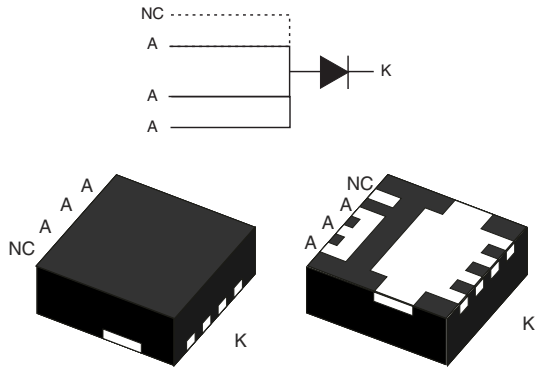
STPS1045DEE

Power Schottky rectifier

Datasheet – production data

Features

- Very low conduction losses
- Negligible switching losses
- Extremely fast switching
- Low thermal resistance
- Avalanche capacity specified
- High junction temperature
- ECOPACK®2 compliant component



PowerFLAT (3.3 x 3.3)
STPS1045DEE-TR

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.

Table 1. Device summary

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

TM: PowerFLAT is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings (limiting values T_{amb} = 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	Tc = 145 °C δ = 0.5	10	A
I_{FSM}	Surge non repetitive forward current	tp = 10 ms sinusoidal	100	A
P_{ARM}(1)	Repetitive peak avalanche power	t_p = 10 µs T_j = 125 °C	300	W
T_{stg}	Storage temperature range		-65 to +175 °C	°C
Tj	Maximum operating junction temperature		175	°C

1. For pulse time duration deratings, please refer to *Figure 3*. More details regarding the avalanche energy measurements and diode validation in the avalanche are provided in the STMicroelectronics Application notes AN1768, “Admissible avalanche power of schottky diodes” and AN2025, “Converter improvement using Schottky rectifier avalanche specification”.

Table 3. Thermal resistance

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

Table 4. 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 = 10A			0.59	V
		T_j = 125 °C		-	0.45	0.53	
		T_j = 25 °C	I_F = 20A	-		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:

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

Figure 1. Average forward power dissipation versus average forward current

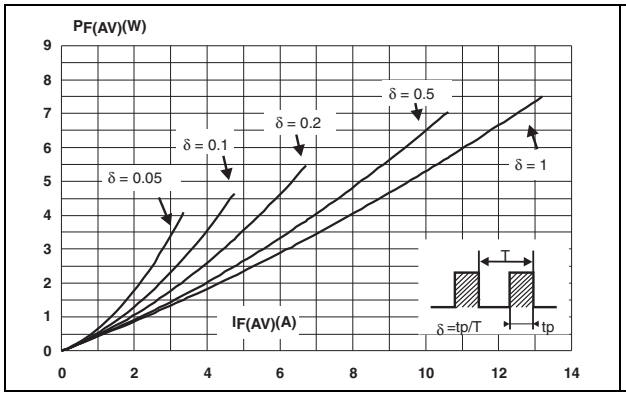


Figure 2. Average forward current versus ambient temperature(δ = 0.5)

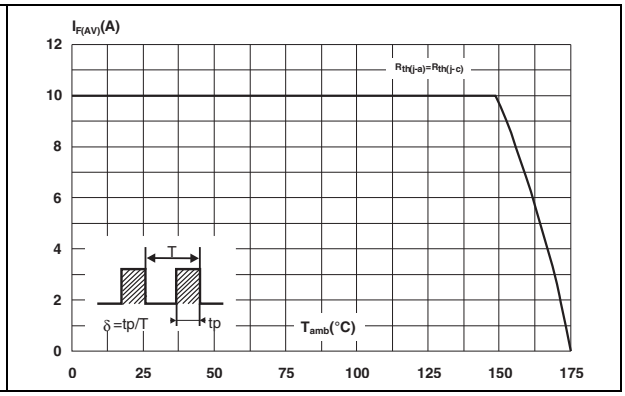


Figure 3. Normalized avalanche power derating versus pulse duration

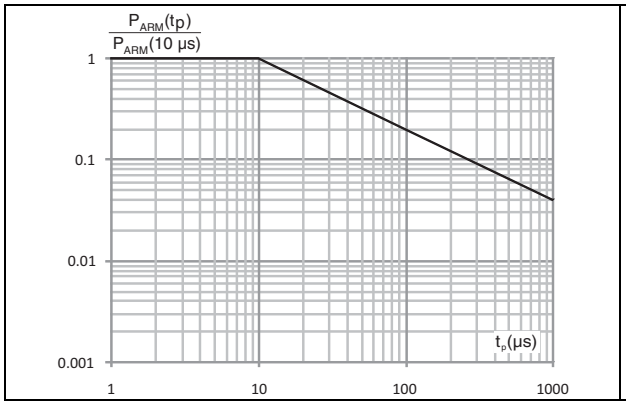


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

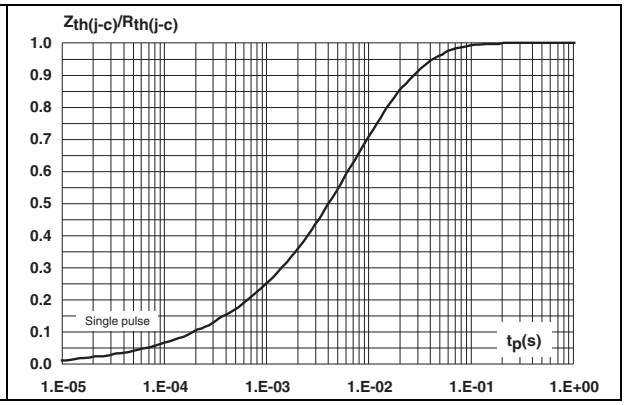


Figure 5. Reverse leakage current versus reverse voltage applied(typical values)

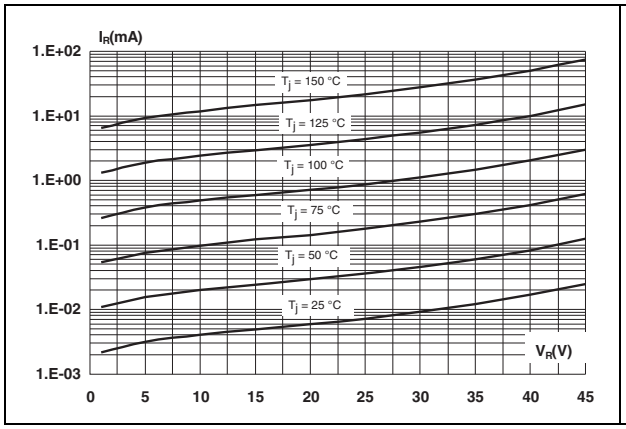


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

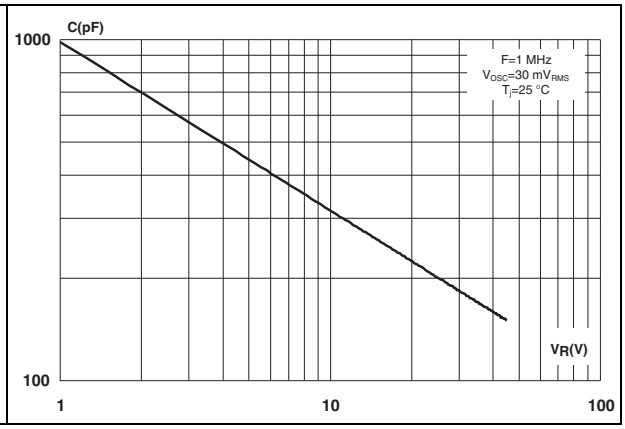


Figure 7. Forward voltage drop versus forward current

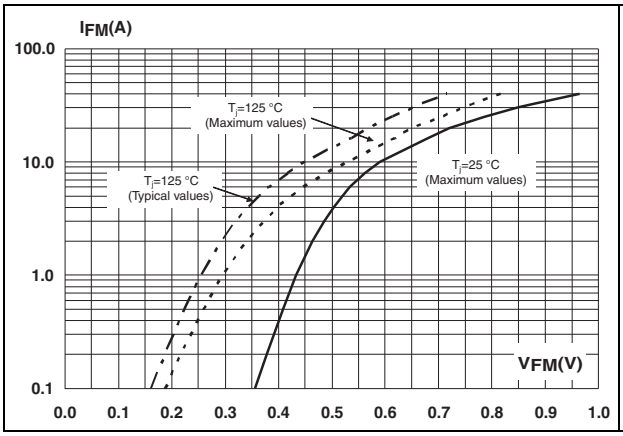
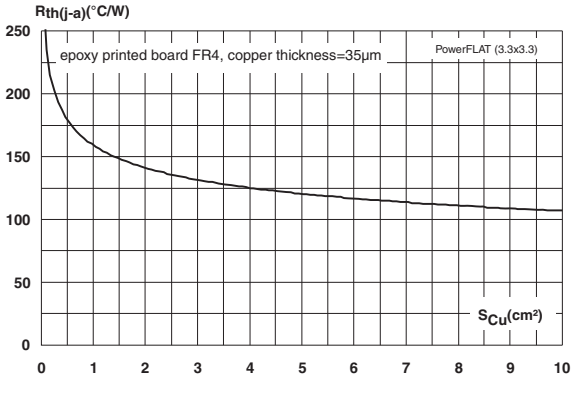


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



2 Package information

- 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.

Figure 9. PowerFLAT-3.3x3.3-8L dimensions (definitions)

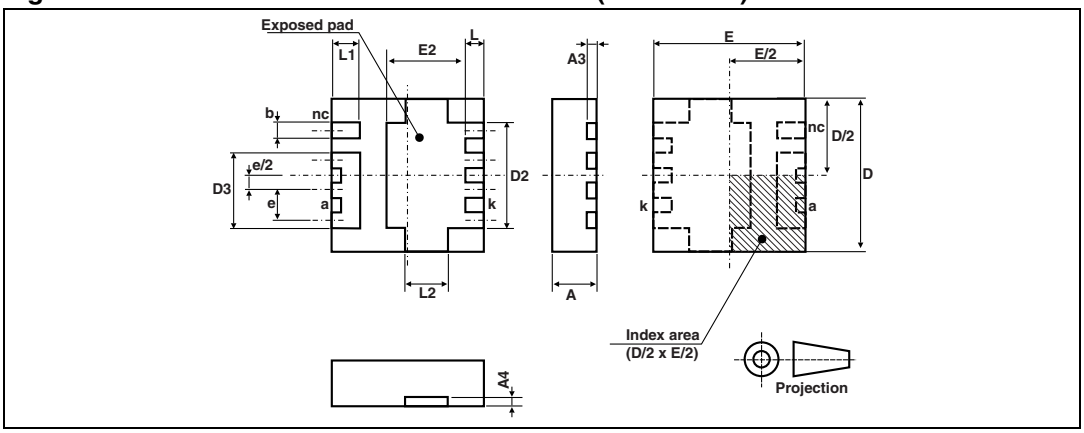
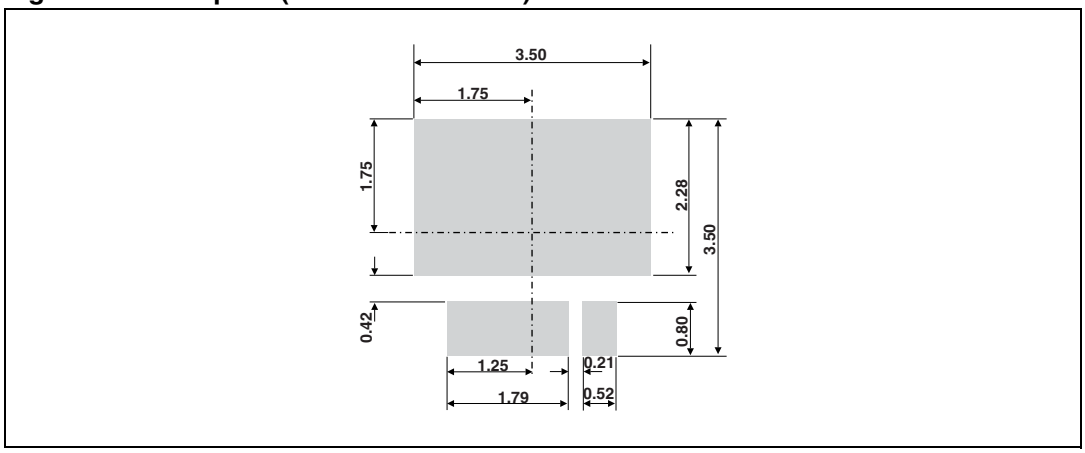


Table 5. PowerFLAT-8L dimensions (values)

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.95	1.00	1.05	0.037	0.039	0.041
A3		0.20			0.0079	
A4		0.20			0.0079	
b	0.30	0.37	0.44	0.012	0.015	0.017
D	3.20	3.30	3.40	0.126	0.130	0.134
D2	2.24	2.31	2.38	0.088	0.091	0.094
D3	1.60	1.67	1.74	0.063	0.066	0.069
e		0.65			0.026	
E	3.20	3.30	3.40	0.126	0.130	0.134
E2	1.68	1.75	1.82	0.066	0.069	0.072
L	0.31	0.38	0.45	0.012	0.015	0.018
L1	0.55	0.62	0.69	0.22	0.024	0.027
L2	0.86	0.93	1.00	0.034	0.037	0.039

Figure 10. Footprint (dimensions in mm)



3 Ordering information

Table 6. 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 reel 13” reel

4 Revision history

Table 7. Document revision history

Date	Revision	Changes
09-Sep-2012	1	First issue.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

STMicroelectronics:

STPS1045DEE-TR