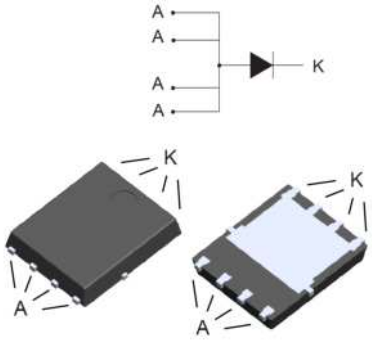
# STPS3045DJF

Datasheet

## 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, δ = 0.5, square wave | $T_C$ = 120 °C | 30 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | 380 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | $t_p$ = 10 µs , $T_j$ = 125 °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 °C | $V_R = V_{RRM}$ | - | | 300 | µA |
| | | $T_j$ = 125 °C | | - | 20 | 80 | mA |
| $V_F$ (1) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 15 A | - | | 0.56 | V |
| | | $T_j$ = 125 °C | | - | 0.41 | 0.46 | |
| | | $T_j$ = 25 °C | $I_F$ = 30 A | - | | 0.64 | |
| | | $T_j$ = 125 °C | | - | 0.50 | 0.56 | |

1. *Pulse test: $t_p$ = 380 µs, δ < 2%*

To evaluate the conduction losses use the following equation:

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

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 on a power diode

## 1.1 Characteristics (curves)

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

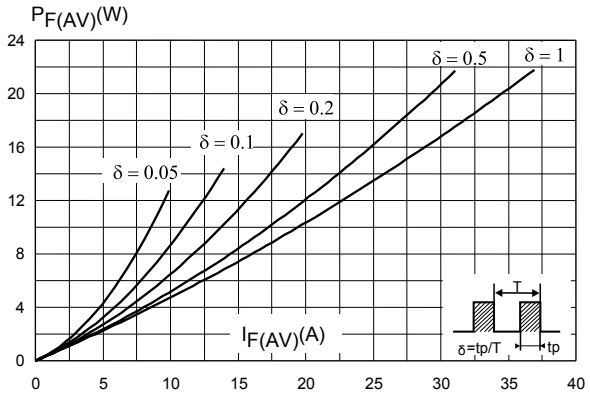



**Figure 2. Average forward current versus ambient temperature (δ = 0.5)**

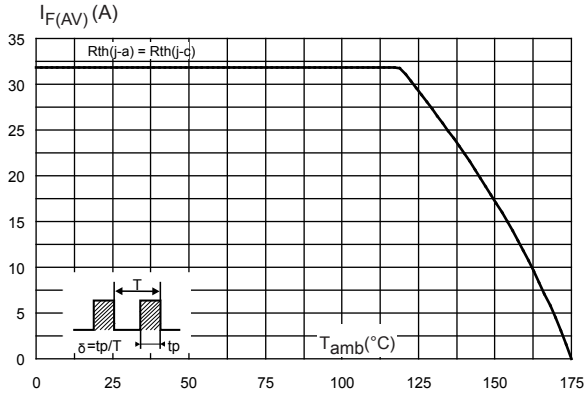



**Figure 3. Normalized avalanche power derating versus pulse duration ($T_j$= 125 °C)**

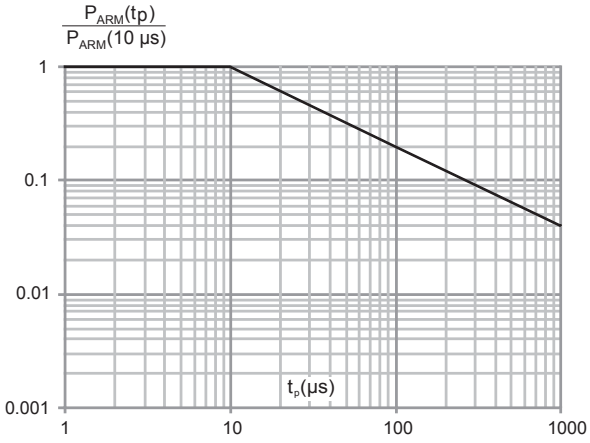



**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**

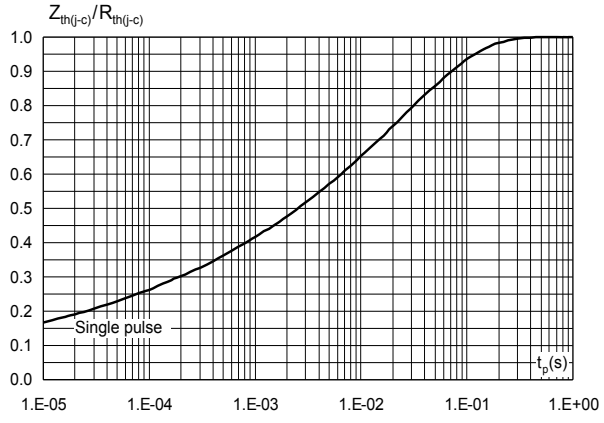


**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**

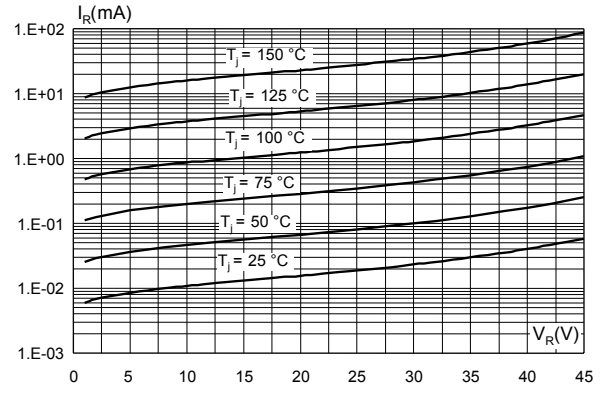



**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**

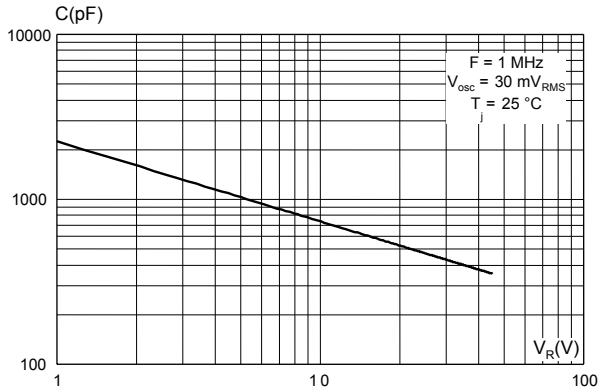



**Figure 7. Forward voltage drop versus forward current**

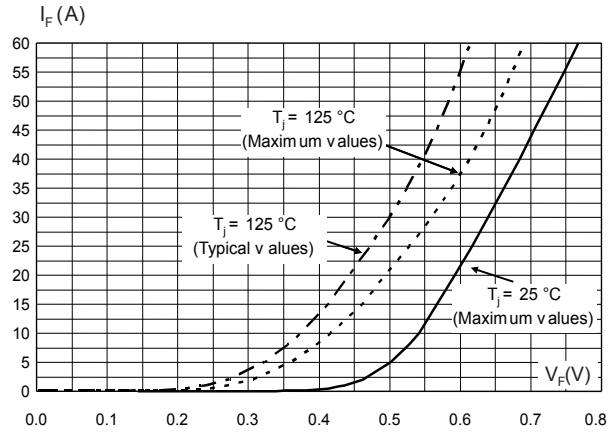
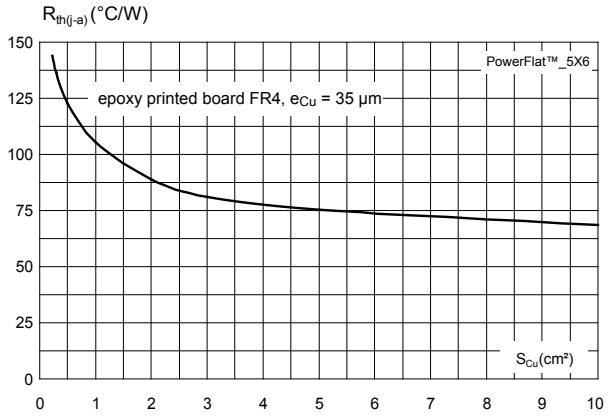



**Figure 8. Thermal resistance junction to ambient versus copper surface under tab**



# 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)**

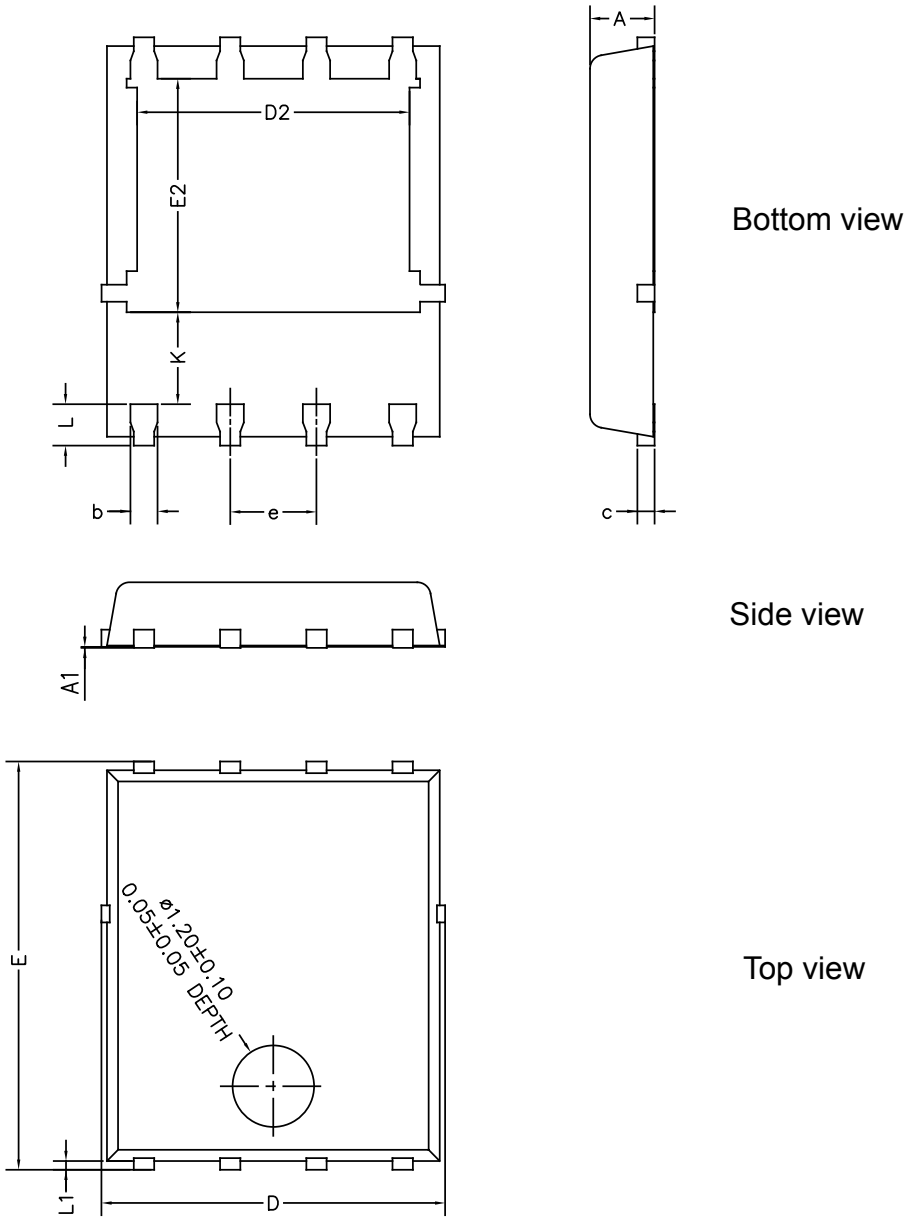
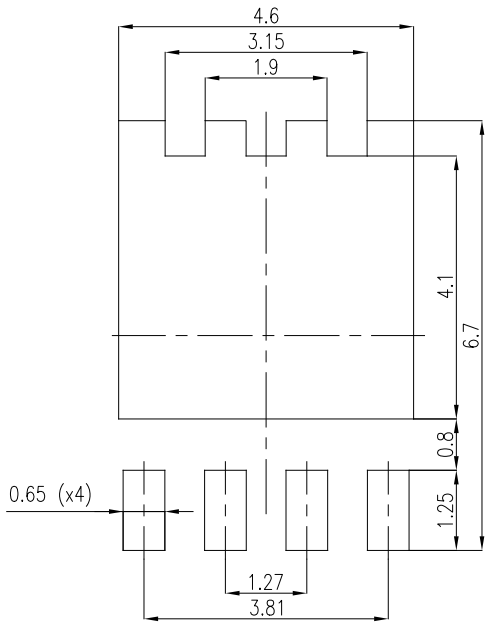


Table 4. **PowerFLAT™ 5x6 mechanical data**

| Dimensions | | | | | | |
|---|---|---|---|---|---|---|
| Ref | 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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