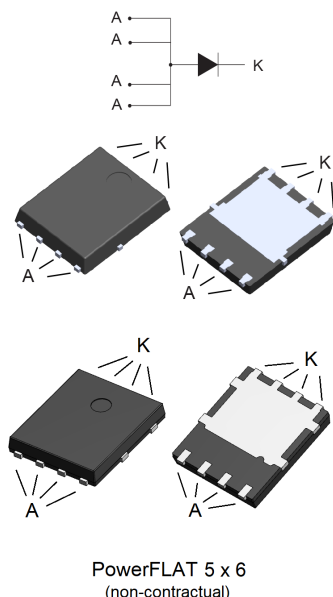


## 60 V, 30 A high efficiency PowerFLAT power Schottky diode



### Features

- Low forward voltage drop
- Very low conduction losses
- Low thermal resistance
- Avalanche rated
- High integration
- Thin package: 1 mm
- ECOPACK2 compliant

### Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power

### Description

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

Packaged in PowerFLAT 5x6, the [STPS30M60DJF](#) 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.

#### Product status link

[STPS30M60DJF](#)

#### Product summary

| Symbol       | Value  |
|--------------|--------|
| $I_{F(AV)}$  | 30 A   |
| $V_{RRM}$    | 60 V   |
| $T_j$ (max.) | 150 °C |
| $V_F$ (typ.) | 0.46 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                       | 60                                                         | V    |
| $I_{F(RMS)}$ | Forward rms current                                   | 45                                                         | A    |
| $I_{F(AV)}$  | Average forward current, $\delta = 0.5$ square wave   | $T_c = 100\text{ °C}$<br>30                                | A    |
| $I_{FSM}$    | Surge non repetitive forward current                  | $t_p = 10\text{ ms sinusoidal}$<br>250                     | A    |
| $P_{ARM}$    | Repetitive peak avalanche power                       | $t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ °C}$<br>1370 | 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. | Unit |
|---------------|------------------|------|------|
| $R_{th(j-c)}$ | Junction to case | 2    | °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 | $T_j = 25\text{ °C}$  | -    |      | 90   | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ | -    | 20   | 50   | mA            |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | -    |      | 0.59 | V             |
|             |                         | $T_j = 125\text{ °C}$ | -    | 0.46 | 0.52 |               |
|             |                         | $T_j = 25\text{ °C}$  | -    |      | 0.72 |               |
|             |                         | $T_j = 125\text{ °C}$ | -    | 0.57 | 0.67 |               |

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

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

To evaluate the conduction losses, use the following equation:

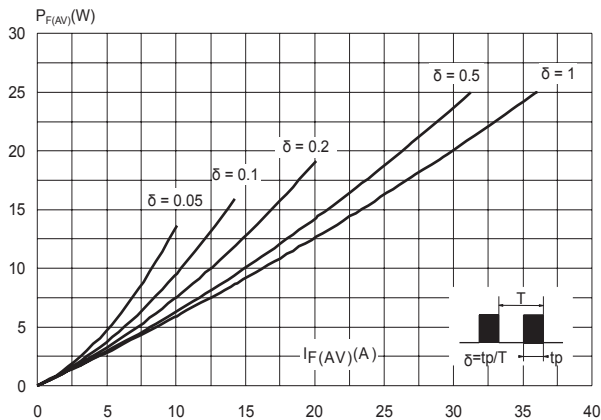
$$P = 0.55 \times I_{F(AV)} + 0.004 \times I_{F(RMS)}^2$$

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

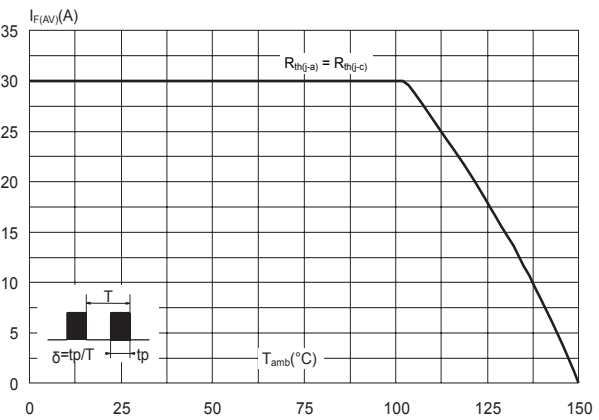
- [AN604](#): Calculation of conduction losses in a power rectifier
- [AN4021](#): Calculation of reverse losses in a power diode

## 1.1 Characteristics (curves)

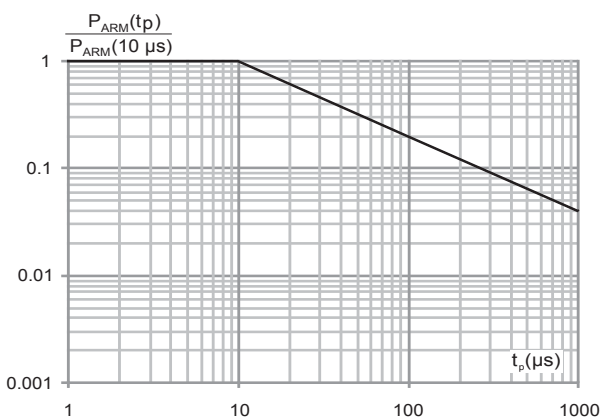
**Figure 1. Average forward power dissipation versus average forward current**



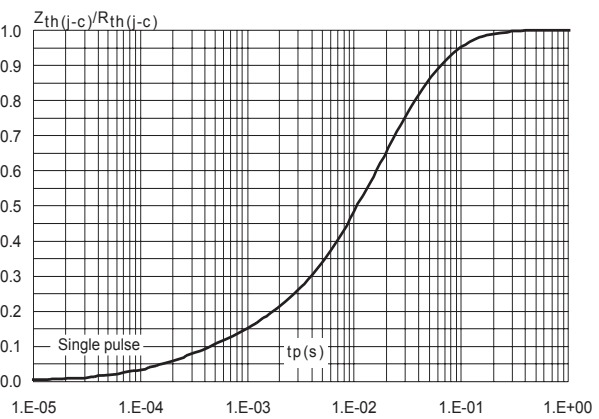
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



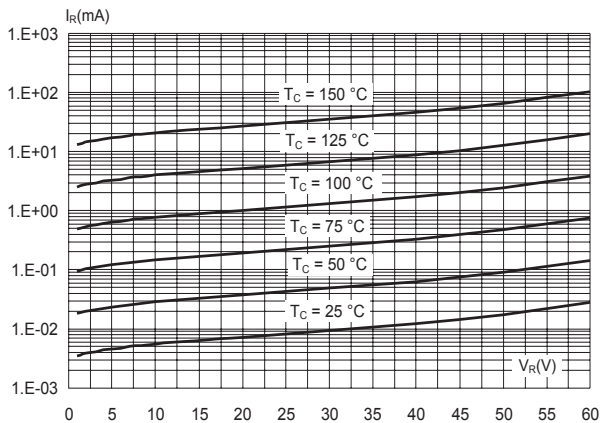
**Figure 3. Normalized avalanche power derating versus pulse duration**



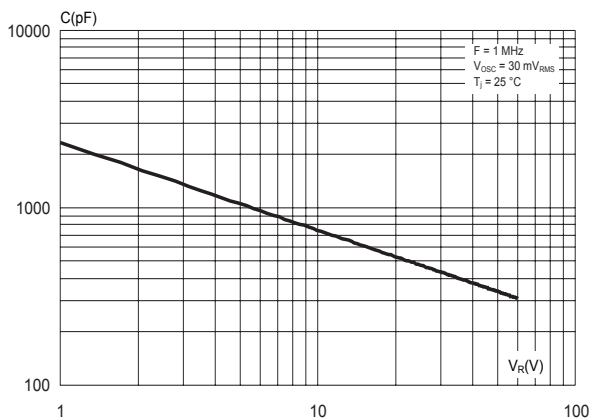
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**

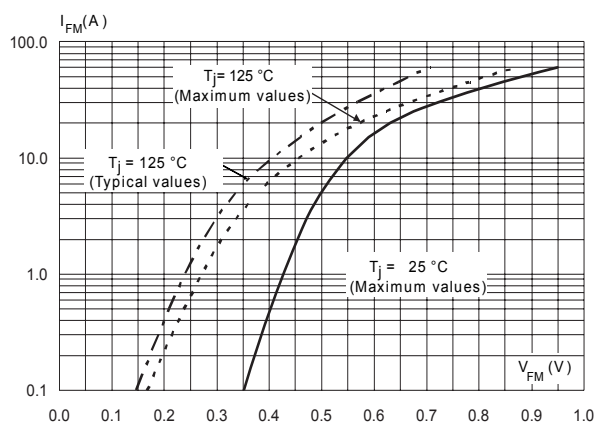
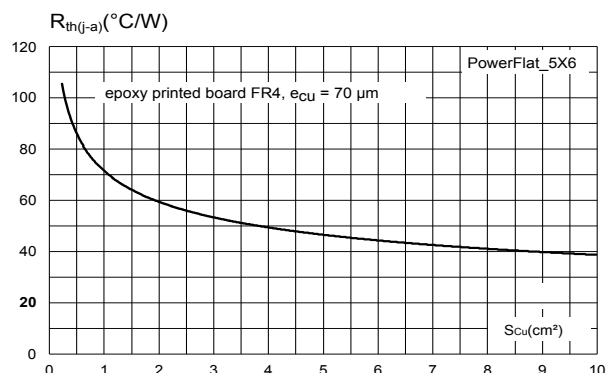


**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



**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 (typical values)**


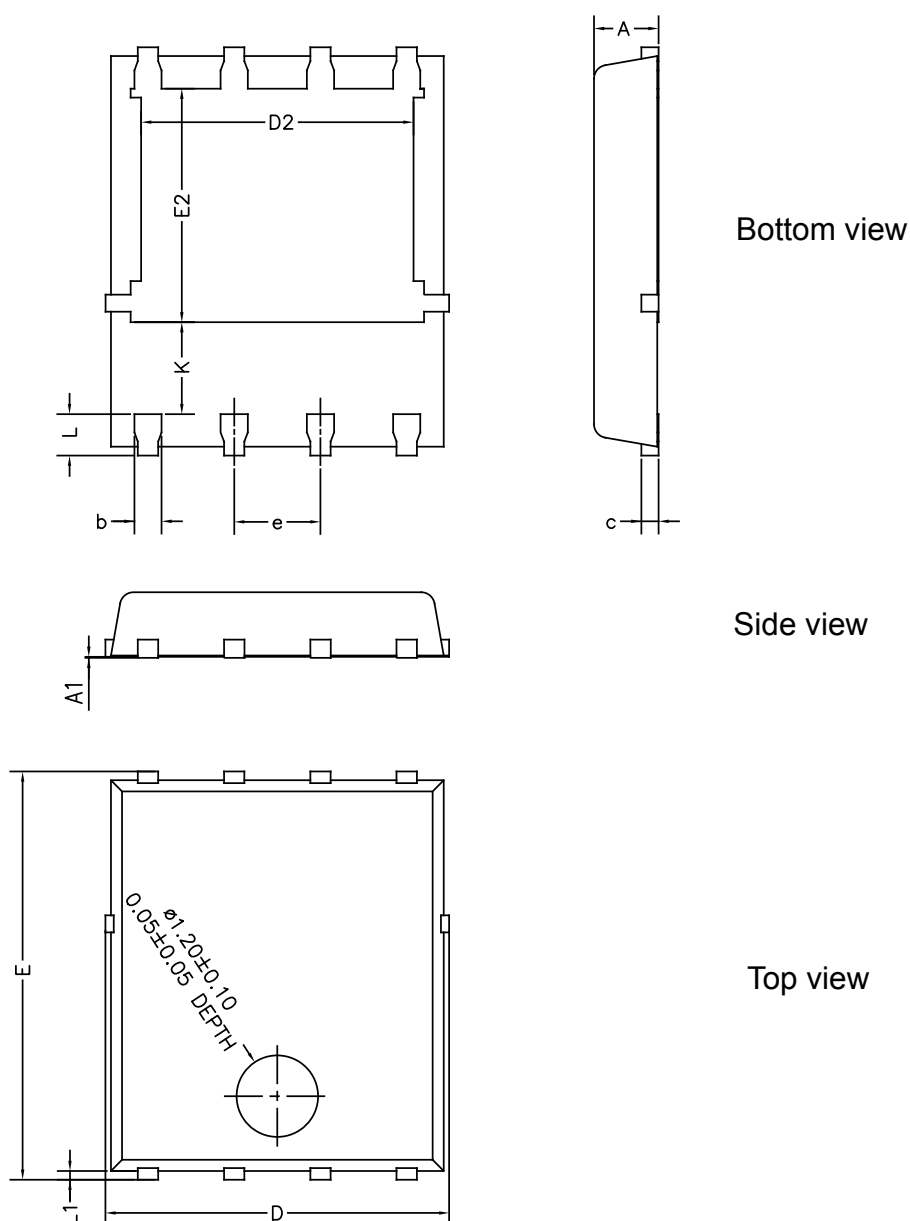
## 2 Package information

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)

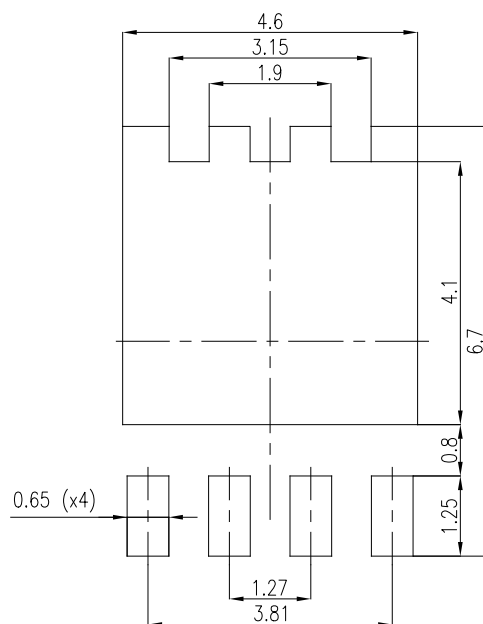
**Figure 9. PowerFLAT 5x6 package outline (non-contractual)**



**Note:** This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

**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)**


**Note:** For packing information, please refer to [TN1173](#).

### 3 Ordering information

**Table 5. Ordering information**

| Order code      | Marking  | Package       | Weight  | Base qty. | Delivery mode |
|-----------------|----------|---------------|---------|-----------|---------------|
| STPS30M60DJF-TR | PS30 M60 | PowerFLAT 5x6 | 0.095 g | 3000      | Tape and reel |

## Revision history

**Table 6. Document revision history**

| Date        | Revision | Changes                                                                                                                                                                                               |
|-------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18-Apr-2012 | 1        | First issue.                                                                                                                                                                                          |
| 15-Mar-2023 | 2        | Updated cover image, Figure 8. Thermal resistance junction to ambient versus copper surface under tab (typical values) and Section 2.1 PowerFLAT 5x6 package information. Added Section Applications. |

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