

### Main product characteristics

|             |        |
|-------------|--------|
| $I_{F(AV)}$ | 2 A    |
| $V_{RRM}$   | 150 V  |
| $T_j$ (max) | 175° C |
| $V_F$ (max) | 0.67 V |

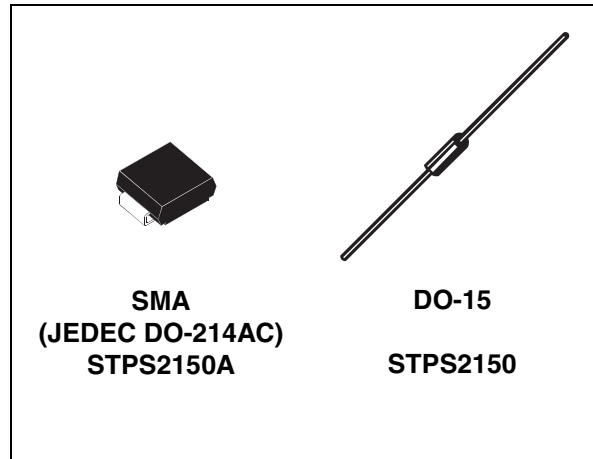
### Description

150 V Power Schottky rectifier are suited for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in SMA and Axial, this device is intended for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

### Order Codes

| Part Number | Marking  |
|-------------|----------|
| STPS2150A   | 2150     |
| STPS2150    | STPS2150 |
| STPS2150RL  | STPS2150 |



### Features and benefits

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability specified

**Table 1. Absolute Ratings (limiting values)**

| Symbol              | Parameter   |       |  | Value        | Unit |
|---------------------|---|-------|--|--------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage                       |       |  | 150          | V    |
| I <sub>F(RMS)</sub> | RMS forward voltage                                   |       |  | 15           | A    |
| I <sub>F(AV)</sub>  | Average forward current                               | SMA   | T <sub>L</sub> = 145° C   δ = 0.5              | 2            | A    |
|                     |   | DO-15 | T <sub>L</sub> = 130° C   δ = 0.5              |              |      |
| I <sub>FSM</sub>    | Surge non repetitive forward current                  | SMA   | t <sub>p</sub> = 10 ms sinusoidal              | 75           | A    |
|                     |   | DO-15 |  | 150          |      |
| P <sub>ARM</sub>    | Repetitive peak avalanche power                       |       | t <sub>p</sub> = 1 μs   T <sub>j</sub> = 25° C | 2400         | W    |
| T <sub>stg</sub>    | Storage temperature range                             |       |  | -65 to + 175 | ° C  |
| T <sub>j</sub>      | Maximum operating junction temperature <sup>(1)</sup> |       |  | 175          | ° C  |

1.  $\frac{dP_{Tot}}{dT_j} > \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

# 1 Characteristics

**Table 2. Thermal resistance**

| Symbol        | Parameter        |                              | Value | Unit                 |
|---------------|------------------|------------------------------|-------|----------------------|
| $R_{th(j-l)}$ | Junction to lead | SMA                          | 20    | $^{\circ}\text{C/W}$ |
|               |                  | Lead length = 10 mm<br>DO-15 | 30    |                      |

**Table 3. Static electrical characteristics**

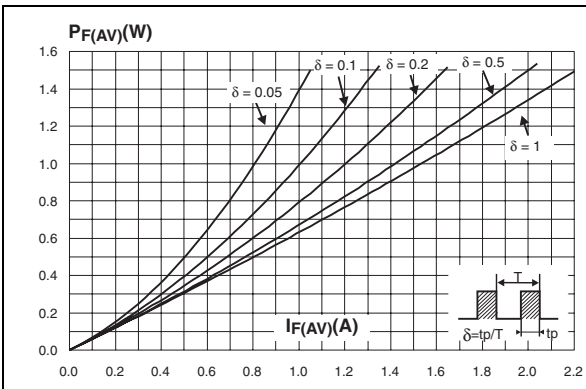
| Symbol      | Parameter               | Tests conditions            |                    | Min. | Typ  | Max. | Unit          |
|-------------|-------------------------|-----------------------------|--------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25^{\circ}\text{C}$  | $V_R = V_{RRM}$    |      | 0.5  | 1.5  | $\mu\text{A}$ |
|             |                         | $T_j = 125^{\circ}\text{C}$ |                    |      | 0.5  | 1.5  | $\text{mA}$   |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25^{\circ}\text{C}$  | $I_F = 2\text{ A}$ |      | 0.78 | 0.82 | $\text{V}$    |
|             |                         | $T_j = 125^{\circ}\text{C}$ |                    |      | 0.62 | 0.67 |               |
|             |                         | $T_j = 25^{\circ}\text{C}$  | $I_F = 4\text{ A}$ |      | 0.86 | 0.89 |               |
|             |                         | $T_j = 125^{\circ}\text{C}$ |                    |      | 0.70 | 0.75 |               |

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

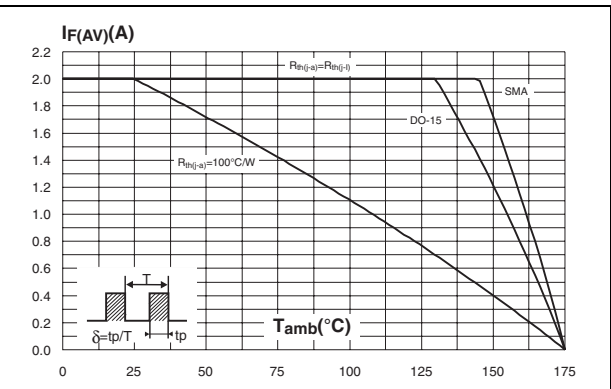
2.  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equation:  $P = 0.59 \times I_{F(AV)} + 0.04 I_{F(RMS)}^2$

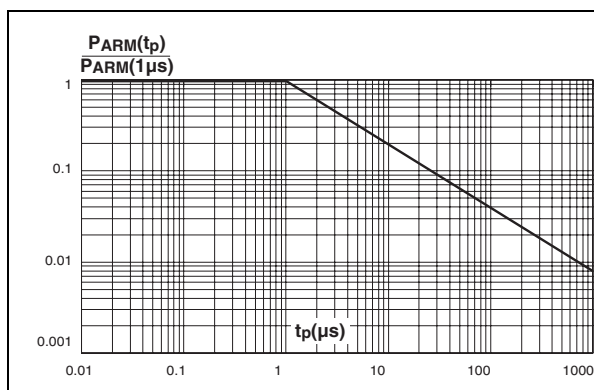
**Figure 1. Average forward power dissipation versus average forward current**



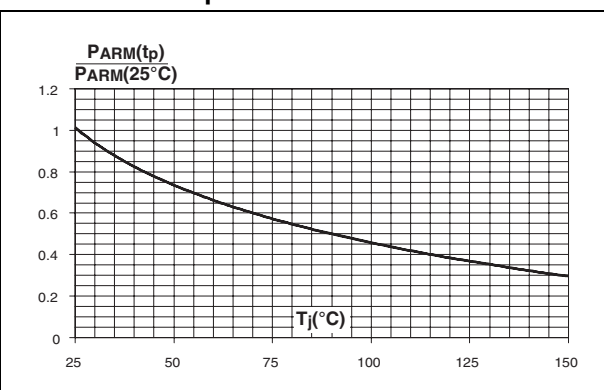
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



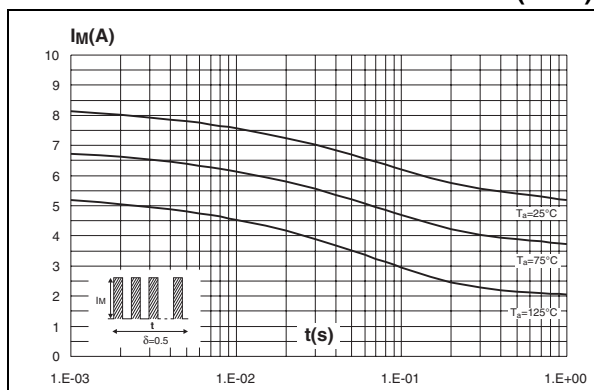
**Figure 3. Normalized avalanche power derating versus pulse duration**



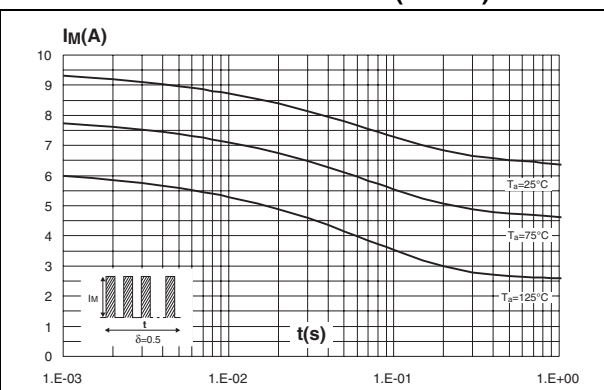
**Figure 4. Normalized avalanche power derating versus junction temperature**



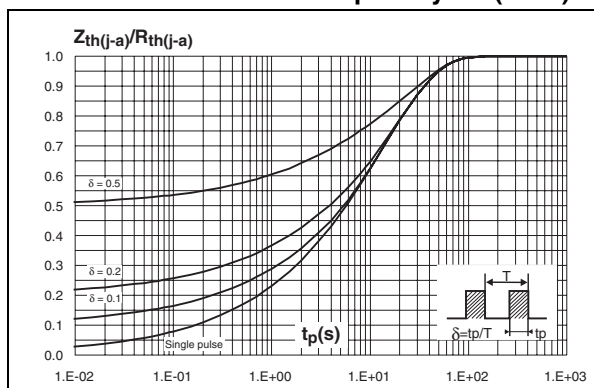
**Figure 5. Non repetitive surge peak forward current versus overload duration - maximum values (SMA)**



**Figure 6. Non repetitive surge peak forward current versus overload duration - maximum values (DO-15)**



**Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration - epoxy printed circuit board,  $e_{Cu} = 35 \mu m$ , recommended pad layout (SMA)**



**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-15)**

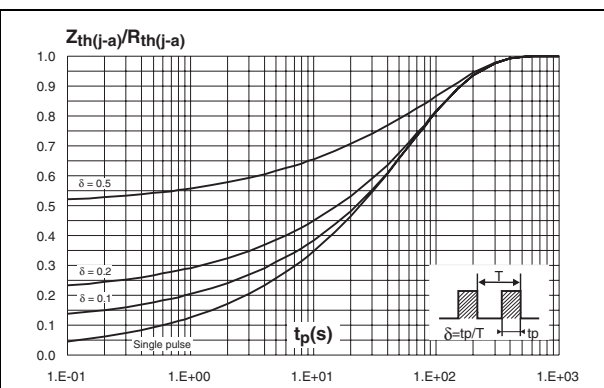


Figure 9. Reverse leakage current versus reverse voltage applied (typical values)

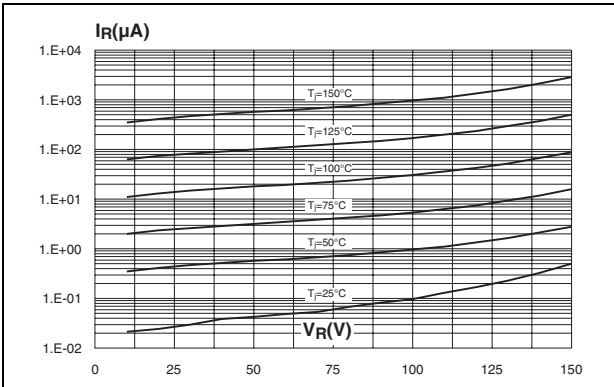


Figure 10. Junction capacitance versus reverse voltage applied (typical values)

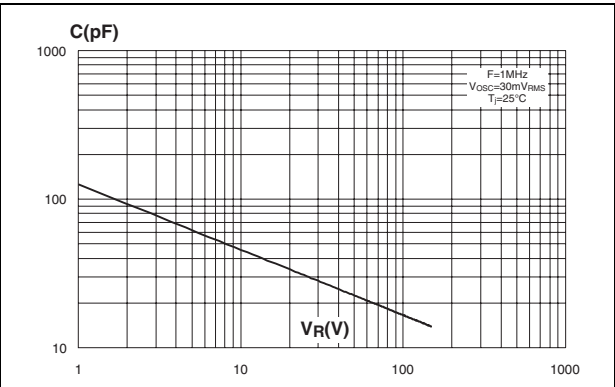


Figure 11. Forward voltage drop versus forward current - maximum values, high level

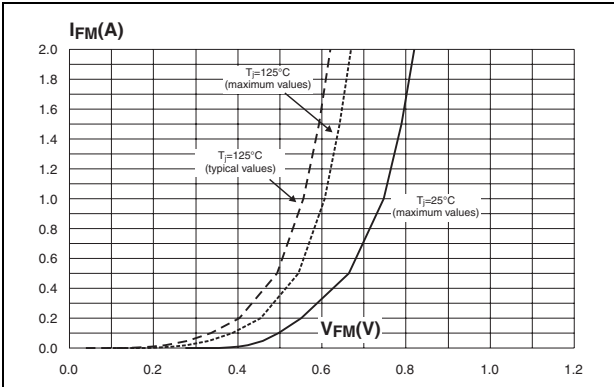


Figure 12. Forward voltage drop versus forward current - maximum values, low level

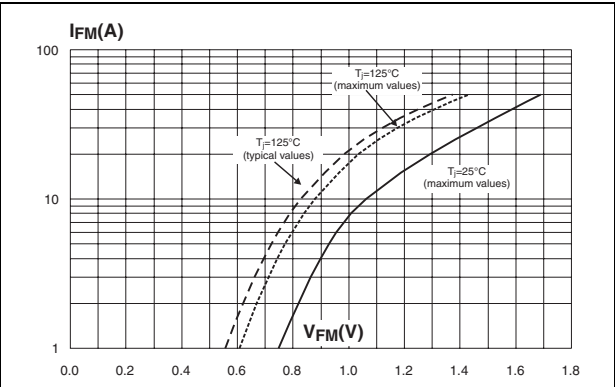


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead - Epoxy printed circuit board FR4,  $e_{Cu} = 35 \mu m$  (SMA)

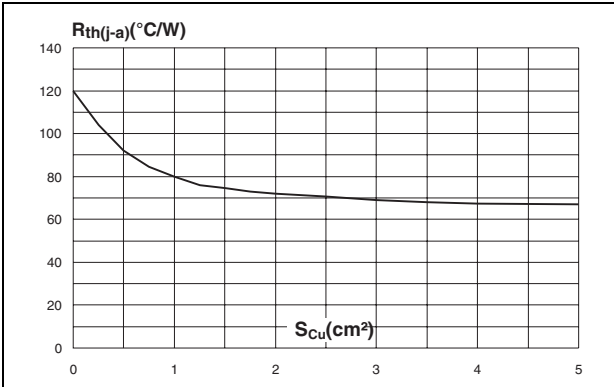
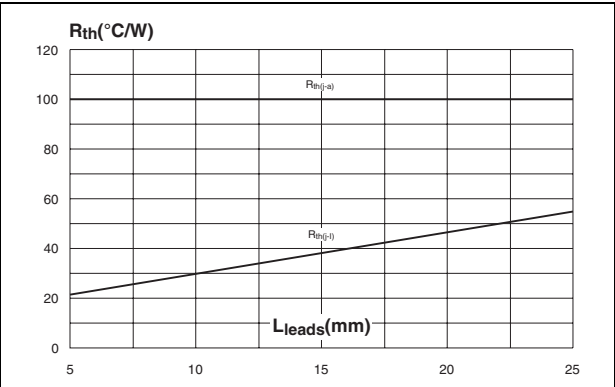


Figure 14. Thermal resistance versus lead length (DO-15)



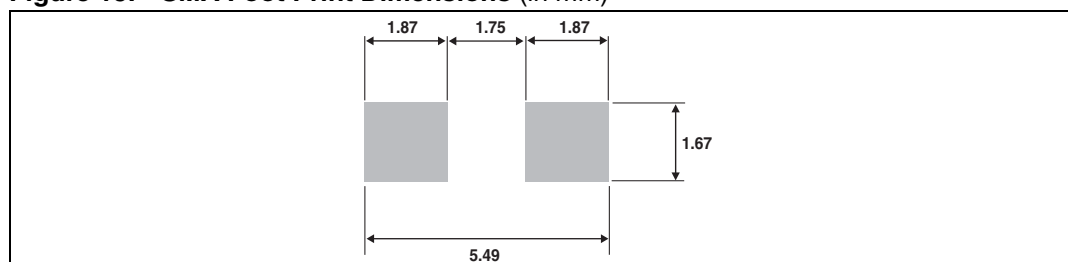
## 2 Package information

Band shows cathode. Epoxy meets UL94, V0.

**Table 4. SMA Package dimensions**

| REF. | DIMENSIONS  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A1   | 1.90        | 2.03 | 0.075  | 0.080 |
| A2   | 0.05        | 0.20 | 0.002  | 0.008 |
| b    | 1.25        | 1.65 | 0.049  | 0.065 |
| c    | 0.15        | 0.41 | 0.006  | 0.016 |
| E    | 4.80        | 5.60 | 0.189  | 0.220 |
| E1   | 3.95        | 4.60 | 0.156  | 0.181 |
| D    | 2.25        | 2.95 | 0.089  | 0.116 |
| L    | 0.75        | 1.60 | 0.030  | 0.063 |

**Figure 15. SMA Foot Print Dimensions (in mm)**



**Table 5. DO-15 Package dimensions**

| REF. | DIMENSIONS  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A    | 6.05        | 6.75 | 0.238  | 0.266 |
| B    | 2.95        | 3.53 | 0.116  | 0.139 |
| C    | 26          | 31   | 1.024  | 1.220 |
| D    | 0.71        | 0.88 | 0.028  | 0.035 |

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

### 3 Ordering information

| Ordering type | Marking  | Package | Weight  | Base qty | Delivery mode |
|---------------|----------|---------|---------|----------|---------------|
| STPS2150A     | 2150     | SMA     | 0.068 g | 5000     | Tape and reel |
| STPS2150      | STPS2150 | DO-15   | 0.4 g   | 2000     | Ammopack      |
| STPS2150RL    | STPS2150 | DO-15   | 0.4 g   | 5000     | Tape and reel |

### 4 Revision history

| Date        | Revision | Description of Changes   |
|-------------|----------|--|
| Jul-2003    | 3A       | Last update.   |
| Aug-2004    | 4        | SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080).                          |
| 31-May-2006 | 5        | Reformatted to current standard. Added ECOPACK statement. Updated SMA footprint in Figure 15. Changed nF to pF in Figure 10. |

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