

STPS8170DEE

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

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.

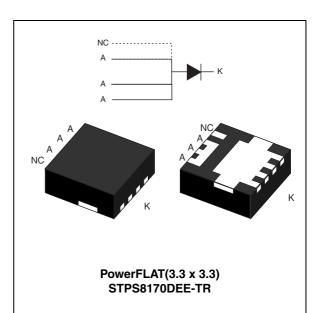


Table 1. Device summary

| , | | |
|----------------------|--------|--|
| Symbol | Value | |
| I _{F(AV)} | 8 A | |
| V _{RRM} | 170 V | |
| T _j (max) | 175 °C | |
| V _F (typ) | 0.66 V | |

TM: PowerFLAT is a trademark of STMicroelectronics

This is information on a product in full production.

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 | | 170 | V |
| I _{F(RMS)} | Forward rms current | | 15 | А |
| I _{F(AV)} | Average forward current | 8 | А | |
| I _{FSM} | Surge non repetitive forward current | 100 | А | |
| P _{ARM} ⁽¹⁾ | Repetitive peak avalanche power | 400 | W | |
| T _{stg} | Storage temperature range | -65 to +175 | °C | |
| Тj | Maximum operating junction temperat | 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. | Тур. | Max. | Unit |
|-------------------------------|-------------------------|-------------------------|---------------------|------|------|------|------|
| I _B ⁽¹⁾ | Reverse leakage current | T _j = 25 °C | V - V | - | | 15 | μA |
| 'R` ′ | neverse leakage current | T _j = 125 °C | $V_{R} = V_{RRM}$ | - | 1.5 | 15 | mA |
| V _F ⁽²⁾ | Forward voltage drop | T _j = 25 °C | I _F = 8A | | | 0.90 | V |
| | | T _j = 125 °C | | - | 0.66 | 0.72 | |

1. Pulse test: $t_p = 5 \text{ ms}, \delta < 2\%$

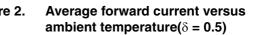
2. Pulse test: t_p = 380 µs, δ < 2%

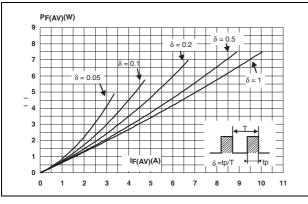
To evaluate the conduction losses use the following equation:

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



Figure 1. Average forward power dissipation Figure 2. versus average forward current





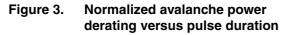


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

75

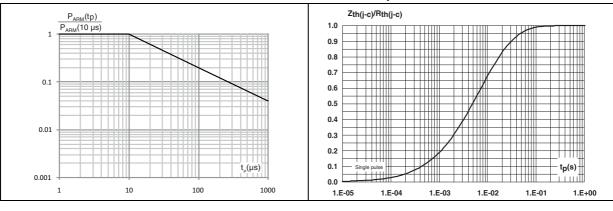
T_{amb}(°C)

125

150

175

100



I_{F(AV)}(A)

8

6

4

2

0

0

δ=tp/T

25

٩tr

50

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

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

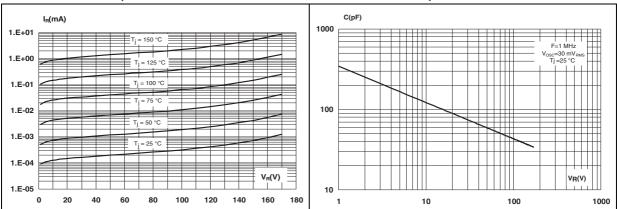
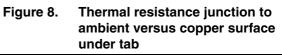
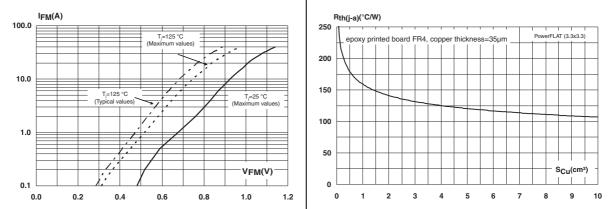




Figure 7. Forward voltage drop versus forward current







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: <u>www.st.com</u>. ECOPACK[®] is an ST trademark.

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

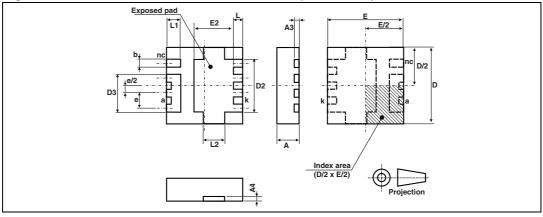
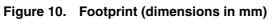
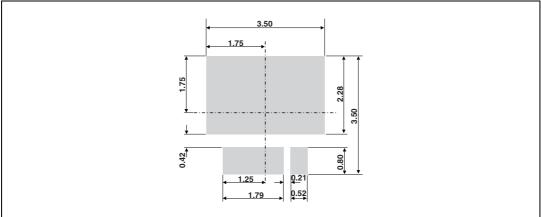


Table 5. PowerFLAT-8L dimensions (values)

| | Dimensions | | | | | | |
|------|-------------|------|------|--------|--------|-------|--|
| Ref. | Millimeters | | | Inches | | | |
| | Min. | Тур. | Max. | Min. | Тур. | Max. | |
| А | 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 | |
| е | | 0.65 | | | 0.026 | | |
| Е | 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 | |









3 Ordering information

Table 6.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 reel 13" reel |

4 Revision history

Table 7.Document revision history

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



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