

Bridge Rectifiers

DF005S - DF10S

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.

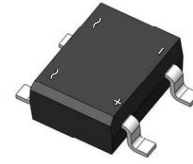
The design offers an surge rating of 50 A. This is important when improving reliability and increasing efficiency. High efficiency designs strive to reduce circuit resistance, which, unfortunately can result in increased inrush surge. As such high surge current ratings can be required to maintain or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

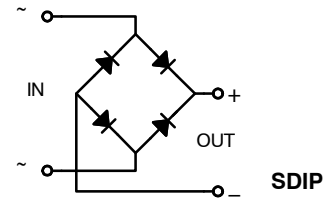
Finally, the DFxS achieves all this in a SDIP surface mount form factor, reducing board space and volumetric requirements vs. competitive devices.

Features

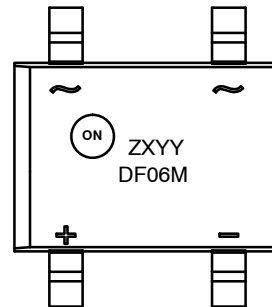
- Maximum Surge Rating: $I_{FSM} = 50\text{ A}$, $I^2t = 10\text{ A}^2\text{Sec}$
- Optimized V_F : Typical 0.94 V at 1.5 A, 25°C
- Glass Passivated Junctions
- Lead Free Compliant to EU RoHS 2002/95/EU Directives
- Green Molding Compound: IEC61249
- Qualified with IR Reflow and Wave Soldering
- UL Certified,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



PDIP-4 GW
CASE 709AE



MARKING DIAGRAM



- Z = Subcon Assembly Plant Code
- X = Last Digit of Calendar Year
- YY = Weekly Payweek Date code
- DFXXXM = Specific Device Number
- xxx = 01, 02, 04, 06, 08, 10, or 005

ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

DF005S – DF10S

ABSOLUTE MAXIMUM RATINGS (Note 3) 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 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 | | | | | | | $^\circ\text{C}$ |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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 (Note 1) (Maximum Land Pattern: 13 x 13 mm) | 62 | $^\circ\text{C}/\text{W}$ |
| | | Multi-Die Measurement (Note 2) (Maximum Land Pattern: 13 x 13 mm) | 50 | |
| | | Multi-Die Measurement (Note 2) (Minimum Land Pattern: 1.3 x 1.5 mm) | 105 | |
| ψ_{JL} | Thermal Characterization Parameter, Junction to Lead | Single-Die Measurement (Note 2) (Maximum and Minimum Land Pattern) | 27 | $^\circ\text{C}/\text{W}$ |

- Device mounted on PCB with 0.5 inch x 0.5 inch (13 mm x 13 mm). Minimum Pads of 2 oz Copper.
- The thermal resistances ($R_{\theta JA}$ & ψ_{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 tow dices are powered at the same time.

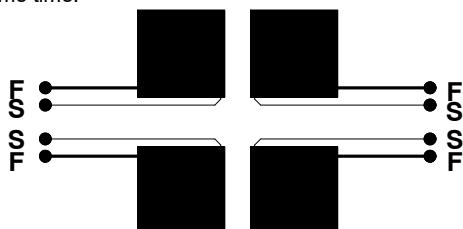


Figure 1. Maximum pads of 2 oz copper



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 | μA |
| | | $T_A = 125^\circ\text{C}$ | - | - | 500 | |
| I^2t | Rating for Fusing ($t < 8.35 \text{ ms}$) | - | - | - | 10 | A^2s |
| C_J | Typical Capacitance, per Leg | $V_R = 4.0 \text{ V}$, $f = 1.0 \text{ MHz}$ | - | 25 | - | pF |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

TYPICAL CHARACTERISTICS

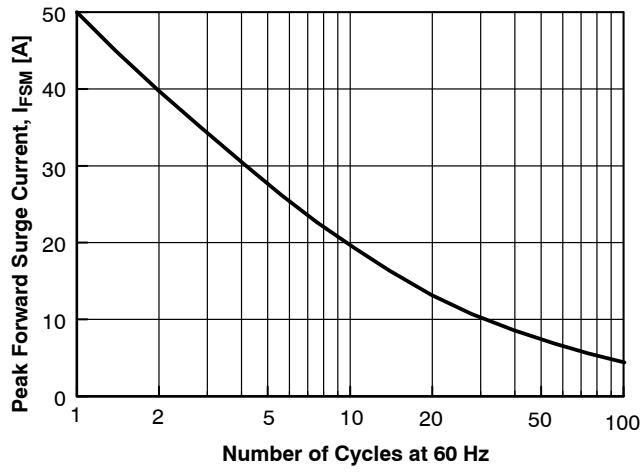


Figure 3. Non-Repetitive Surge Current

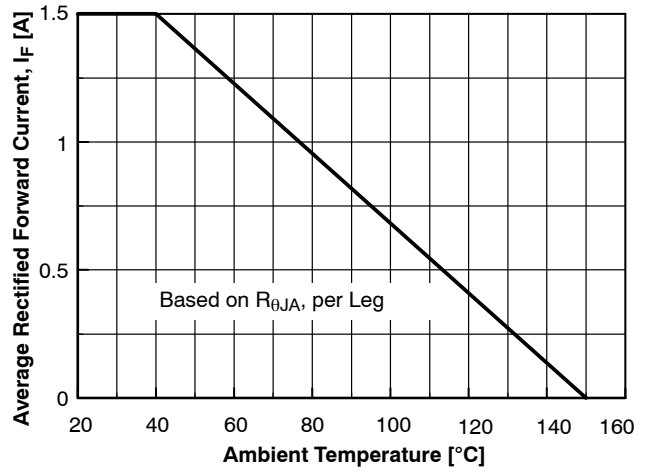


Figure 4. Forward Current Derating Curve

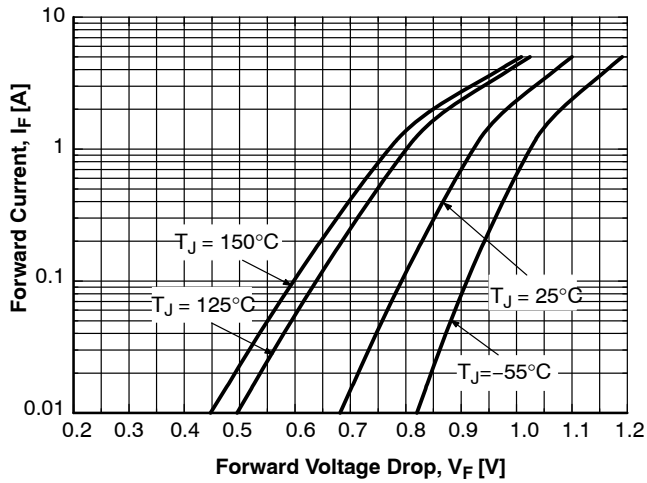


Figure 5. Forward Voltage Characteristics

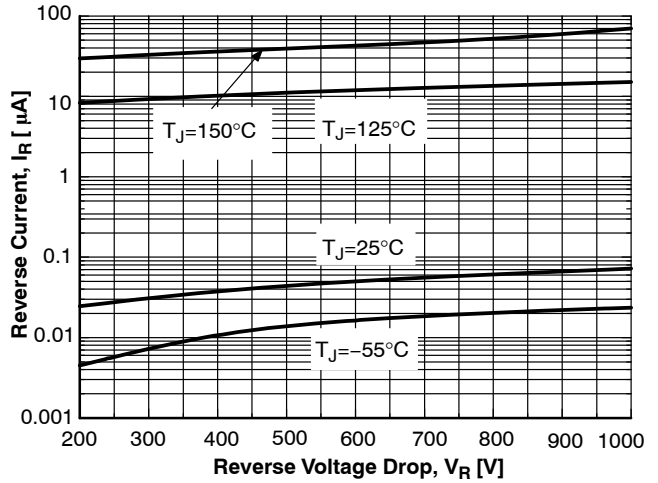


Figure 6. Reverse Current vs. Reverse Voltage

DF005S – DF10S

ORDERING INFORMATION

| Product Number | Device Code Marking | Package | Shipping [†] |
|----------------|---------------------|--------------------------------------|-----------------------|
| DF005S | DF005S | PDIP-4, GW (Pb-Free, Halide Free) | 1500 / Tape and Reel |
| DF01S | DF01S | PDIP-4, GW (Pb-Free, Halide Free) | 1500 / Tape and Reel |
| DF02S | DF02S | PDIP-4, GW (Pb-Free, Halide Free) | 1500 / Tape and Reel |
| DF04S | DF04S | PDIP-4, GW (Pb-Free, Halide Free) | 1500 / Tape and Reel |
| DF06S | DF06S | PDIP-4, GW (Pb-Free, Halide Free) | 1500 / Tape and Reel |
| DF08S | DF08S | PDIP-4, GW (Pb-Free, Halide Free) | 1500 / Tape and Reel |
| DF10S | DF10S | PDIP-4, GW (Pb-Free, Halide Free) | 1500 / Tape and Reel |

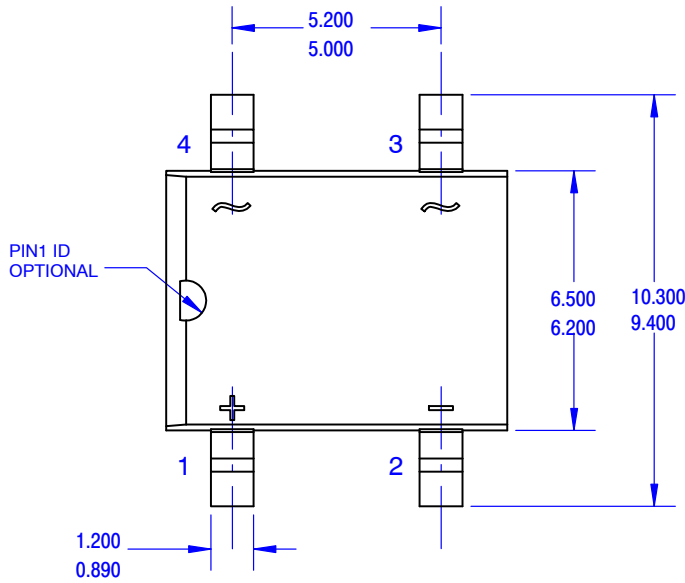
[†]For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

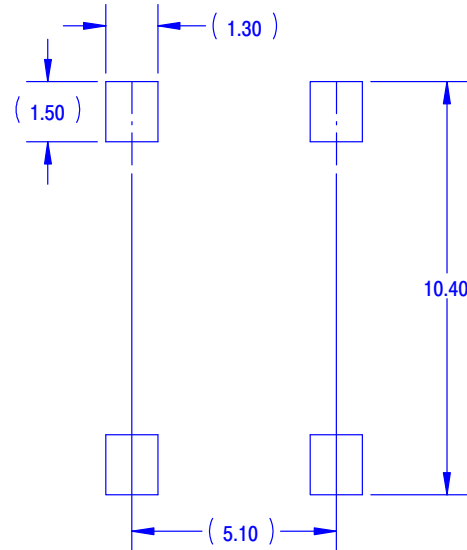


PDIP4 GW
CASE 709AE
ISSUE 0

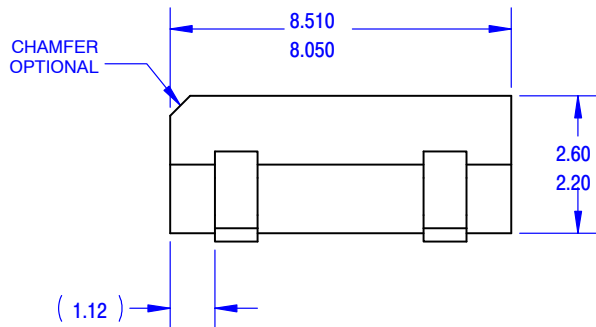
DATE 31 JUL 2016



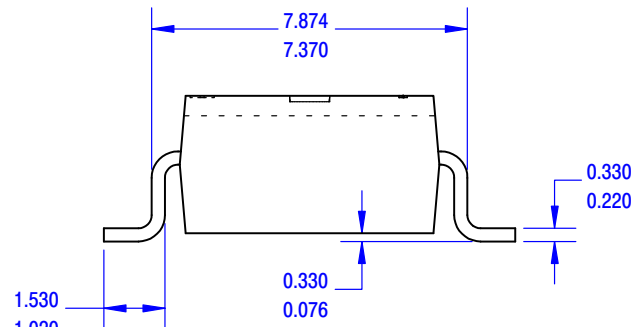
TOP VIEW



LAND PATTERN RECOMMENDATION



SIDE VIEW



END VIEW

NOTES:

- A. THIS PACKAGE DOES NOT CONFORM TO ANY REFERENCE STANDARD.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.

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|-------------------------|--------------------|--|
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| DESCRIPTION: | PDIP4 GW | PAGE 1 OF 1 |

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