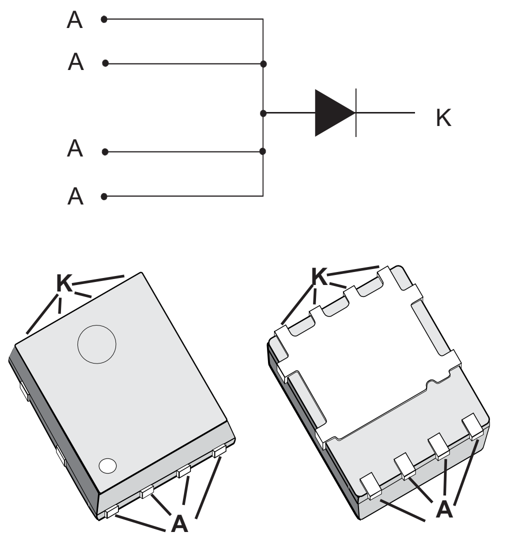
FERD30S50

Field effect rectifier

Datasheet − production data



PowerFLAT 5x6
FERD30S50DJF

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

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.

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, $\delta = 0.5$	$T_c = 95$ °C	30	A
I_{FSM}	Surge non repetitive forward current	$t_p = 10$ ms sinusoidal	180	A
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j(1)	Maximum operating junction temperature		150	°C

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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	°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	$T_j = 125$ °C	$V_R = 35$ V		25		mA
		$T_j = 25$ °C	$V_R = V_{RRM}$			0.8	
		$T_j = 125$ °C			30	60	
V_F(2)	Forward voltage drop	$T_j = 25$ °C	$I_F = 5$ A		0.32		V
		$T_j = 125$ °C			0.25		
		$T_j = 25$ °C	$I_F = 10$ A		0.37		
		$T_j = 125$ °C			0.33		
		$T_j = 25$ °C	$I_F = 15$ A		0.415	0.47	
		$T_j = 125$ °C			0.39	0.45	

1. Pulse test: $t_p = 5$ ms, $\delta < 2\%$
2. Pulse test: $t_p = 380$ µs, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

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

Figure 1. Average forward power dissipation versus average forward current

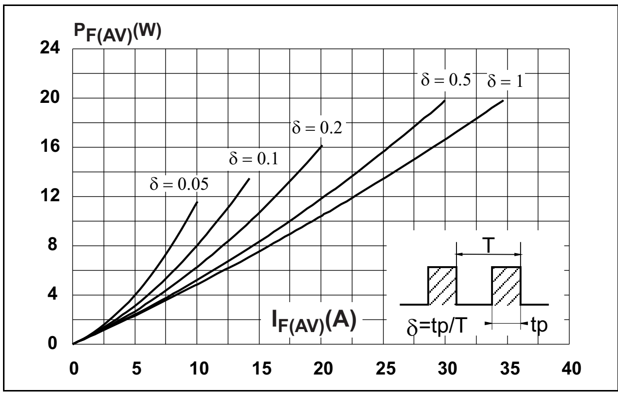


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

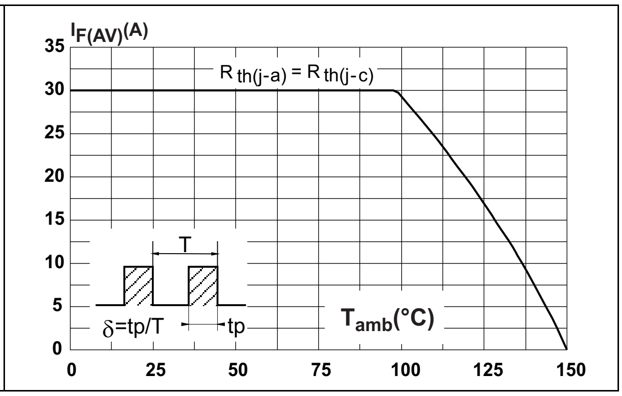


Figure 3. Relative variation of thermal impedance junction to case versus pulse duration

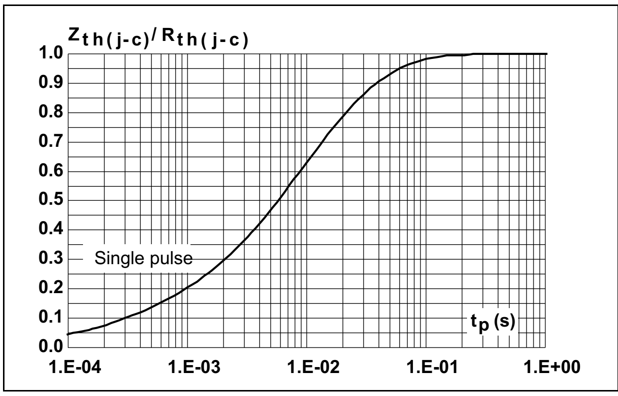


Figure 4. Reverse leakage current versus reverse voltage applied (typical values)

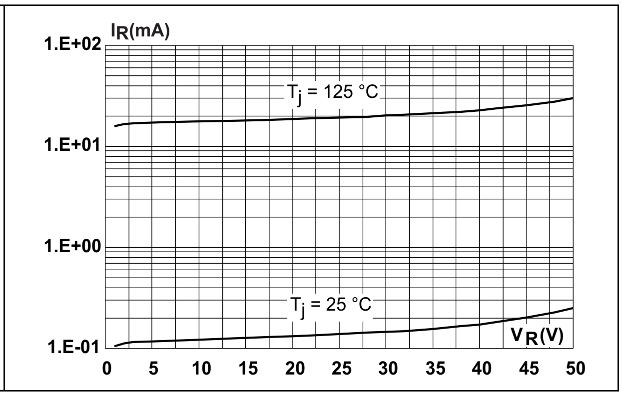


Figure 5. Junction capacitance versus reverse voltage applied (typical values)

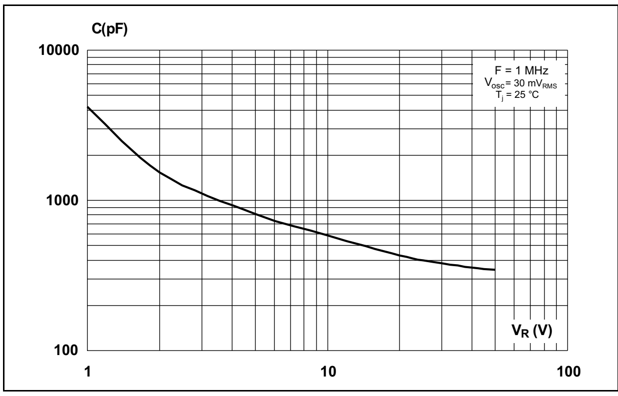


Figure 6. Forward voltage drop versus forward current (typical values)

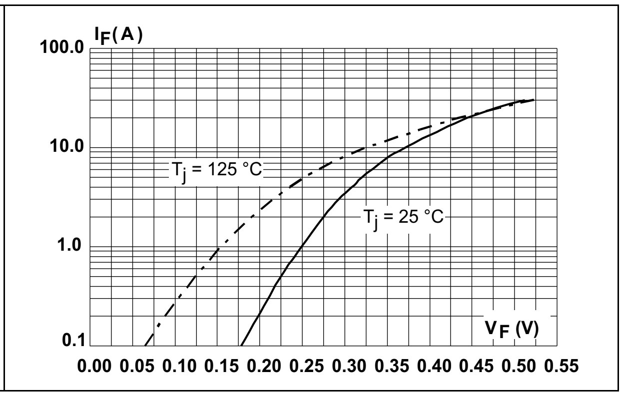
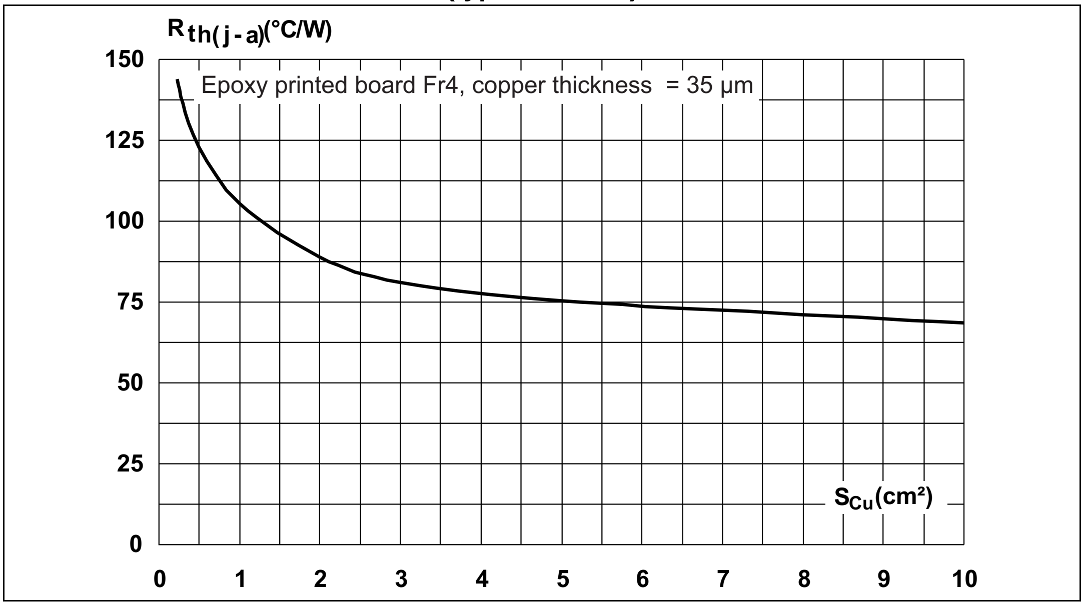


Figure 7. Thermal resistance junction to ambient versus copper surface under tab (typical values)



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*. ECOPACK® is an ST trademark.

Figure 8. PowerFLAT-8L dimensions (definitions)

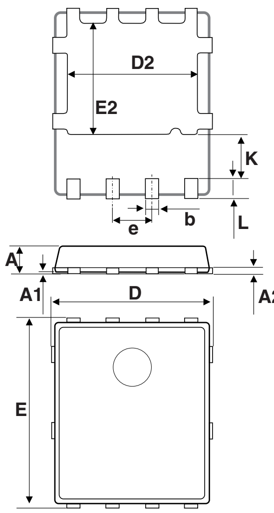
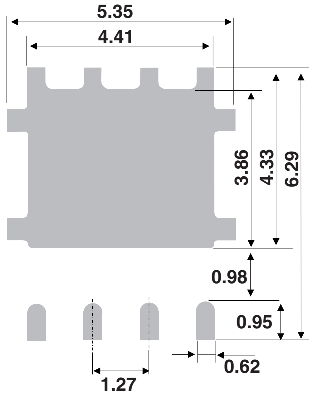


Table 5. PowerFLAT-8L dimensions (values)

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 *Table 1* and *Table 4*. Inserted new *Figure 1*, *Figure 2*, *Figure 4* and *Figure 6*. Product name changed from FERD30S50DJF to FERD30S50.