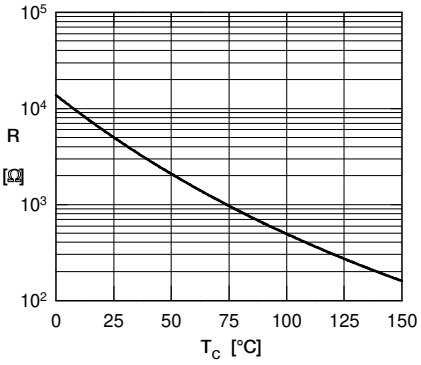
Part description

M = Module
D = Diode
N = High Voltage Standard Rectifier
A = (>= 2000V)
660 = Current Rating [A]
U = 3~ Rectifier Bridge
2200 = Reverse Voltage [V]
PT = PressFit-Pin, Thermistor
EH = E3-Pack
- = Hyphen
PC = Phase Change Material

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDNA660U2200PTEH	MDNA660U2200PTEH	Blister	24	516663
Alternative	MDNA660U2200PTEH-PC	MDNA660U2200PTEH	Blister	24	514482

Temperature Sensor NTC

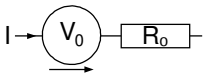
Symbol	**Definition**	**Conditions**	**min.**	**typ.**	**max.**	**Unit**
R_{25}	*resistance*	T_{VJ} = 25°	4.85	5	5.15	kΩ
$B_{25/50}$	*temperature coefficient*			3375		K



Typ. NTC resistance vs. temperature

Equivalent Circuits for Simulation

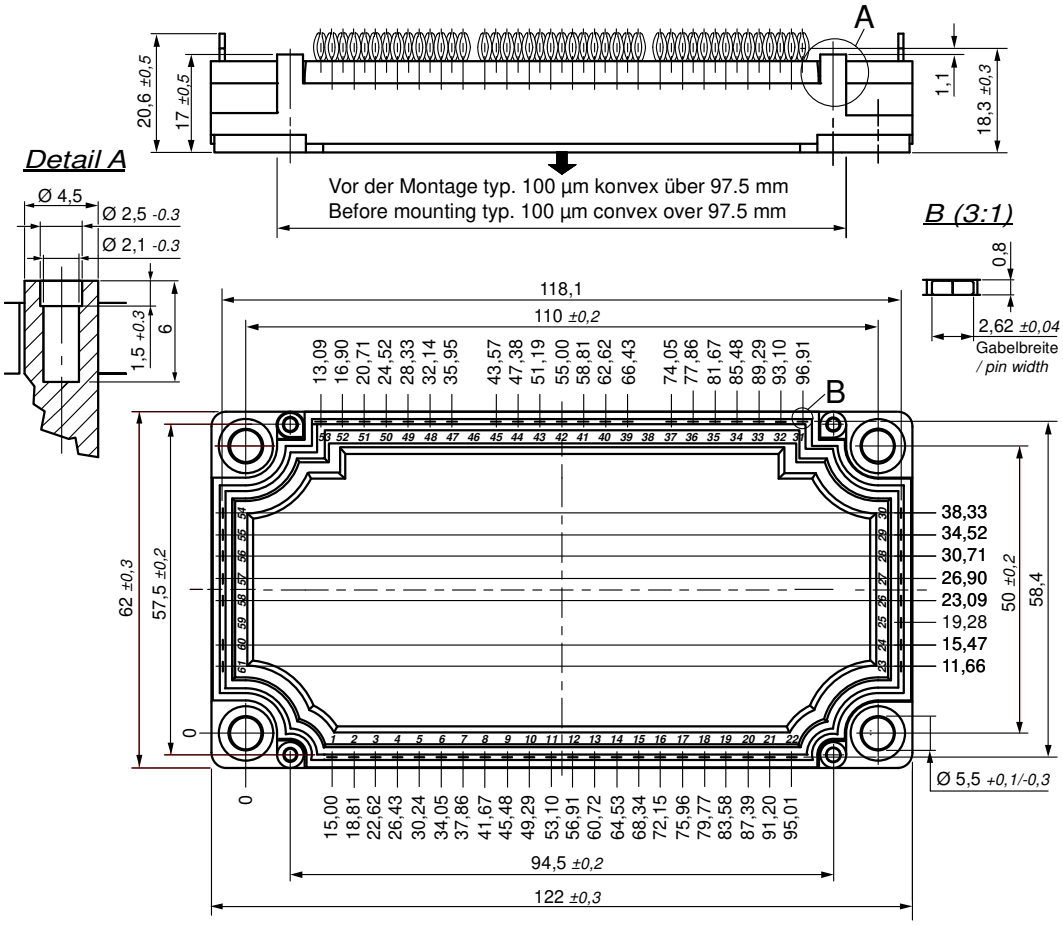
** on die level* T_{VJ} = 150 °C



Rectifier

$V_{0\ max}$	*threshold voltage*	0.77	V
$R_{0\ max}$	*slope resistance **	0.57	mΩ

Outlines E3-Pack

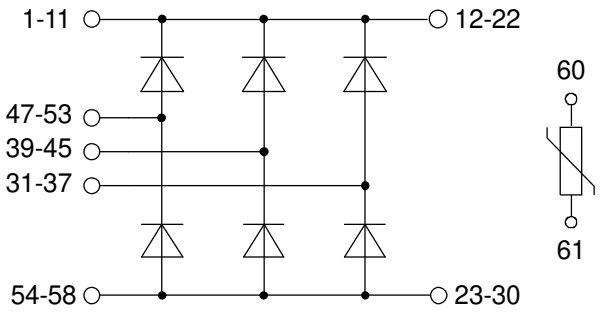


Bemerkung / ***Note:***

- Nichttolerierte Maße nach / *Measure without tolerances according DIN ISO 2768-T1-m*
- PCB-Lochmuster / *PCB hole pattern:* **see pin position**
- Toleranz Pin-Position und PCB-Lochmuster / *Tolerance of pin position and PCB hole pattern:* ⌖ **0.1**
- Bohrlochdurchmesser / *Diameter of drill:* **Ø 2.35 mm**
- Endlochdurchmesser / *Diameter of plated holes:* **Ø 2.14 - 2.29 mm** (Cu thickness in via typ. 50 µm)
- Beschichtung / *Plating:* **chem. Sn max. 15 µm**
- Einpresskraft / *Insert Force:* per terminal with a typ. insert speed of 7 mm/s: **typ. 90 N**
- Weitere Angaben / *Further information:* www.ixys.com **Application note IXAN0077**
- Montageanleitung / *Mounting instruction:* www.ixys.com **Application note IXAN0024**

***Detail A*:** PCB-Montage / *Mounting on PCB*

- Empfohlene, selbstschneidende Schraube / *Recommended, self-tapping screw:* **EJOT PT®** (Größe / *size:* **K25**)
- Max. Schraubenlänge / *Max. screw length:* **PCB-Dicke** / **thickness + 6 mm** *(*max. Lochtiefe / *hole depth)*
- Empfohlenes Drehmoment / *Recommended mounting torque:* **1.5 Nm**



Rectifier

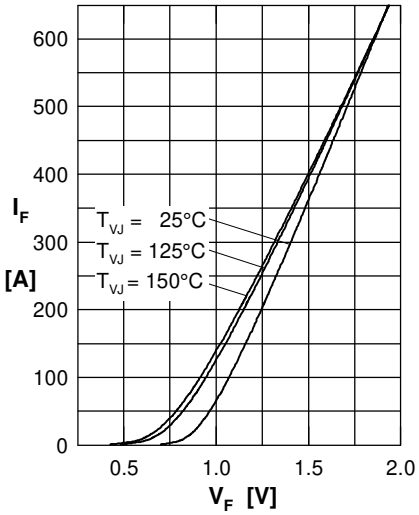


Fig. 1 Forward current versus voltage drop per diode

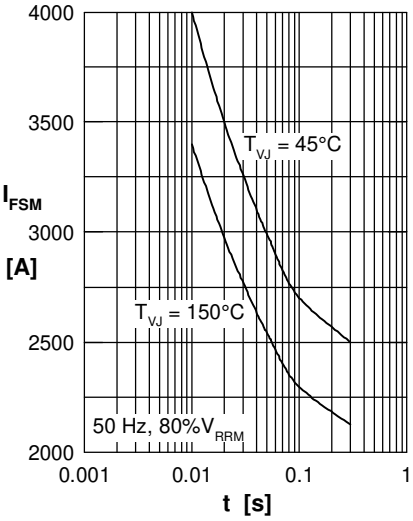


Fig. 2 Surge overload current vs. time per diode

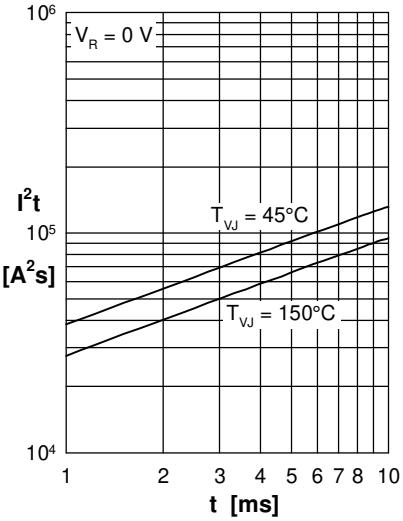


Fig. 3 I^2t versus time per diode

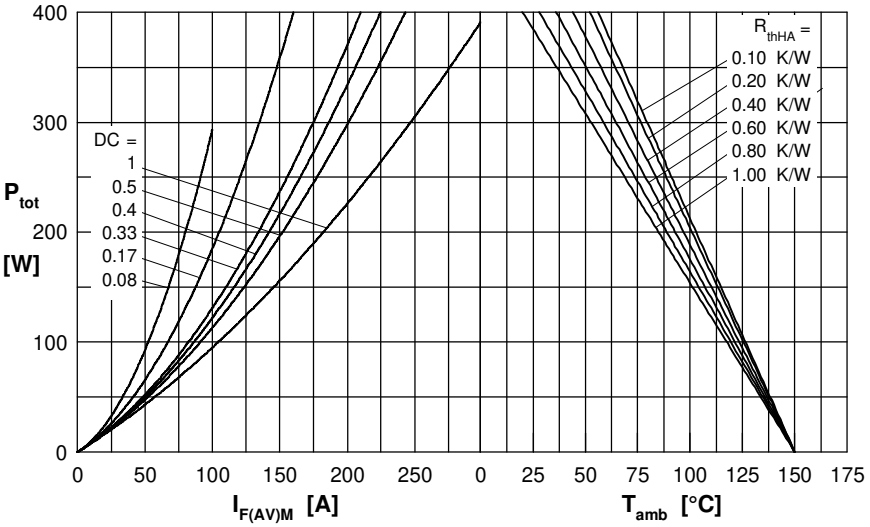


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

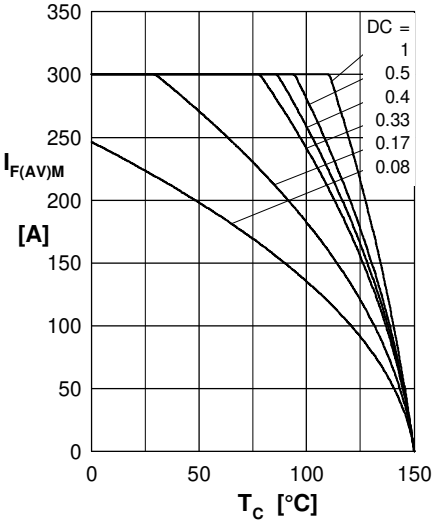


Fig. 5 Max. forward current vs. case temperature per diode

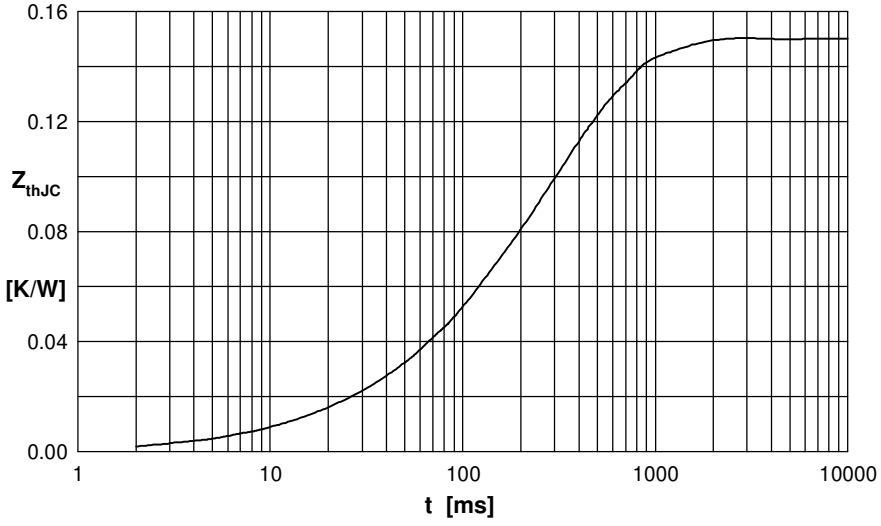


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.006	0.015
2	0.017	0.080
3	0.039	0.220
4	0.088	0.380