

## STPS3045DJF

## Power Schottky rectifier

### 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<sup>®</sup>2 compliant component

## Description

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

Packaged in PowerFLAT<sup>™</sup>, 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
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Symbol	Value
I <sub>F(AV)</sub>	30 A
V <sub>RRM</sub>	45 V
T <sub>j</sub> (max)	150 °C
V <sub>F</sub> (typ)	0.41 V

TM: PowerFLAT is a trademark of STMicroelectronics

#### **Characteristics** 1

#### Table 2. Absolute ratings (limiting values, anode terminals short circuited)

Symbol	Parameter	Value	Unit		
V <sub>RRM</sub>	Repetitive peak reverse voltage		45	V	
I <sub>F(RMS)</sub>	Forward rms current		45	А	
I <sub>F(AV)</sub>	Average forward current $T_c = 95 \text{ °C}, \delta = 0.5$		30	А	
I <sub>FSM</sub>	Surge non repetitive forward current	ion repetitive forward current $t_p = 10 \text{ ms sinusoidal} T_c = 25 \text{ °C}$		А	
P <sub>ARM</sub>	Repetitive peak avalanche power	e peak avalanche power $t_p = 1 \ \mu s \ T_j = 25 \ ^{\circ}C$		W	
T <sub>stg</sub>	Storage temperature range	-65 to + 175	°C		
Тj	Maximum operating junction temperation	150	°C		
dPtot	1				

1.  $\frac{\alpha r_{tot}}{dT_j} < \frac{r}{Rth(j-a)}$  condition to avoid thermal runaway for a diode on its own heatsink

#### Table 3. Thermal resistance

Symbol	Parameter	Value	Unit
R <sub>th(j-c)</sub>	Junction to case	2.5	°C/W

Table 4.	Static electrical characteristics (anode terminals short circuited)
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Symbol	Parameter	Test Conditions		Min.	Тур.	Max.	Unit
I <sub>R</sub> <sup>(1)</sup> Reverse leakage current	Poverse leakage ourrept	T <sub>j</sub> = 25 °C	V – V	-	-	300	μA
	T <sub>j</sub> = 125 °C	$v_{\rm R} = v_{\rm RRM}$	-	20	80	mA	
V <sub>F</sub> <sup>(1)</sup> Forward voltage drop	T <sub>j</sub> = 25 °C	L _ 15 A	-	-	0.56		
	Forward voltage drop	T <sub>j</sub> = 125 °C	1F – 13 A	-	0.41	0.46	V
	Forward voltage drop	T <sub>j</sub> = 25 °C		-	-	0.64	v
	T <sub>j</sub> = 125 °C	$I_{\rm F} = 30  {\rm A}$	-	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 x  $I_{F(AV)}$  + 0.00433  ${I_F}^2_{(RMS)}$ 

















Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

Figure 6. Relative variation of thermal impedance, junction to case, versus pulse duration



F = 1 MHz <sub>osc</sub> = 30 mV<sub>RM</sub>

 $V_{\rm B}(V)$ 

100

## Figure 7. Reverse leakage current versus reverse voltage applied (typical values)



## Figure 9. Forward voltage drop versus forward current

# Figure 10. Thermal resistance, junction to ambient, versus copper surface



10000 C(pF)

1000

100

# Figure 8. Junction capacitance versus reverse voltage applied (typical values)



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## 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<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <u>www.st.com</u>. ECOPACK<sup>®</sup> is an ST trademark.

 Table 5.
 PowerFLAT 5x6 dimensions

				Dimen	sions		
للصحيكيا	Ref.	Μ	lillimete	rs		Inches	
		Min.	Тур.	Max.	Min.	Тур.	Max.
	Α	0.80		1.00	0.031		0.039
 ↓ κ	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
	е		1.27			0.050	
E q p	E		6.15			0.242	
	E2	3.50		3.70	0.138		0.146
	L	0.50		0.80	0.020		0.031
	К	1.275		1.575	0.050		0.062

### Figure 11. Footprint (dimensions in mm)





Figure 12. Tape and reel specifications

## **3** Ordering information

Table 6. Ordering inform	nation
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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 <i>Table 6</i> . Added <i>Figure 12</i> .

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