

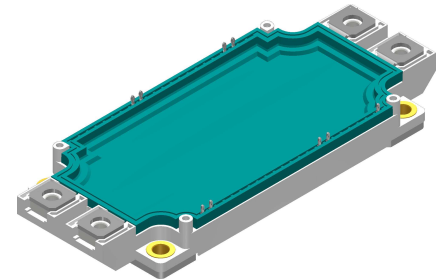
Standard Rectifier Module

$V_{RRM} = 2 \times 1600 \text{ V}$
 $I_{FAV} = 425 \text{ A}$
 $V_F = 1.21 \text{ V}$

Phase leg + NTC

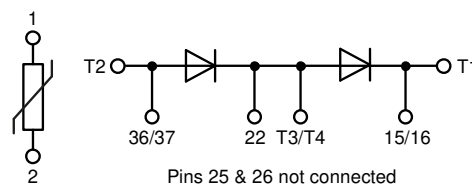
Part number

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

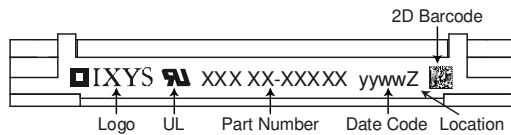
- Isolation Voltage: 4300 V~
- Industry standard outline
- RoHS compliant
- PressFit-Pins for PCB mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling
- Phase Change Material available

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Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
V_{RSM}	max. non-repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1700	V	
V_{RRM}	max. repetitive reverse blocking voltage	$T_{VJ} = 25^{\circ}C$			1600	V	
I_R	reverse current	$V_R = 1600\text{ V}$	$T_{VJ} = 25^{\circ}C$		300	μA	
		$V_R = 1600\text{ V}$	$T_{VJ} = 150^{\circ}C$		8	mA	
V_F	forward voltage drop	$I_F = 425\text{ A}$	$T_{VJ} = 25^{\circ}C$		1.29	V	
		$I_F = 850\text{ A}$			1.65	V	
		$I_F = 425\text{ A}$	$T_{VJ} = 125^{\circ}C$		1.21	V	
		$I_F = 850\text{ A}$			1.64	V	
I_{FAV}	average forward current	$T_C = 100^{\circ}C$ rectangular $d = 0.5$	$T_{VJ} = 150^{\circ}C$		425	A	
V_{F0}	threshold voltage	} for power loss calculation only	$T_{VJ} = 150^{\circ}C$		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		$T_C = 25^{\circ}C$		1785	W	
I_{FSM}	max. forward surge current	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		10.0	kA	
		$t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$	$V_R = 0\text{ V}$		10.8	kA	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		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	$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 45^{\circ}C$		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	
		$t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$	$T_{VJ} = 150^{\circ}C$		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	$V_R = 400\text{ V}; f = 1\text{ MHz}$	$T_{VJ} = 25^{\circ}C$		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		4300		V
		t = 1 minute	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	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

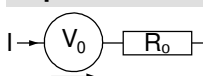
Similar Part	Package	Voltage class
MDMA300P1600PTSF	SimBus F	1600
MDMA600P1600PTSF	SimBus F	1600
MDNA300P2200PTSF	SimBus F	2200
MDNA600P2200PTSF	SimBus F	2200

Temperature Sensor NTC

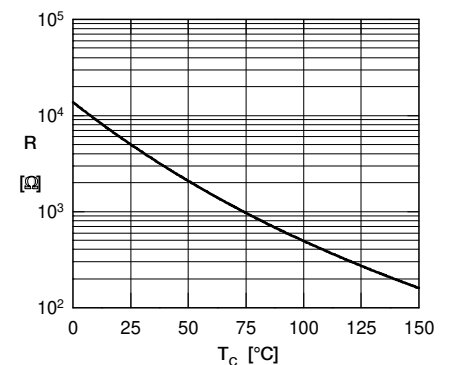
Symbol	Definition	Conditions	min.	typ.	max.	Unit
R_{25}	resistance	$T_{VJ} = 25^\circ$	4.85	5	5.15	k Ω
$B_{25/50}$	temperature coefficient			3375		K

Equivalent Circuits for Simulation

* on die level

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


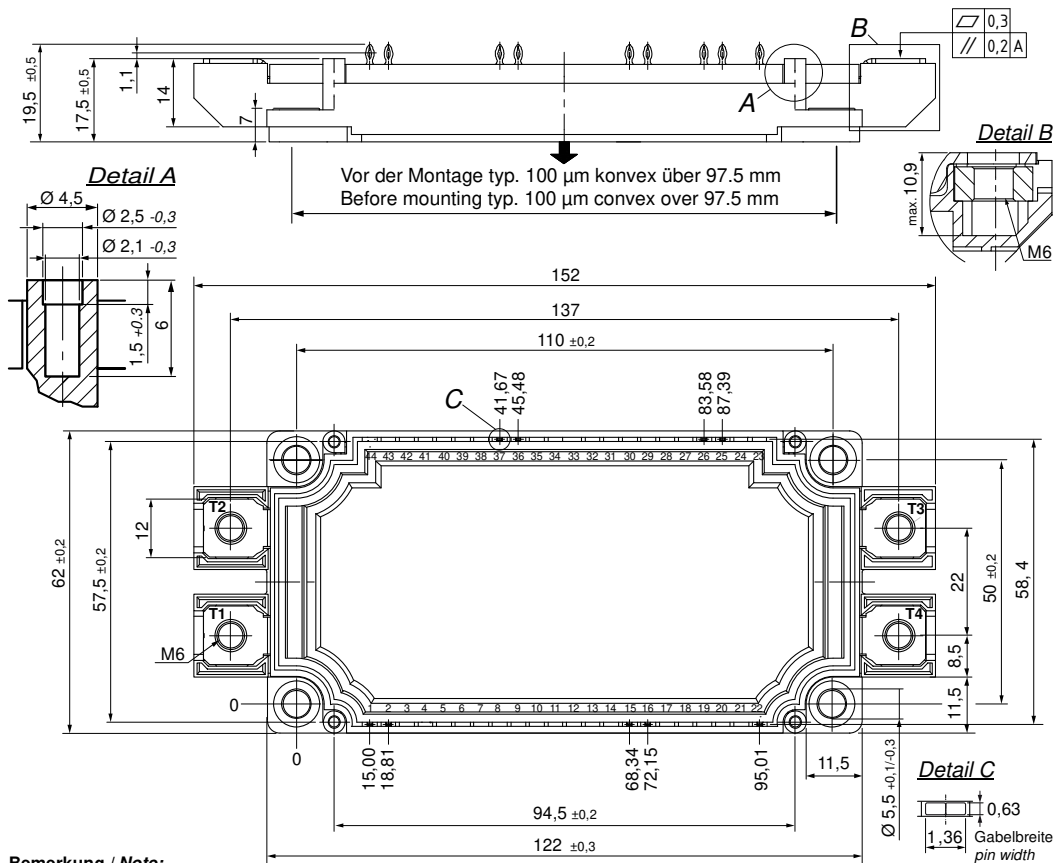
$V_{0\max}$	threshold voltage	0.77				V
$R_{0\max}$	slope resistance *	0.29				m Ω



Typ. NTC resistance vs. temperature



Outlines SimBus F

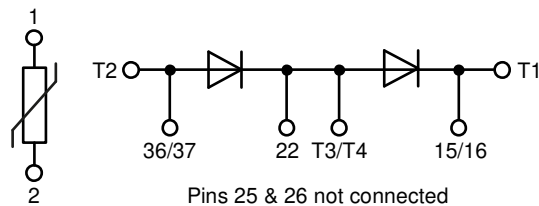


Bemerkung / Note:

- Nichttolerierete 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: $\oplus 0.1$
- Bohrl Lochdurchmesser / Diameter of drill: $\varnothing 1.16$ mm
- Endlochdurchmesser / Diameter of plated holes: $\varnothing 1.00 - 1.10$ 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**



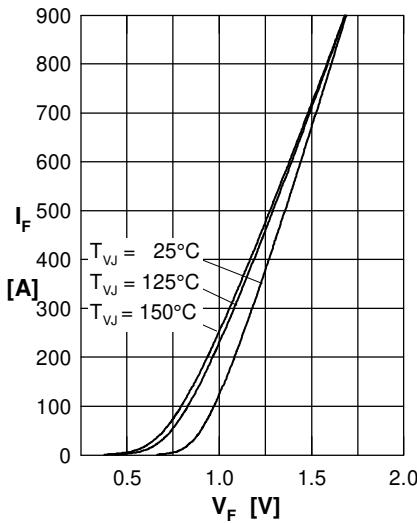
Rectifier


Fig. 1 Forward current versus voltage drop per diode

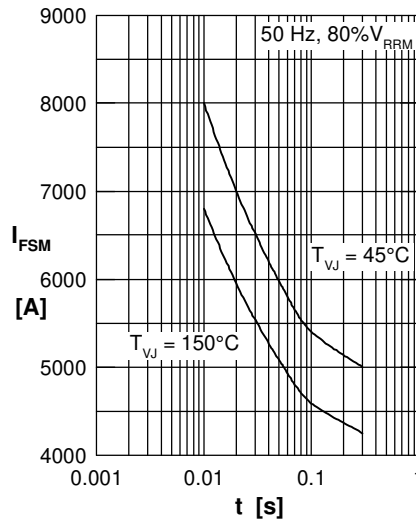


Fig. 2 Surge overload current vs. time per diode

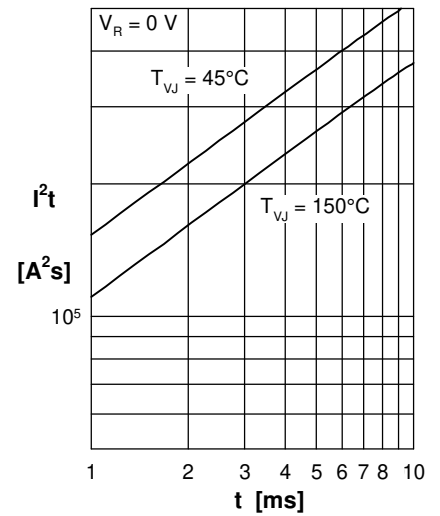
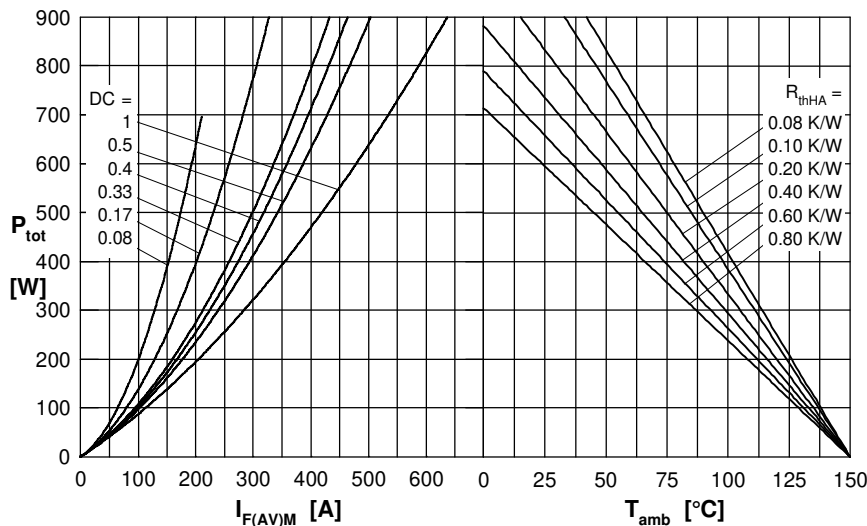

 Fig. 3 I^2t versus time per diode


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

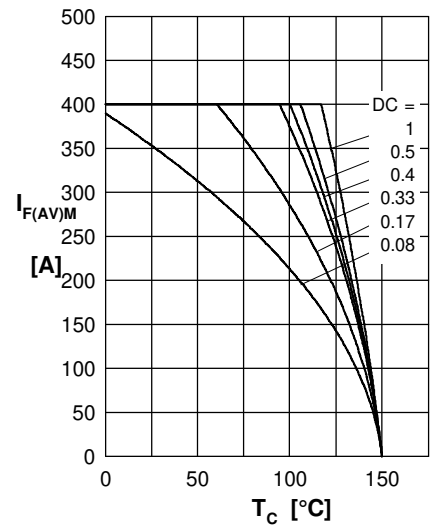


Fig. 5 Max. forward current vs. case temperature per diode

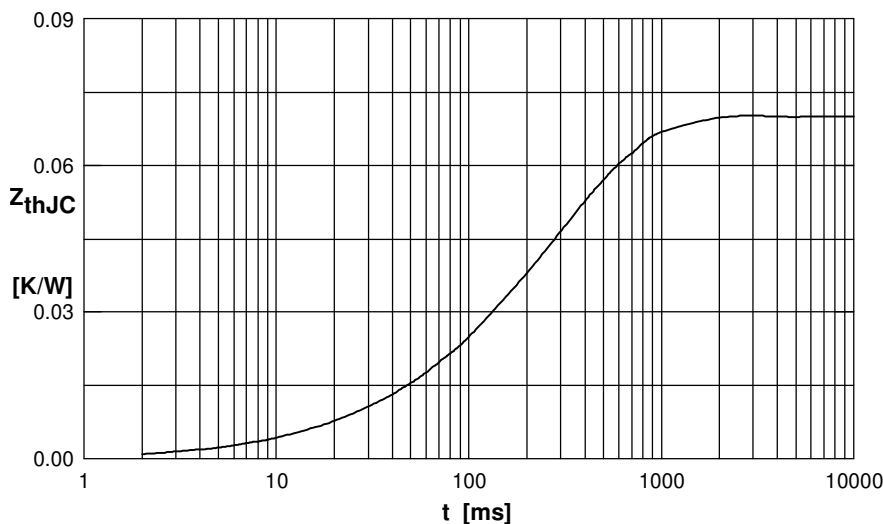


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 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