

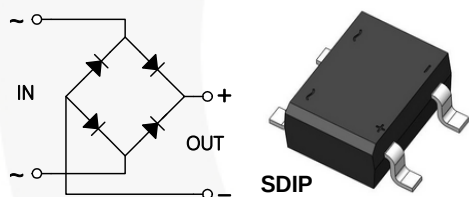


May 2015

## DF005S - DF10S Bridge Rectifiers

### Features

- Maximum Surge Rating:  $I_{FSM} = 50\text{ A}$   
 $I^2t = 10\text{ A}^2\text{Sec}$
- Optimized  $V_F$ : Typical 0.94 V at 1.5 A, 25°C
- Glass Passivated Junctions
- Lead Free Compliant to EU RoHS 2002/95/EU Directives
- Green Molding Compound: IEC61249
- Qualified with IR Reflow and Wave Soldering
- UL Certified, UL #E258596



### Description

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

The design offers an surge rating of 50 A. This is important when improving reliability and increasing efficiency. High efficiency designs strive to reduce circuit resistance, which, unfortunately can result in increased inrush surge. As such high surge current ratings can be required to maintain or improve reliability.

The design also offers better efficiency by achieving a 1.5 A  $V_F$  of 1.1 V maximum at 25°C. This lower  $V_F$  also supports cooler and more efficient operation.

Finally, the DFxS achieves all this 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 |
|-------------|----------|---------|----------------|
| DF005S      | DF005S   | SDIP 4L | Tape and Reel  |
| DF01S       | DF01S    | SDIP 4L | Tape and Reel  |
| DF02S       | DF02S    | SDIP 4L | Tape and Reel  |
| DF04S       | DF04S    | SDIP 4L | Tape and Reel  |
| DF06S       | DF06S    | SDIP 4L | Tape and Reel  |
| DF08S       | DF08S    | SDIP 4L | Tape and Reel  |
| DF10S       | DF10S    | 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             |
|-------------|---------------------------------------------------------------------------|-------------|-------|-------|-------|-------|-------|-------|------------------|
|             |                                                                           | DF005S      | DF01S | DF02S | DF04S | DF06S | DF08S | DF10S |                  |
| $V_{RRM}$   | Maximum Repetitive 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                |
| $V_{DC}$    | DC Reverse Voltage at Rated $I_R$                                         | 50          | 100   | 200   | 400   | 600   | 800   | 1000  | V                |
| $I_{F(AV)}$ | Average Rectified Forward Current at $T_A = 40^\circ\text{C}$             | 1.5         |       |       |       |       |       |       | A                |
| $I_{FSM}$   | Non-Repetitive Peak Forward Surge Current<br>8.3 ms Single Half-Sine Wave | 50          |       |       |       |       |       |       | A                |
| $T_{STG}$   | Storage Temperature Range                                                 | -55 to +150 |       |       |       |       |       |       | $^\circ\text{C}$ |
| $T_J$       | Operating Junction Temperature                                            | -55 to +150 |       |       |       |       |       |       | $^\circ\text{C}$ |

## Thermal Characteristics

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

| Symbol          | Parameter                                            |                                                                              | Value | Unit               |
|-----------------|------------------------------------------------------|------------------------------------------------------------------------------|-------|--------------------|
| $P_D$           | Power Dissipation                                    |                                                                              | 3.1   | W                  |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient              | Single-Die Measurement <sup>(1)</sup><br>(Maximum Land Pattern: 13 x 13 mm)  | 62    | $^\circ\text{C/W}$ |
|                 |                                                      | Multi-Die Measurement <sup>(2)</sup><br>(Maximum Land Pattern: 13 x 13 mm)   | 50    |                    |
|                 |                                                      | Multi-Die Measurement <sup>(2)</sup><br>(Minimum Land Pattern: 1.3 x 1.5 mm) | 105   |                    |
| $\psi_{JL}$     | Thermal Characterization Parameter, Junction to Lead | Single-Die Measurement <sup>(2)</sup><br>(Maximum and Minimum Land Pattern)  | 27    | $^\circ\text{C/W}$ |

### Notes:

- Device mounted on PCB with 0.5 inch  $\times$  0.5 inch (13 mm  $\times$  13 mm).
- 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  $\times$  114.3 mm.  
Heating effect from adjacent dice is considered and only two dice are powered at the same time.

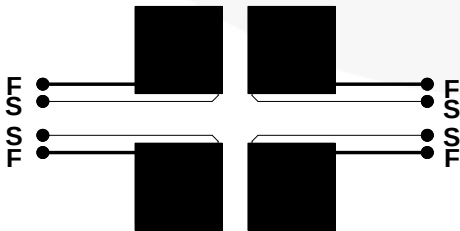


Figure 1. Maximum Pads of 2 oz Copper



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, per Element                | $I_F = 1.5\text{ A}$                           |      |      | 1.1  | V                    |
| $I_R$  | Reverse Current, per Element at Rated $V_R$ | $T_A = 25^\circ\text{C}$                       |      |      | 5.0  | $\mu\text{A}$        |
|        |                                             | $T_A = 125^\circ\text{C}$                      |      |      | 500  |                      |
| $I^2t$ | Rating for Fusing ( $t < 8.35\text{ ms}$ )  |                                                |      |      | 10   | $\text{A}^2\text{s}$ |
| $C_J$  | Typical Capacitance, per Leg                | $V_R = 4.0\text{ V}$ ,<br>$f = 1.0\text{ MHz}$ |      | 25   |      | pF                   |

## Typical Performance Characteristics

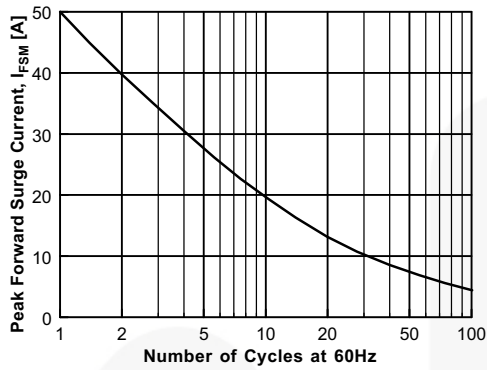


Figure 3. Non-Repetitive Surge Current

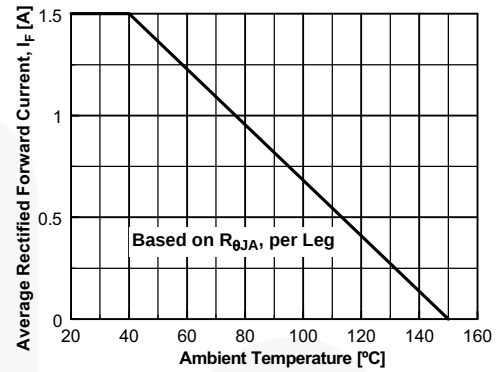


Figure 4. Forward Current Derating Curve

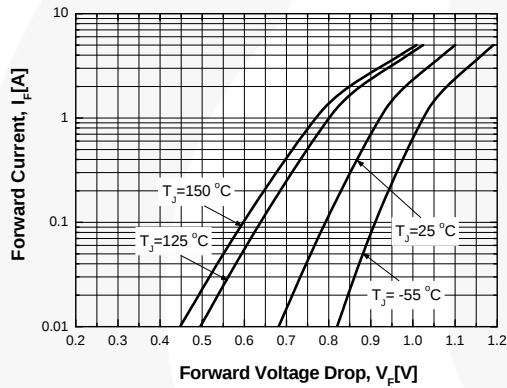


Figure 5. Forward Voltage Characteristics

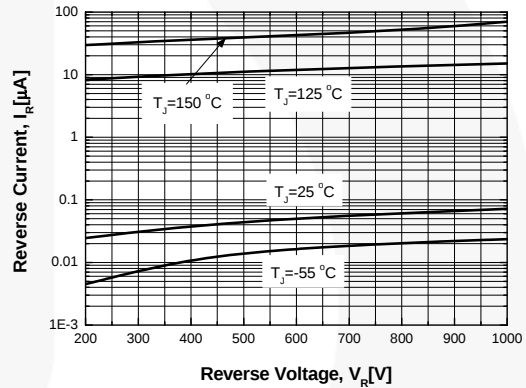
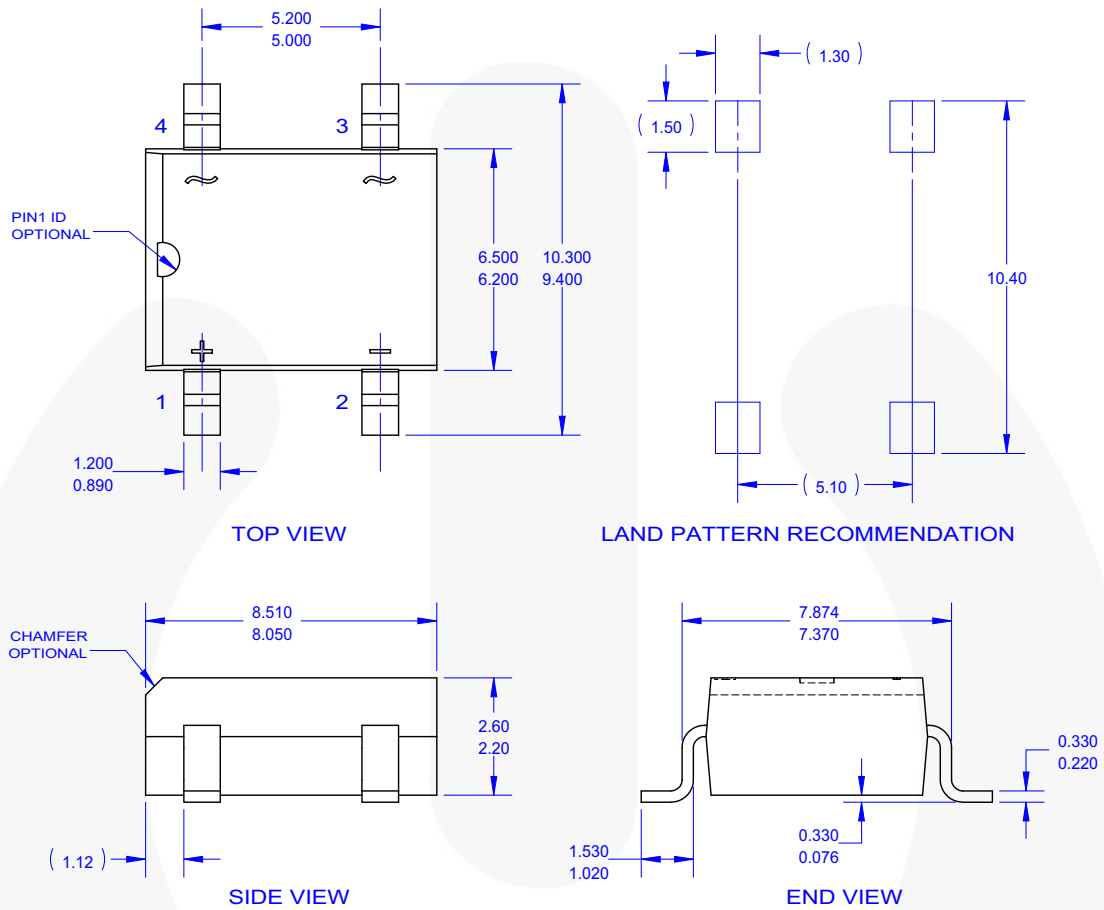


Figure 6. Reverse Current vs. Reverse Voltage

## Physical Dimensions



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- G. DRAWING FILE NAME: MKT-SDIP04AREV5.



Figure 7. 4-LEAD, SDIP, 6.5 MM WIDE



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