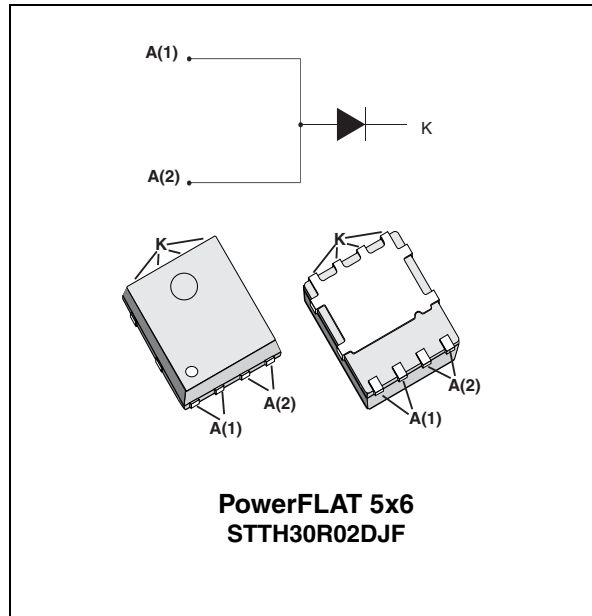


### Features

- Suited for DC/DC converts
- Low losses
- High  $T_j$
- High surge current capability
- High energy avalanche capability
- 1 mm package thickness
- ECOPACK<sup>®</sup>2 compliant component

### Description

High performance diode suited for high frequency DC to DC converters. Packaged in PowerFLAT<sup>™</sup> 5x6, this device is intended for use in low voltage high frequency inverters.



**Table 1. Device summary**

| Symbol         | Value  |
|----------------|--------|
| $I_{F(AV)}$    | 30 A   |
| $V_{RRM}$      | 200 V  |
| $T_j$          | 175 °C |
| $V_F$ (typ)    | 0.8 V  |
| $t_{rr}$ (typ) | 27 ns  |

TM: PowerFLAT is a trademark of STMicroelectronics

# 1 Characteristics

**Table 2. Absolute ratings (limiting values with anode terminals short-circuited)**

| Symbol       | Parameter                              | Value   | Unit             |
|--------------|--|---|------------------|
| $V_{RRM}$    | Repetitive peak reverse voltage        | 200   | V                |
| $I_{F(RMS)}$ | Forward rms current                    | 45  | A                |
| $I_{F(AV)}$  | Average forward current                | $T_c = 105\text{ }^\circ\text{C}$<br>$\delta = 0.5$ | A                |
| $I_{FSM}$    | Surge non repetitive forward current   | $t_p = 10\text{ ms}$<br>sinusoidal                  | A                |
| $T_{stg}$    | Storage temperature range              | -65 to + 175  | $^\circ\text{C}$ |
| $T_j$        | Maximum operating junction temperature | 175   | $^\circ\text{C}$ |

**Table 3. Thermal parameter**

| Symbol        | Parameter        | Maximum | Unit               |
|---------------|------------------|---------|--------------------|
| $R_{th(j-c)}$ | Junction to case | 2.0     | $^\circ\text{C/W}$ |

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

| Symbol      | Parameter               | Test conditions                   | Min.                | Typ  | Max. | Unit          |
|-------------|-------------------------|-----------------------------------|---------------------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ }^\circ\text{C}$  |                     |      | 10   | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ }^\circ\text{C}$ |                     |      | 10   |               |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ }^\circ\text{C}$  | $I_F = 30\text{ A}$ | 1    | 1.15 | V             |
|             |                         | $T_j = 150\text{ }^\circ\text{C}$ |                     | 0.80 | 0.95 |               |

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 maximum conduction losses use the following equation:

$$P = 0.77 \times I_{F(AV)} + 0.006 I_{F(RMS)}^2$$

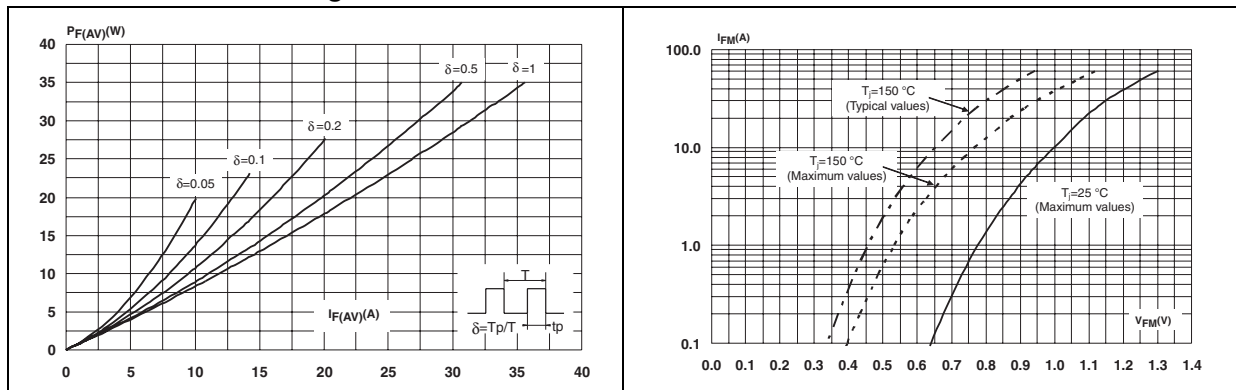
**Table 5. Recovery characteristics**

| Symbol       | Parameter                        | Test conditions                   |   | Min. | Typ | Max. | Unit |
|--------------|----------------------------------|-----------------------------------|---|------|-----|------|------|
| $t_{rr}$     | Reverse recovery time            | $T_j = 25\text{ }^\circ\text{C}$  | $I_F = 1\text{ A}$<br>$V_r = 30\text{ V}$<br>$di_F/dt = 100\text{ A}/\mu\text{s}$           |      | 27  | 35   | ns   |
|              |                                  |                                   | $I_F = 1\text{ A}$<br>$V_r = 30\text{ V}$<br>$di_F/dt = 50\text{ A}/\mu\text{s}$            |      | 38  | 50   |      |
| $I_{RM}$     | Reverse recovery current         | $T_j = 125\text{ }^\circ\text{C}$ | $I_F = 30\text{ A}$ ,<br>$di_F/dt = -200\text{ A}/\mu\text{s}$ ,<br>$V_{CC} = 160\text{ V}$ |      | 6.0 | 8.0  | A    |
| $S_{factor}$ | Reverse recovery softness factor |                                   |   |      | 0.3 |      | -    |
| $Q_{rr}$     | Reverse recovery charges         |                                   |   |      | 140 |      | nC   |

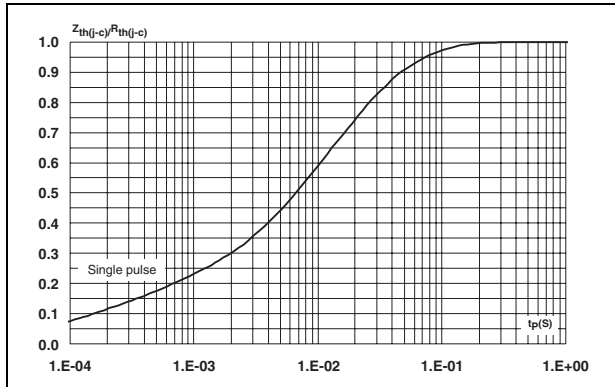
**Table 6. Turn-on switching characteristics**

| Symbol   | Parameter                | Test conditions                  |  | Min. | Typ | Max. | Unit |
|----------|--------------------------|----------------------------------|--|------|-----|------|------|
| $t_{fr}$ | Forward recovery time    | $T_j = 25\text{ }^\circ\text{C}$ | $I_F = 30\text{ A}$<br>$di_F/dt = 200\text{ A}/\mu\text{s}$<br>$V_{FR} = 1.3\text{ V}$ |      |     | 300  | ns   |
| $V_{FP}$ | Forward recovery voltage |                                  |  |      | 2.3 | 3.5  | V    |

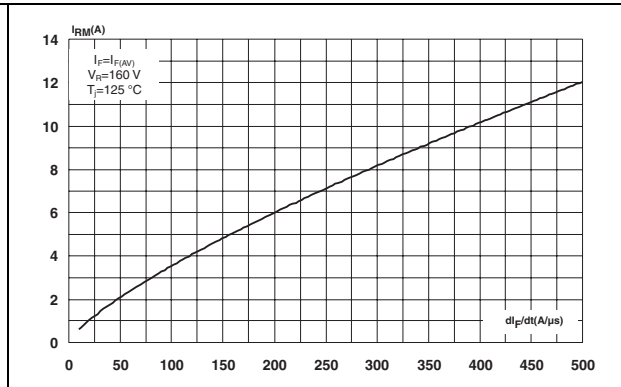
**Figure 1. Average forward power dissipation versus average forward current**      **Figure 2. Forward voltage drop versus forward current**



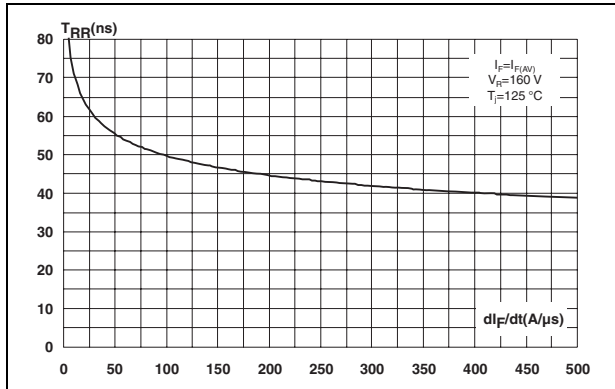
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



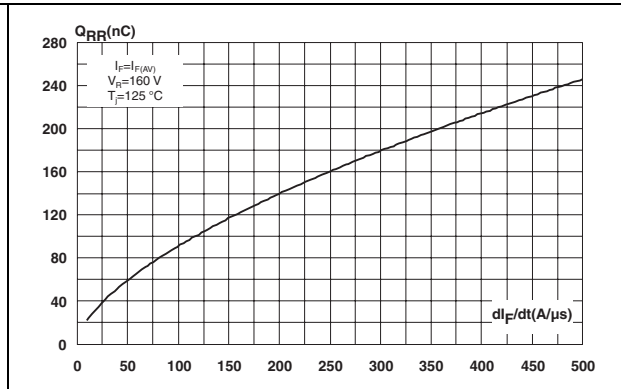
**Figure 4. Peak reverse recovery current versus  $di_F/dt$  (typical values)**



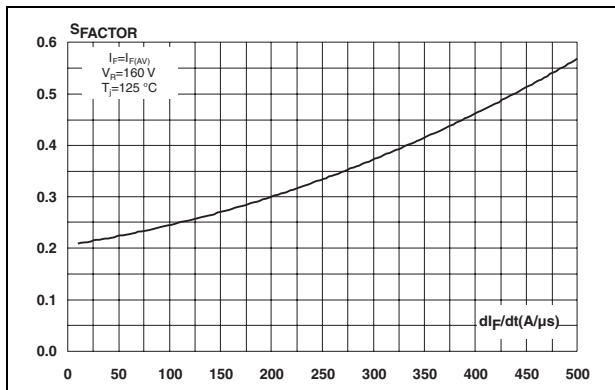
**Figure 5. Reverse recovery time versus  $di_F/dt$  (typical values)**



**Figure 6. Reverse recovery charges versus  $di_F/dt$  (typical values)**



**Figure 7. Softness factor versus  $di_F/dt$  (typical values)**



**Figure 8. Relative variations of dynamic parameters versus junction temperature**

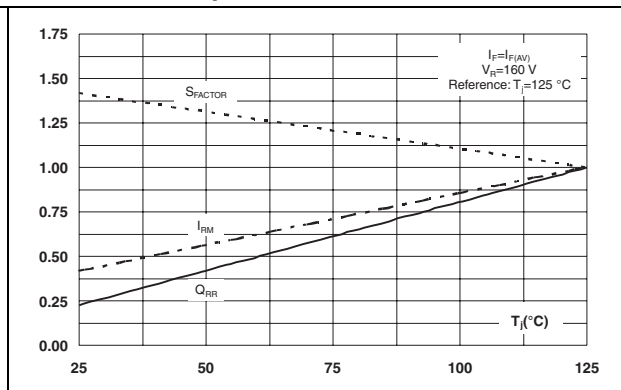


Figure 9. Transient peak forward voltage versus  $di_F/dt$  (typical values)

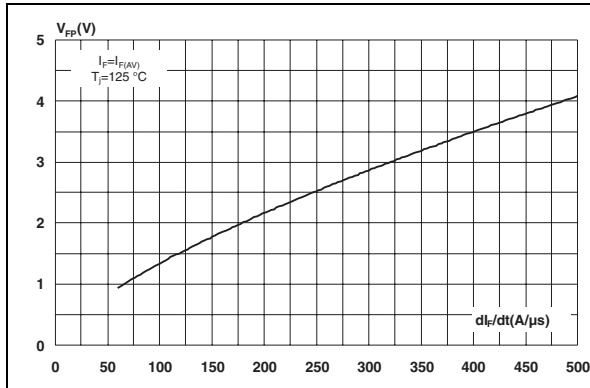


Figure 10. Forward recovery time versus  $di_F/dt$  (typical values)

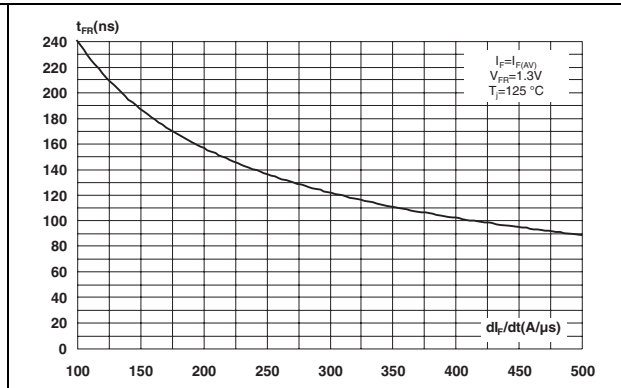


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

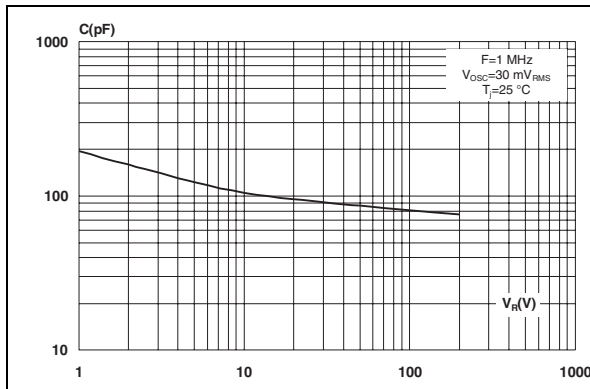
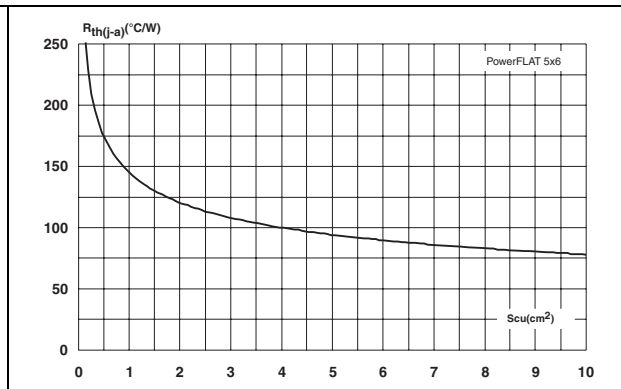


Figure 12. Thermal resistance junction to ambient versus copper surface under tab



## 2 Package information

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

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.

**Table 7. 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 13. Footprint (dimensions in mm)**

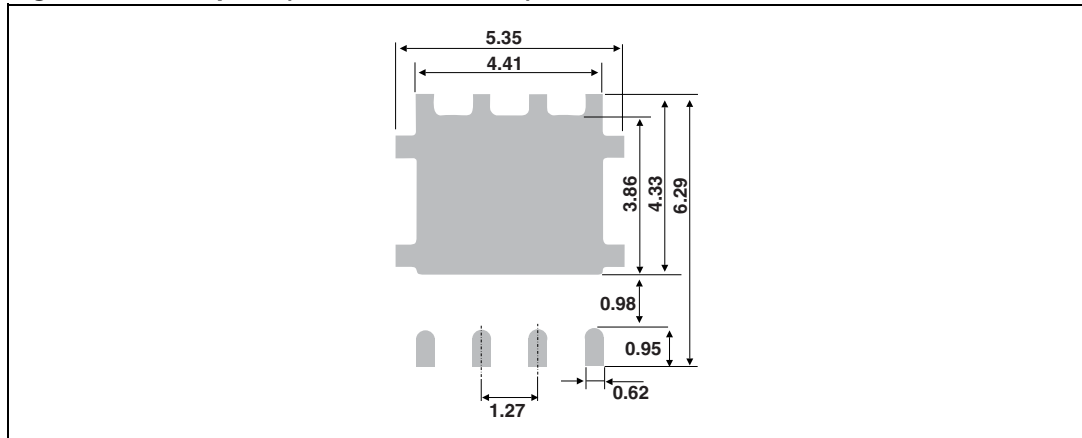
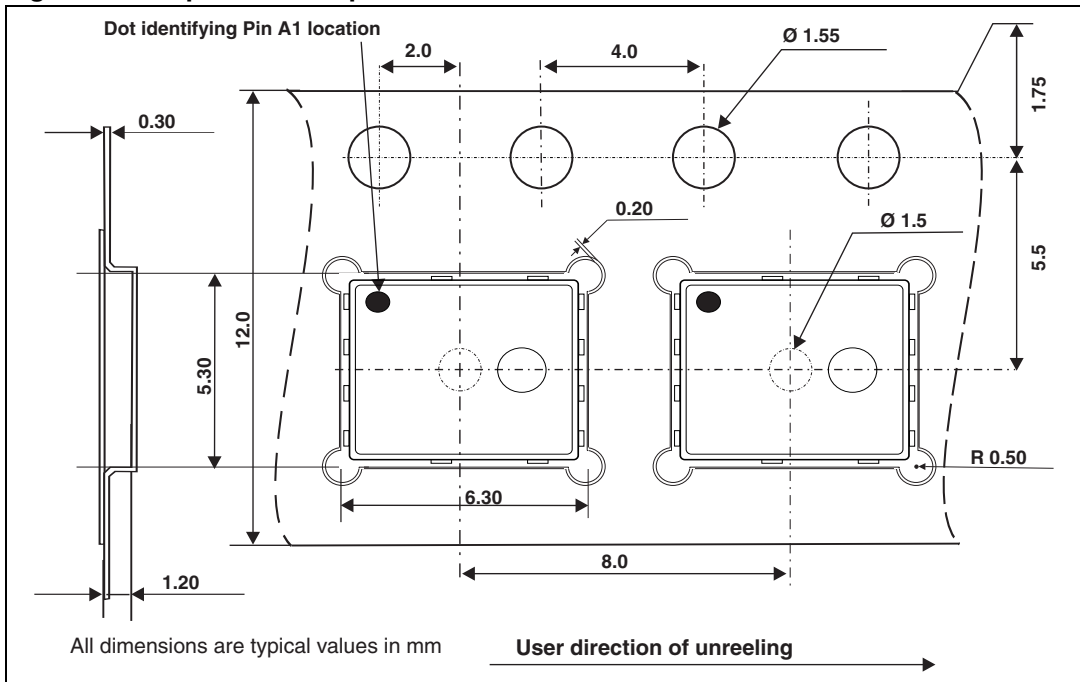


Figure 14. Tape and reel specifications



### 3 Ordering information

**Table 8. Other information**

| Order code      | Marking  | Package          | Weight  | Base qty | Delivery mode |
|-----------------|----------|------------------|---------|----------|---------------|
| STTH30R02DJF-TR | TH30R 02 | PowerFLAT<br>5x6 | 0.095 g | 3000     | Tape and Reel |

### 4 Revision history

**Table 9. Document revision history**

| Date        | Revision | Changes      |
|-------------|----------|--------------|
| 16-Mar-2012 | 1        | First issue. |



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