

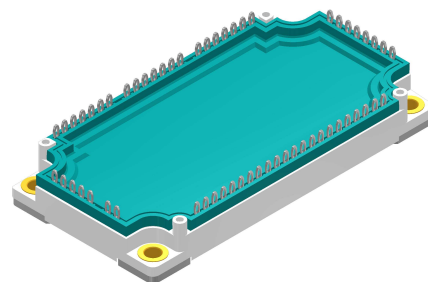
High Voltage Standard Rectifier Module

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

3~ Rectifier Bridge + NTC

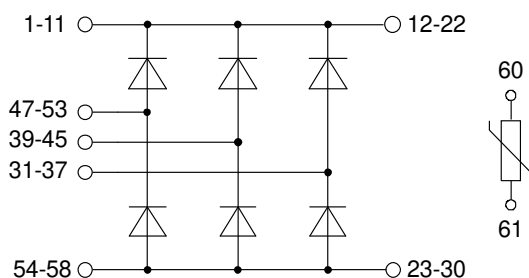
Part number

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

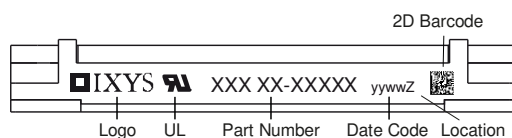
- Isolation Voltage: 4300 V~
- Industry standard outline
- RoHS compliant
- PressFit-Pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

Disclaimer Notice

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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				2300	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				2200	V
I_R	reverse current	$V_R = 2200\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			400	μA
		$V_R = 2200\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			6	mA
V_F	forward voltage drop	$I_F = 220\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.28	V
		$I_F = 660\text{ A}$				1.95	V
		$I_F = 220\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1.19	V
		$I_F = 660\text{ A}$				1.95	V
I_{DAV}	bridge output current	$T_C = 85^{\circ}\text{C}$ rectangular	$T_{VJ} = 150^{\circ}\text{C}$ $d = \frac{1}{3}$			660	A
V_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0.77	V
r_F	slope resistance					1.8	m Ω
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	$T_C = 25^{\circ}\text{C}$				830	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			5.00	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			5.40	kA
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			4.25	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			4.59	kA
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			125.0	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			121.3	kA ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			90.3	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			87.6	kA ² s
C_J	junction capacitance	$V_R = 700\text{ V}; f = 1\text{ MHz}$			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		175	°C
T _{op}	operation temperature			-40		150	°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	4300			V
		t = 1 minute		3600			V



Part description

M = Module
 D = Diode
 N = High Voltage Standard Rectifier
 A = ($\geq 2000V$)
 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

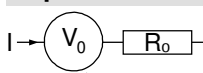
Temperature Sensor NTC

Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	resistance	$T_{VJ} = 25^\circ$	4.85	5	5.15	k Ω
$B_{25/50}$	temperature coefficient			3375		K

Equivalent Circuits for Simulation

* on die level

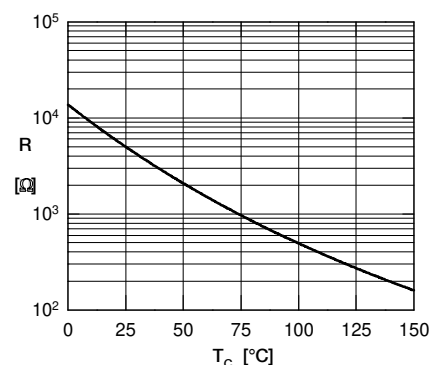
$T_{VJ} = 150^\circ C$



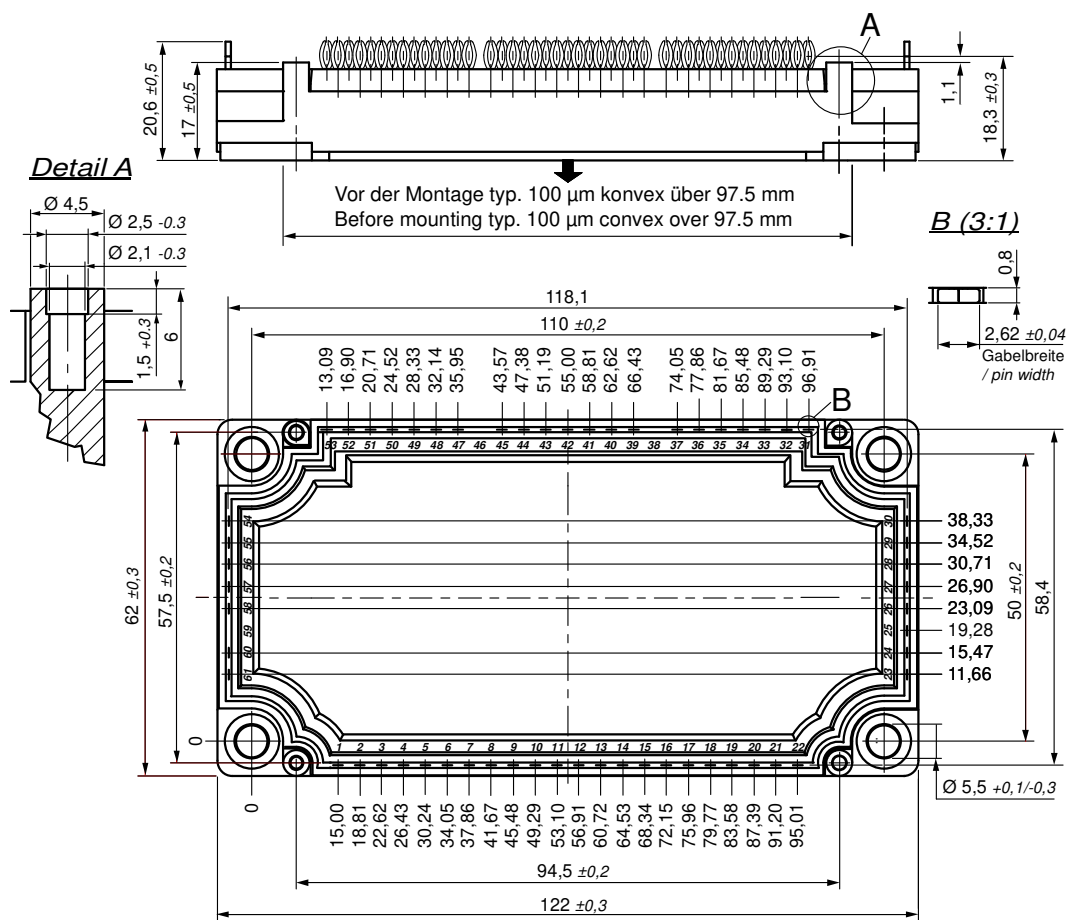
Rectifier

$V_{0\ max}$ threshold voltage 0.77 V

$R_{0\ max}$ slope resistance * 0.57 m Ω



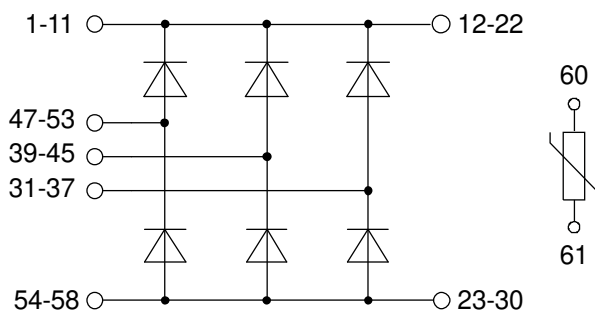
Typ. NTC resistance vs. temperature

Outlines E3-Pack

Bemerkung / Note:

- Nichttolerierete 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 PCB¹

- Empfohlene, selbstschneidende Schraube / Recommended, self-tapping screw: **EJOT PT®** (Größe / size: **K25**)¹
- Max. Schraubenlänge / Max. screw length: **PCB-Dicke / thickness + 6 mm** (max. Lochtiefe / hole depth)¹
- Empfohlenes Drehmoment / Recommended mounting torque: **1.5 Nm**



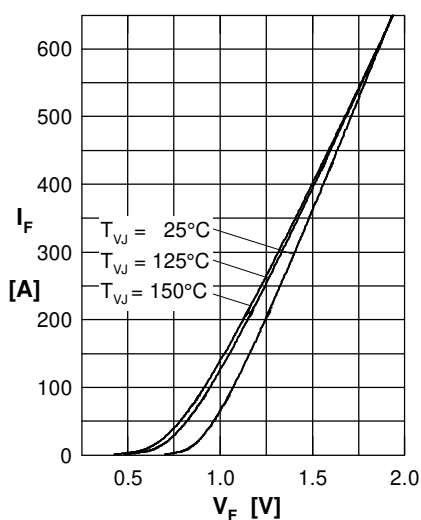
Rectifier


Fig. 1 Forward current versus voltage drop per diode

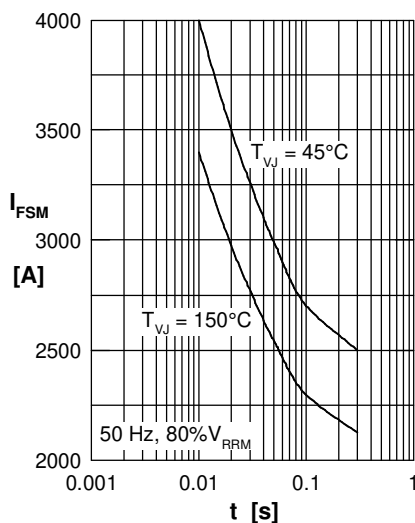


Fig. 2 Surge overload current vs. time per diode

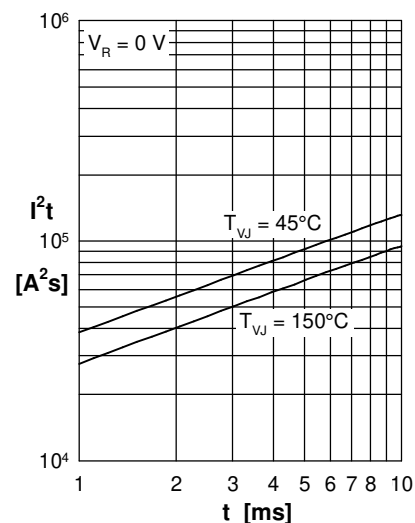
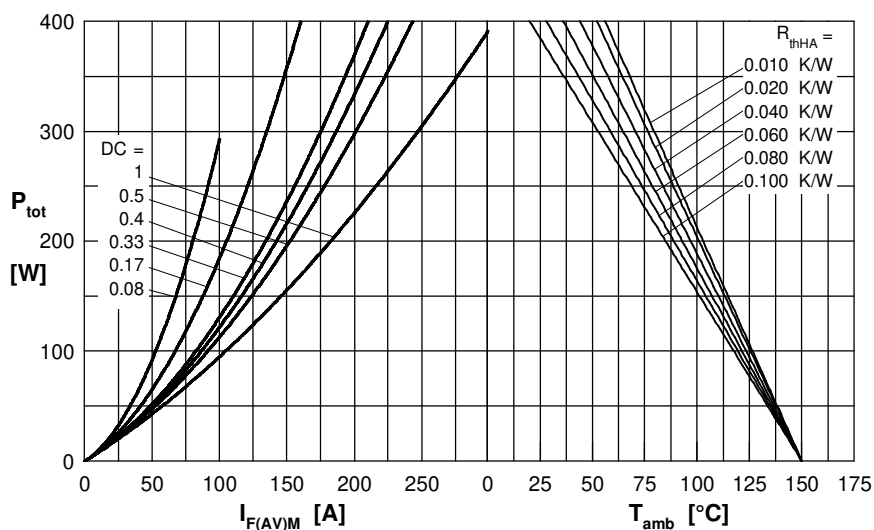

 Fig. 3 I^2t versus time per diode


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

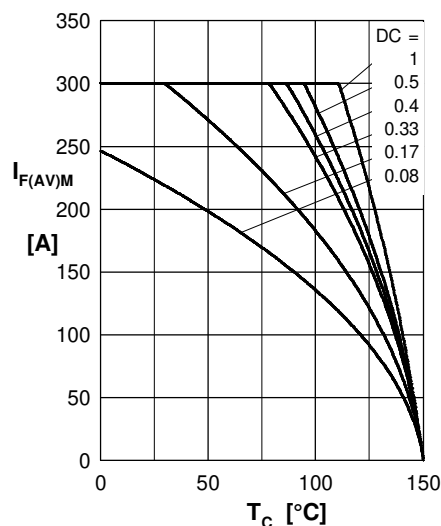


Fig. 5 Max. forward current vs. case temperature per diode

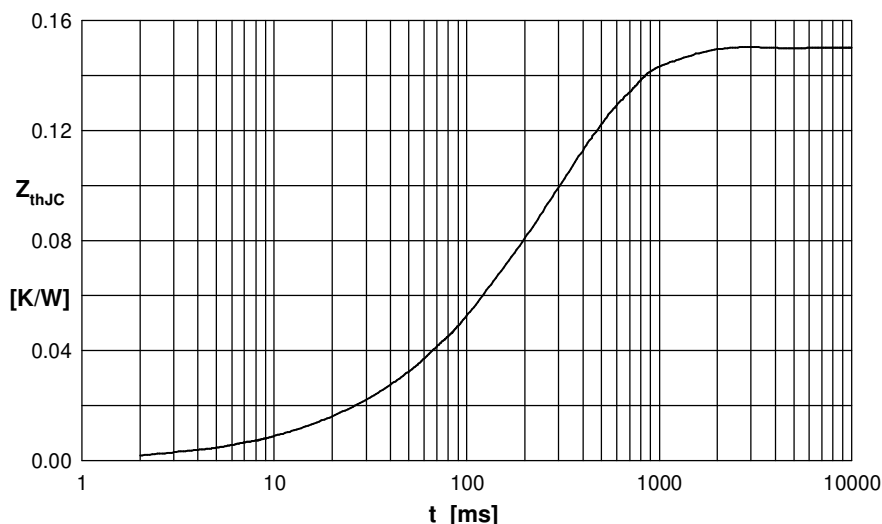


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 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