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June 2015



# DF005S2 - DF10S2 Bridge Rectifier

## Features

- Maximum Surge Rating:  $I_{FSM} = 85\text{ A}$   
 $I^2t = 30\text{ A}^2\text{Sec}$
- Optimized  $V_F$ : Typical 0.93 V at 2 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

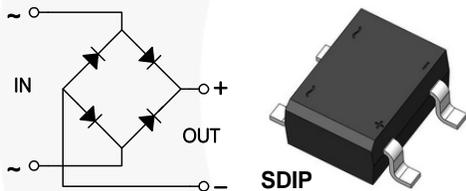
## Description

With the ever-pressing need to improve power supply efficiency, improve surge rating, improve reliability, and reduce size, the DFxS2 family sets a new standard in performance.

The new design offers an improved surge rating of 85 A. This is especially important when striving to improve reliability and increase efficiency. High efficiency designs strive to reduce circuit resistance, which, unfortunately can result in increased inrush surge. As such higher surge current ratings can be required to maintain or improve reliability.

The design also offers improved efficiency by achieving a 2 A  $V_F$  of 1.1 V maximum at 25°C. This lower  $V_F$  also supports cooler and more efficient operation.

Finally, the DFxS2 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
DF005S2	DF005S2	SDIP 4L	Tape and Reel
DF01S2	DF01S2	SDIP 4L	Tape and Reel
DF02S2	DF02S2	SDIP 4L	Tape and Reel
DF04S2	DF04S2	SDIP 4L	Tape and Reel
DF06S2	DF06S2	SDIP 4L	Tape and Reel
DF08S2	DF08S2	SDIP 4L	Tape and Reel
DF10S2	DF10S2	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
		DF005S2	DF01S2	DF02S2	DF04S2	DF06S2	DF08S2	DF10S2	
$V_{RRM}$	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 $T_A = 40^\circ\text{C}$	2.0							A
$I_{FSM}$	Peak Forward Surge Current 8.3 ms Single Half-Sine Wave Superimposed on Rated Load (JEDEC Method)	85							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 (Maximum Land Pattern: 13 x 13 mm)	60	$^\circ\text{C/W}$
		Multi-Die Measurement (Maximum Land Pattern: 13 x 13 mm)	50	
		Multi-Die Measurement (Minimum Land Pattern: 1.3 x 1.5 mm)	100	
$\psi_{JL}$	Thermal Characterization Parameter, Junction to Lead	Single-Die Measurement (Maximum and Minimum Land Pattern)	25	$^\circ\text{C/W}$

### 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.

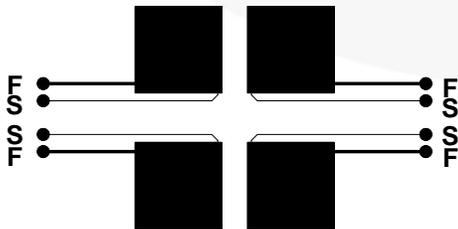


Figure 1. Maximum Pads of 2 oz Copper



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	$I_F = 2.0\text{ A}$			1.1	V
$I_R$	DC Reverse Current 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 ( $t < 8.3\text{ ms}$ )				30	$\text{A}^2\text{S}$
$C_J$	Junction Capacitance	$V_R = 4.0\text{ V},$ $f = 1.0\text{ MHz}$		23		$\text{pF}$

## Typical Performance Characteristics

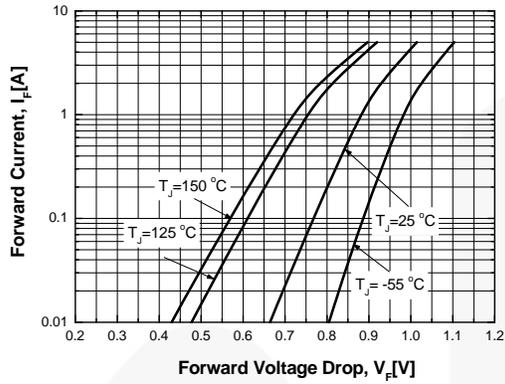


Figure 3. Typical Instantaneous Forward Characteristics

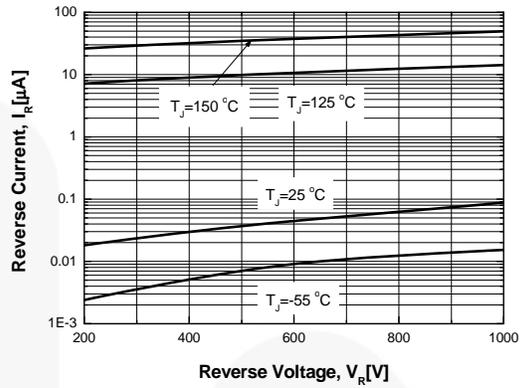


Figure 4. Typical Reverse Characteristics

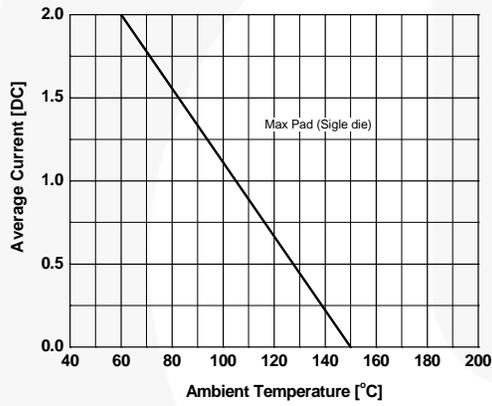


Figure 5. Maximum Average Current vs. Ambient Temperature

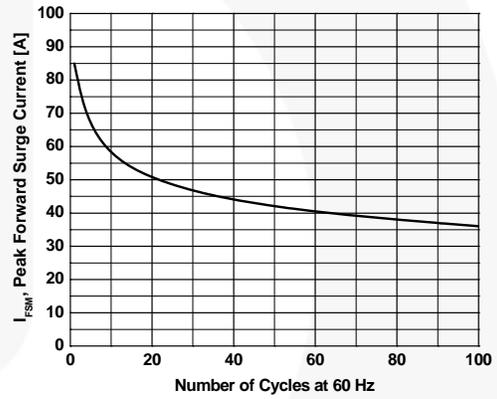


Figure 6. Peak Forward Surge Current vs. Number of Cycles at 60Hz

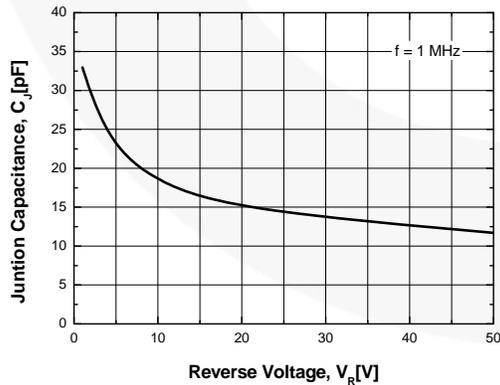
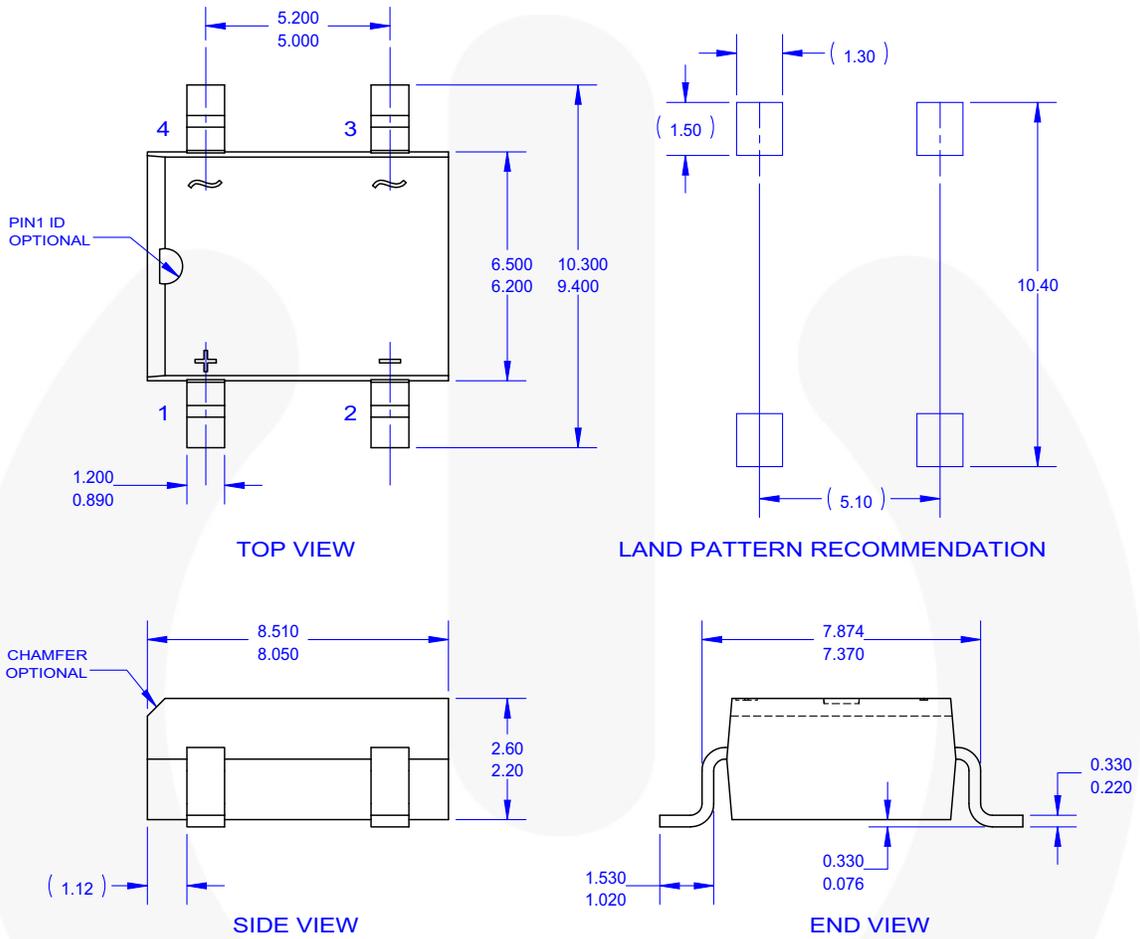


Figure 7. Typical Junction Capacitance

Physical Dimensions



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Figure 8. 4-LEAD, SDIP, 6.5 MM WIDE



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