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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

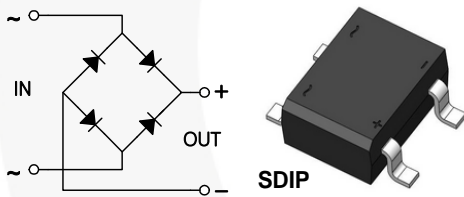
## Description

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 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> (Maximum Land Pattern: 13 x 13 mm)	62	$^\circ\text{C/W}$
		Multi-Die Measurement <sup>(2)</sup> (Maximum Land Pattern: 13 x 13 mm)	50	
		Multi-Die Measurement <sup>(2)</sup> (Minimum Land Pattern: 1.3 x 1.5 mm)	105	
$\psi_{JL}$	Thermal Characterization Parameter, Junction to Lead	Single-Die Measurement <sup>(2)</sup> (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 x 114.3 mm.  
Heating effect from adjacent dice is considered and only two dice are powered at the same time.

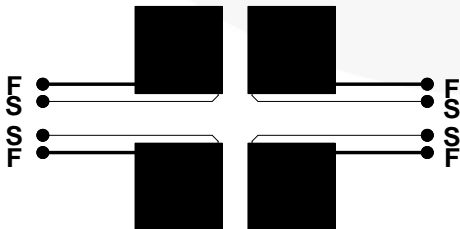


Figure 1. Maximum Pads of 2 oz Copper



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, 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

## Typical Performance Characteristics



Figure 3. Non-Repetitive Surge Current



Figure 4. Forward Current Derating Curve

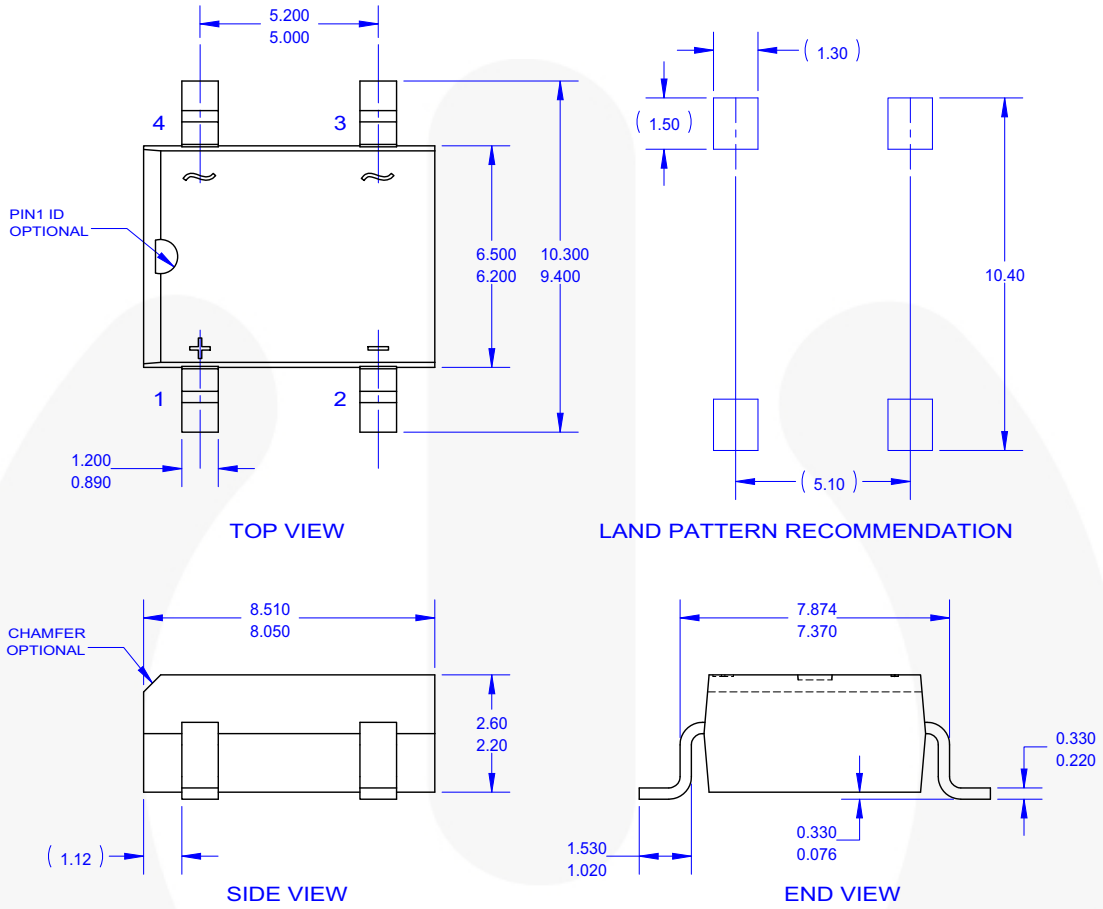


Figure 5. Forward Voltage Characteristics



Figure 6. Reverse Current vs. Reverse Voltage

Physical Dimensions



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



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