

Standard Rectifier Module

$$V_{RRM} = 2 \times 1600 \text{ V}$$

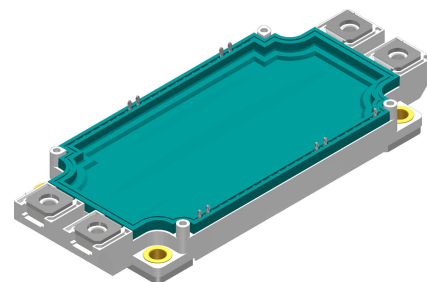
$$I_{FAV} = 425 \text{ A}$$

$$V_F = 1.21 \text{ V}$$

Phase leg + NTC

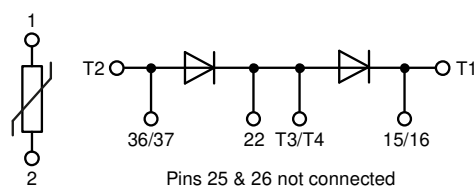
Part number

MDMA425P1600PTSF



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: SimBus F

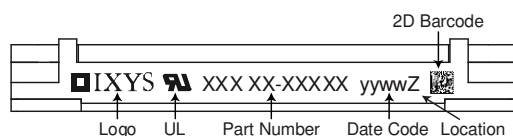
- Isolation Voltage: 4300 V~
- Industry standard outline
- RoHS compliant
- PressFit-Pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1700	V
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}\text{C}$				1600	V
I_R	reverse current	$V_R = 1600\text{ V}$	$T_{VJ} = 25^{\circ}\text{C}$			300	μA
		$V_R = 1600\text{ V}$	$T_{VJ} = 150^{\circ}\text{C}$			8	mA
V_F	forward voltage drop	$I_F = 425\text{ A}$	$T_{VJ} = 25^{\circ}\text{C}$			1.29	V
		$I_F = 850\text{ A}$				1.65	V
		$I_F = 425\text{ A}$	$T_{VJ} = 125^{\circ}\text{C}$			1.21	V
		$I_F = 850\text{ A}$				1.64	V
I_{FAV}	average forward current	$T_C = 100^{\circ}\text{C}$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}\text{C}$			425	A
V_{F0}	threshold voltage	} for power loss calculation only		$T_{VJ} = 150^{\circ}\text{C}$		0.77	V
r_F	slope resistance					1.01	m Ω
R_{thJC}	thermal resistance junction to case					0.07	K/W
R_{thCH}	thermal resistance case to heatsink				0.04		K/W
P_{tot}	total power dissipation	$T_C = 25^{\circ}\text{C}$				1785	W
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			10.0	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			10.8	kA
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			8.50	kA
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			9.18	kA
I^2t	value for fusing	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}\text{C}$			500.0	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			485.2	kA ² s
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}\text{C}$			361.3	kA ² s
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$			350.6	kA ² s
C_J	junction capacitance	$V_R = 400\text{ V}; f = 1\text{ MHz}$			661		pF

Package SimBus F				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
I_{RMS}	RMS current	per terminal				tbd	A
T_{VJ}	virtual junction temperature			-40		175	°C
T_{op}	operation temperature			-40		150	°C
T_{stg}	storage temperature			-40		125	°C
Weight					350		g
M_D	mounting torque			3		6	Nm
M_T	terminal torque			3		6	Nm
$d_{Spp/App}$	creepage distance on surface striking distance through air	terminal to terminal	13.3	10.0			mm
$d_{Spb/Apb}$		terminal to backside	10.2	10.2			mm
V_{ISOL}	isolation voltage	t = 1 second	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	4300			V
		t = 1 minute		3600			V



Part description

M = Module
 D = Diode
 M = Standard Rectifier
 A = (up to 1800V)
 425 = Current Rating [A]
 P = Phase leg
 1600 = Reverse Voltage [V]
 PT = PressFit-Pin, Thermistor
 SF = SimBus F
 - = Hyphen
 PC = Phase Change Material

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDMA425P1600PTSF	MDMA425P1600PTSF	Blister	24	519078
Alternative	MDMA425P1600PTSF-PC	MDMA425P1600PTSF	Blister	24	519057

Similar Part	Package	Voltage class
MDMA300P1600PTSF	SimBus F	1600
MDMA600P1600PTSF	SimBus F	1600
MDNA300P2200PTSF	SimBus F	2200
MDNA600P2200PTSF	SimBus F	2200

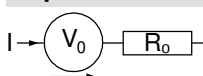
Temperature Sensor NTC

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

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



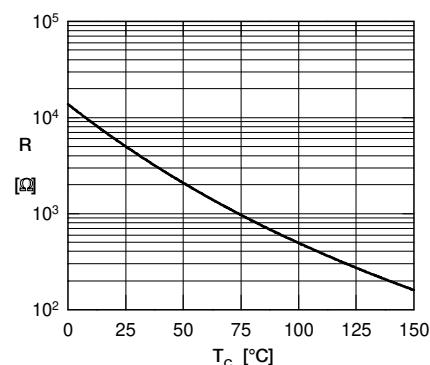
Rectifier

$V_{0 \max}$ threshold voltage 0.77

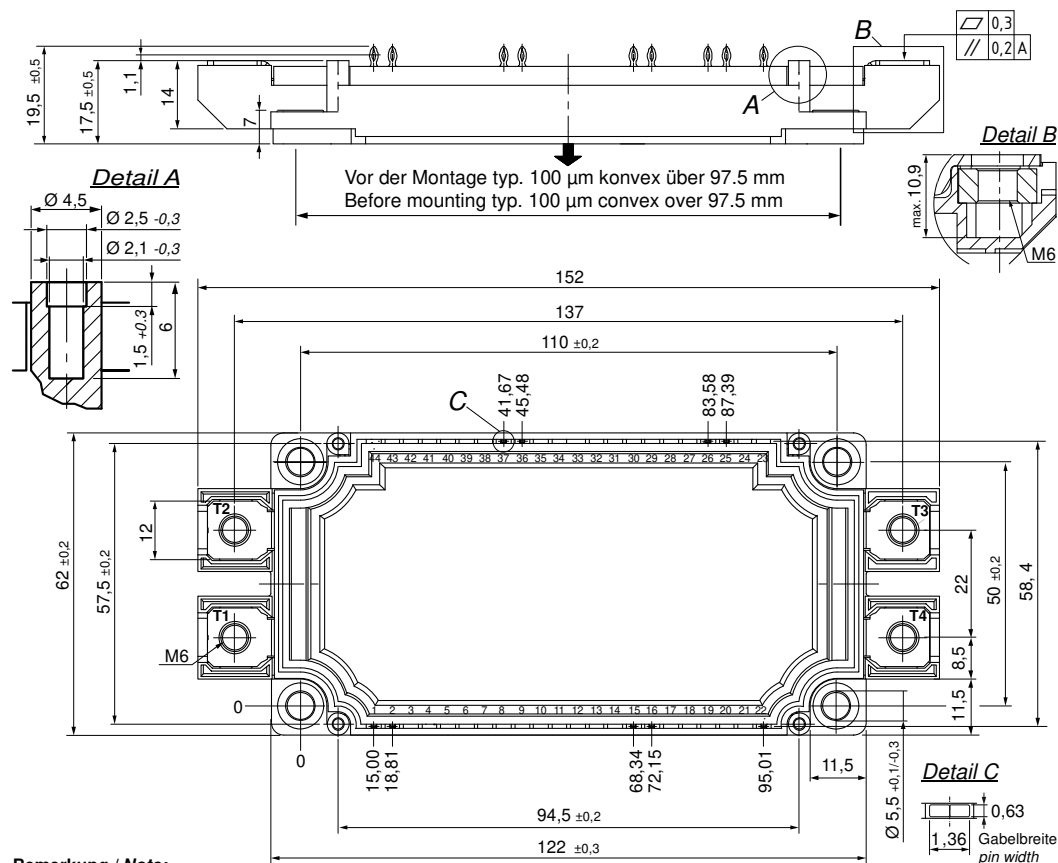
$R_{0 \max}$ slope resistance * 0.29

V

m Ω



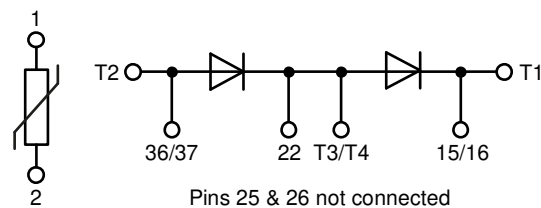
Typ. NTC resistance vs. temperature

Outlines SimBus F

Bemerkung / Note:

- Nichttolerierte Maße nach / Measure w/o tolerances acc. 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: $\oplus 0,1$
- Bohrlochdurchmesser / Diameter of drill: Ø 1.16 mm
- Endlochdurchmesser / Diameter of plated holes: Ø 1.00 - 1.10 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 1 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^L

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



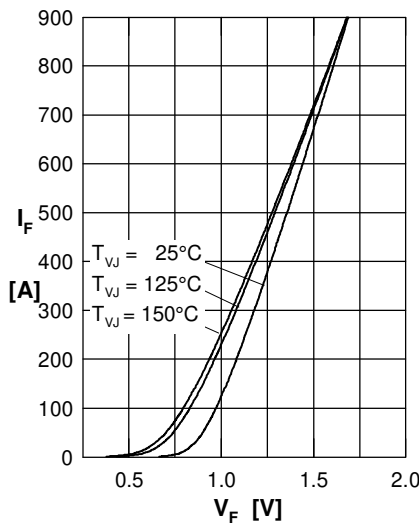
Rectifier


Fig. 1 Forward current versus voltage drop per diode

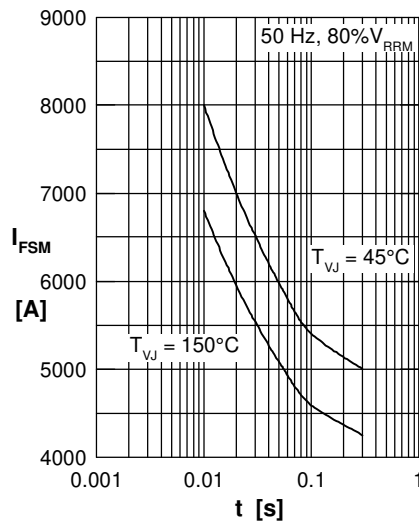


Fig. 2 Surge overload current vs. time per diode

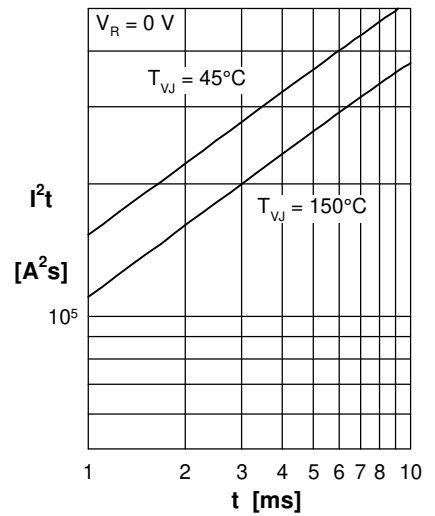
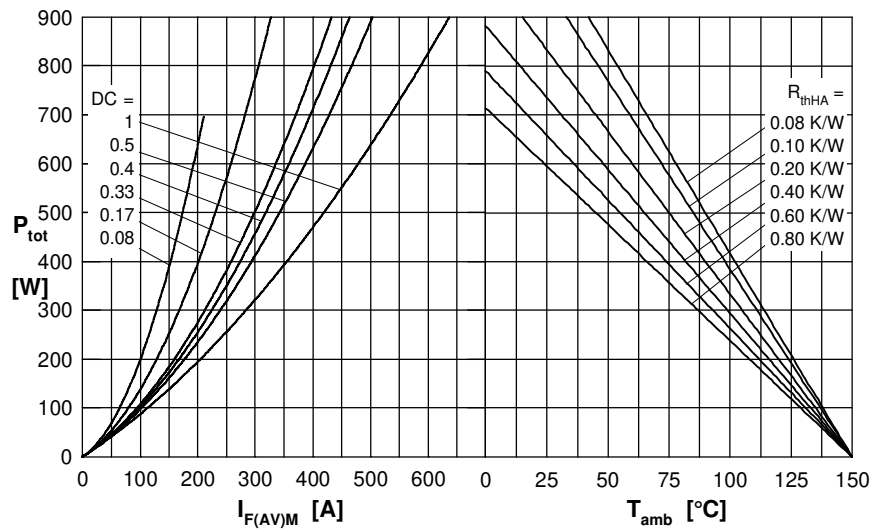

 Fig. 3 I^2t versus time per diode


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

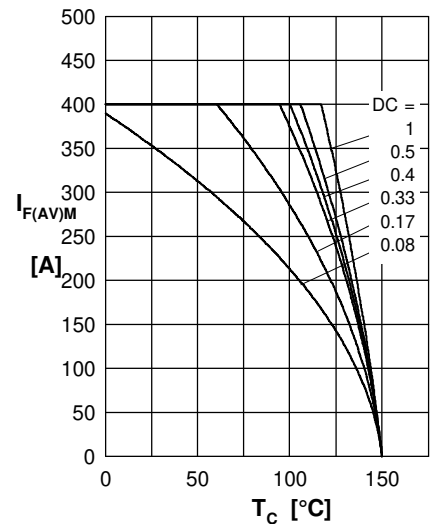


Fig. 5 Max. forward current vs. case temperature per diode

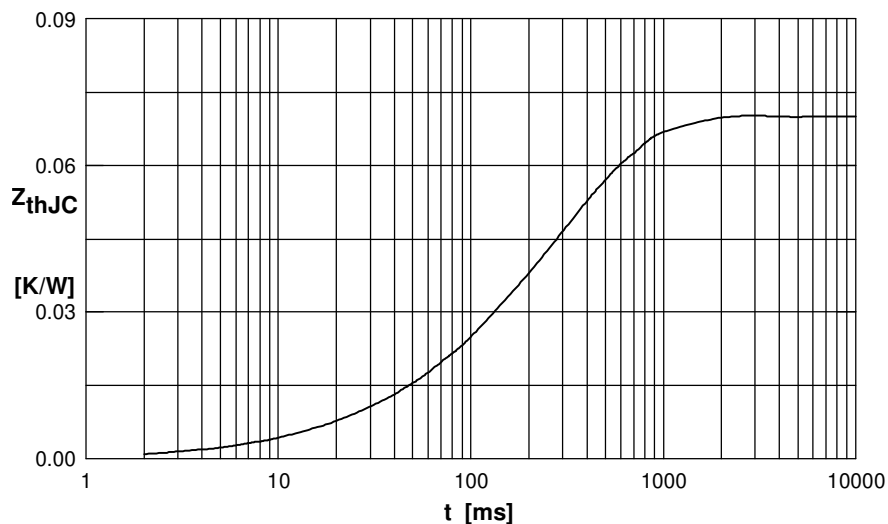


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 Constants for Z_{thJC} calculation:

i	R_{thi} (K/W)	t_i (s)
1	0.003	0.0150
2	0.009	0.0800
3	0.016	0.2200
4	0.042	0.3800