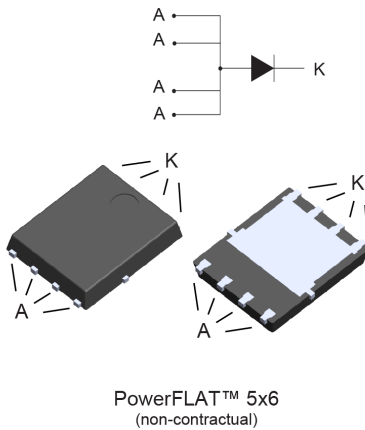


## 100 V, 30 A power Schottky rectifier



### Features

- Very low conduction losses
- Low forward voltage drop
- Low thermal resistance
- High specified avalanche capability
- High integration
- ECOPACK®2 compliant

### Applications

- Switching diode
- SMPS
- DC/DC converter
- LED lighting
- Desktop power supply

### Description

The **STPS30M100DJF** is a power Schottky rectifier optimized for switch mode power supply and high frequency DC to DC converters.

Packaged in PowerFLAT™, this device is intended to be used in adaptors requiring good efficiency at both low and high load. Its low profile was especially designed to be used in applications with space-saving constraints.

PowerFLAT™ is a trademark of STMicroelectronics.

| Product status link           |        |
|-------------------------------|--------|
| <a href="#">STPS30M100DJF</a> |        |
| Product summary               |        |
| Symbol                        | Value  |
| $I_{F(AV)}$                   | 30 A   |
| $V_{RRM}$                     | 100 V  |
| $T_j \text{ (max.)}$          | 150 °C |
| $V_F \text{ (typ.)}$          | 0.66 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                       |                                                       | 100         | V    |
| $I_{F(RMS)}$ | Forward rms current                                   |                                                       | 45          | A    |
| $I_{F(AV)}$  | Average forward current, $\delta = 0.5$ , square wave | $T_C = 90\text{ °C}$                                  | 30          | A    |
| $I_{FSM}$    | Surge non repetitive forward current                  | $t_p = 10\text{ ms}$ sinusoidal                       | 200         | A    |
| $P_{ARM}$    | Repetitive peak avalanche power                       | $t_p = 10\text{ }\mu\text{s}$ , $T_j = 125\text{ °C}$ | 1080        | W    |
| $T_{stg}$    | Storage temperature range                             |                                                       | -65 to +175 | °C   |
| $T_j$        | Maximum operating junction temperature <sup>(1)</sup> |                                                       | 150         | °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 | $T_j = 25\text{ °C}$  | $V_R = V_{RRM}$     | -    |      | 100  | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                     | -    | 10   | 40   | mA            |
| $V_F^{(1)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 15\text{ A}$ | -    |      | 0.82 | V             |
|             |                         | $T_j = 125\text{ °C}$ |                     | -    | 0.58 | 0.66 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 30\text{ A}$ |      |      | 0.96 |               |
|             |                         | $T_j = 125\text{ °C}$ |                     |      | 0.66 | 0.73 |               |

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

To evaluate the conduction losses, use the following equation:

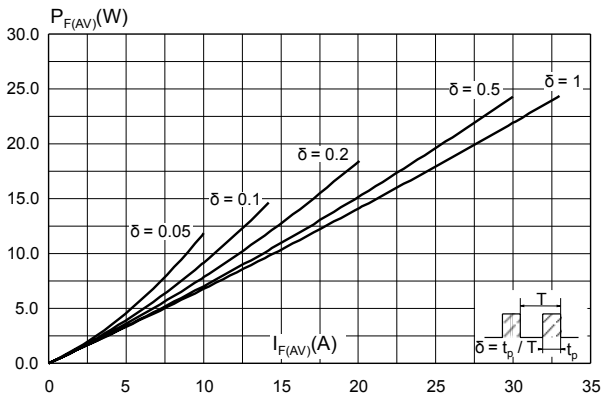
$$P = 0.65 \times I_{F(AV)} + 0.00267 \times I_F^2 (RMS)$$

For more information, please refer to the following application notes related to the power losses :

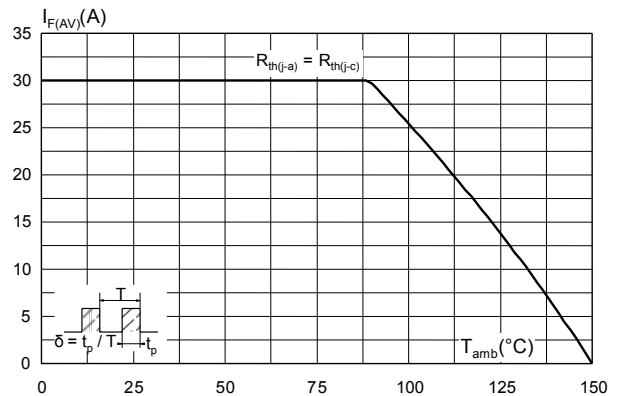
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

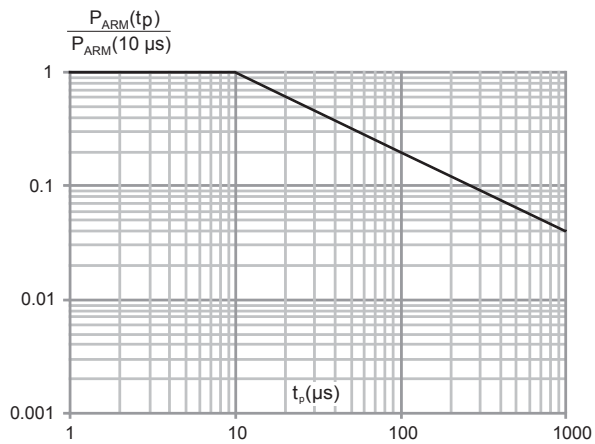
**Figure 1. Average forward power dissipation versus average forward current**



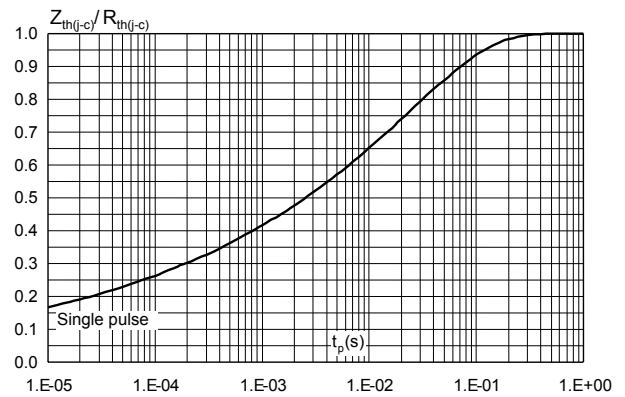
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**

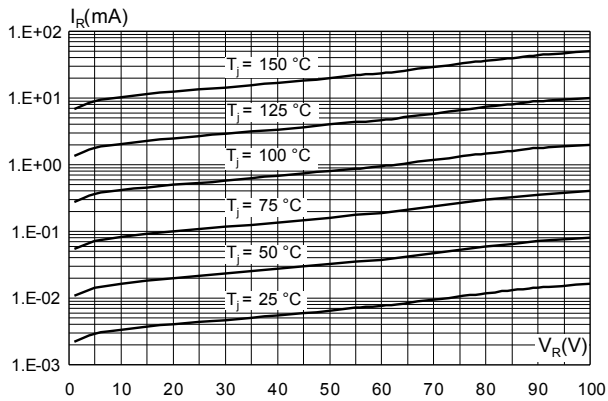
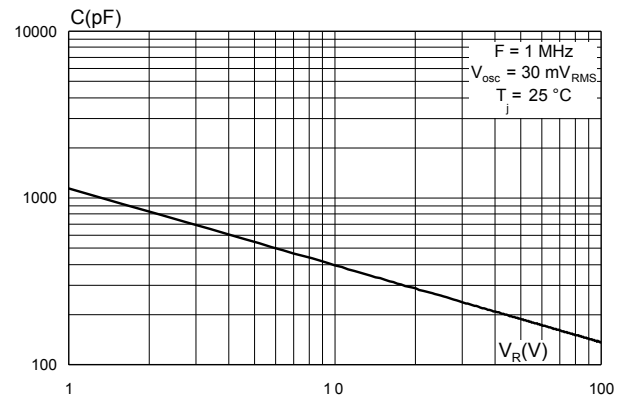
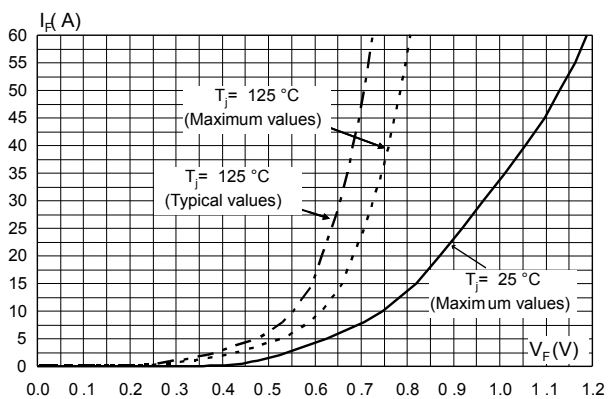
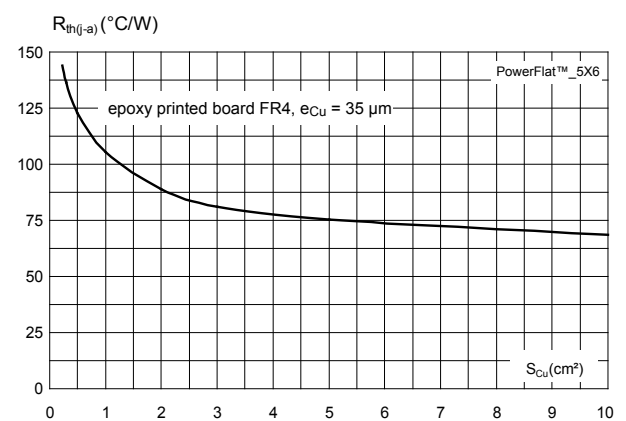


**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



**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**


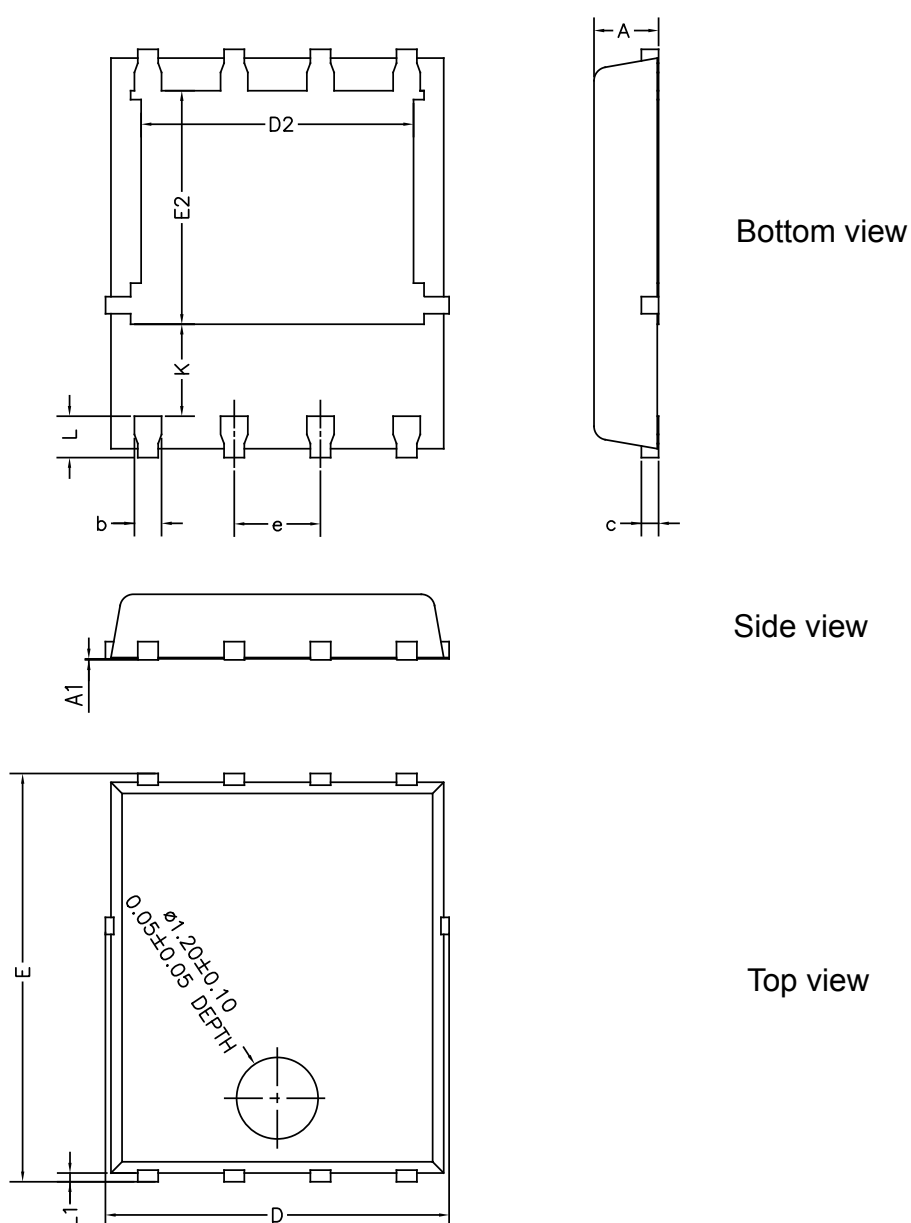
## 2 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

### 2.1 PowerFLAT™ 5x6 package information

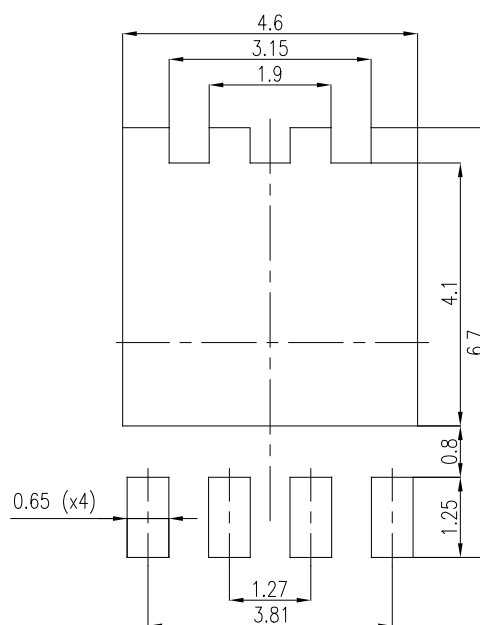
- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)

**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 |
|------------------|-----------|---------------|---------|-----------|---------------|
| STPS30M100DJF-TR | PS30M 100 | PowerFLAT 5x6 | 0.095 g | 3000      | Tape and reel |

## Revision history

**Table 6. Document revision history**

| Date        | Version | Changes                                                                                                                                                                                                                               |
|-------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 06-Nov-2009 | 1       | First issue.                                                                                                                                                                                                                          |
| 30-Jul-2010 | 2       | Replace Power QFN with PowerFLAT.                                                                                                                                                                                                     |
| 15-Jan-2011 | 3       | Add reference E in Table 5.                                                                                                                                                                                                           |
| 20-May-2011 | 4       | Update all package illustrations. Updated base quantity and marking in Table 6. Updated terminal identification in captions of Table 2 and Table 4. Added Figure 14.                                                                  |
| 11-Jun-2018 | 5       | Removed figure 5, figure 6 and figure 12.<br>Updated <a href="#">Table 1. Absolute Ratings</a> (limiting values at 25 °C, unless otherwise specified, anode terminals short circuited).<br>Minor text changes to improve readability. |
| 08-Feb-2019 | 6       | Updated <a href="#">Section Cover image</a> , <a href="#">Figure 9. PowerFLAT™ 5x6 package outline (non-contractual)</a> and <a href="#">Table 4. PowerFLAT™ 5x6 mechanical data</a> .                                                |

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