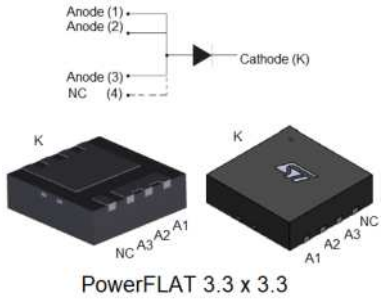
# STPS8170DEE

Datasheet

## 170 V, 8 A power Schottky rectifier



PowerFLAT 3.3 x 3.3

| Product status link |
|---|
| STPS8170DEE |

| Product summary | |
|---|---|
| **Symbol** | **Value** |
| $I_{F(AV)}$ | 8 A |
| $V_{RRM}$ | 170 V |
| $T_j$ (max.) | 175 °C |
| $V_F$ (typ.) | 0.66 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 | | | 170 | V |
| $I_{F(RMS)}$ | Forward rms current | | | 15 | A |
| $I_{F(AV)}$ | Average forward current, δ = 0.5 square wave | | $T_c$ = 145 °C | 8 | 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 | 400 | 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 | $V_R = V_{RRM}$ | - | | 15 | µA |
| | | $T_j$ = 125 °C | | - | 1.5 | 15 | mA |
| $V_F$[2] | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 8 A | - | | 0.90 | V |
| | | $T_j$ = 125 °C | | - | 0.66 | 0.72 | |

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:

$P = 0.62 \times I_{F(AV)} + 0.0125 \times I_F{}^2{}_{(RMS)}$

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

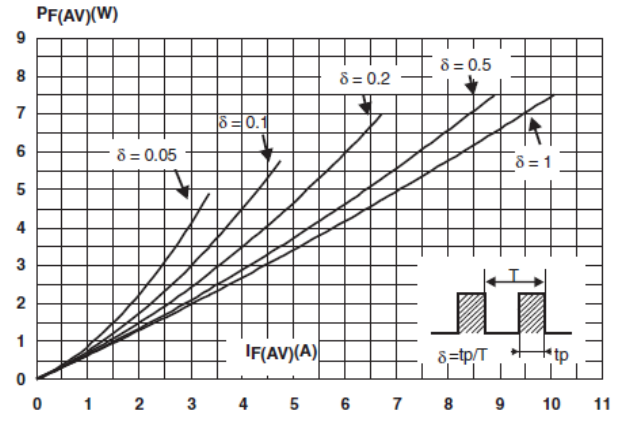



**Figure 2.** Average forward current versus ambient temperature(δ = 0.5)

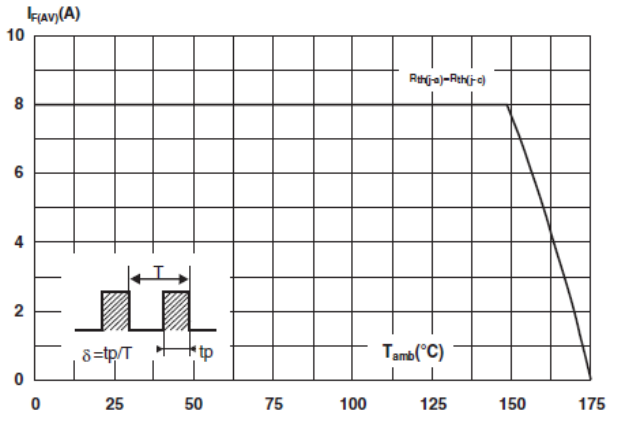



**Figure 3.** Normalized avalanche power derating versus pulse duration

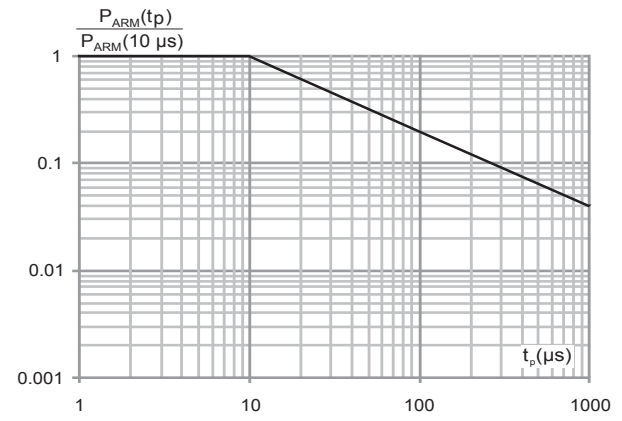



**Figure 4.** Relative variation of thermal impedance junction to case versus pulse duration

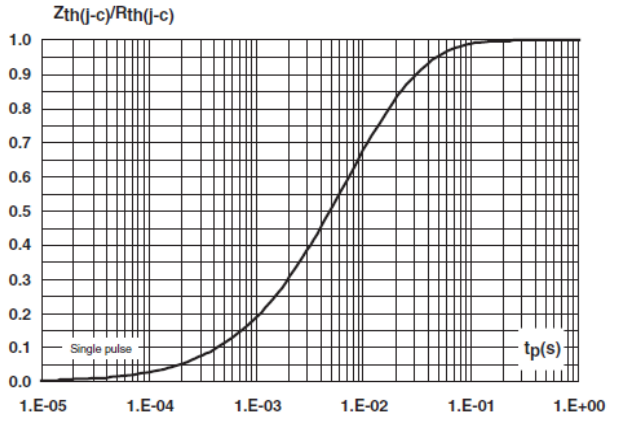



**Figure 5.** Reverse leakage current versus reverse voltage applied (typical values)

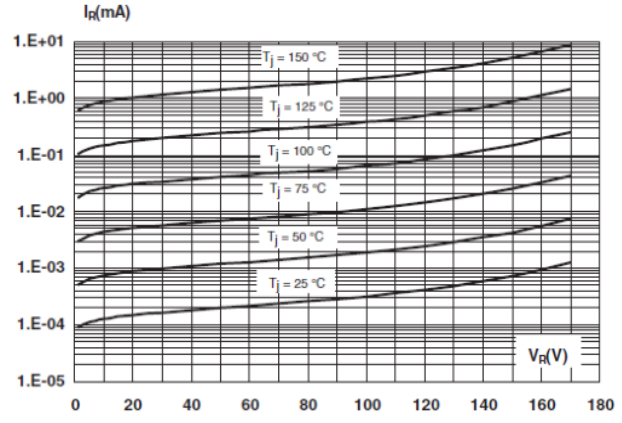



**Figure 6.** Junction capacitance versus reverse voltage applied (typical values)

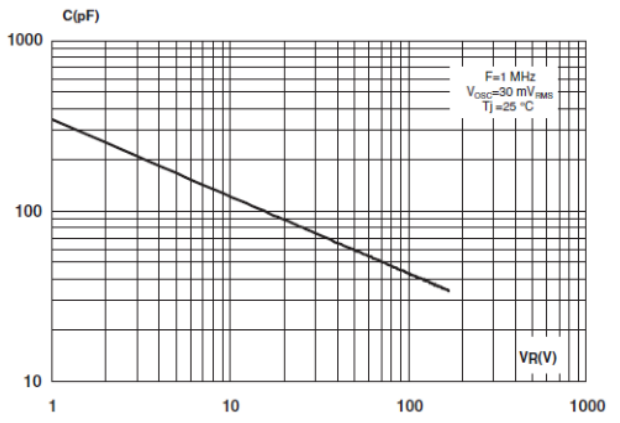


**Figure 7. Forward voltage drop versus forward current**

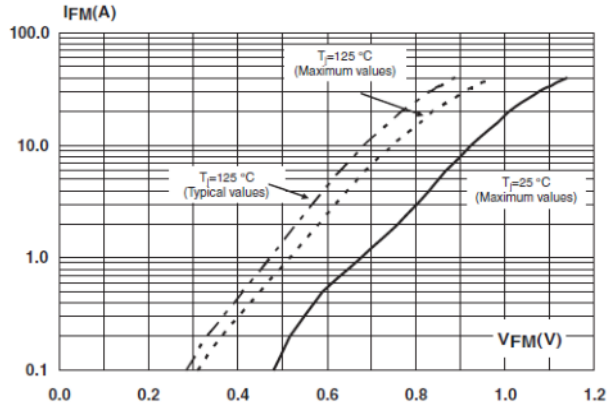
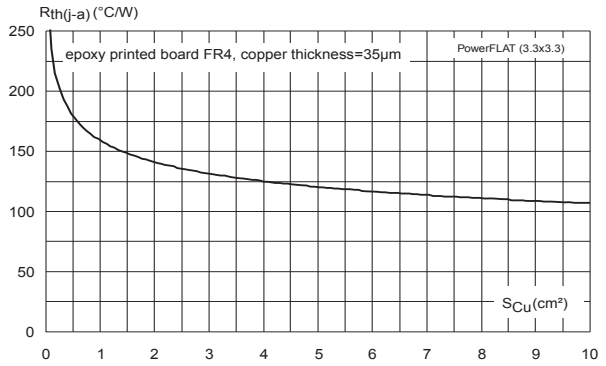



**Figure 8. Thermal resistance junction to ambient versus copper surface under tab**



# 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**

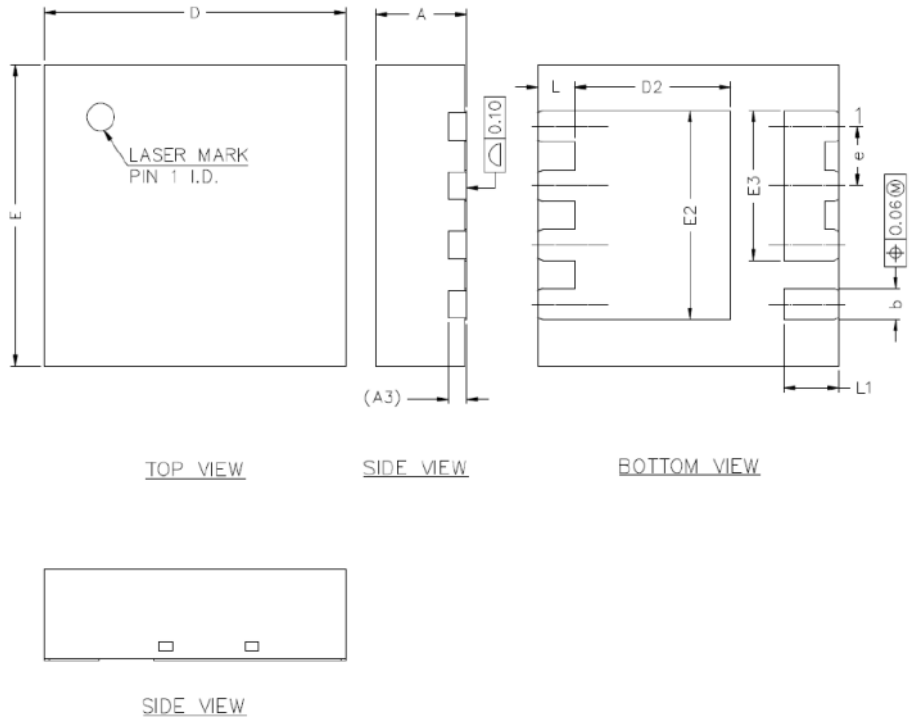
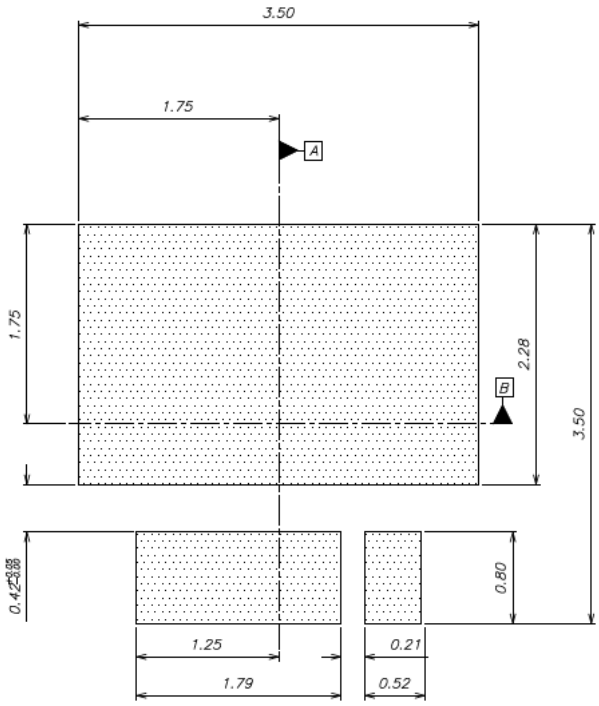



**Table 4. PowerFLAT 3.3x3.3 mm mechanical data**

| 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 |
|---|---|---|---|---|---|
| STPS8170DEE-TR | PS8170 | PowerFLAT 3.3 x 3.3 | 34 mg | 3000 | Tape and 13" reel |

## Revision history

Table 6. **Document revision history**

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

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