

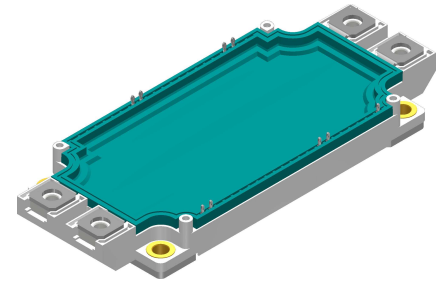
# Standard Rectifier Module

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

Phase leg + NTC

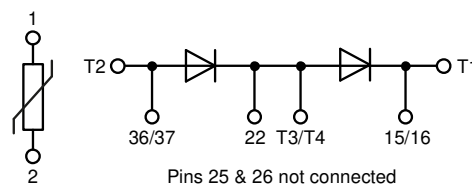
Part number

**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

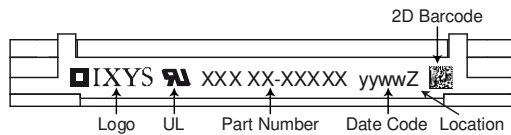
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Rectifier				Ratings			
Symbol	Definition	Conditions	min.	typ.	max.	Unit	
$V_{RSM}$	max. non-repetitive reverse blocking voltage				1700	V	
$V_{RRM}$	max. repetitive reverse blocking voltage				1600	V	
$I_R$	reverse current	$V_R = 1600$ V			300	$\mu$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

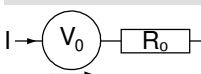
**Temperature Sensor NTC**

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

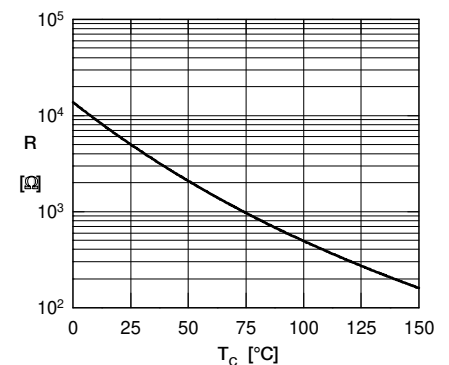
**Equivalent Circuits for Simulation**

\* on die level

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



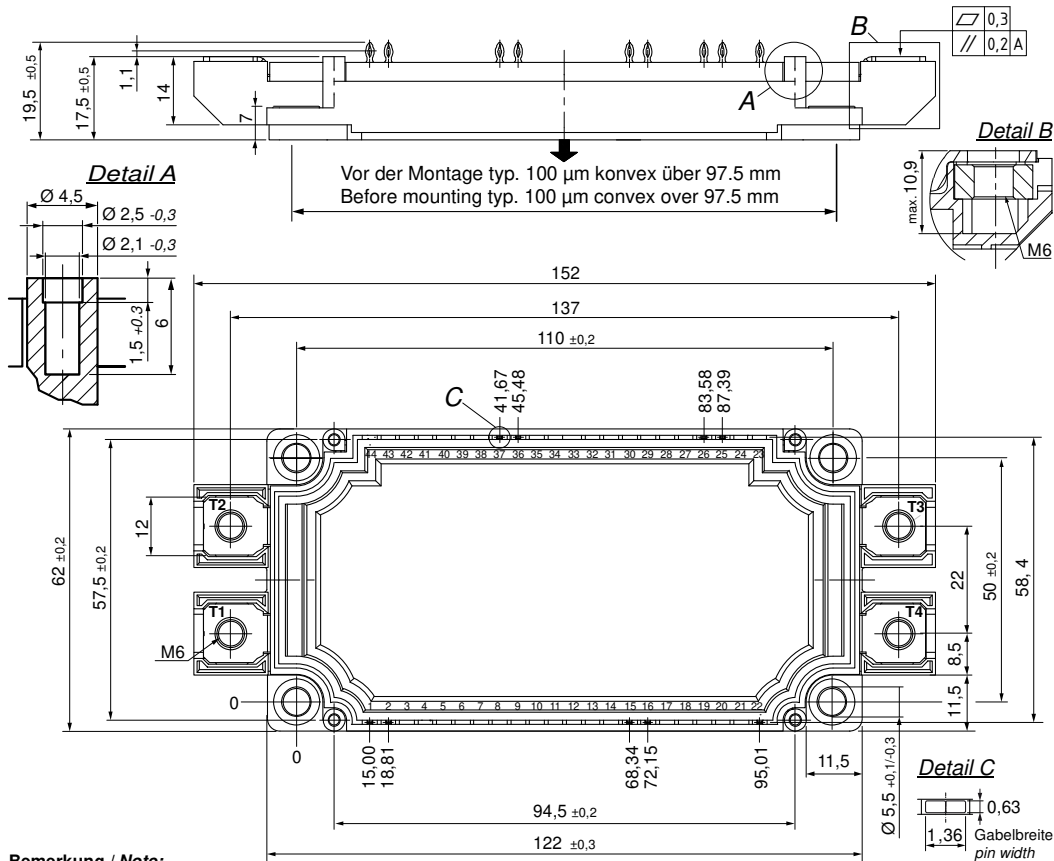
$V_{0 \max}$	threshold voltage	0.77				V
$R_{0 \max}$	slope resistance *	0.29				m $\Omega$



Typ. NTC resistance vs. temperature



**Outlines SimBus F**

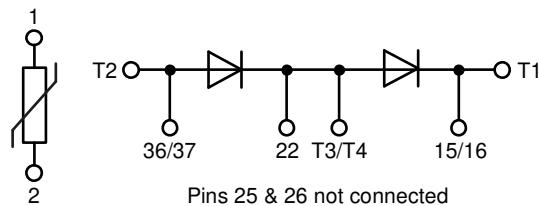


**Bemerkung / Note:**

- 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:  $\oplus 0.1$
- Bohrlochdurchmesser / 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](http://www.ixys.com) Application note IXAN0077
- Montageanleitung / Mounting instruction: [www.ixys.com](http://www.ixys.com) Application note IXAN0024

**Detail A:** PCB-Montage / Mounting on PCB<sup>L</sup>

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



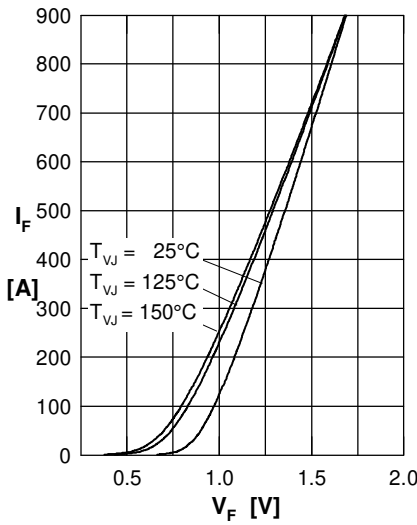
**Rectifier**


Fig. 1 Forward current versus voltage drop per diode

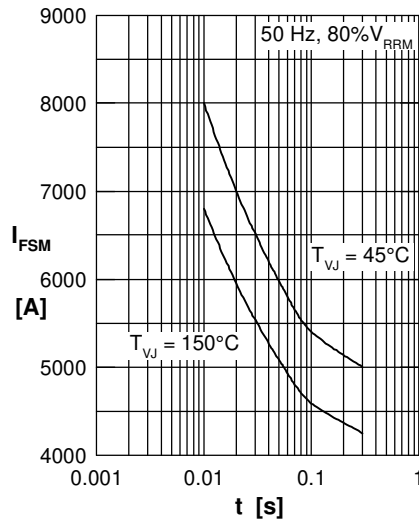


Fig. 2 Surge overload current vs. time per diode

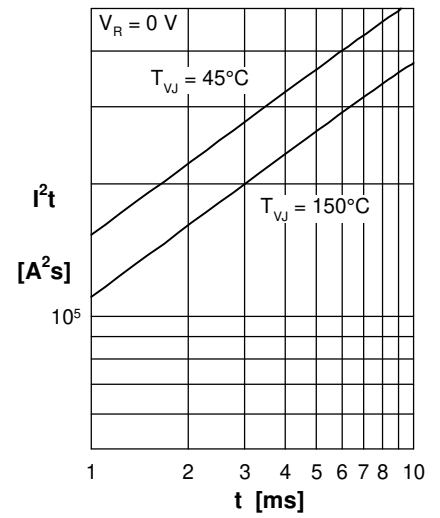
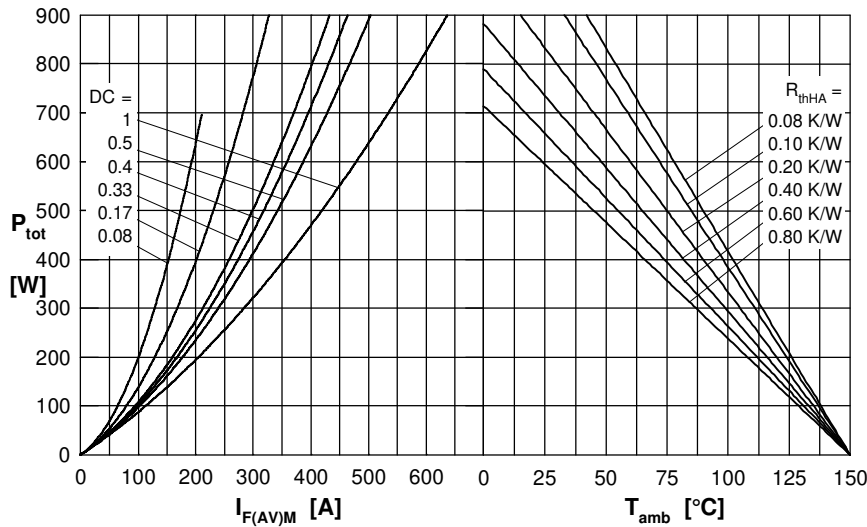

 Fig. 3  $I^2t$  versus time per diode


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

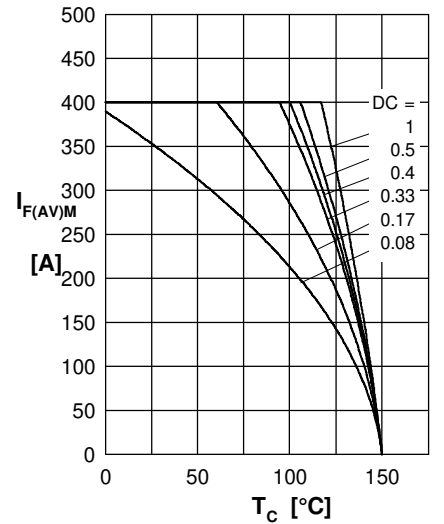


Fig. 5 Max. forward current vs. case temperature per diode

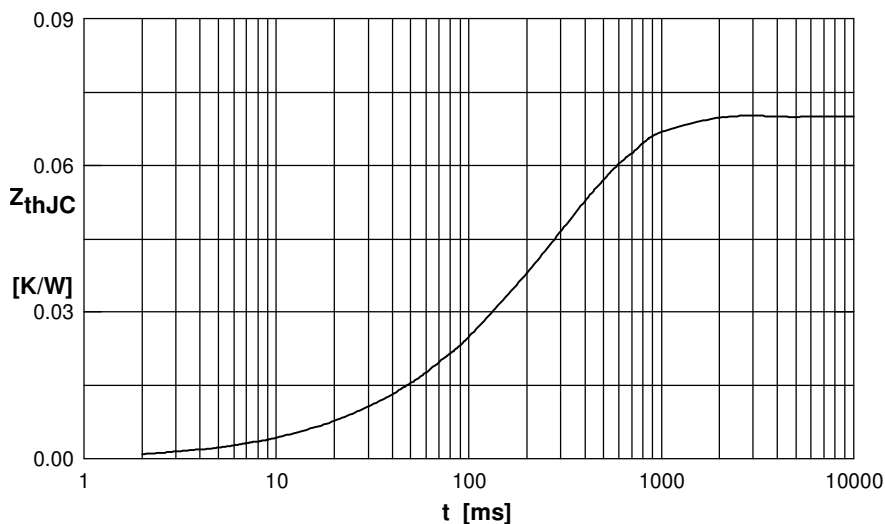


Fig. 6 Transient thermal impedance junction to case vs. time per diode

 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