STPS1045DEE

Datasheet

45 V, 10 A power Schottky rectifier



PowerFLAT 3.3 x 3.3

Product status link
STPS1045DEE

Product summary	
Symbol	**Value**
$I_{F(AV)}$	10 A
V_{RRM}	45 V
T_j (max.)	175 °C
V_F (typ.)	0.45 V

Features

- Very low conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capacity specified
- High junction temperature capability
- ECOPACK2 compliant

Application

- Cordless appliance
- SSD
- Battery charger
- Telecom power
- DC / DC converter
- Polarity protection
- Freewheeling

Description

This Schottky rectifier is designed 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, by-pass diode and polarity protection applications.Its low profile was especially designed to be used in applications with space-saving constraints.

1 Characteristics

Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
V_{RRM}	Repetitive peak reverse voltage			45	V
$I_{F(RMS)}$	Forward rms current			15	A
$I_{F(AV)}$	Average forward current, δ = 0.5 square wave		T_c = 145 °C	10	A
I_{FSM}	Surge non repetitive forward current		t_p = 10 ms sinusoidal	100	A
P_{ARM}	Repetitive peak avalanche power	t_p = 10 µs	T_c = 125 °C	300	W
T_{stg}	Storage temperature range			-65 to +175	°C
T_j	Maximum operating junction temperature			+175	°C

Table 2. Thermal resistance parameters

Symbol	Parameter	Max. value	Unit
$R_{th(j-c)}$	Junction to case	4	°C/W

For more information, please refer to the following application note:

- AN5088: Rectifiers thermal management, handling and mounting recommendations

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R[1]	Reverse leakage current	T_j = 25 °C	$V_R = V_{RRM}$	-		200	µA
		T_j = 125 °C		-	15	40	mA
V_F[2]	Forward voltage drop	T_j = 25 °C	I_F = 10 A	-		0.59	V
		T_j = 125 °C		-	0.45	0.53	
		T_j = 25 °C	I_F = 20 A	-		0.72	
		T_j = 125 °C		-	0.57	0.65	

1. *Pulse test: t_p = 5 ms, δ < 2%*
2. *Pulse test: t_p = 380 µs, δ < 2%*

To evaluate the conduction losses, use the following equation:

$P = 0.41 \times I_{F(AV)} + 0.012 \times I_F{}^2{}_{(RMS)}$

For more information, please refer to the following application notes related to the power losses:

- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses in a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

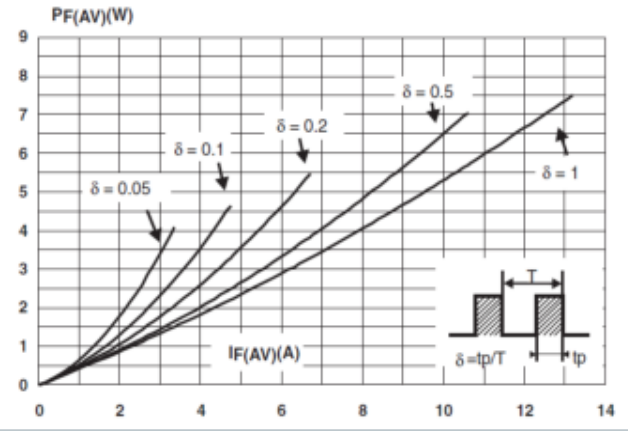


Figure 2. Average forward current versus ambient temperature(δ = 0.5)

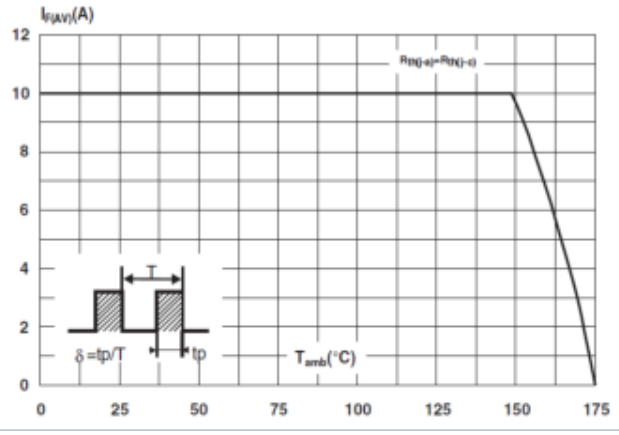


Figure 3. Normalized avalanche power derating versus pulse duration

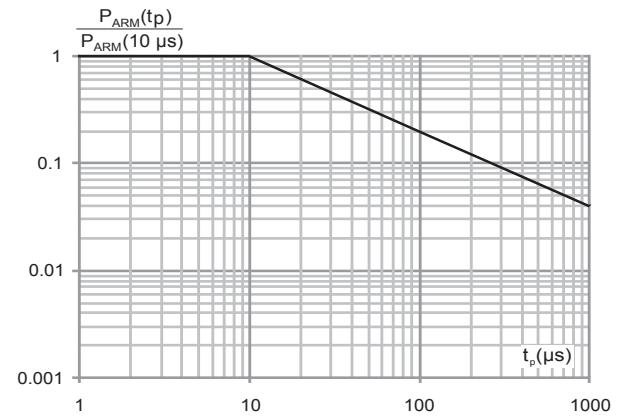


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

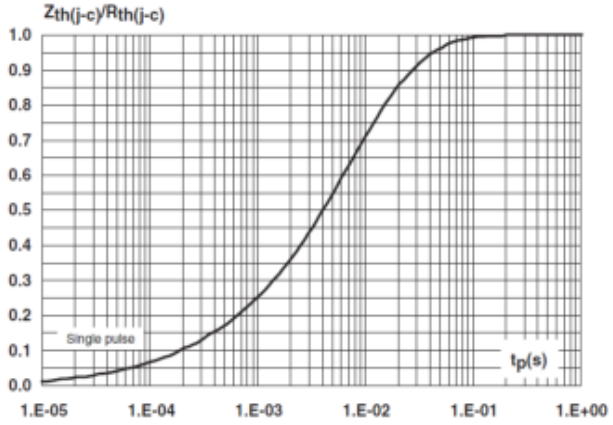


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

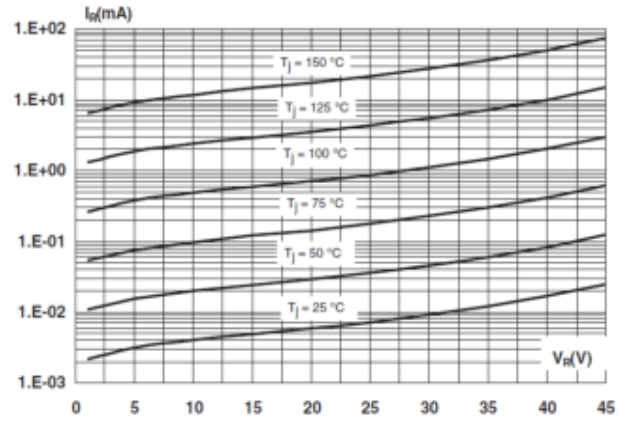


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

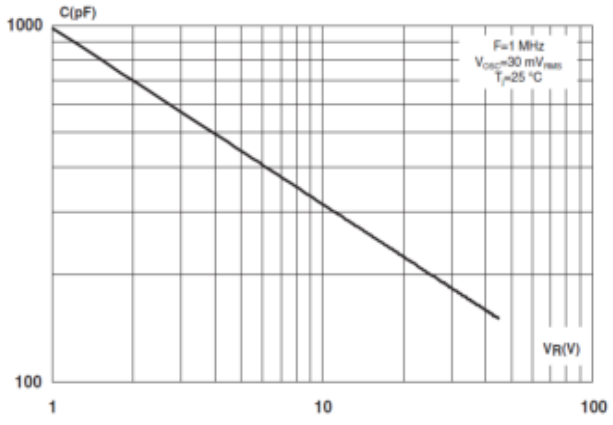


Figure 7. Forward voltage drop versus forward current

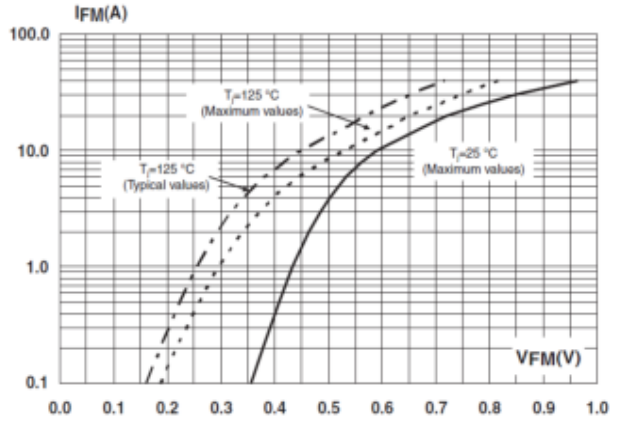
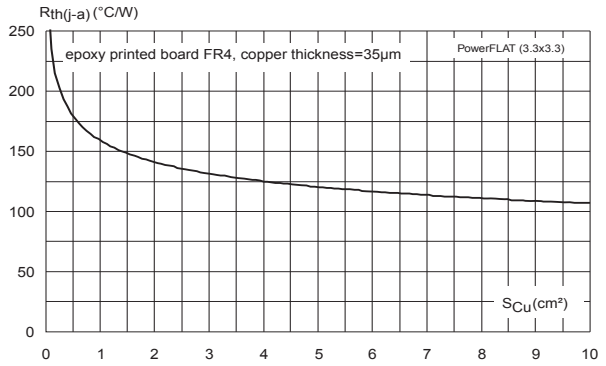


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

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.

2.1 PowerFLAT 3.3x3.3 mm package information

Figure 9. PowerFLAT 3.3x3.3 mm package outline

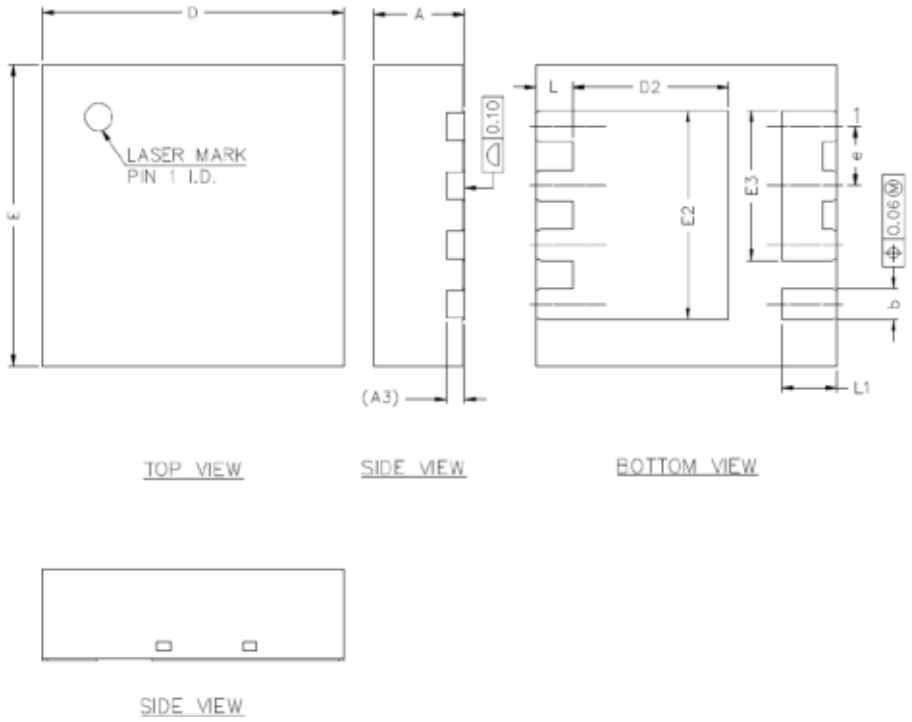
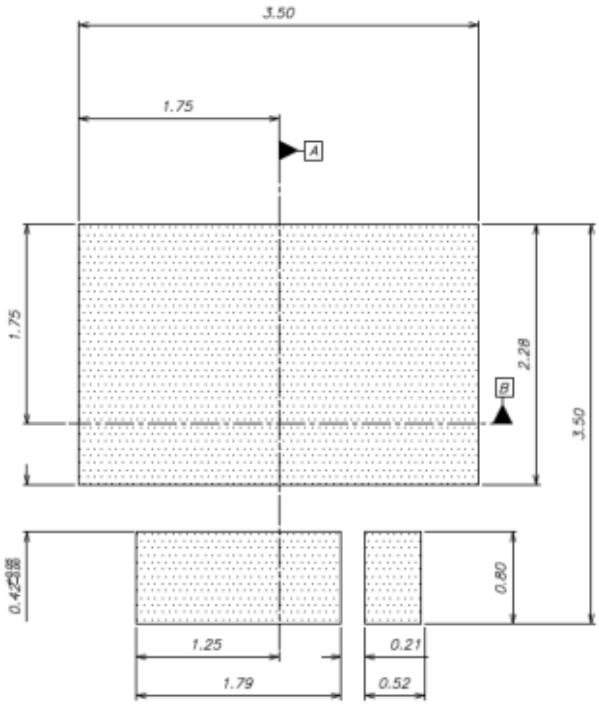


Table 4. PowerFLAT 3.3x3.3 mm mechanical data

Ref.	Dimensions		
	Millimeters		
	Min.	Typ.	Max.
A	0.90		1.10
A3		0.20	
b	0.29		0.44
D	3.20		3.40
D2	1.61		1.82
E	3.20		3.40
E2	2.19		2.39
E3	1.54		1.74
e	0.55		0.75
L	0.30		0.50
L1	0.50		0.70

Figure 10. **Recommended footprint (dimensions are in mm)**



3 Ordering information

Table 5. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
STPS1045DEE-TR	PS1045	PowerFLAT 3.3 x 3.3	34 mg	3000	Tape and 13" reel

Revision history

Table 6. **Document revision history**

Date	Version	Changes
09-Sep-2012	1	First issue.
18-May-2022	2	Updated package outline PowerFLAT 3.3 x 3.3.

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