

## Standard Rectifier Module

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

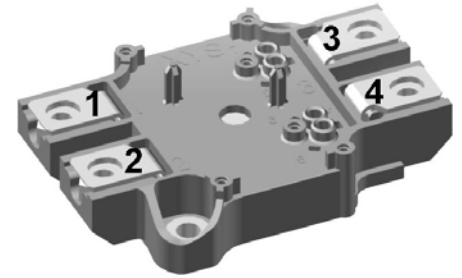
$$I_{FAV} = 200 \text{ A}$$

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

Phase leg

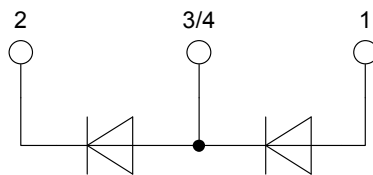
Part number

MDMA200P1600SA



Backside: isolated

 E72873



### Features / Advantages:

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

### Applications:

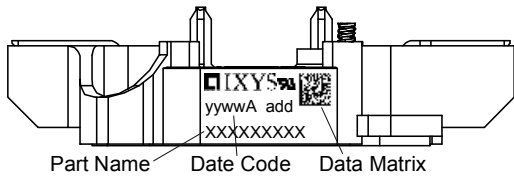
- Diode for main rectification
- For single and three phase bridge configurations

### 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

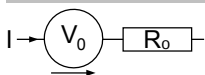
Rectifier				Ratings			
Symbol	Definition	Conditions		min.	typ.	max.	Unit
$V_{RSM}$	max. non-repetitive reverse blocking voltage					1700	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1600	V
$I_R$	reverse current	$V_R = 1600$ V	$T_{VJ} = 25^\circ\text{C}$			200	$\mu\text{A}$
		$V_R = 1600$ 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	$T_C = 110^\circ\text{C}$ rectangular	$T_{VJ} = 150^\circ\text{C}$ d = 0.5			200	A
$V_{FO}$	threshold voltage	} for power loss calculation only				0.76	V
$r_F$	slope resistance						1.4
$R_{thJC}$	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

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
$d_{Spp/App}$	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	50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA	4000		V


**Part number**

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

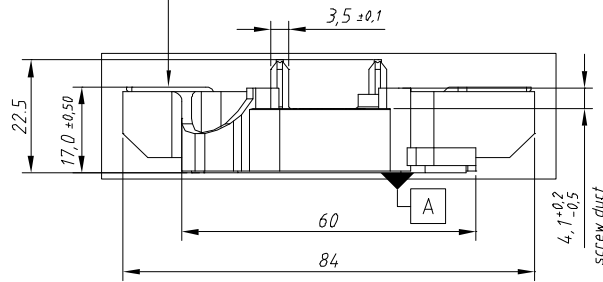
**Equivalent Circuits for Simulation**
*\* on die level*
 $T_{VJ} = 150\text{ °C}$ 

**Rectifier**

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

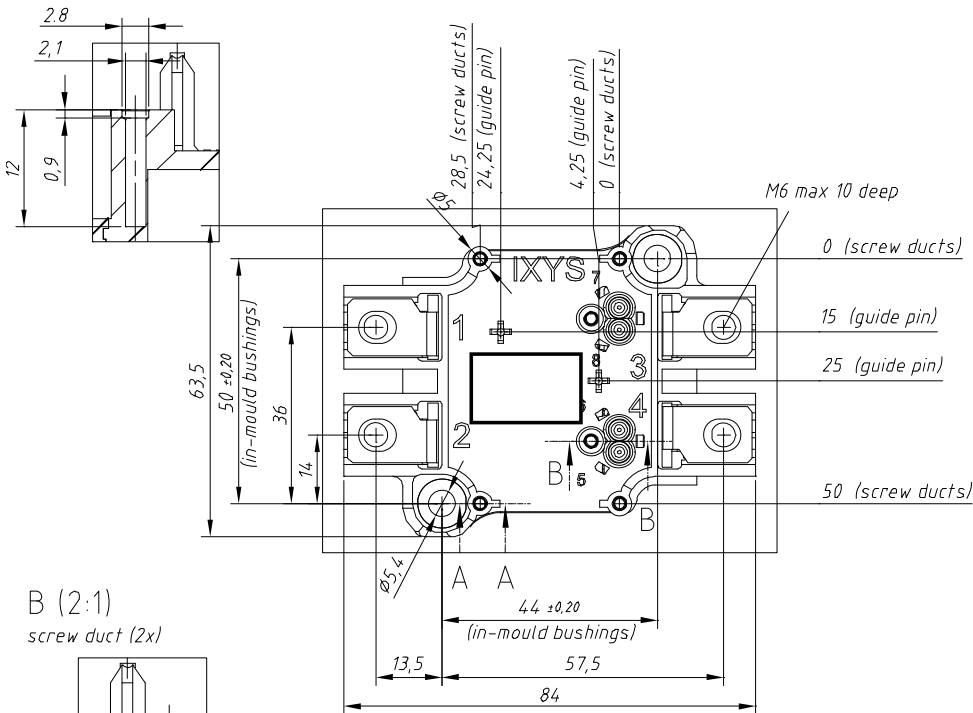
## Outlines SimBus A

general tolerance:  
ISO 2768-mK

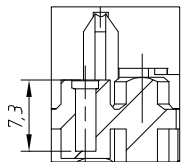
	0,3	main terminal
	0,2	A



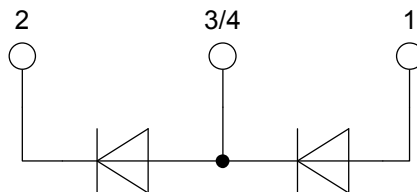
A (2:1)  
screw duct (4x)



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**

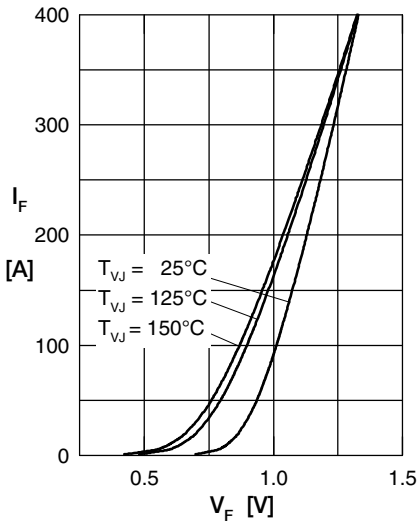


Fig. 1 Forward current versus voltage drop per diode

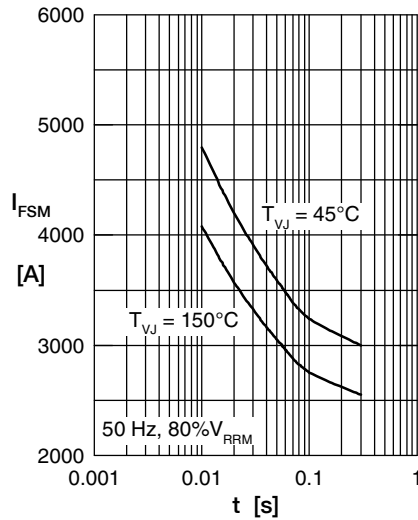


Fig. 2 Surge overload current vs. time per diode

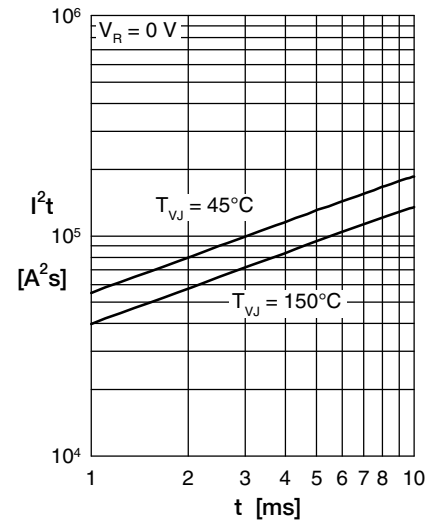


Fig. 3  $I^2t$  versus time per diode

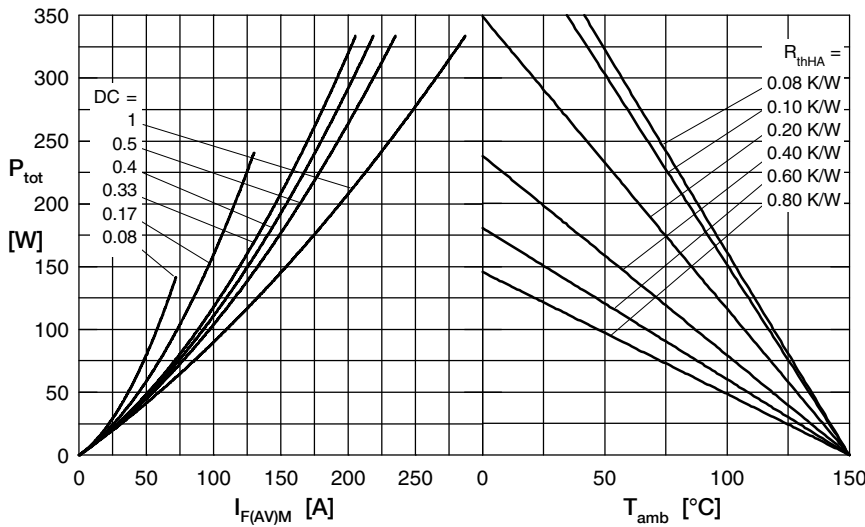


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

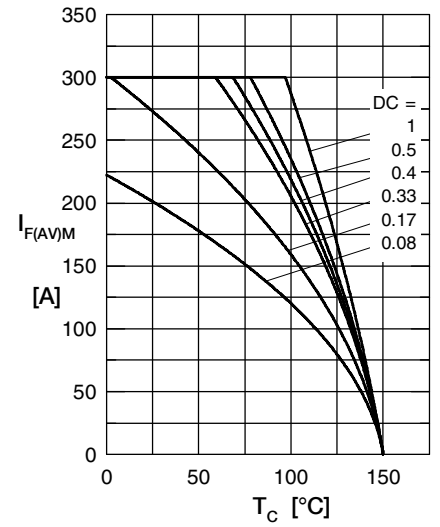


Fig. 5 Max. forward current vs. case temperature per diode

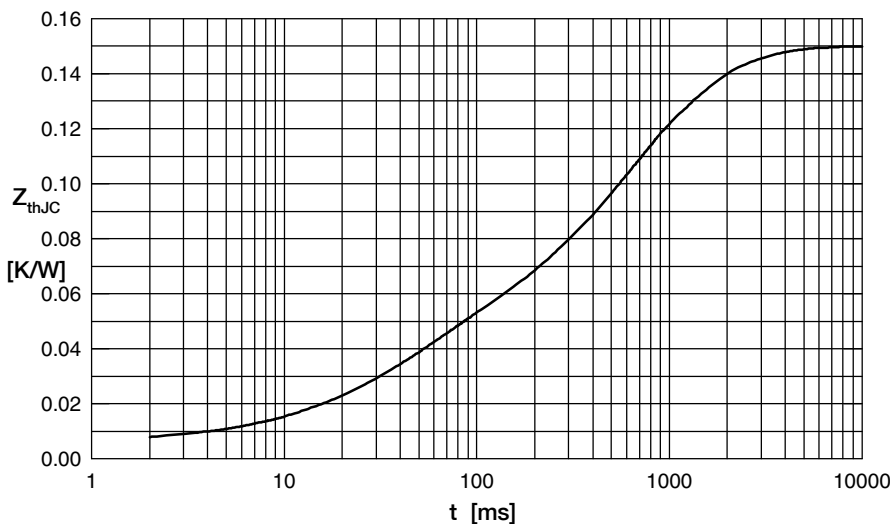


Fig. 6 Transient thermal impedance junction to case vs. time per diode

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