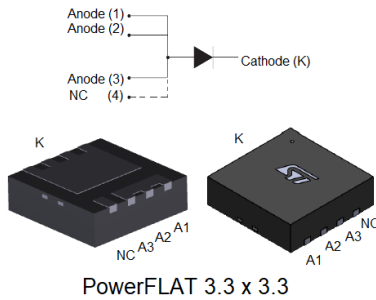


## 45 V, 10 A power Schottky rectifier



### 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

#### 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

### 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, $\delta = 0.5$ square wave	$T_c = 145\text{ °C}$	10	A	
$I_{FSM}$	Surge non repetitive forward current		$t_p = 10\text{ ms}$ sinusoidal	100	A
$P_{ARM}$	Repetitive peak avalanche power	$t_p = 10\text{ }\mu\text{s}$	$T_c = 125\text{ °C}$	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	$T_j = 25\text{ °C}$	$V_R = V_{RRM}$	-		200	$\mu\text{A}$
		$T_j = 125\text{ °C}$		-	15	40	mA
$V_F^2$	Forward voltage drop	$T_j = 25\text{ °C}$	$I_F = 10\text{ A}$	-		0.59	V
		$T_j = 125\text{ °C}$		-	0.45	0.53	
		$T_j = 25\text{ °C}$	$I_F = 20\text{ A}$	-		0.72	
		$T_j = 125\text{ °C}$		-	0.57	0.65	

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:

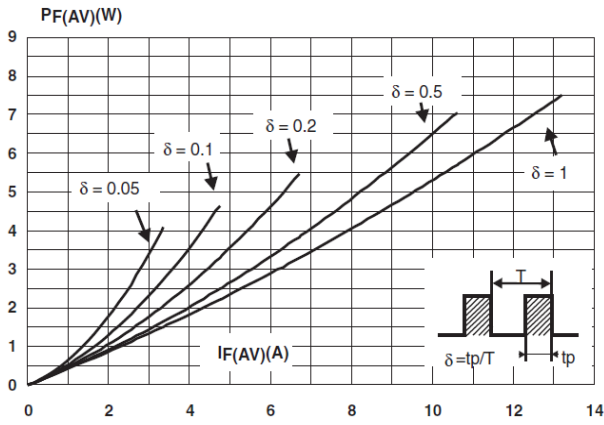
$$P = 0.41 \times I_{F(AV)} + 0.012 \times I_{F(RMS)}^2$$

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

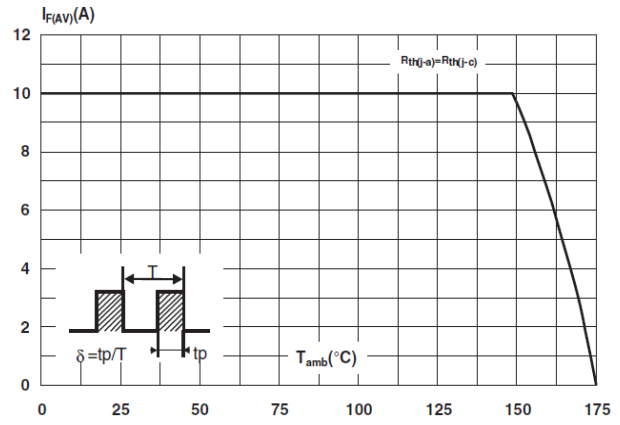
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses in a power diode

## 1.1 Characteristics (curves)

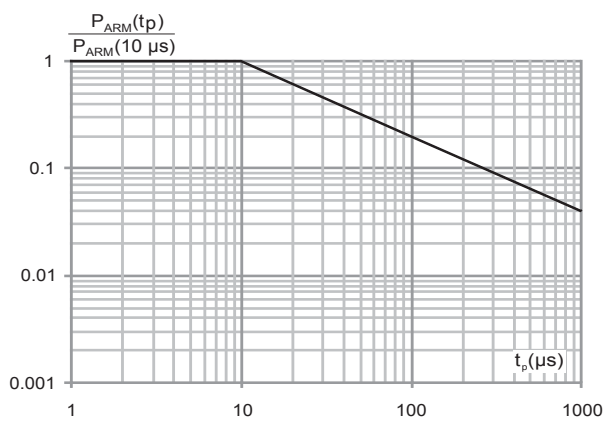
**Figure 1. Average forward power dissipation versus average forward current**



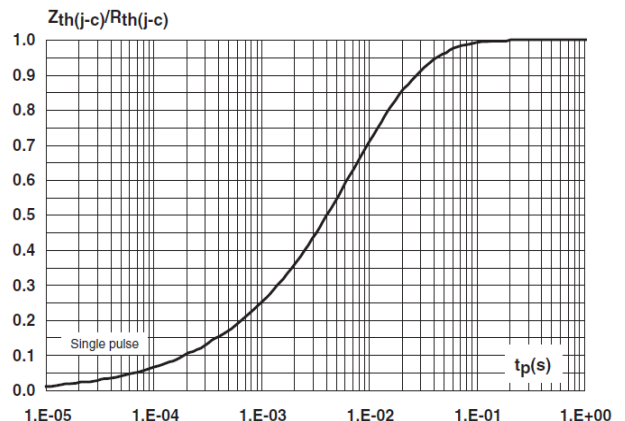
**Figure 2. Average forward current versus ambient temperature (δ = 0.5)**



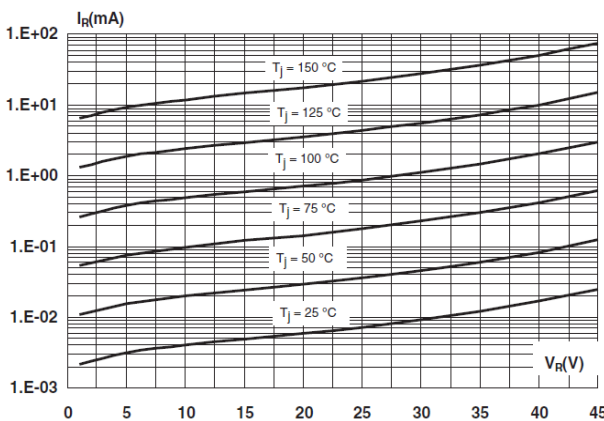
**Figure 3. Normalized avalanche power derating versus pulse duration**



**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)**

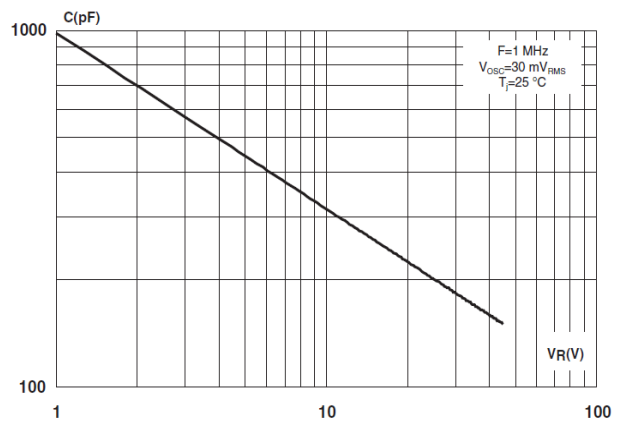


Figure 7. Forward voltage drop versus forward current

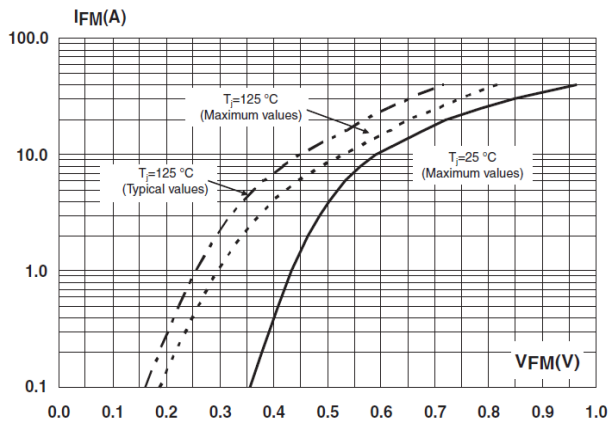
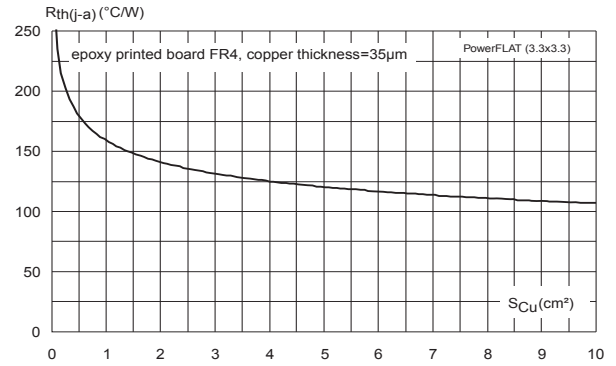


Figure 8. Thermal resistance junction to ambient versus copper surface under tab

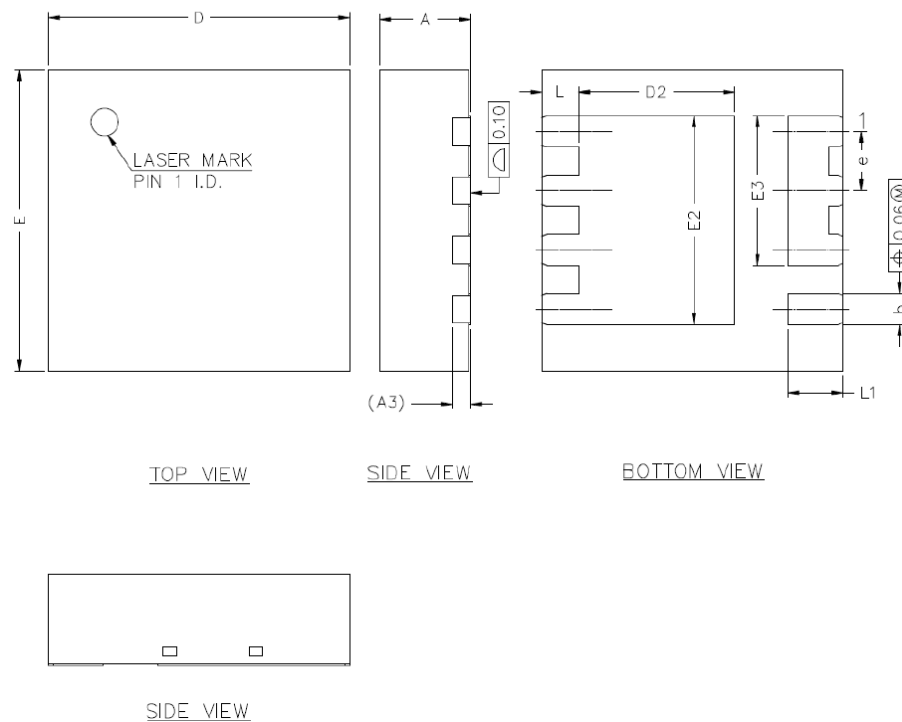


## 2 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 PowerFLAT 3.3x3.3 mm package information

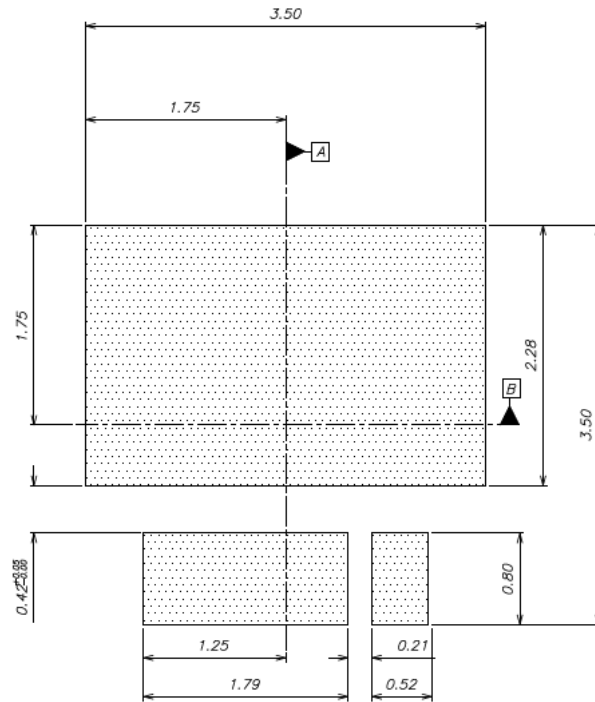
**Figure 9. PowerFLAT 3.3x3.3 mm package outline**



**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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