

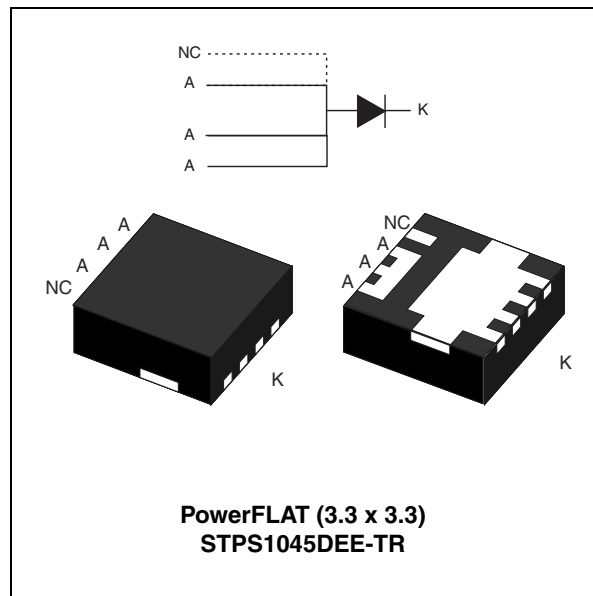
### Features

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

### 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  $T_{amb} = 25\text{ °C}$  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                | $T_C = 145\text{ °C}$ $\delta = 0.5$                | 10             | A    |
| $I_{FSM}$       | Surge non repetitive forward current   | $t_p = 10\text{ ms}$ sinusoidal                     | 100            | A    |
| $P_{ARM}^{(1)}$ | Repetitive peak avalanche power        | $t_p = 10\text{ }\mu\text{s}$ $T_J = 125\text{ °C}$ | 300            | W    |
| $T_{stg}$       | Storage temperature range              |                                                     | -65 to +175 °C | °C   |
| $T_J$           | 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 | $T_J = 25\text{ °C}$  | $V_R = V_{RRM}$     | -    |      | 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:

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

Figure 1. Average forward power dissipation versus average forward current

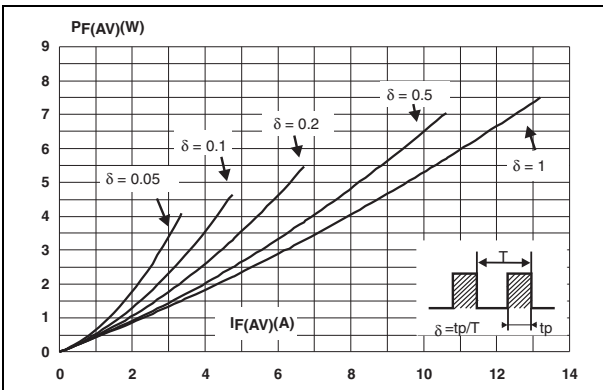


Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )

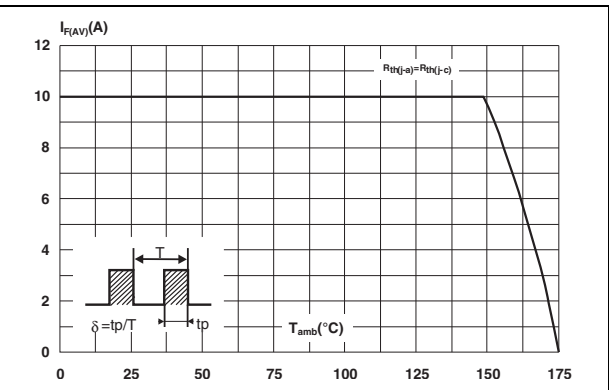


Figure 3. Normalized avalanche power derating versus pulse duration

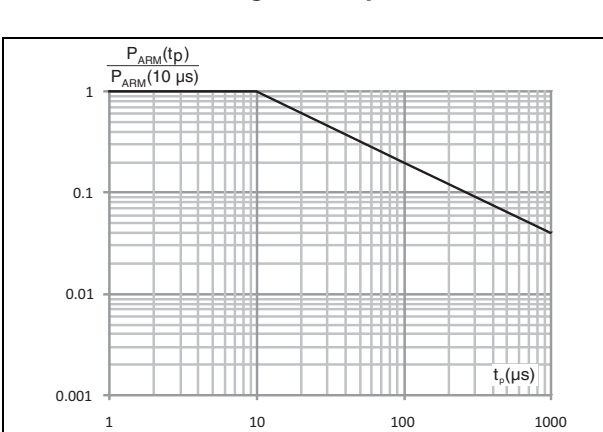


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

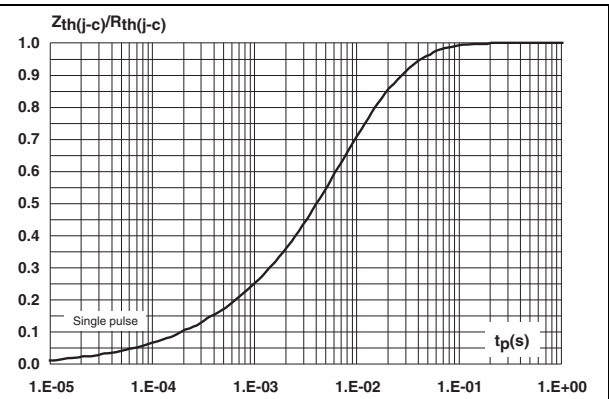


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

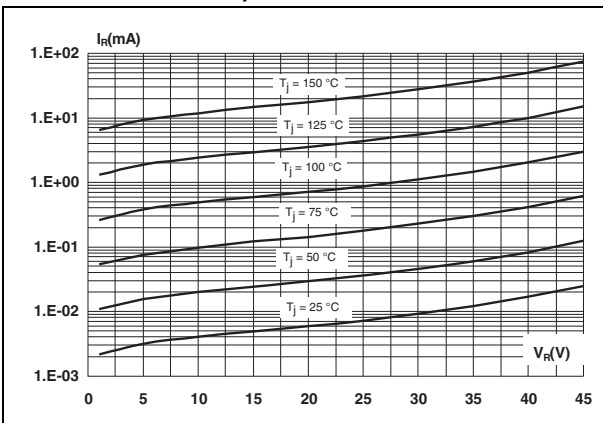


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

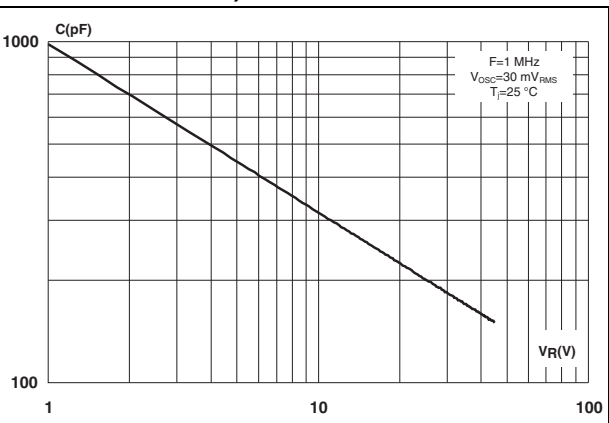


Figure 7. Forward voltage drop versus forward current

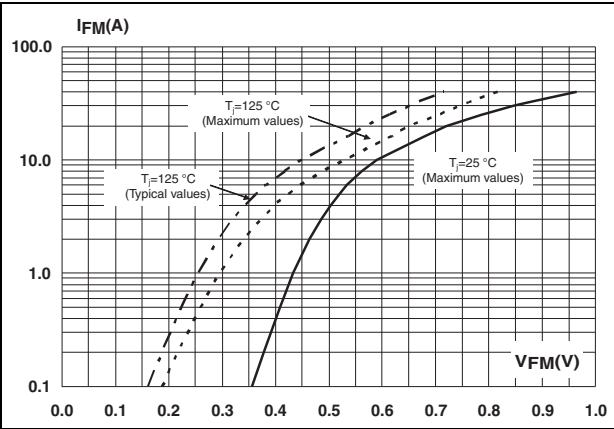
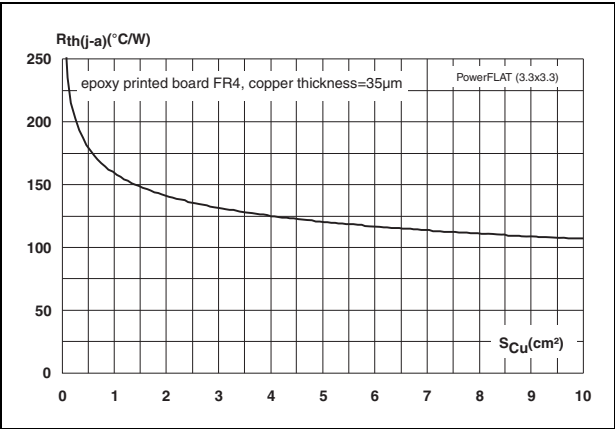


Figure 8. Thermal resistance junction to ambient versus copper surface under tab

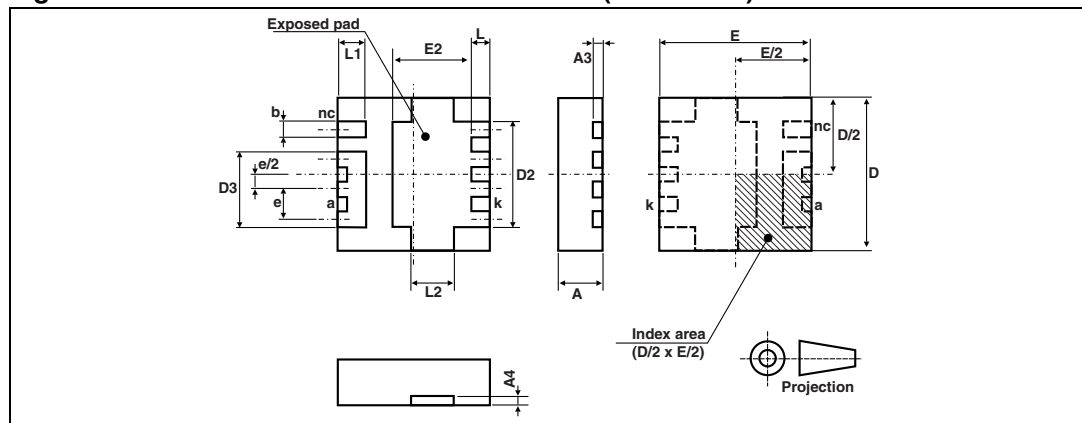


## 2 Package information

- Epoxy meets UL94,V0
- Lead-free package

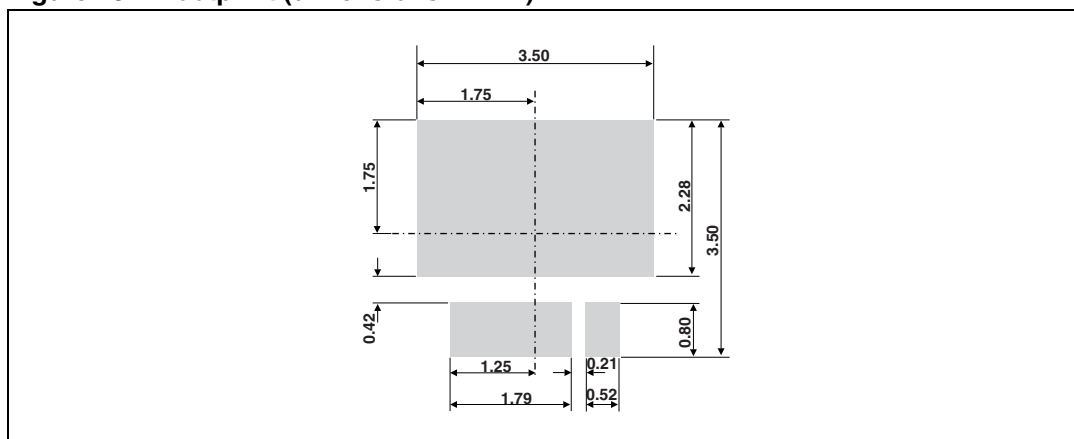
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> 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 | 0.022  | 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<br>(3.3 x 3.3) | 34 mg  | 3000     | Tape and reel<br>13" reel |

### 4 Revision history

Table 7. Document revision history

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

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