

on request

# Standard Rectifier Module

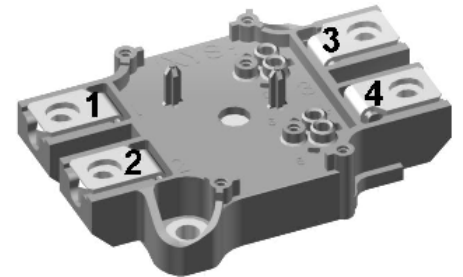
$$V_{RRM} = 2 \times 1600 \text{ V}$$

$$I_{FAV} = 200 \text{ A}$$


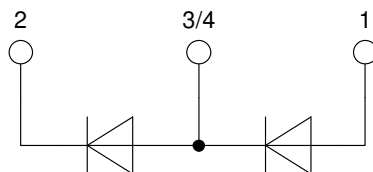
$$V_F = 1.06 \text{ V}$$

Phase leg

Part number

**MDMA200P1600SA**


Backside: isolated

### Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

### Applications:

- Diode for main rectification
- For single and three phase bridge configurations

### Package: SimBus A

- Isolation Voltage: 4800 V~
- Industry standard outline
- RoHS compliant
- Gate: Spring contacts for solder-free PCB-mounting
- Height: 17 mm
- Base plate: Copper internally DCB isolated
- Advanced power cycling

### Disclaimer Notice

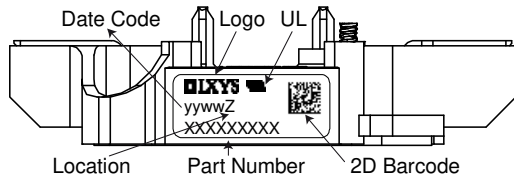
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Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					1700	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1600	V
$I_R$	reverse current	$V_R = 1600$ V		$T_{VJ} = 25^\circ\text{C}$		200	$\mu\text{A}$
		$V_R = 1600$ V		$T_{VJ} = 150^\circ\text{C}$		15	mA
$V_F$	forward voltage drop	$I_F = 200$ A		$T_{VJ} = 25^\circ\text{C}$		1.13	V
		$I_F = 400$ A				1.33	V
		$I_F = 200$ A		$T_{VJ} = 125^\circ\text{C}$		1.06	V
		$I_F = 400$ A				1.32	V
$I_{FAV}$	average forward current	$T_C = 110^\circ\text{C}$		$T_{VJ} = 150^\circ\text{C}$		200	A
		rectangular	d = 0.5				
$V_{FO}$	threshold voltage			$T_{VJ} = 150^\circ\text{C}$		0.76	V
$r_F$	slope resistance					1.4	m $\Omega$
		} for power loss calculation only					
$R_{thJC}$	thermal resistance junction to case					0.15	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.08		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		830	W
$I_{FSM}$	max. forward surge current	t = 10 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		6.00	kA
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		6.48	kA
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		5.10	kA
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		5.51	kA
$I^2t$	value for fusing	t = 10 ms; (50 Hz), sine		$T_{VJ} = 45^\circ\text{C}$		180.0	kA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		174.7	kA <sup>2</sup> s
		t = 10 ms; (50 Hz), sine		$T_{VJ} = 150^\circ\text{C}$		130.1	kA <sup>2</sup> s
		t = 8,3 ms; (60 Hz), sine		$V_R = 0$ V		126.3	kA <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400$ V; f = 1 MHz		$T_{VJ} = 25^\circ\text{C}$		273	pF



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Package SimBus A		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			300	A
$T_{VJ}$	virtual junction temperature		-40		150	°C
$T_{op}$	operation temperature		-40		125	°C
$T_{stg}$	storage temperature		-40		125	°C
<b>Weight</b>				152		g
$M_D$	mounting torque		3		5	Nm
$M_T$	terminal torque		2.5		5	Nm
$d_{Spp/Apb}$	creepage distance on surface   striking distance through air	terminal to terminal	14.0	10.0		mm
$d_{Spb/Apb}$		terminal to backside	14.0	10.0		mm
$V_{ISOL}$	isolation voltage	t = 1 second	4800			V
		t = 1 minute	4000			V



**Part description**

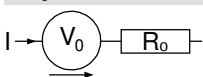
- M = Module
- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 200 = Current Rating [A]
- P = Phase leg
- 1600 = Reverse Voltage [V]
- SA = SimBus A

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	MDMA200P1600SA	MDMA200P1600SA	Blister	9	510373

**Equivalent Circuits for Simulation**

\* on die level

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



**Rectifier**

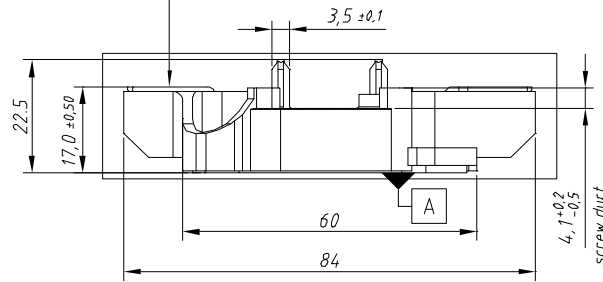
$V_{0\ max}$	threshold voltage	0.76	V
$R_{0\ max}$	slope resistance *	0.8	mΩ



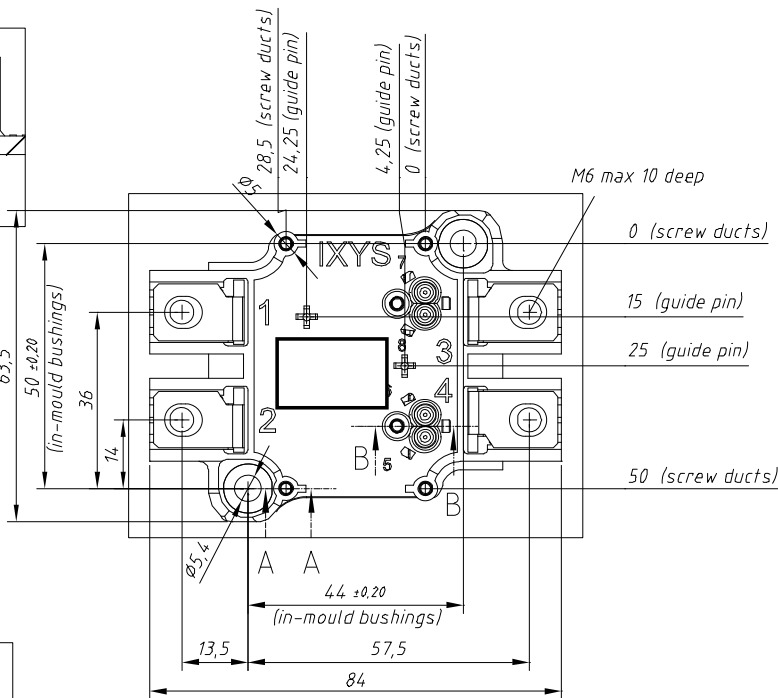
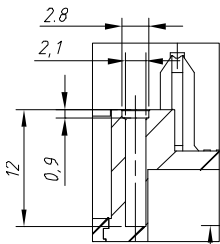
**Outlines SimBus A**

general tolerance:  
ISO 2768-mK

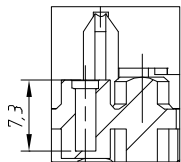
	0,3	main terminal
	0,2	A



A (2:1)  
screw duct (4x)

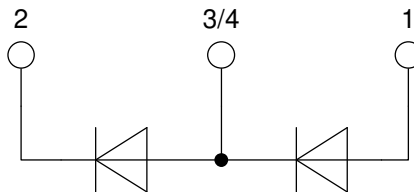


B (2:1)  
screw duct (2x)



**Rules for the contact PCB:**

- spring landing pad =  $\phi 3,5 \pm 0,2$ ; position tolerance  $\pm 0,1$
- holes guide pins =  $\phi 4 \pm 0,1$ ; position tolerance  $\pm 0,1$
- holes PCB screws =  $2,9 \pm 0,1$ ; position tolerance  $\pm 0,1$





**Rectifier**

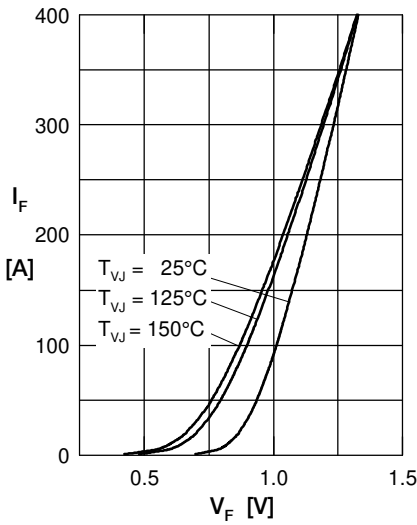


Fig. 1 Forward current versus voltage drop per diode

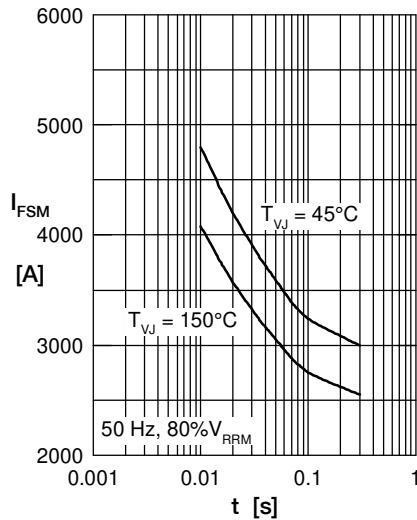


Fig. 2 Surge overload current vs. time per diode

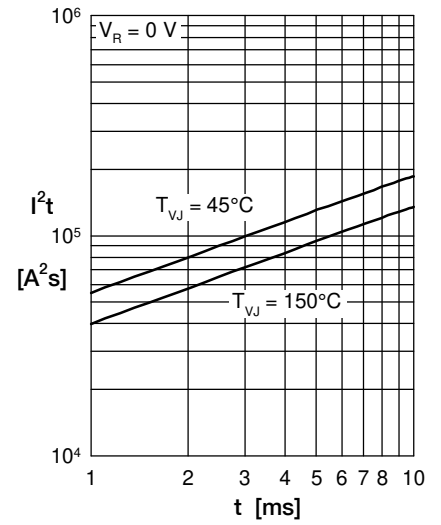


Fig. 3  $I^2t$  versus time per diode

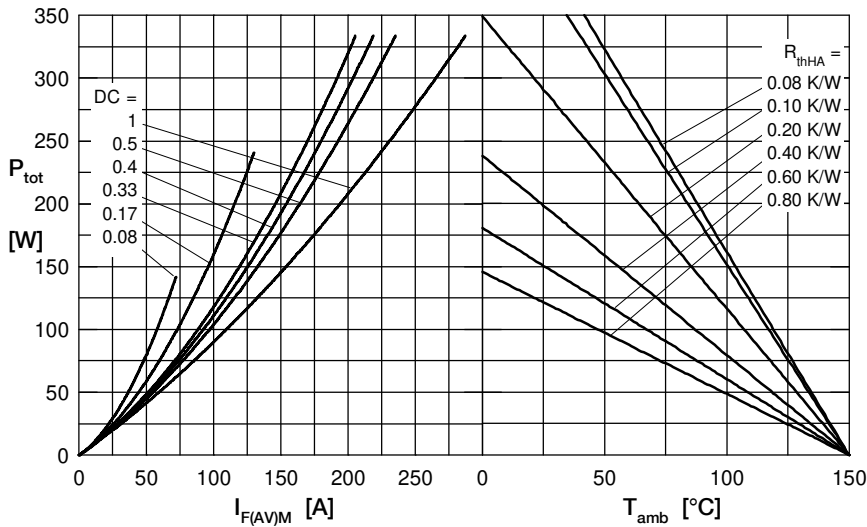


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

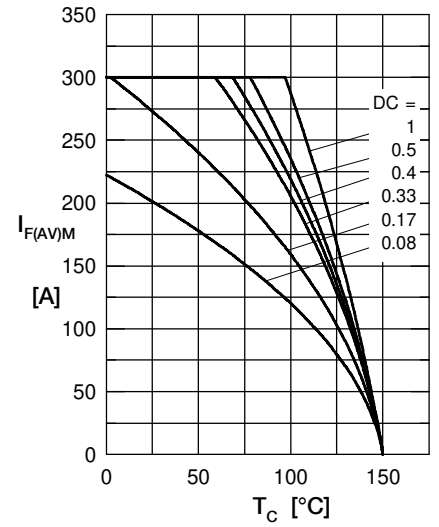


Fig. 5 Max. forward current vs. case temperature per diode

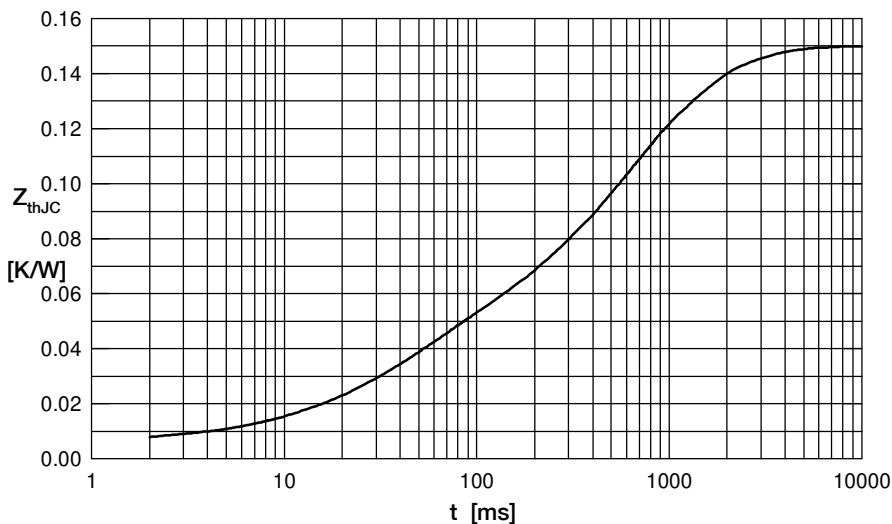


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

i	$R_{thi}$ (K/W)	$t_i$ (s)
1	0.006	0.0005
2	0.035	0.0400
3	0.079	0.5500
4	0.030	1.5000