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June 2015

## DF005S1 - DF10S1 Bridge Rectifier

### Features

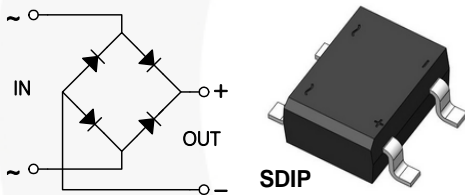
- Maximum Surge Rating:  $I_{FSM} = 35\text{ A}$   
 $I^2t = 5.1\text{ A}^2\text{Sec}$
- Optimized  $V_F$ : Typical 0.95 V at 1 A, 25°C
- DF10S Socket Compatible
- Glass Passivated Junctions
- Lead Free Compliant to EU RoHS 2002/95/EU Directives
- Green Molding Compound: IEC61249
- Qualified with IR Reflow and Wave Soldering

### Description

With the ever-pressing need to improve power supply efficiency, improve surge rating, improve reliability, and reduce size, the DFxS1 family sets a new standard in performance and cost saving.

The DFxS1 family balances performance against cost. The design offers a moderate surge rating of 35 A required to handle inrush surge and maintain good reliability, with fair price.

The DFxS1 achieves good performance in a SDIP surface mount form factor, reducing board space and volumetric requirements vs. competitive devices.



### Ordering Information

| Part Number | Top Mark | Package | Packing Method |
|-------------|----------|---------|----------------|
| DF005S1     | DF005S1  | SDIP 4L | Tape and Reel  |
| DF01S1      | DF01S1   | SDIP 4L | Tape and Reel  |
| DF02S1      | DF02S1   | SDIP 4L | Tape and Reel  |
| DF04S1      | DF04S1   | SDIP 4L | Tape and Reel  |
| DF06S1      | DF06S1   | SDIP 4L | Tape and Reel  |
| DF08S1      | DF08S1   | SDIP 4L | Tape and Reel  |
| DF10S1      | DF10S1   | SDIP 4L | 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             |
|-------------|--|-------------|--------|--------|--------|--------|--------|--------|------------------|
|             |  | DF005S1     | DF01S1 | DF02S1 | DF04S1 | DF06S1 | DF08S1 | DF10S1 |                  |
| $V_{RRM}$   | Maximum Recurrent Peak Reverse Voltage   | 50          | 100    | 200    | 400    | 600    | 800    | 1000   | V                |
| $V_{RMS}$   | Maximum RMS Bridge Input Voltage   | 35          | 70     | 140    | 280    | 420    | 560    | 700    | V                |
| $V_{DC}$    | Maximum DC Blocking Voltage  | 50          | 100    | 200    | 400    | 600    | 800    | 1000   | V                |
| $I_{F(AV)}$ | Maximum Average Forward Current $T_A = 40^\circ\text{C}$   | 1.0         |        |        |        |        |        |        | A                |
| $I_{FSM}$   | Peak Forward Surge Current<br>8.3 ms Single Half-Sine Wave Superimposed on Rated Load (JEDEC Method) | 35          |        |        |        |        |        |        | A                |
| $T_{STG}$   | Storage Temperature Range  | -55 to +150 |        |        |        |        |        |        | $^\circ\text{C}$ |
| $T_J$       | Operating Junction Temperature Range   | -55 to +150 |        |        |        |        |        |        | $^\circ\text{C}$ |

## Thermal Characteristics<sup>(1)</sup>

| Symbol          | Parameter  | Conditions  | Max. | Unit               |
|-----------------|--|---|------|--------------------|
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient              | Single-Die Measurement<br>(Maximum Land Pattern: 13 x 13 mm)  | 65   | $^\circ\text{C/W}$ |
|                 |  | Multi-Die Measurement<br>(Maximum Land Pattern: 13 x 13 mm)   | 50   |                    |
|                 |  | Multi-Die Measurement<br>(Minimum Land Pattern: 1.3 x 1.5 mm) | 105  |                    |
| $\psi_{JL}$     | Thermal Characterization Parameter, Junction to Lead | Single-Die Measurement<br>(Maximum and Minimum Land Pattern)  | 27   | $^\circ\text{C/W}$ |

### 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.  
Heating effect from adjacent dice is considered and only two dice are powered at the same time.



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 noted.

| Symbol | Parameter  | Conditions                                     | Min. | Typ. | Max. | Unit                 |
|--------|--|--|------|------|------|----------------------|
| $V_F$  | Forward Voltage Drop per Bridge Element            | $I_F = 1.0\text{ A}$                           |      |      | 1.1  | V                    |
| $I_R$  | DC Reverse Current<br>at Rated DC Blocking Voltage | $T_J = 25^\circ\text{C}$                       |      |      | 3    | $\mu\text{A}$        |
|        |  | $T_J = 125^\circ\text{C}$                      |      |      | 500  |                      |
| $I^2t$ | Rating for Fusing ( $t < 8.3\text{ ms}$ )          |  |      |      | 5.1  | $\text{A}^2\text{S}$ |
| $C_J$  | Junction Capacitance                               | $V_R = 4.0\text{ V}$ ,<br>$f = 1.0\text{ MHz}$ |      | 10   |      | pF                   |

## Typical Performance Characteristics

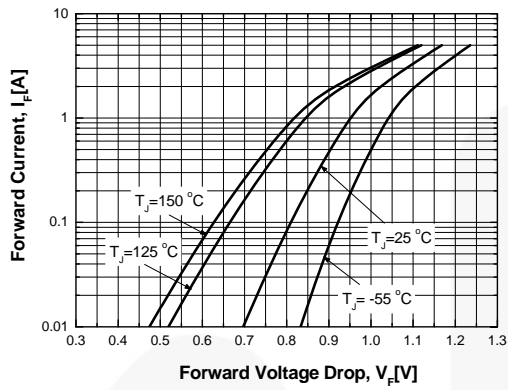


Figure 3. Typical Instantaneous Forward Characteristics

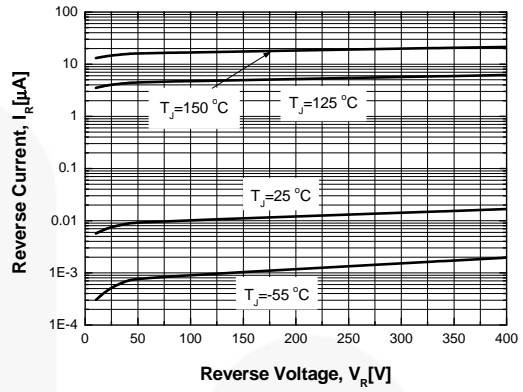


Figure 4. Typical Reverse Characteristics

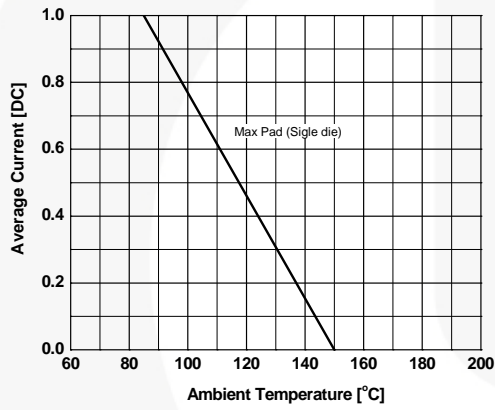


Figure 5. Maximum Average Current vs. Ambient Temperature

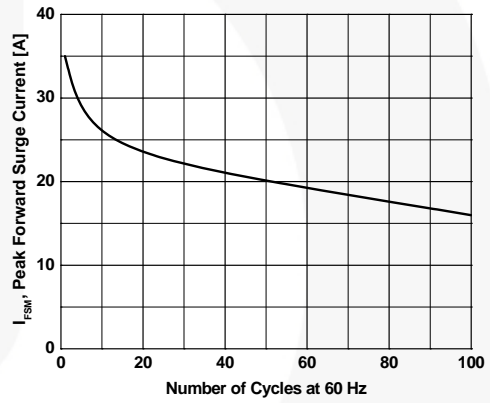


Figure 6. Peak Forward Surge Current vs. Number of Cycles at 60Hz

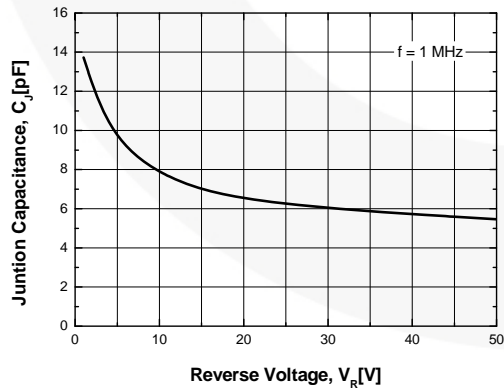
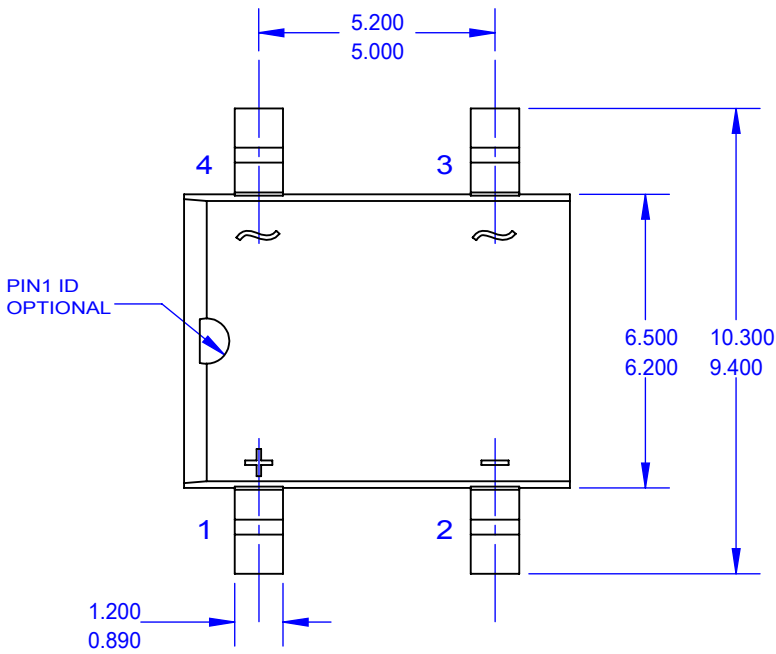
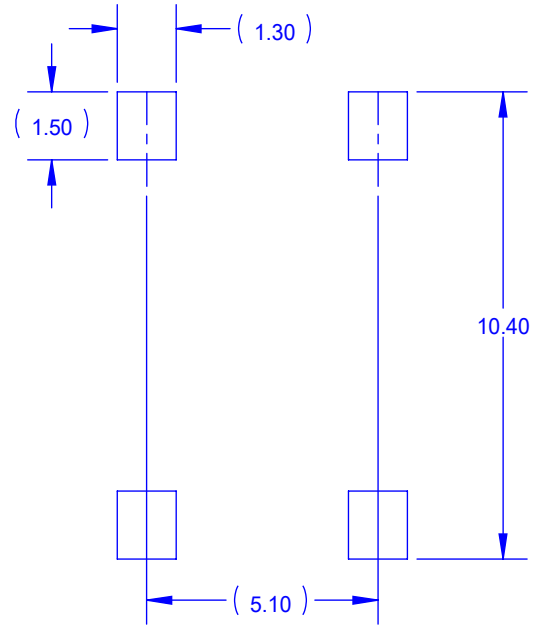


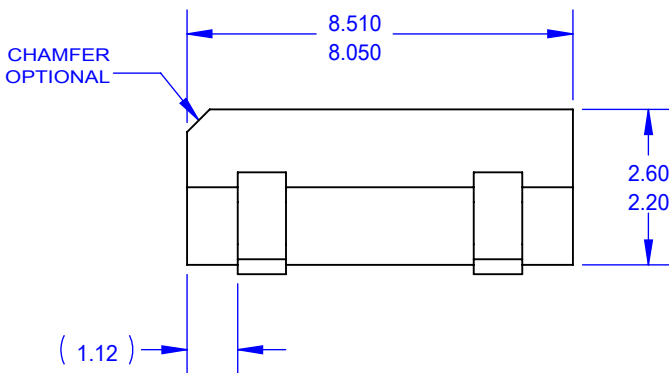
Figure 7. Typical Junction Capacitance



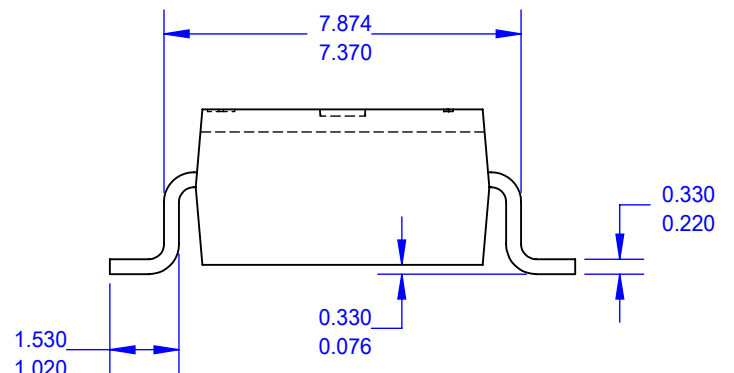
TOP VIEW



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SIDE VIEW



END VIEW

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