# STPS30U100DJF

## ULVF™ power Schottky rectifier

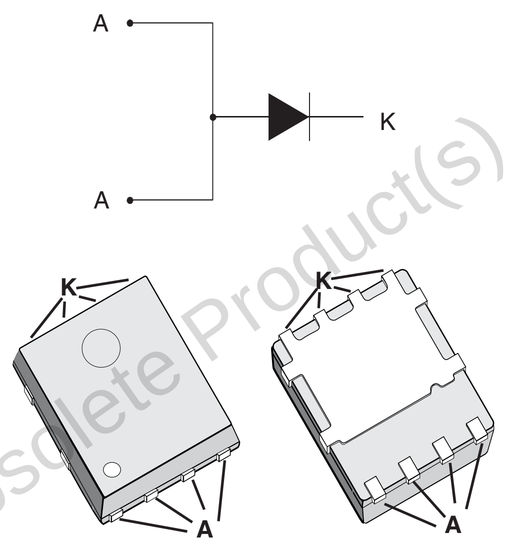
## Features

- High current capability
- Ultralow forward voltage drop
- Low thermal resistance
- High frequency operation
- High integration

## Description

The STPS30U100DJF is a power Schottky rectifier featuring an ultralow forward voltage drop (ULVF), suited for high frequency switch mode power supply and DC to DC converters.

Packaged in PowerFLAT™, this device is intended to be used in notebook, game station and desktop adapters, providing these applications with good efficiency at both low and high load. Its low profile was especially designed to be used in applications with space-saving constraints.




**PowerFLAT 5x6**
**STPS30U100DJF**

**Table 1. Device summary**

| Symbol | Value |
|---|---|
| $I_{F(AV)}$ | 30 A |
| $V_{RRM}$ | 100 V |
| $T_j$ (max) | 150 °C |
| $V_F$(typ) | 0.69 V |

**TM**: ULVF and PowerFLAT are trademarks of STMicroelectronics

# 1 Characteristics

Table 2. Absolute ratings (limiting values, anode terminals short circuited)

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 100 | V |
| $I_{F(RMS)}$ | Forward rms current | | 45 | A |
| $I_{F(AV)}$ | Average forward current | $T_c = 75°C, \delta = 0.5$ | 30 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sine-wave | 200 | A |
| $T_{stg}$ | Storage temperature range | | -65 to + 150 | °C |
| $T_j$ | Maximum operating junction temperature [(1)] | | 150 | °C |

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

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

Table 4. Static electrical characteristics (anode terminals short circuited)

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$[(1)] | Reverse leakage current | $T_j$ = 125 °C | $V_R$ = 70 V | - | 8 | - | mA |
| | | $T_j$ = 25 °C | $V_R = V_{RRM}$ | - | - | 170 | µA |
| | | $T_j$ = 125 °C | | - | 20 | 45 | mA |
| $V_F$[(2)] | Forward voltage drop | $T_j$ = 125 °C | $I_F$ = 5 A | - | 0.38 | 0.42 | V |
| | | $T_j$ = 125 °C | $I_F$ = 10 A | - | 0.475 | 0.53 | |
| | | $T_j$ = 25 °C | $I_F$ = 30 A | - | - | 0.855 | |
| | | $T_j$ = 125 °C | | - | 0.69 | 0.77 | |

1. Pulse test: $t_p$ = 5 ms, $\delta < 2\%$
2. Pulse test: $t_p$ = 380 µs, $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation:

$P = 0.590 \times I_{F(AV)} + 0.006 \times I_F^2{}_{(RMS)}$

**Figure 1. Average forward power dissipation versus average forward current (maximum values)**

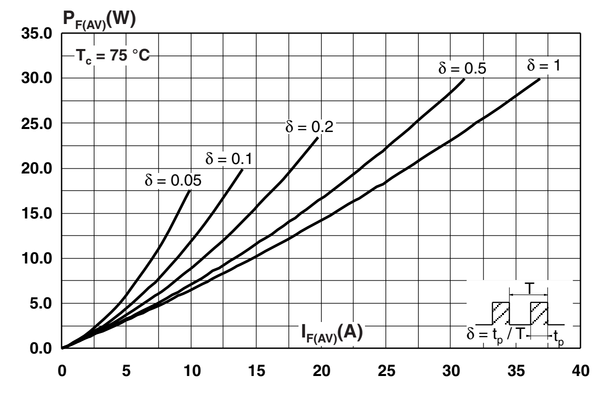



**Figure 2. Average forward current versus ambient temperature (δ = 0.5)**

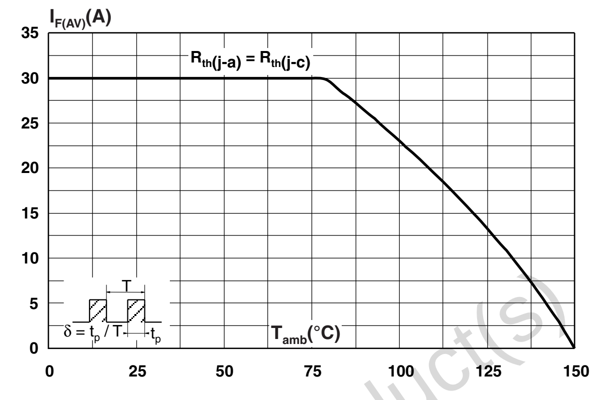



**Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)**

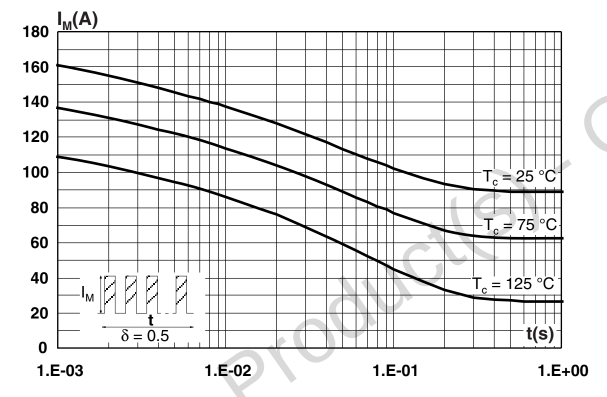



**Figure 4. Relative variation of thermal impedance, junction to case, versus pulse duration**

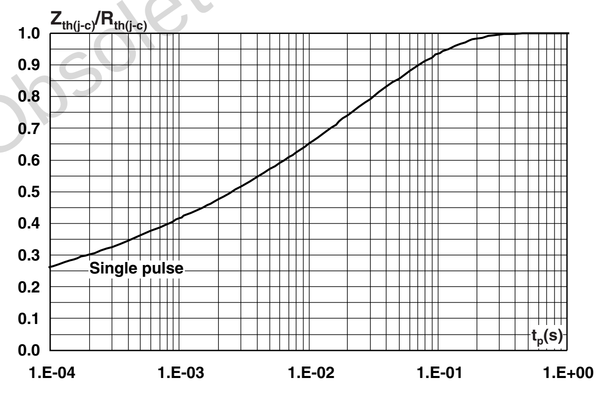



**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**

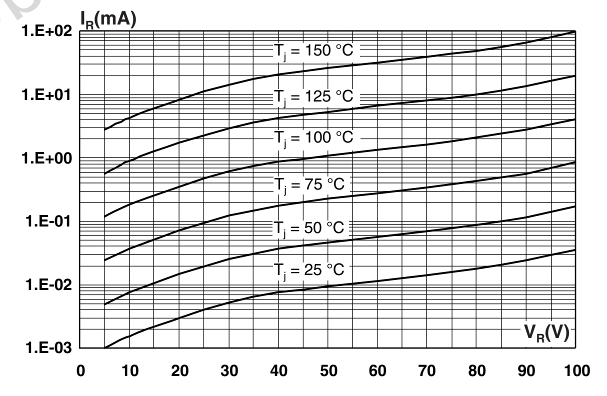



**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**

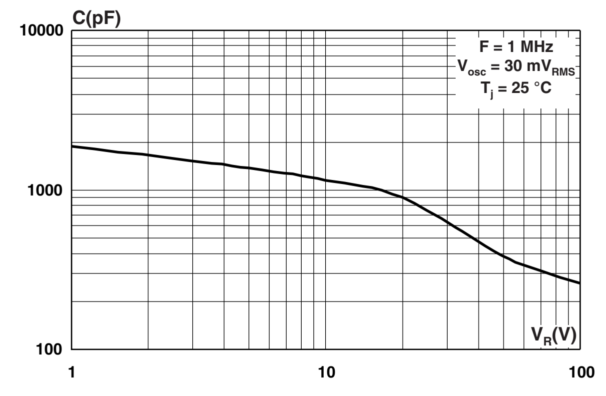


**Figure 7. Forward voltage drop versus forward current**

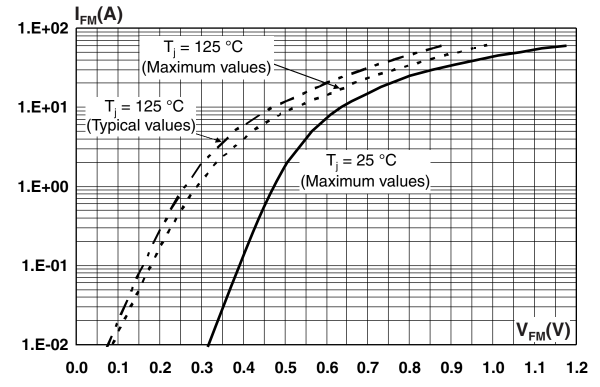
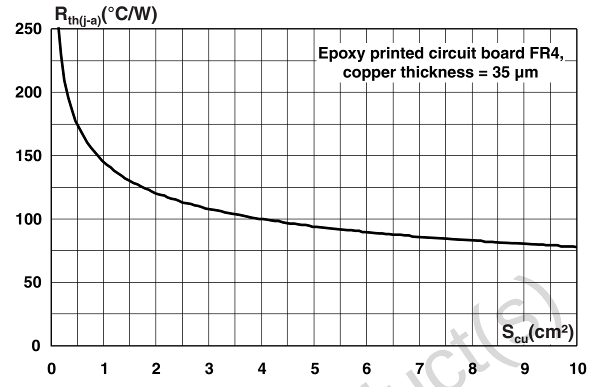


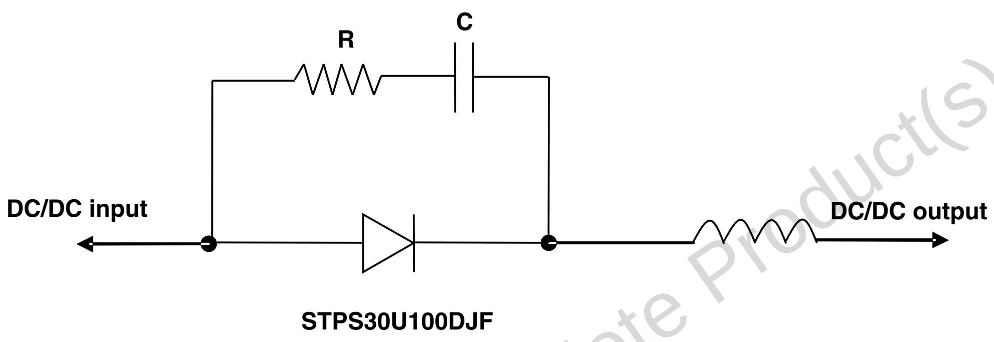

**Figure 8. Thermal resistance, junction to ambient, versus copper surface under tab**



# 2 Application information

It is mandatory to ensure a peak reverse voltage below the $V_{RRM}$ absolute rating. Therefore ST recommends the use of an RC clamping snubber circuit in parallel with the STPS30U100DJF device.

**Figure 9. Application schematic**

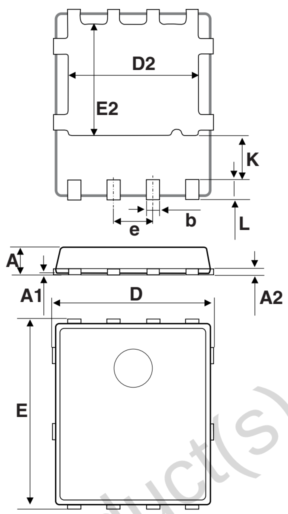


# 3 Package information

- 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: www.st.com. ECOPACK® is an ST trademark.

**Table 5. PowerFLAT 5x6 dimensions**




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.80 | | 1.00 | 0.031 | | 0.039 |
| A1 | 0.02 | | 0.05 | 0.001 | | 0.002 |
| A2 | | 0.25 | | | 0.010 | |
| b | 0.30 | | 0.50 | 0.012 | | 0.020 |
| D | | 5.20 | | | 0.205 | |
| D2 | 4.11 | | 4.31 | 0.162 | | 0.170 |
| e | | 1.27 | | | 0.050 | |
| E | | 6.15 | | | 0.242 | |
| E2 | 3.50 | | 3.70 | 0.138 | | 0.146 |
| L | 0.50 | | 0.80 | 0.020 | | 0.031 |
| K | 1.275 | | 1.575 | 0.050 | | 0.062 |



**Figure 10. Footprint (dimensions in mm)**

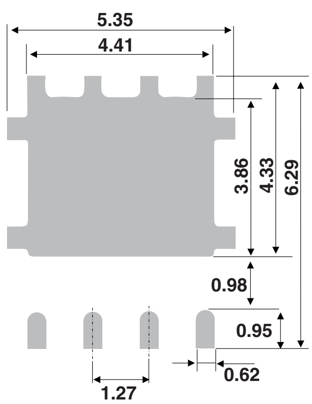
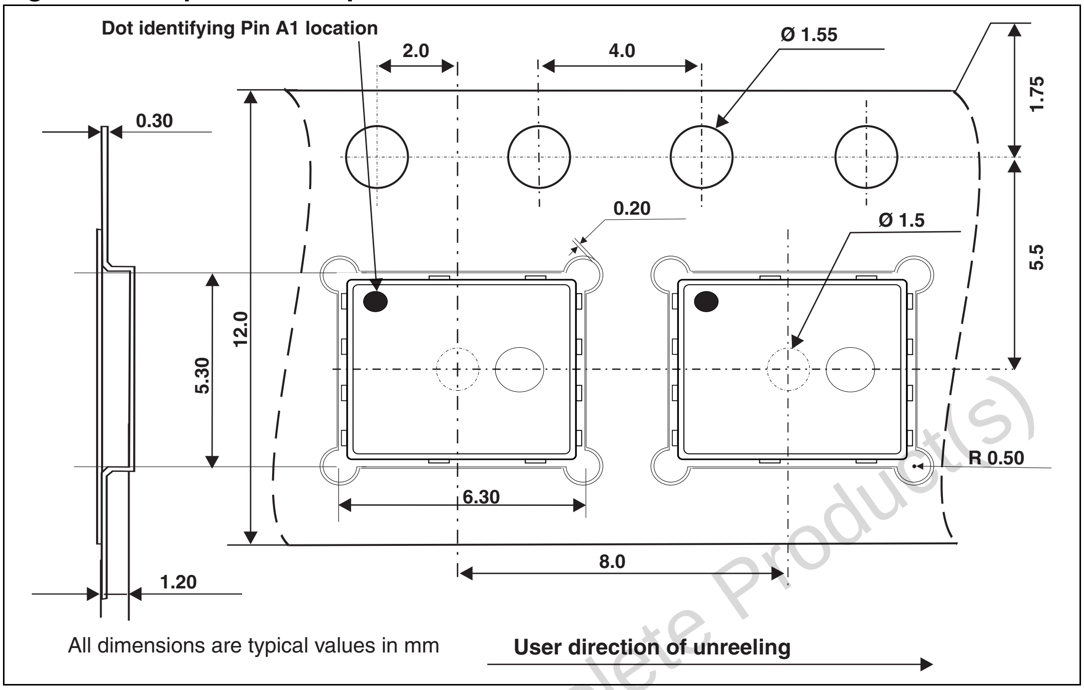


Figure 11. Tape and reel specifications




# 4 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS30U100DJF-TR | PS30 U100 | PowerFLAT 5x6 | 95 mg | 3000 | Tape and reel |

# 5 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|---|---|---|
| 02-Nov-2010 | 1 | First issue. |
| 09-Dec-2010 | 2 | Added “maximum” to conduction loss calculation in *Section 1 on page 2*. |
| 20-May-2011 | 3 | Added reference E in *Table 5*. Updated package graphics. Updated base quantity and marking in *Table 6*. Added *Figure 11*. |

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