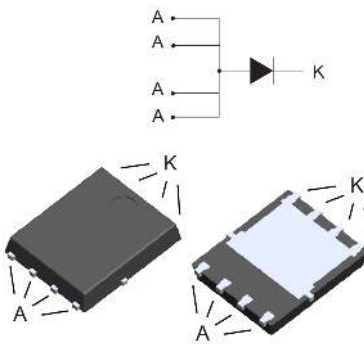


45 V, 30 A power Schottky rectifier



PowerFLAT™ 5x6
(non-contractual)

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Low thermal resistance
- High avalanche capability specified
- Thin package: 1 mm
- ECOPACK®2 compliant

Applications

- Telecom power supply
- Desktop power supply

Description

This Schottky rectifier is ideally suited for switch mode power supply and high frequency DC to DC converters.

Packaged in PowerFLAT™ 5x6, the **STPS3045DJF** is optimized for use in low voltage high frequency inverters, free-wheeling and polarity protection applications.

Its low profile was especially designed to be used in applications with space-saving constraints.

PowerFLAT™ is a trademark of STMicroelectronics.

Product status link

[STPS3045DJF](#)

Product summary

| Symbol | Value |
|--------------|--------|
| $I_{F(AV)}$ | 30 A |
| V_{RRM} | 45 V |
| T_j (max.) | 175 °C |
| V_F (typ.) | 0.50 V |

1 Characteristics

Table 1. Absolute Ratings (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited)

| Symbol | Parameter | Value | Unit |
|--------------|-------------------------------------------------------|--------------------------------------------------------------|------|
| V_{RRM} | Repetitive peak reverse voltage | 45 | V |
| $I_{F(RMS)}$ | Forward rms current | 45 | A |
| $I_{F(AV)}$ | Average forward current, $\delta = 0.5$, square wave | $T_C = 120\text{ °C}$ 30 | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms}$ sinusoidal 380 | A |
| P_{ARM} | Repetitive peak avalanche power | $t_p = 10\text{ }\mu\text{s}$, $T_j = 125\text{ °C}$ 900 | W |
| T_{stg} | Storage temperature range | -65 to +175 | °C |
| T_j | Maximum operating junction temperature ⁽¹⁾ | 175 | °C |

1. $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$ condition to avoid thermal runaway for a diode on its own heatsink.

Table 2. Thermal resistance parameters

| Symbol | Parameter | Max. value | Unit |
|---------------|------------------|------------|------|
| $R_{th(j-c)}$ | Junction to case | 2.5 | °C/W |

For more information, please refer to the following application note :

- AN5046 : Printed circuit board assembly recommendations for STMicroelectronics PowerFLAT™ packages

Table 3. Static electrical characteristics (anode terminals short circuited)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit | |
|----------------------|-------------------------|-----------------------|---------------------|------|------|------|---------------|
| I_R ⁽¹⁾ | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = V_{RRM}$ | - | | 300 | μA |
| | | $T_j = 125\text{ °C}$ | | - | 20 | 80 | mA |
| V_F ⁽¹⁾ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 15\text{ A}$ | - | | 0.56 | V |
| | | $T_j = 125\text{ °C}$ | | - | 0.41 | 0.46 | |
| | | $T_j = 25\text{ °C}$ | $I_F = 30\text{ A}$ | - | | 0.64 | |
| | | $T_j = 125\text{ °C}$ | | - | 0.50 | 0.56 | |

1. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.43 \times I_{F(AV)} + 0.00433 I_F^2 \text{ (RMS)}$$

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 on a power diode

1.1 Characteristics (curves)

Figure 1. Average forward power dissipation versus average forward current

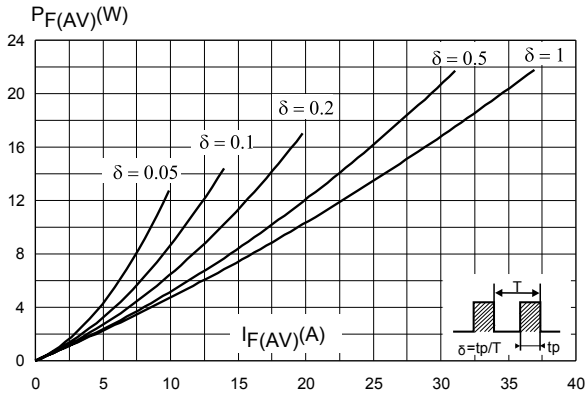


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

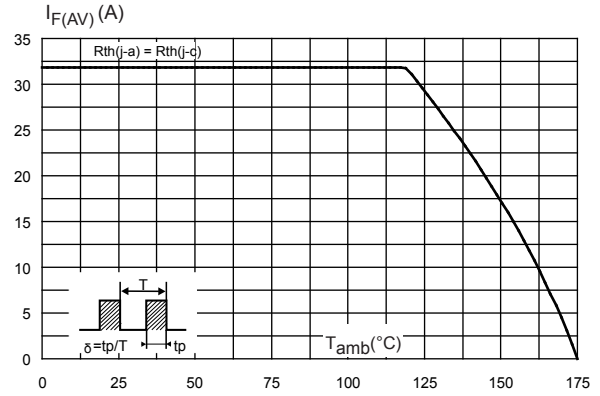


Figure 3. Normalized avalanche power derating versus pulse duration ($T_j = 125$ °C)

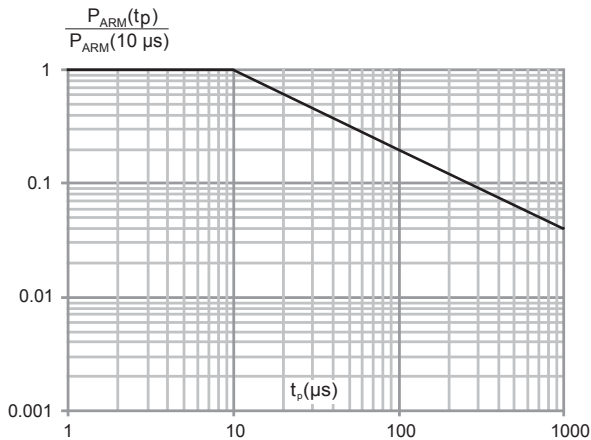


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

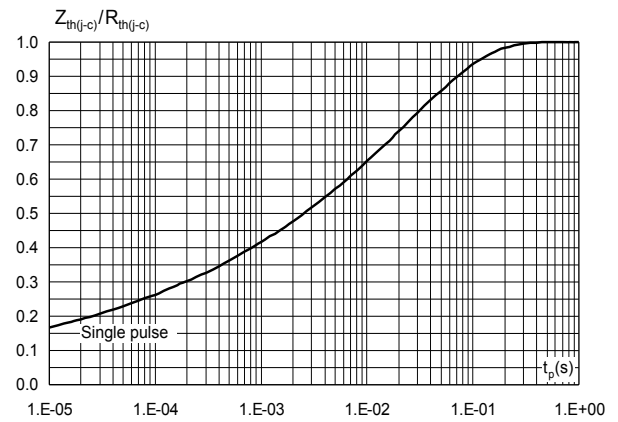


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

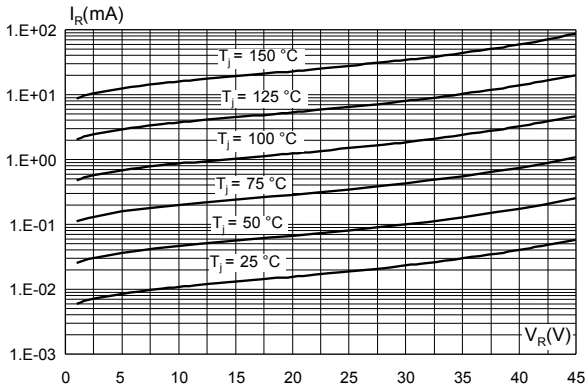


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

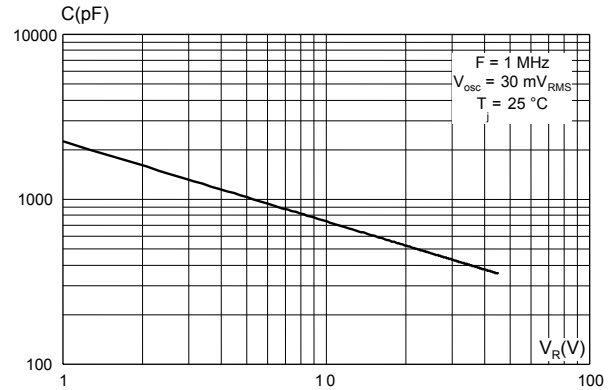


Figure 7. Forward voltage drop versus forward current

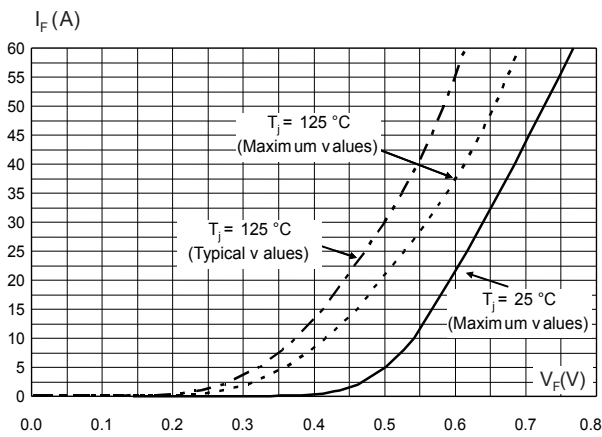
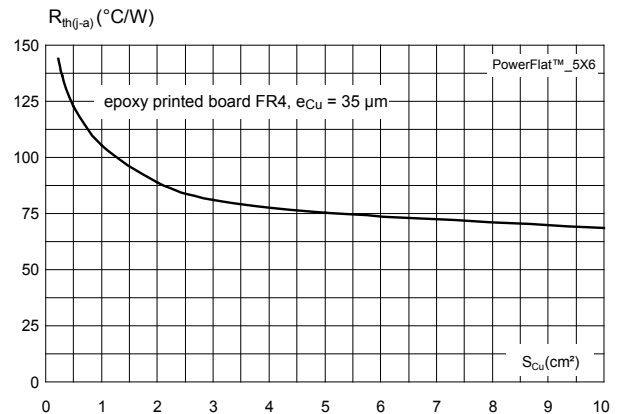


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



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™ 5x6 package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

Figure 9. PowerFLAT™ 5x6 package outline (non-contractual)

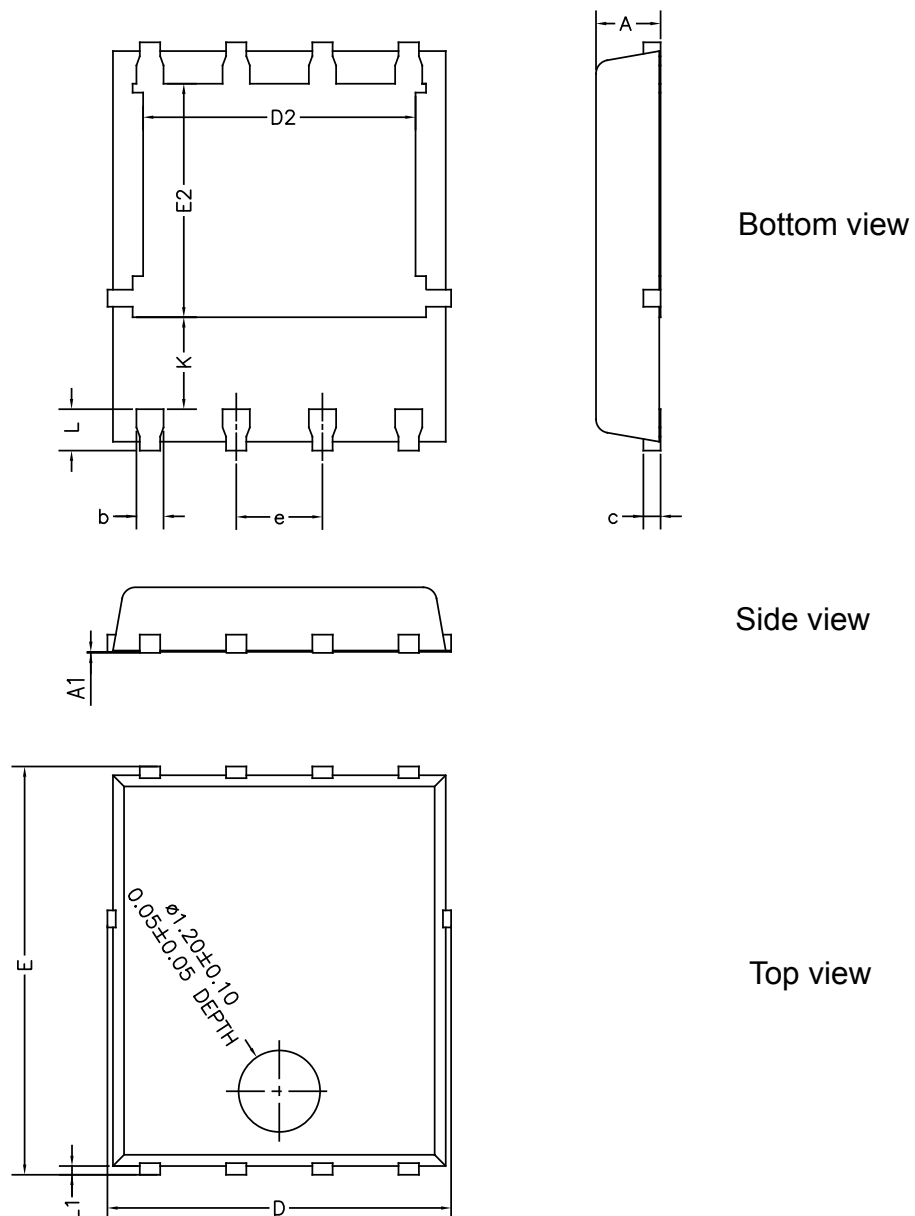
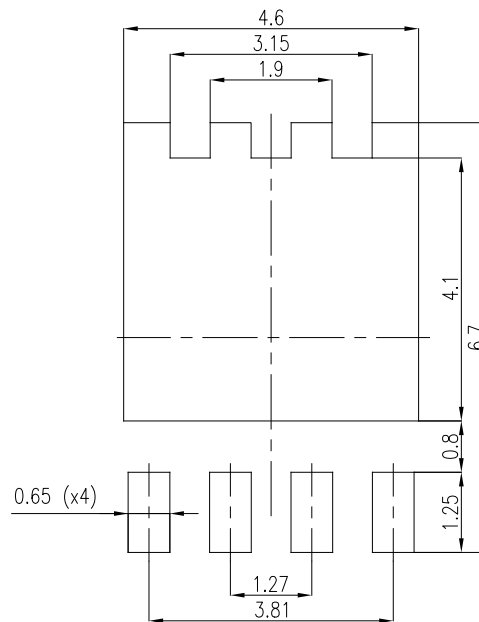


Table 4. PowerFLAT™ 5x6 mechanical data

| Ref | Dimensions | | | | | |
|-----|-------------|------|-------|-----------------------------|-------|-------|
| | Millimeters | | | Inches (for reference only) | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.80 | | 1.00 | 0.031 | | 0.039 |
| A1 | 0.00 | | 0.05 | 0.000 | | 0.002 |
| b | 0.30 | | 0.50 | 0.01 | | 0.02 |
| c | | 0.25 | | | 0.010 | |
| D | 4.80 | | 5.40 | 0.189 | | 0.212 |
| D2 | 3.91 | | 4.45 | 0.154 | | 0.175 |
| e | | 1.27 | | | 0.050 | |
| E | 5.90 | | 6.35 | 0.232 | | 0.250 |
| E2 | 3.34 | | 3.70 | 0.138 | | 0.146 |
| L | 0.50 | | 0.80 | 0.020 | | 0.031 |
| K | 1.10 | | 1.575 | 0.015 | | 0.023 |
| L1 | 0.05 | 0.15 | 0.25 | 0.002 | 0.006 | 0.009 |

Figure 10. PowerFLAT™ 5x6 recommended footprint (dimensions are in mm)



3 Ordering information

Table 5. Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|----------------|---------|----------------|---------|-----------|---------------|
| STPS3045DJF-TR | PS30 45 | PowerFLAT™ 5x6 | 0.095 g | 3000 | Tape and reel |

Revision history

Table 6. Document revision history

| Date | Revision | Changes |
|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 09-Nov-2009 | 1 | First issue. |
| 05-Jul-2010 | 2 | Replace Power QFN with PowerFLAT™. |
| 20-May-2011 | 3 | Updated package graphics and marking in Table 6. Added Figure 10. |
| 12-Aug-2015 | 4 | Updated cover image and Table 1 on cover page. Updated Table 2 and Section 1.1: Characteristics (curves). |
| 14-Feb-2019 | 5 | Updated Section Cover image , Figure 9. PowerFLAT™ 5x6 package outline (non-contractual) and Table 4. PowerFLAT™ 5x6 mechanical data . Minor text changes to improve readability. |

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