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November 2014



MDB10SV — 1.2 A, 1000 V, Micro-DIP, Single-Phase Bridge Rectifier

# MDB10SV

## 1.2 A, 1000 V, Micro-DIP, Single-Phase Bridge Rectifier

### Features

- Optimized  $V_F$ : 1.015 V Maximum at 1.2 A
- $I_{F(AV)} = 1.2$  A
- $I_{FSM} = 50$  A
- MDB10SS and MDB10S Socket Compatible
- Glass-Passivated Junctions
- Requires Only 35 mm<sup>2</sup> of Board Space
- Low Package Profile: 1.45 mm Typical, 1.60 mm Maximum
- RoHS Compliant
- Halogen Free
- Qualified with IR/convection Solder Reflow (J-STD-020) and Wave Soldering (JESD22-A111)

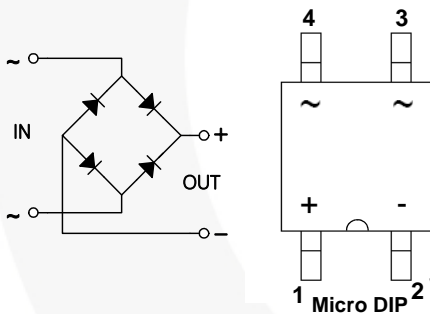
### Description

With the ever-pressing need to improve power supply efficiency and reliability, the MDB10SV sets a new standard in small form-factor, efficient, robust, bridge rectifier performance.

The design offers improved efficiency by achieving a 1.2 A  $V_F$  of 1.015 V maximum at 25°C. This lower  $V_F$  results in cooler and more efficient power supply operation.

The design enhances reliability with a 50 A  $I_{FSM}$  rating to absorb high surge currents, improved  $I^2t$  ratings, and supporting a rated breakdown voltage of 1000 V.

Finally, the MDB10SV achieves all this in a small form-factor micro-DIP package, offering a maximum height of 1.6 mm, and requiring only 35 mm<sup>2</sup> of board space.



### Ordering Information

Part Number	Top Mark	Package	Packing Method
MDB10SV	MDB10V	Micro DIP	Tape and Reel

## Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$V_{RRM}$	Maximum Repetitive Peak Reverse Voltage	1000	V
$V_{RMS}$	Maximum RMS Voltage	700	V
$V_{DC}$	Maximum DC Blocking Voltage	1000	V
$I_{F(AV)}$	Average Rectified Forward Current <sup>(1)</sup>	1.2	A
$I_{FSM}$	Peak Forward Surge Current <sup>(2)</sup>	50	A
$I^2t$	$I^2t$ Rating for Fusing ( $t < 8.3$ ms)	10.4	A <sup>2</sup> S
$T_J$	Operating Junction Temperature Range	-55 to +150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to +150	$^\circ\text{C}$

### Notes:

- 8.3 ms single half-sine wave, R-load,  $T_A = 25^\circ\text{C}$ .
- 8.3 ms single half-sine wave, single pulse,  $T_J = 25^\circ\text{C}$ , compliant with MIL standard.

## Thermal Characteristics<sup>(3)</sup>

Symbol	Parameter	Conditions	Max.	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	Multi-Die Measurement (Maximum Land Pattern: 12 x 12 mm)	55	$^\circ\text{C/W}$
		Multi-Die Measurement (Minimum Land Pattern: 0.95 x 1.65 mm)	115	
$\psi_{JL}$	Thermal Characterization Parameter, Junction to Lead	Single-Die Measurement (Maximum and Minimum Land Pattern)	18	$^\circ\text{C/W}$

### Note:

- The thermal resistances ( $R_{\theta JA}$  &  $\psi_{JL}$ ) are characterized with the device mounted on the following FR4 printed circuit boards, as shown in Figure 1 and Figure 2. PCB size: 76.2 x 114.3 mm.

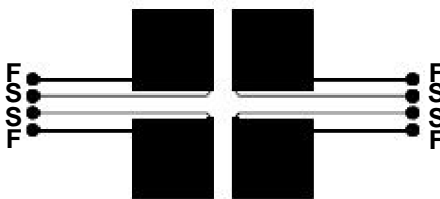


Figure 1. Maximum Pads of 2 oz Copper

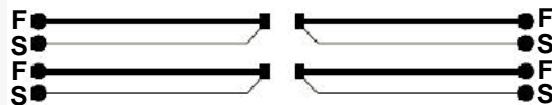


Figure 2. Minimum Pads of 2 oz Copper

### Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions	Value		Unit	
			Typ.	Max.		
$V_F$	Maximum Forward Voltage	$I_F = 0.3\text{ A}$ , 300 $\mu\text{s}$ Pulse, 1% Duty Cycle, Per Diode	0.850		V	
		$I_F = 1.0\text{ A}$ , 300 $\mu\text{s}$ Pulse, 1% Duty Cycle, Per Diode	0.930			
		$I_F = 1.2\text{ A}$ , 300 $\mu\text{s}$ Pulse, 1% Duty Cycle, Per Diode	0.940	1.015		
$I_R$	Maximum Reverse Current	At $V_{RWM}$ , Pulse Measurement, Per Diode	$T_A = 25^\circ\text{C}$	0.1	10.0	$\mu\text{A}$
			$T_A = 125^\circ\text{C}$	95.0		
$C_J$	Typical Junction Capacitance	$V_R = 4\text{ V}$ , $f = 1\text{ MHz}$	14		pF	
$t_{rr}$	Typical Reverse-Recovery Time	$I_F = 0.5\text{ A}$ , $I_{RM} = 1\text{ A}$ , $I_{R(REC)} = 0.25\text{ A}$	1430		ns	

## Typical Performance Characteristics

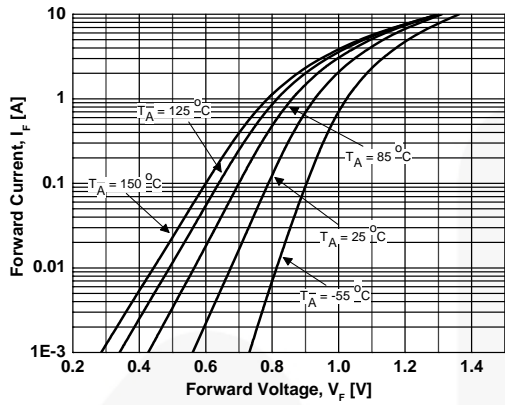


Figure 3. Typical Instantaneous Forward Voltage Per Leg

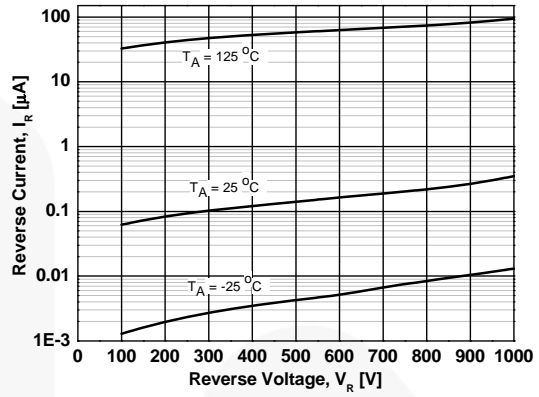


Figure 4. Typical Reverse-Voltage Current Characteristics

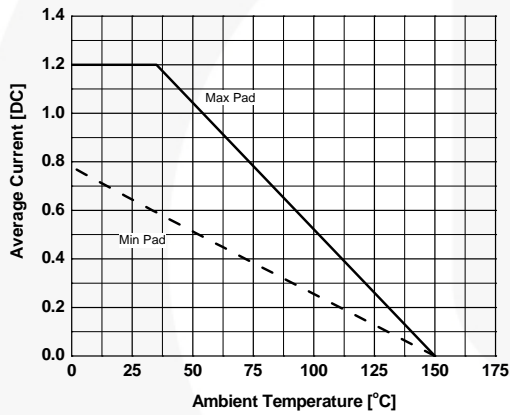


Figure 5. Forward Current Derating Curve

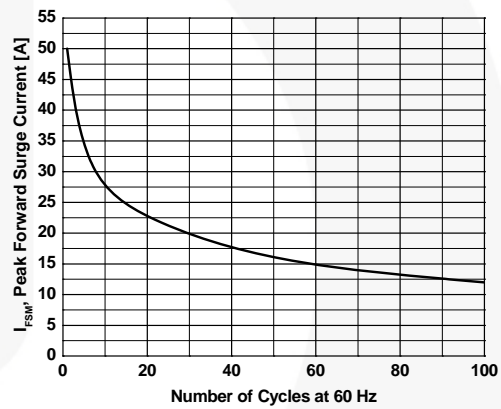


Figure 6. Surge Current Derating Curve

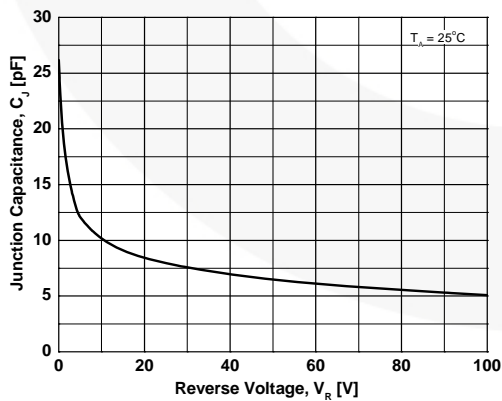
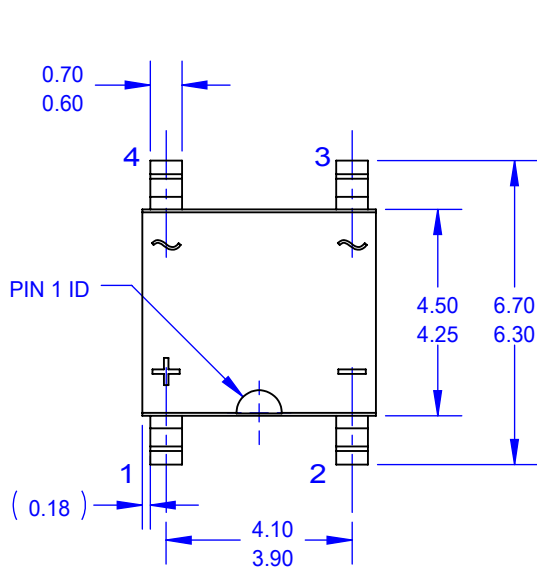
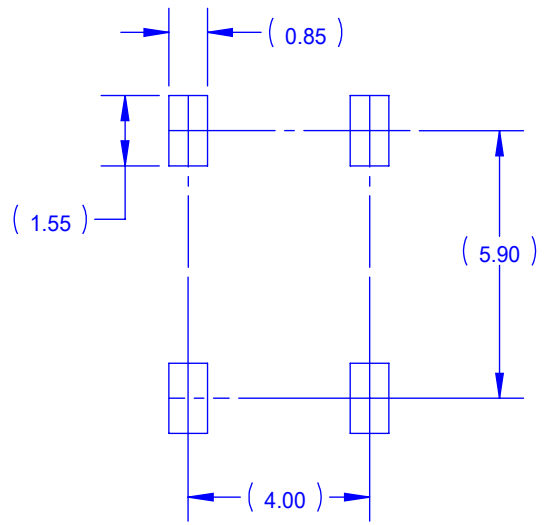


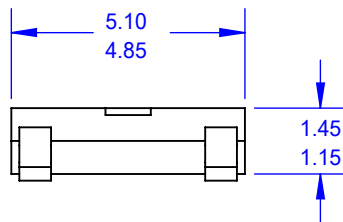
Figure 7. Typical Junction Capacitance



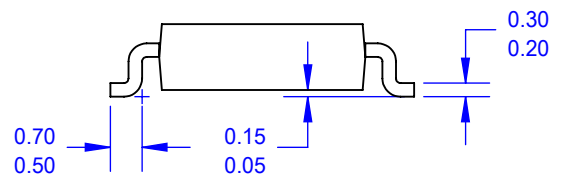
TOP VIEW



LAND PATTERN RECOMMENDATION



SIDE VIEW



END VIEW

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