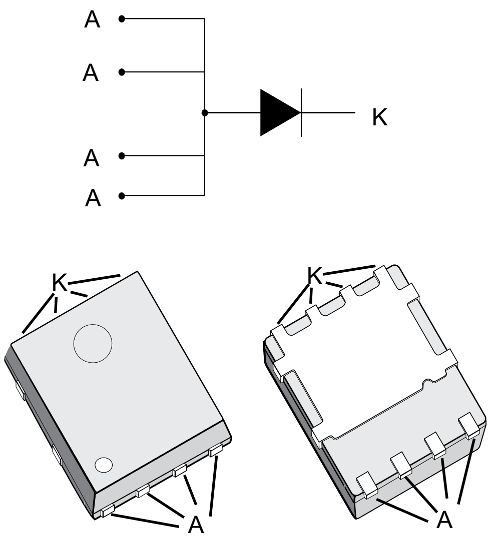
STPS3045DJF

Power Schottky rectifier

Datasheet - production data



PowerFLAT 5x6
STPS3045DJF

Description

Schottky rectifier suited for switch mode power supply and high frequency DC to DC converters.

Packaged in PowerFLAT™, this device is intended for use in low voltage, high frequency inverters, free-wheeling and polarity protection applications.

Its low profile was especially designed to be used in applications with space-saving constraints.

Table 1. Device summary

Symbol	Value
$I_{F(AV)}$	30 A
V_{RRM}	45 V
T_j (max)	175 °C (up to 200 °C forward mode only for PowerFLAT 5x6)
V_F(typ)	0.50 V

Features

- Low forward voltage drop
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capability specified
- Thin package: 1 mm
- ECOPACK®2 compliant component

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		45	V
$I_{F(RMS)}$	Forward rms current		45	A
$I_{F(AV)}$	Average forward current	T_c = 120 °C, $\delta = 0.5$	30	A
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal T_c = 25 °C	380	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs T_j = 125 °C	900	W
T_{stg}	Storage temperature range		-65 to + 175	°C
T_j	Maximum operating junction temperature (1)	PowerFLAT 5x6	175	°C
		PowerFLAT 5x6 (DC forward current without a reverse bias, t= 1 hour)	200	°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	Unit
$R_{th(j-c)}$	Junction to case	2.5	°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 = 25 °C	$V_R = V_{RRM}$	-	-	300	µA
		T_j = 125 °C		-	20	80	mA
V_F(1)	Forward voltage drop	T_j = 25 °C	I_F = 15 A	-	-	0.56	V
		T_j = 125 °C		-	0.41	0.46	
		T_j = 25 °C	I_F = 30 A	-	-	0.64	
		T_j = 125 °C		-	0.50	0.56	

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

To evaluate the conduction losses use the following equation:
$P = 0.43 \times I_{F(AV)} + 0.00433\ I_F{}^2{}_{(RMS)}$

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

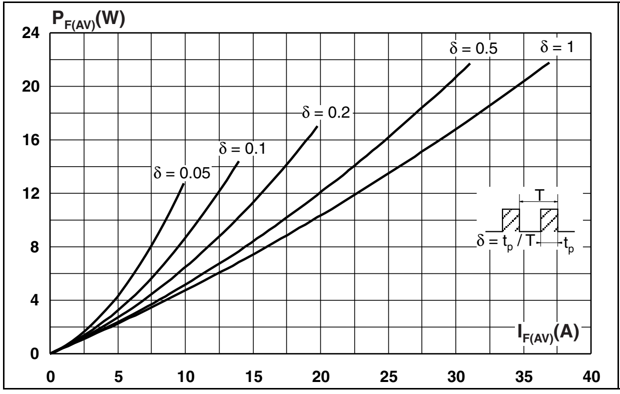


Figure 2. Average forward current versus ambient temperature (δ = 0.5)

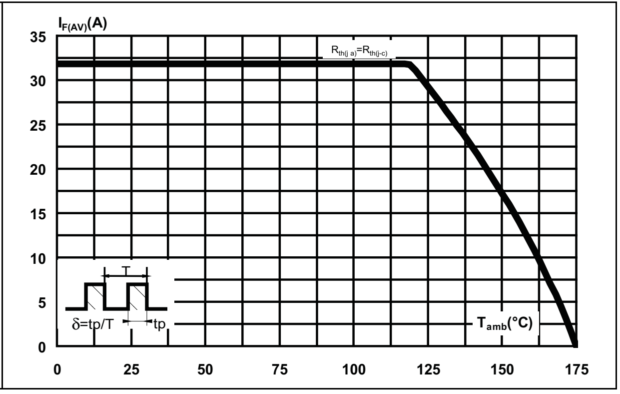


Figure 3. Normalized avalanche power derating versus pulse duration (Tj= 125 °C)

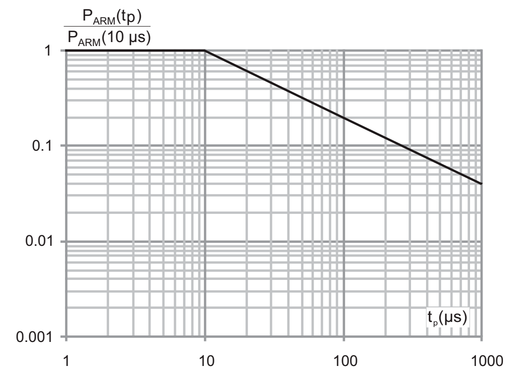


Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration

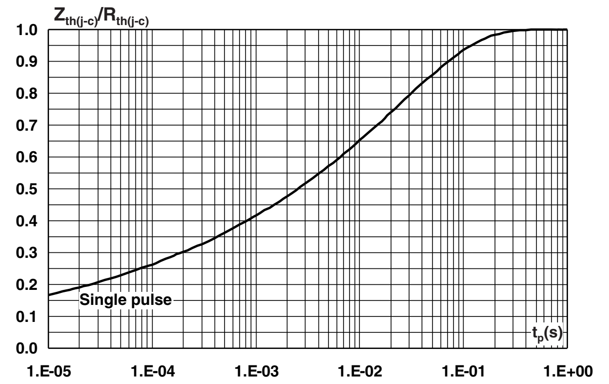


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

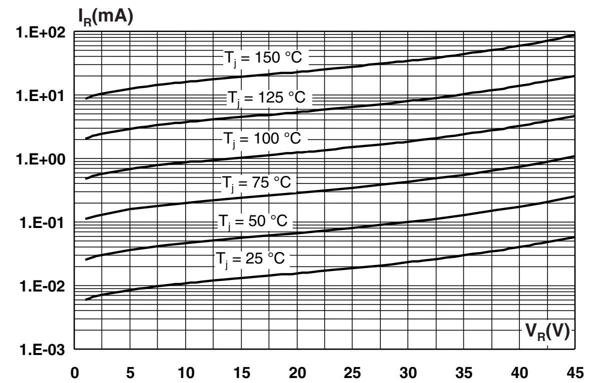


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

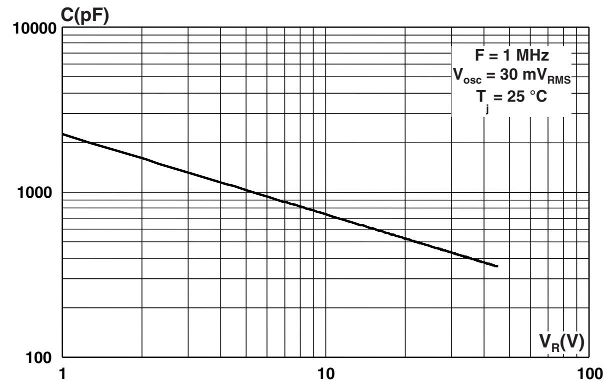


Figure 7. Forward voltage drop versus forward current

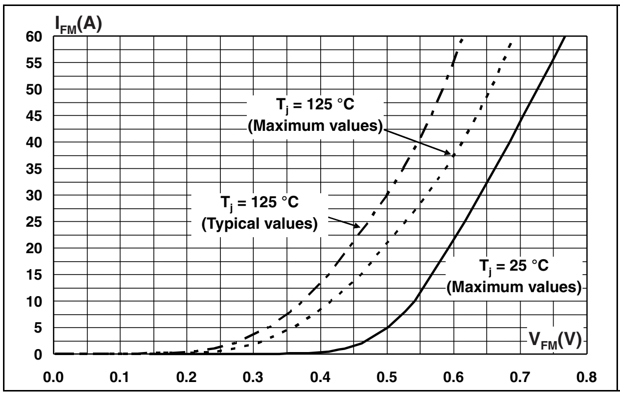
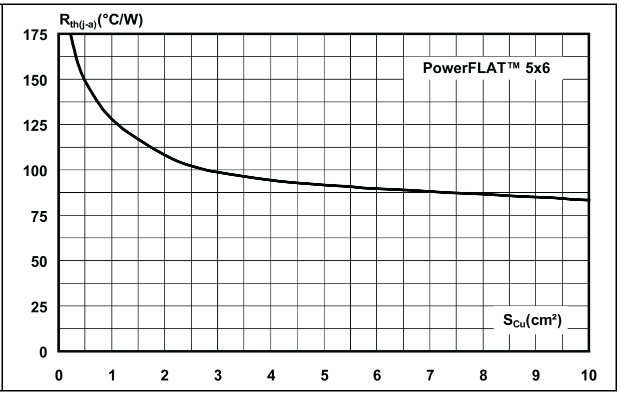


Figure 8. Thermal resistance, junction to ambient, versus copper surface under tab (typical values, epoxy printed board FR4, e_{CU}= 35µm

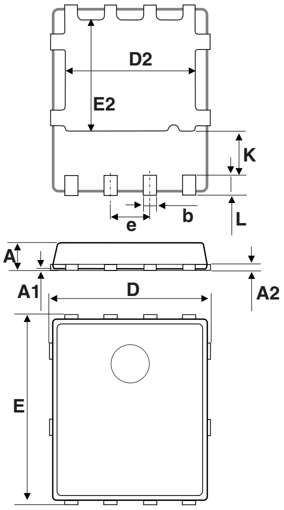


2 Package information

- Epoxy meets UL94,V0
- Lead-free package

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.

Table 5. PowerFLAT 5x6 dimensions



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)

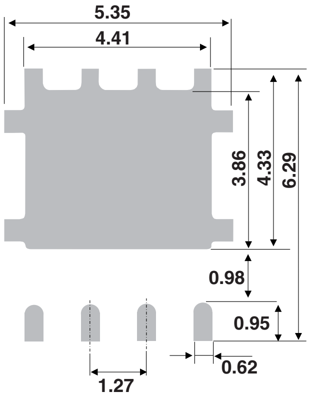
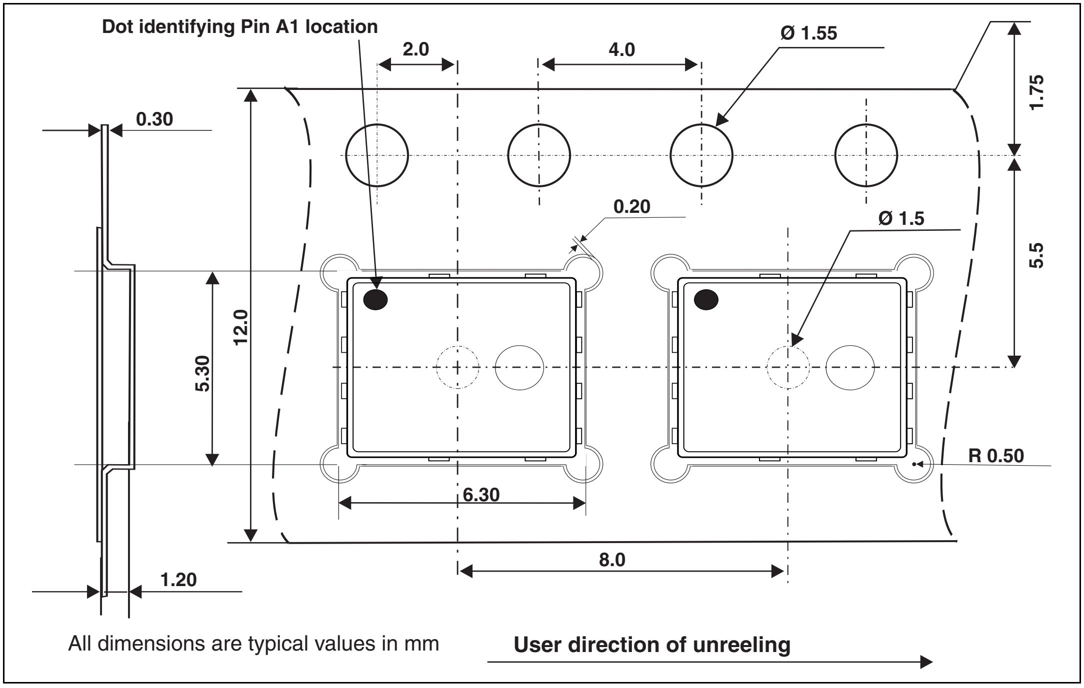


Figure 10. Tape and reel specifications



All dimensions are typical values in mm

3 Ordering information

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
STPS3045DJF-TR	PS30 45	PowerFLAT 5x6	95 mg	3000	Tape and reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
09-Nov-2009	1	First issue.
05-Jul-2010	2	Replace Power QFN with PowerFLAT.
20-May-2011	3	Updated package graphics and marking in *Table 6*. Added *Figure 10.*
12-Aug-2015	4	Updated cover image and *Table 1* on cover page. Updated *Table 2* and *Section 1.1: Characteristics (curves)*.