

## Features

- CMOS proprietary process
- Stable leakage current over reverse voltage
- Low forward voltage drop
- High frequency operation

## Description

This single rectifier is based on a proprietary technology, enabling to achieve the best in class  $V_F/I_R$  trade-off for a given silicon surface.

Packaged in PowerFLAT™ 5x6, this device is intended to be used in rectification and freewheeling operations in switch-mode power supplies.

**Table 1. Device summary**

Symbol	Value
$I_{F(AV)}$	30 A
$V_{RRM}$	50 V
$T_j$ (max)	+150 °C
$V_F$ (typ)	0.33 V

TM: PowerFLAT is a trademark of STMicroelectronics

# 1 Characteristics

**Table 2. Absolute ratings (limiting values, at 25 °C, unless otherwise specified, anode terminals short-circuited)**

Symbol	Parameter		Value	Unit
$V_{RRM}$	Repetitive peak reverse voltage		50	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current, $\delta = 0.5$	$T_c = 95 \text{ }^\circ\text{C}$	30	A
$I_{FSM}$	Surge non repetitive forward current	$t_p = 10 \text{ ms sinusoidal}$	180	A
$T_{stg}$	Storage temperature range		-65 to +175	$^\circ\text{C}$
$T_j^{(1)}$	Maximum operating junction temperature		150	$^\circ\text{C}$

1.  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink

**Table 3. Thermal resistance**

Symbol	Parameter	Value (max)	Unit
$R_{th(j-c)}$	Junction to case	2.6	$^\circ\text{C/W}$

**Table 4. Static electrical characteristics (anode terminals short-circuited)**

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
$I_R^{(1)}$	Reverse leakage current	$T_j = 125 \text{ }^\circ\text{C}$	$V_R = 35 \text{ V}$		25		mA
		$T_j = 25 \text{ }^\circ\text{C}$	$V_R = V_{RRM}$			0.8	
		$T_j = 125 \text{ }^\circ\text{C}$			30	60	
$V_F^{(2)}$	Forward voltage drop	$T_j = 25 \text{ }^\circ\text{C}$	$I_F = 5 \text{ A}$		0.32		V
		$T_j = 125 \text{ }^\circ\text{C}$			0.25		
		$T_j = 25 \text{ }^\circ\text{C}$	$I_F = 10 \text{ A}$		0.37		
		$T_j = 125 \text{ }^\circ\text{C}$			0.33		
		$T_j = 25 \text{ }^\circ\text{C}$	$I_F = 15 \text{ A}$		0.415	0.47	
		$T_j = 125 \text{ }^\circ\text{C}$			0.39	0.45	

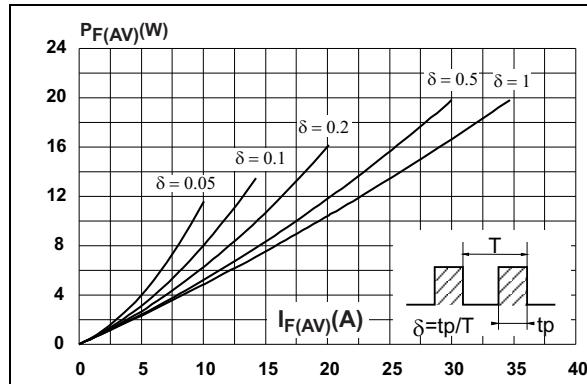
1. Pulse test:  $t_p = 5 \text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 380 \text{ } \mu\text{s}$ ,  $\delta < 2\%$

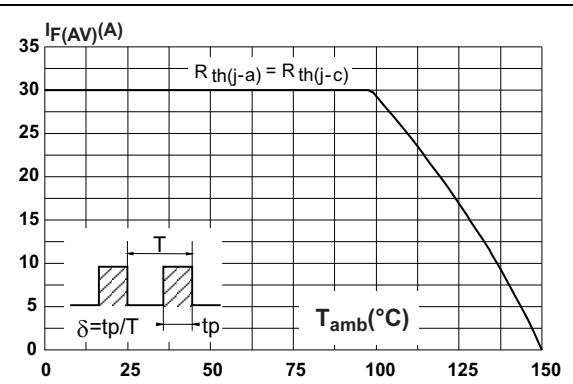
To evaluate the conduction losses use the following equation:

$$P = 0.205 \times I_{F(AV)} + 0.017 I_{F(RMS)}^2$$

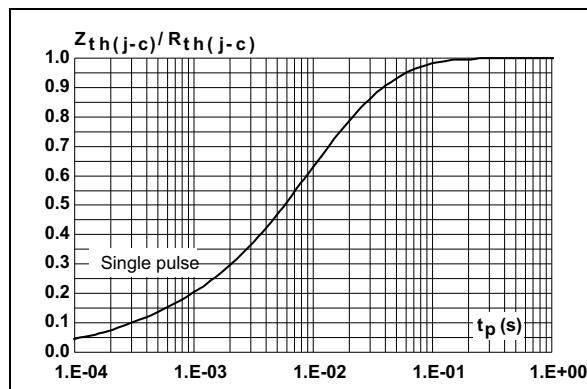
**Figure 1. Average forward power dissipation versus average forward current**



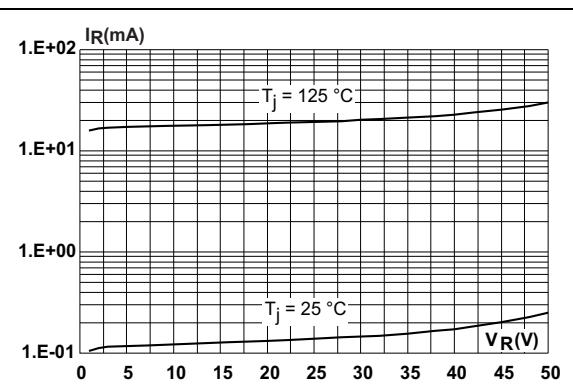
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



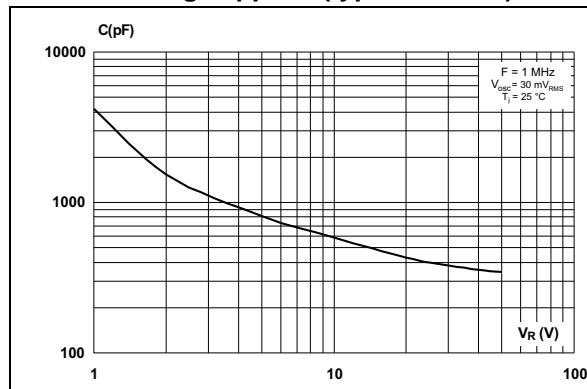
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



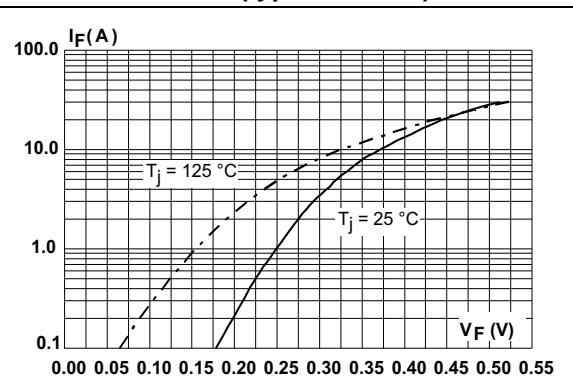
**Figure 4. Reverse leakage current versus reverse voltage applied (typical values)**



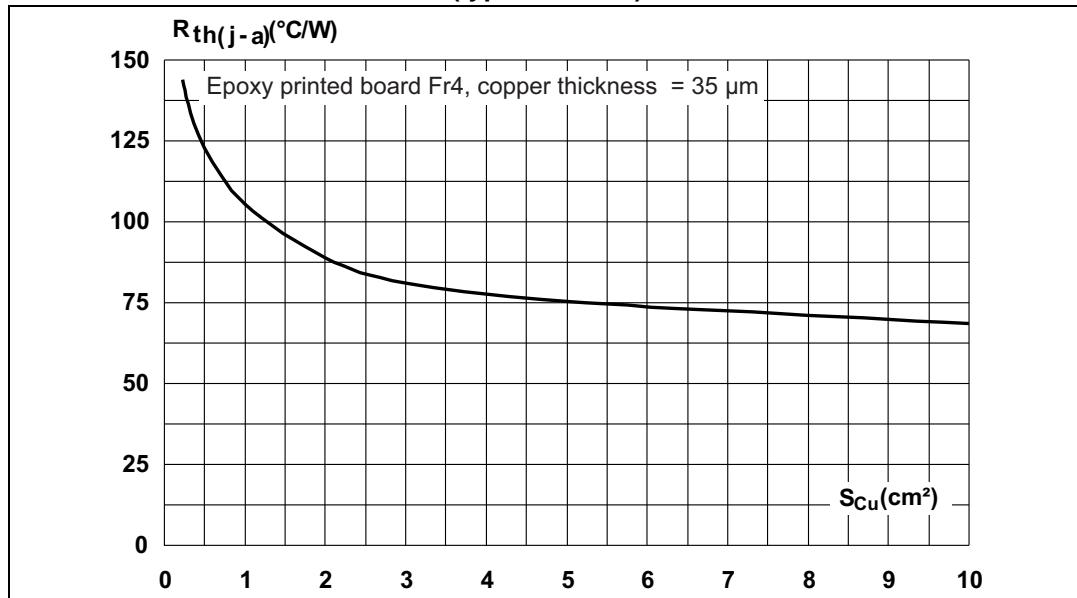
**Figure 5. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 6. Forward voltage drop versus forward current (typical values)**



**Figure 7. Thermal resistance junction to ambient versus copper surface under tab  
(typical values)**

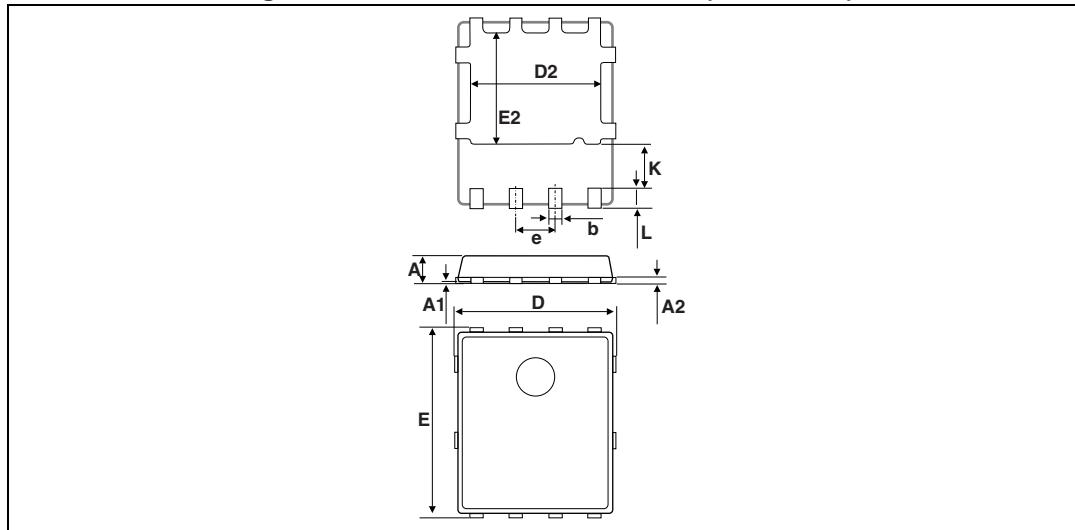


## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

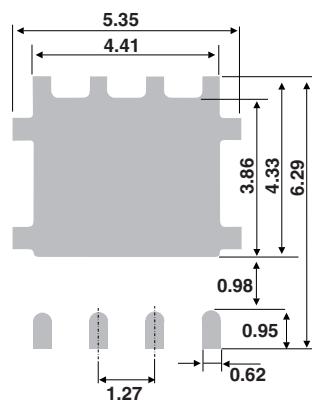
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

**Figure 8. PowerFLAT-8L dimensions (definitions)**



**Table 5. PowerFLAT-8L dimensions (values)**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.80		1.00	0.031		0.039
A1	0.02		0.05	0.001		0.002
A2		0.25			0.010	
b	0.30		0.50	0.012		0.020
D		5.20			0.205	
D2	4.11		4.31	0.162		0.170
e		1.27			0.050	
E		6.15			0.242	
E2	3.50		3.70	0.138		0.146
L	0.50		0.80	0.020		0.031
K	1.275		1.575	0.050		0.062

**Figure 9. Footprint (dimensions in mm)**

### 3 Ordering information

**Table 6. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
FERD30S50DJF	FD30S50	PowerFLAT 5x6	95 mg	3000	Tape and reel

### 4 Revision history

**Table 7. Document revision history**

Date	Revision	Changes
28-Jun-2013	1	Initial release.
18-Nov-2013	2	Updated <i>Table 1</i> and <i>Table 4</i> . Inserted new <i>Figure 1</i> , <i>Figure 2</i> , <i>Figure 4</i> and <i>Figure 6</i> . Product name changed from FERD30S50DJF to FERD30S50.

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