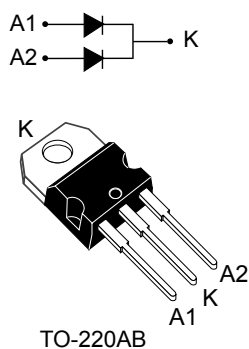


## 150 V power Schottky rectifier



### Features

- High junction temperature capability
- Low leakage current
- High voltage capabilities
- Low thermal resistance
- High frequency operation
- Avalanche specification
- ECOPACK®2 compliant

### Applications

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

### Description

This dual center tab Schottky rectifier is suited for high frequency switched mode power supplies.

Packaged in TO-220AB, the **STPS60150C** combines high current rating and low volume to enhance both reliability and power density of the application.

| Product status  |          |
|-----------------|----------|
| STPS60150C      |          |
| Product summary |          |
| $I_{F(AV)}$     | 2 x 30 A |
| $V_{RRM}$       | 150 V    |
| $T_{j(max.)}$   | 175 °C   |
| $V_F(typ.)$     | 0.72 V   |

# 1 Characteristics

**Table 1. Absolute ratings (limiting values, per diode at 25 °C, unless otherwise specified)**

| Symbol              | Parameter                                             |                                                 |            | Value       | Unit |
|---------------------|-------------------------------------------------------|-------------------------------------------------|------------|-------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage                       |                                                 |            | 150         | V    |
| I <sub>F(RMS)</sub> | Forward rms current                                   |                                                 |            | 60          | A    |
| I <sub>F(AV)</sub>  | Average forward current, δ = 0.5, square wave         | T <sub>C</sub> = 145 °C                         | Per diode  | 30          | A    |
|                     |                                                       | T <sub>C</sub> = 135 °C                         | Per device | 60          |      |
| I <sub>FSM</sub>    | Surge non repetitive forward current                  | t <sub>p</sub> = 10 ms sinusoidal               |            | 270         | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power                       | t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125 °C |            | 1245        | 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.  $(dP_{tot}/dT_j) < (1/R_{th(j-a)})$  condition to avoid thermal runaway for a diode on its own heatsink.

**Table 2. Thermal resistance parameters**

| Symbol        | Parameter        |           | Value | Unit |
|---------------|------------------|-----------|-------|------|
|               |                  |           | Max.  |      |
| $R_{th(j-c)}$ | Junction to case | Per diode | 1.0   | °C/W |
|               |                  | Total     | 0.7   |      |
| $R_{th(c)}$   | Coupling         |           | 0.4   | °C/W |

When the diodes 1 and 2 are used simultaneously:

$$\Delta T_{j(\text{diode1})} = P_{(\text{diode1})} \times R_{th(j-c)} (\text{per diode}) + P_{(\text{diode2})} \times R_{th(c)}$$

**Table 3. Static electrical characteristics (per diode)**

| Symbol      | Parameter               | Test conditions       |                     | Min. | Typ. | Max. | Unit          |
|-------------|-------------------------|-----------------------|---------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$  | $V_R = V_{RRM}$     | -    | 3    | 15   | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                     | -    | 3    | 10   | mA            |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 30\text{ A}$ | -    |      | 0.94 | V             |
|             |                         | $T_j = 125\text{ °C}$ |                     | -    | 0.72 | 0.76 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 60\text{ A}$ | -    | 0.97 | 1.05 |               |
|             |                         | $T_j = 125\text{ °C}$ |                     | -    | 0.86 | 0.92 |               |

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:

$$P = 0.6 \times I_{F(AV)} + 0.0053 \times I_F^2 (RMS)$$

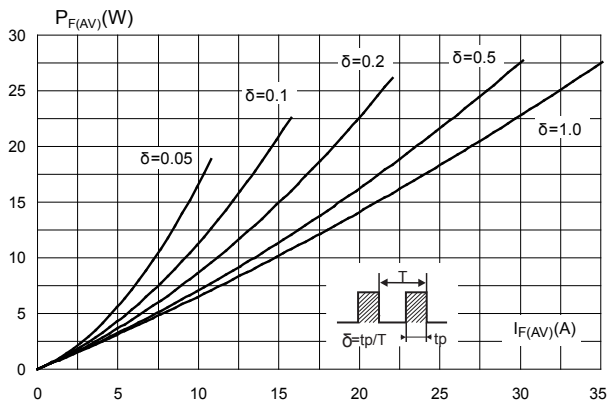
For more information, please refer to the following application notes related to the power losses :

- AN604: Calculation of conduction losses in a power rectifier

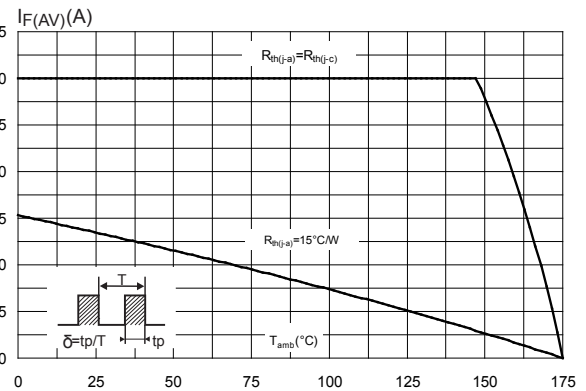
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

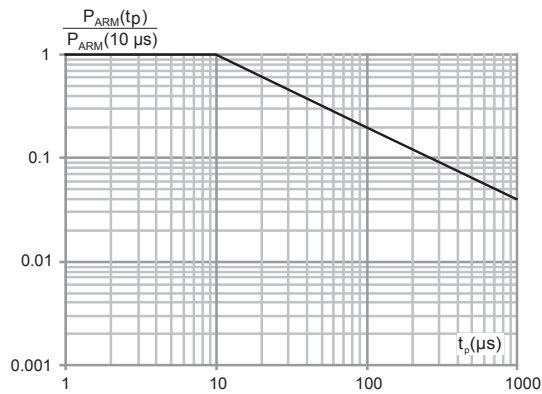
**Figure 1. Average forward power dissipation versus average forward current (per diode)**



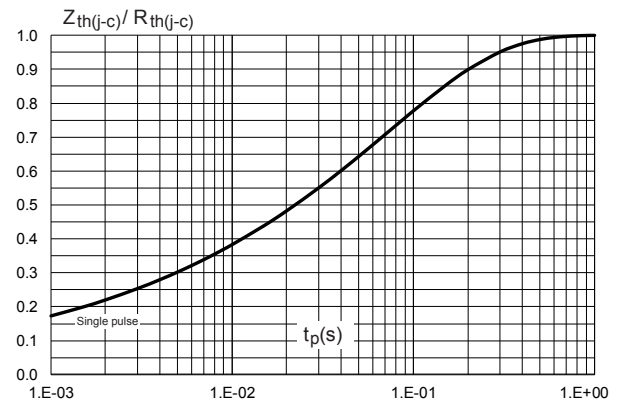
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ , per diode)**



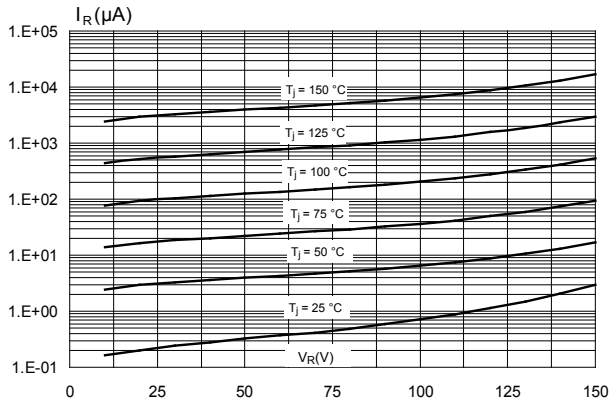
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



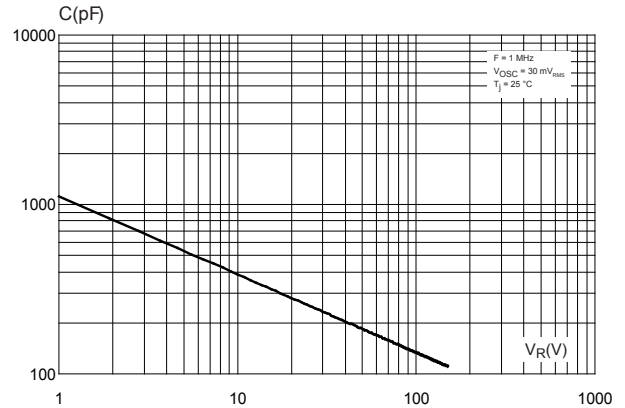
**Figure 4. Relative variation of thermal impedance junction to case versus pulse duration**



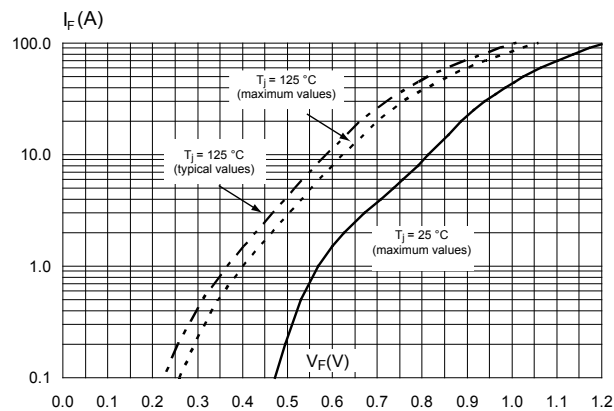
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values, per diode)**



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



**Figure 7. Forward voltage drop versus forward current (per diode)**



## 2 Package information

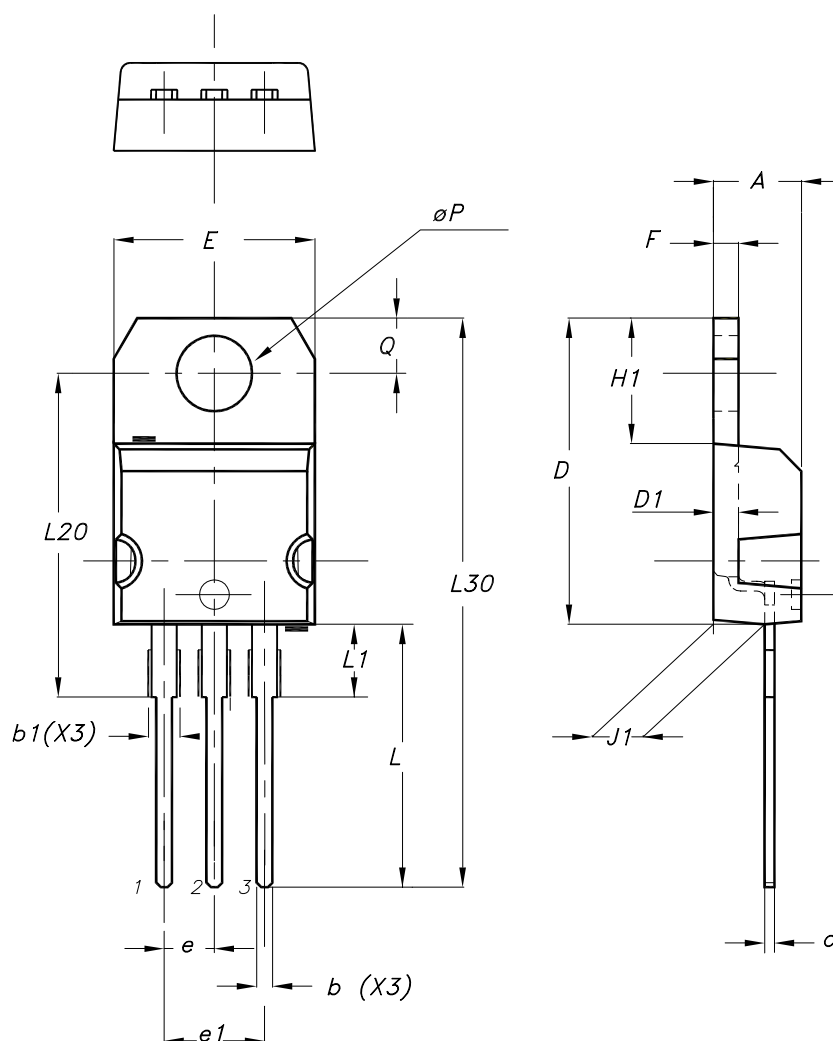
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In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

## 2.1 TO-220AB package information

- Epoxy meets UL 94,V0
- Cooling method: by conduction (C)
- Recommended torque value: 0.55 N·m
- Maximum torque value: 0.70 N·m

**Figure 8. TO-220AB package outline**



**Table 4. TO-220AB package mechanical data**

| Ref. | Dimensions  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A    | 4.40        | 4.60 | 0.173  | 0.181 |
| b    | 0.61        | 0.88 | 0.240  | 0.035 |
| b1   | 1.14        | 1.55 | 0.045  | 0.061 |

| Ref. | Dimensions  |       |            |       |
|------|-------------|-------|------------|-------|
|      | Millimeters |       | Inches     |       |
|      | Min.        | Max.  | Min.       | Max.  |
| c    | 0.48        | 0.70  | 0.019      | 0.028 |
| D    | 15.25       | 15.75 | 0.600      | 0.620 |
| D1   | 1.27 typ.   |       | 0.050 typ. |       |
| E    | 10.00       | 10.40 | 0.394      | 0.409 |
| e    | 2.40        | 2.70  | 0.094      | 0.106 |
| e1   | 4.95        | 5.15  | 0.195      | 0.203 |
| F    | 1.23        | 1.32  | 0.048      | 0.052 |
| H1   | 6.20        | 6.60  | 0.244      | 0.260 |
| J1   | 2.40        | 2.72  | 0.094      | 0.107 |
| L    | 13.00       | 14.00 | 0.512      | 0.551 |
| L1   | 3.50        | 3.93  | 0.138      | 0.155 |
| L20  | 16.40 typ.  |       | 0.646 typ. |       |
| L30  | 28.90 typ.  |       | 1.138 typ. |       |
| θP   | 3.75        | 3.85  | 0.148      | 0.152 |
| Q    | 2.65        | 2.95  | 0.104      | 0.116 |

### 3 Ordering information

**Table 5. Order code**

| Order code  | Marking     | Package  | Weight | Base qty. | Delivery mode |
|-------------|-------------|----------|--------|-----------|---------------|
| STPS60150CT | STPS60150CT | TO-220AB | 1.95 g | 50        | Tube          |

## Revision history

**Table 6. Document revision history**

| Date        | Revision | Changes                                                                      |
|-------------|----------|------------------------------------------------------------------------------|
| 19-Oct-2004 | 1        | First issue.                                                                 |
| 01-Jun-2018 | 2        | Updated PARM value and removed "Normalized avalanche power derating" curves. |

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