

# Standard Rectifier

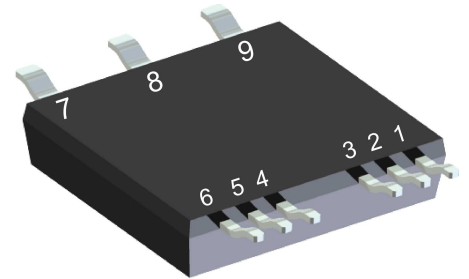
<b>3~ Rectifier</b>	
$V_{RRM}$	= 1800 V
$I_{DAV}$	= 90 A
$I_{FSM}$	= 350 A

ISOPLUS™  
 Surface Mount Power Device  
 3~ Rectifier Bridge


Part number

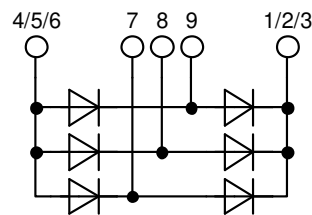
**DMA90U1800LB**

Marking on Product: DMA90U1800LB



Backside: isolated

 E72873



## Features / Advantages:

- Rectifier diode
- Isolated back surface
- Low coupling capacity between pins and heatsink
- Enlarged creepage towards heatsink
- Application friendly pinout
- Low inductive current path
- High reliability

## Applications:

- Line rectifying 50/60 Hz
- Drives
- SMPS
- UPS

## Package: SMPD

- Isolation Voltage: 3000 V~
- Industry convenient outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- 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					1900	V
$V_{RRM}$	max. repetitive reverse blocking voltage					1800	V
$I_R$	reverse current	$V_R = 1800$ V	$T_{VJ} = 25^\circ\text{C}$			40	$\mu\text{A}$
		$V_R = 1800$ V	$T_{VJ} = 150^\circ\text{C}$			1.5	mA
$V_F$	forward voltage drop	$I_F = 30$ A	$T_{VJ} = 25^\circ\text{C}$			1.26	V
		$I_F = 90$ A				1.79	V
		$I_F = 30$ A	$T_{VJ} = 150^\circ\text{C}$			1.20	V
		$I_F = 90$ A				1.93	V
$I_{DAV}$	bridge output current	$T_C = 110^\circ\text{C}$ rectangular	$T_{VJ} = 175^\circ\text{C}$ $d = \frac{1}{3}$			90	A
$V_{F0}$	threshold voltage	} for power loss calculation only				0.81	V
$r_F$	slope resistance					12.7	m $\Omega$
$R_{thJC}$	thermal resistance junction to case					1.1	K/W
$R_{thCH}$	thermal resistance case to heatsink				0.4		K/W
$P_{tot}$	total power dissipation			$T_C = 25^\circ\text{C}$		135	W
$I_{FSM}$	max. forward surge current	$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			350	A
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			380	A
		$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			300	A
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			320	A
$I^2t$	value for fusing	$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 45^\circ\text{C}$			615	A <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			600	A <sup>2</sup> s
		$t = 10$ ms; (50 Hz), sine	$T_{VJ} = 150^\circ\text{C}$			450	A <sup>2</sup> s
		$t = 8,3$ ms; (60 Hz), sine	$V_R = 0$ V			425	A <sup>2</sup> s
$C_J$	junction capacitance	$V_R = 400$ V; $f = 1$ MHz		$T_{VJ} = 25^\circ\text{C}$		11	pF



Package SMPD		Ratings				
Symbol	Definition	Conditions	min.	typ.	max.	Unit
$I_{RMS}$	RMS current	per terminal			100	A
$T_{VJ}$	virtual junction temperature		-55		175	°C
$T_{op}$	operation temperature		-55		150	°C
$T_{stg}$	storage temperature		-55		150	°C
<b>Weight</b>				8.5		g
$F_C$	mounting force with clip		40		130	N
$d_{Spp/ App}$	creepage distance on surface / striking distance through air	terminal to terminal	1.6			mm
$d_{Spb/ Apb}$		terminal to backside	4.0			mm
$V_{ISOL}$	isolation voltage	t = 1 second	3000			V
		t = 1 minute	2500			V



**Part description**

- D = Diode
- M = Standard Rectifier
- A = (up to 1800V)
- 90 = Current Rating [A]
- U = 3- Rectifier Bridge
- 1800 = Reverse Voltage [V]
- LB = SMPD-B

Ordering	Ordering Number	Marking on Product	Delivery Mode	Quantity	Code No.
Standard	DMA90U1800LB-TUB	DMA90U1800LB	Tube	20	517130
Alternative	DMA90U1800LB-TRR	DMA90U1800LB	Tape & Reel	200	524497

**Equivalent Circuits for Simulation**

\* on die level

$T_{VJ} = 175\text{ °C}$



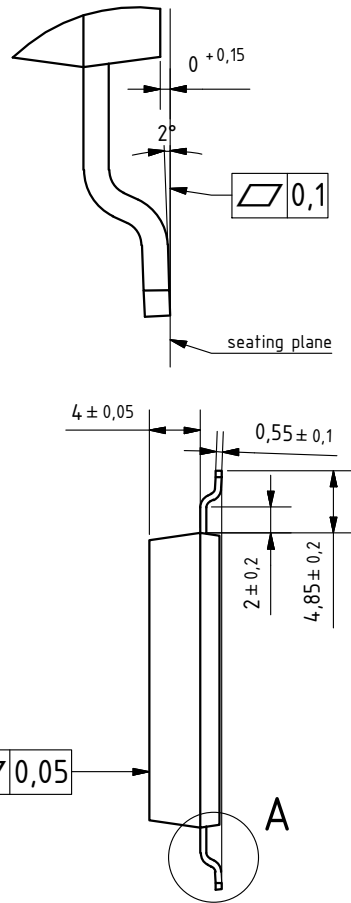
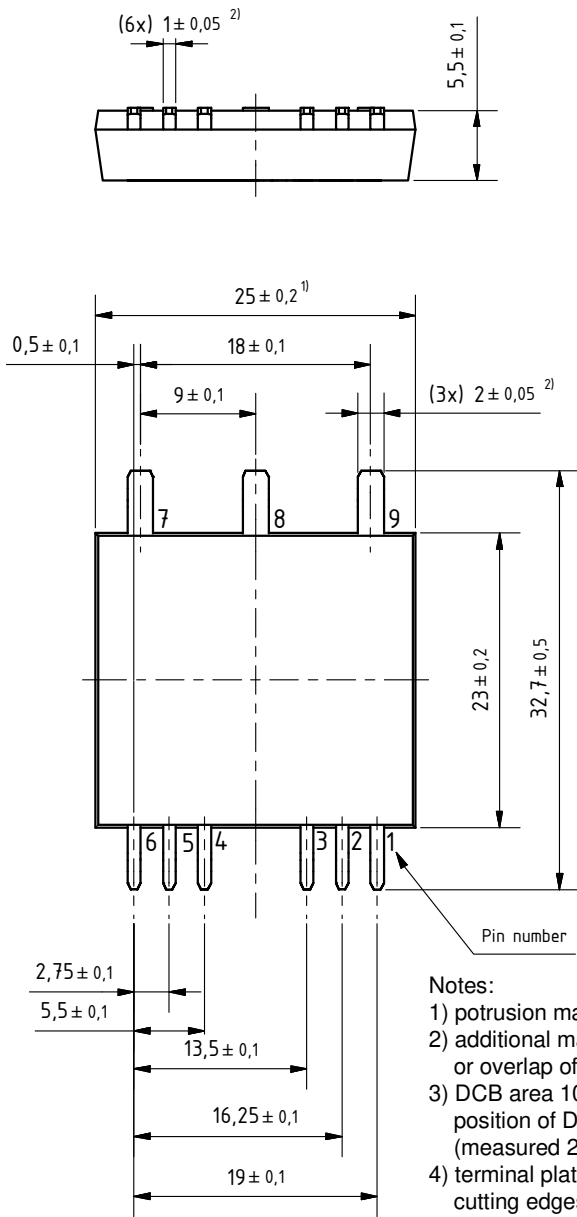
**Rectifier**

$V_{0\ max}$	threshold voltage	0.81	V
$R_{0\ max}$	slope resistance *	10.1	mΩ



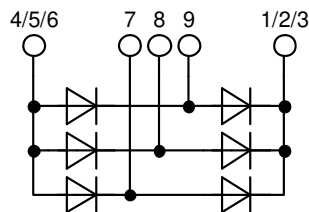
**Outlines SMPD**

**A ( 8 : 1 )**



**Notes:**

- 1) protrusion may add 0.2 mm max. on each side
- 2) additional max. 0.05 mm per side by punching misalignment or overlap of dam bar or bending compression
- 3) DCB area 10 to 50  $\mu\text{m}$  convex; position of DCB area in relation to plastic rim:  $\pm 25 \mu\text{m}$  (measured 2 mm from Cu rim)
- 4) terminal plating: 0.2 - 1  $\mu\text{m}$  Ni + 10 - 25  $\mu\text{m}$  Sn (gal v.) cutting edges may be partially free of plating





**Rectifier**

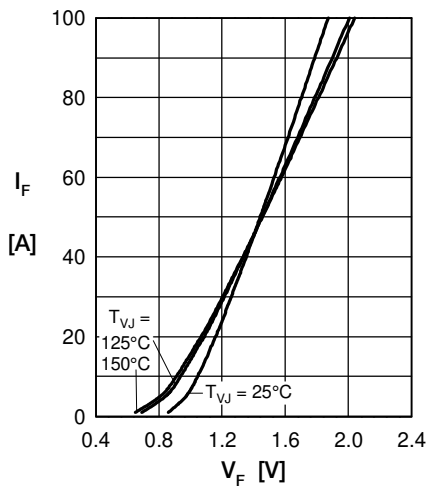


Fig. 1 Forward current vs. voltage drop per diode

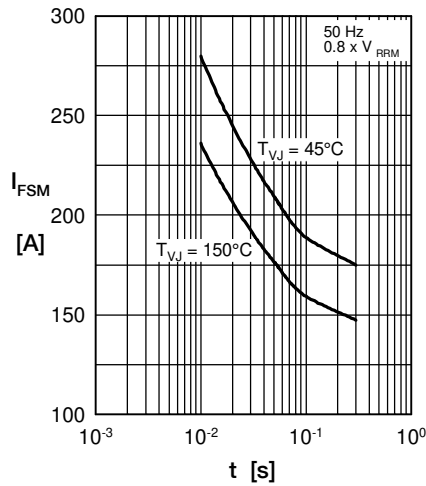


Fig. 2 Surge overload current vs. time per diode

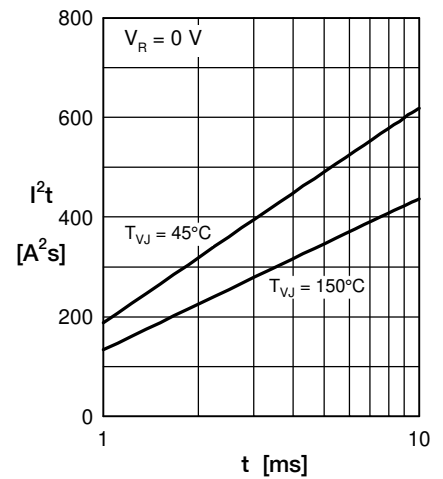


Fig. 3  $I^2t$  vs. time per diode

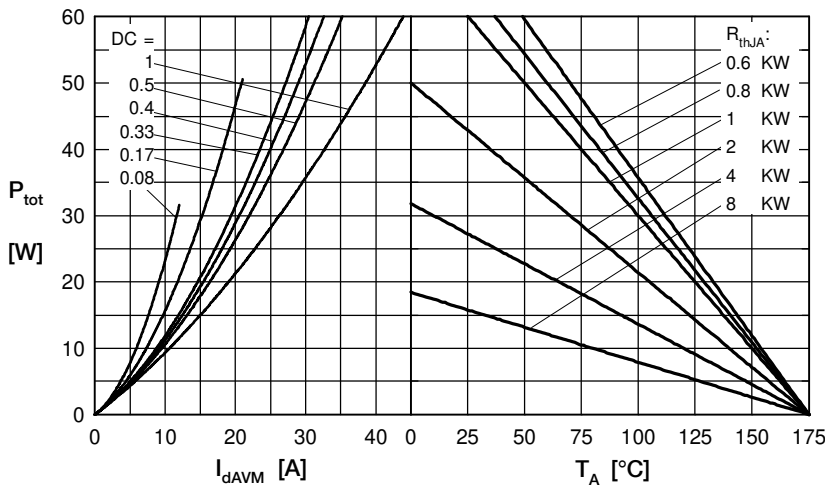


Fig. 4 Power dissipation vs. forward current and ambient temperature per diode

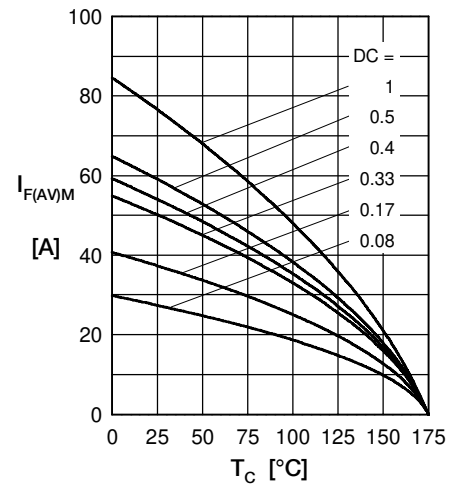


Fig. 5 Max. forward current vs. case temperature per diode

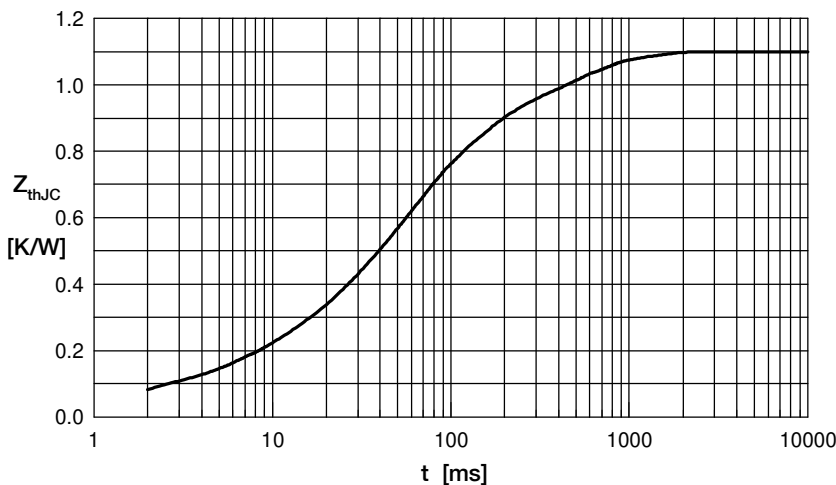


Fig. 6 Transient thermal impedance junction to case vs. time per diode

Constants for  $Z_{thJC}$  calculation:

i	$R_{th}$ (K/W)	$t_i$ (s)
1	0.030	0.0003
2	0.072	0.0045
3	0.092	0.0530
4	0.606	0.0520
5	0.300	0.4000