

# 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.

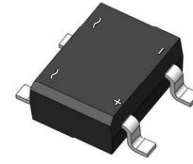
The design offers an surge rating of 50 A. This is important when improving reliability and increasing efficiency. High efficiency designs strive to reduce circuit resistance, which, unfortunately can result in increased inrush surge. As such high surge current ratings can be required to maintain or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

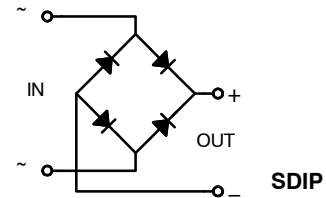
Finally, the DFxS achieves all this in a SDIP surface mount form factor, reducing board space and volumetric requirements vs. competitive devices.

### Features

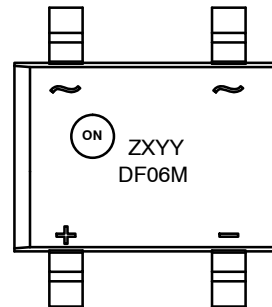
- Maximum Surge Rating:  $I_{FSM} = 50\text{ A}$ ,  $I^2t = 10\text{ A}^2\text{Sec}$
- Optimized  $V_F$ : Typical 0.94 V at 1.5 A, 25°C
- Glass Passivated Junctions
- Lead Free Compliant to EU RoHS 2002/95/EU Directives
- Green Molding Compound: IEC61249
- Qualified with IR Reflow and Wave Soldering
- 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	
$\psi_{JL}$	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 ( $R_{\theta JA}$  &  $\psi_{JL}$ ) 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 tow dices are powered at the same time.

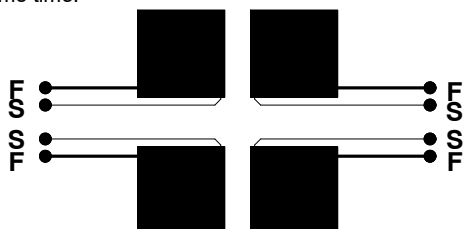


Figure 1. Maximum pads of 2 oz copper



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

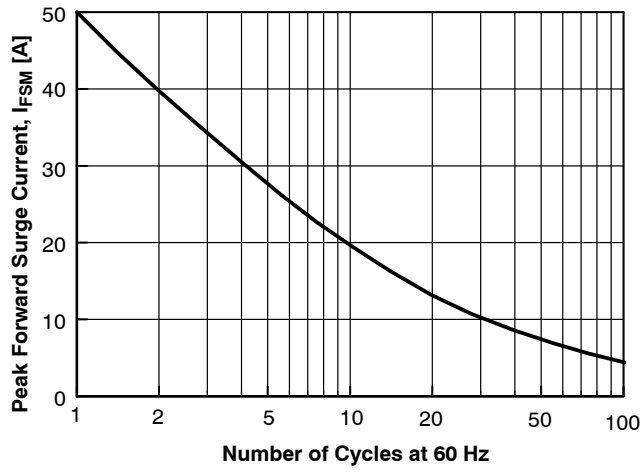


Figure 3. Non-Repetitive Surge Current

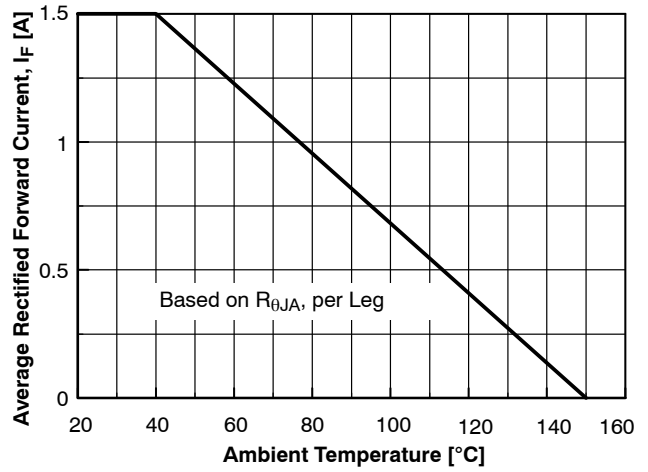


Figure 4. Forward Current Derating Curve

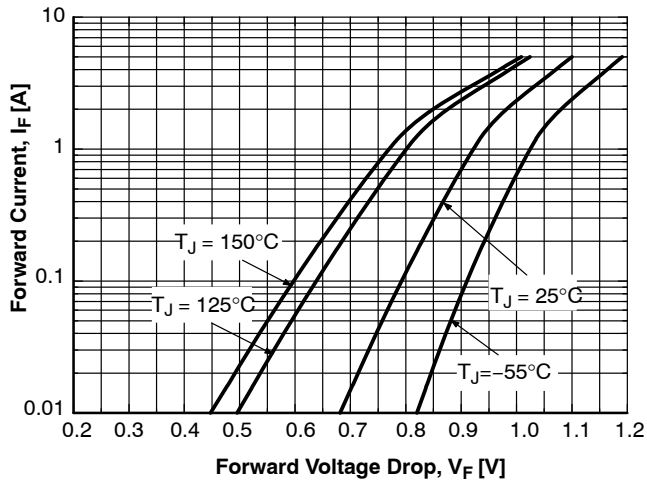


Figure 5. Forward Voltage Characteristics

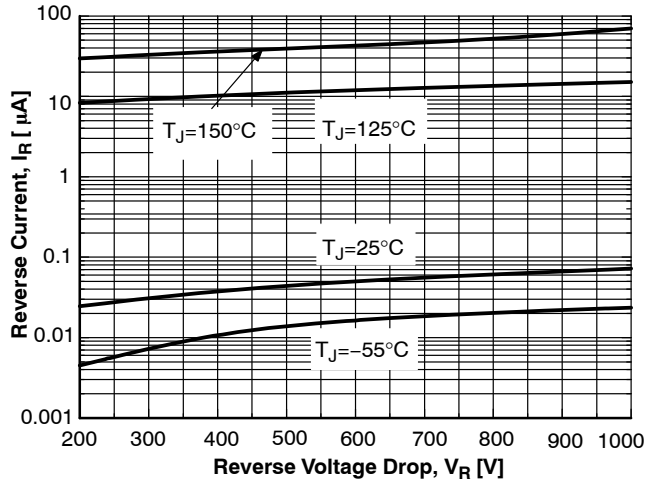


Figure 6. Reverse Current vs. Reverse Voltage

## DF005S – DF10S

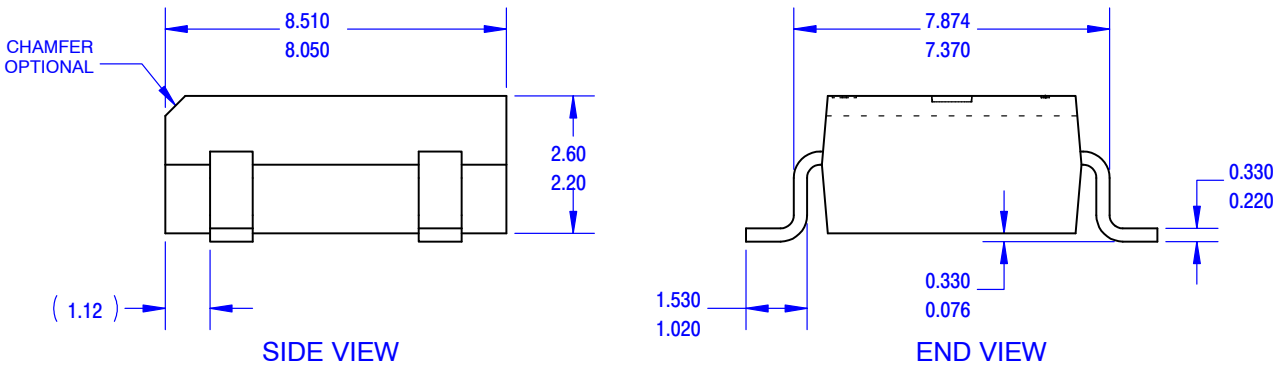
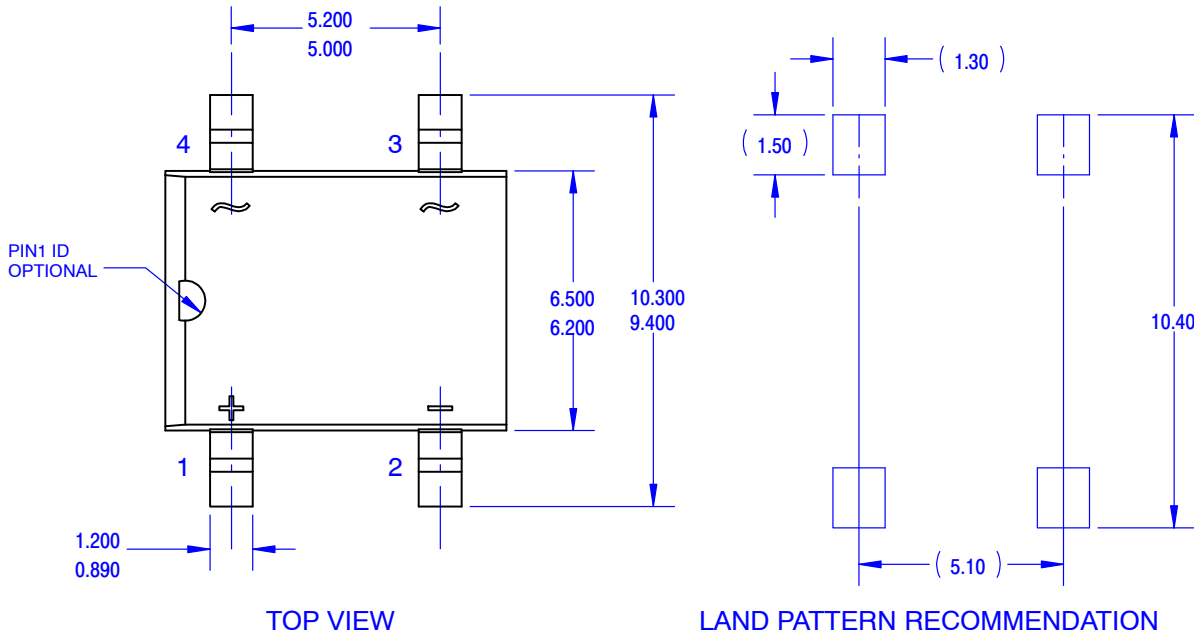
### ORDERING INFORMATION

Product Number	Device Code Marking	Package	Shipping <sup>†</sup>
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

<sup>†</sup>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.

**PDIP4 GW**  
**CASE 709AE**  
**ISSUE O**

DATE 31 JUL 2016



**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.

<b>DOCUMENT NUMBER:</b>	<b>98AON13473G</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>PDIP4 GW</b>	<b>PAGE 1 OF 1</b>

onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

**onsemi**, **Onsemi**, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as-is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## ADDITIONAL INFORMATION

### TECHNICAL PUBLICATIONS:

Technical Library: [www.onsemi.com/design/resources/technical-documentation](http://www.onsemi.com/design/resources/technical-documentation)  
onsemi Website: [www.onsemi.com](http://www.onsemi.com)

### ONLINE SUPPORT: [www.onsemi.com/support](http://www.onsemi.com/support)

For additional information, please contact your local Sales Representative at [www.onsemi.com/support/sales](http://www.onsemi.com/support/sales)