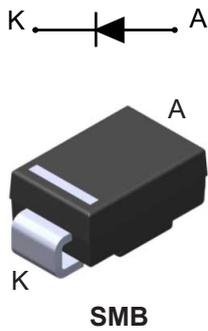


## 25 V power Schottky rectifier



### Features

- Very low forward voltage drop for less power dissipation
- Optimized conduction/reverse losses trade-off which means the highest efficiency in the applications
- Avalanche rated
- ECOPACK<sup>®</sup>2 compliant

### Applications

- Cordless appliance
- SSD
- Battery charger
- Telecom power
- DC / DC converter

### Description

Schottky rectifiers designed for high frequency miniature switched mode power supplies such as adaptors and on board DC/DC converters.

Packaged in SMB for thermal resistance characteristic improvement, the [STPS2L25](#) is ideal for use in parallel with MOSFETs in synchronous rectification.

| Product status  |         |
|-----------------|---------|
| STPS2L25        |         |
| Product summary |         |
| Symbol          | Value   |
| $I_{F(AV)}$     | 2 A     |
| $V_{RRM}$       | 25 V    |
| $T_{j(max.)}$   | 150 °C  |
| $V_{F(typ.)}$   | 0.325 V |

# 1 Characteristics

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

| Symbol              | Parameter   | Value  | Unit |   |
|---------------------|---|--|------|---|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage                       | 25   | V    |   |
| I <sub>F(RMS)</sub> | Forward rms current                                   | 10   | A    |   |
| I <sub>F(AV)</sub>  | Average forward current, $\delta = 0.5$ square wave   | T <sub>L</sub> = 125 °C                              | 2    | A |
| I <sub>FSM</sub>    | Surge non repetitive forward current                  | t <sub>p</sub> = 10 ms sinusoidal                    | 75   | A |
| P <sub>ARM</sub>    | Repetitive peak avalanche power                       | t <sub>p</sub> = 10 $\mu$ s, T <sub>j</sub> = 125 °C | 108  | W |
| T <sub>stg</sub>    | Storage temperature range                             | -65 to +150  | °C   |   |
| T <sub>j</sub>      | 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 parameter**

| Symbol               | Parameter        | Max. value | Unit |
|----------------------|------------------|------------|------|
| R <sub>th(j-l)</sub> | Junction to lead | 25         | °C/W |

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristics**

| Symbol                        | Parameter               | Test conditions         | Min.                              | Typ. | Max.  | Unit    |
|-------------------------------|-------------------------|-------------------------|-----------------------------------|------|-------|---------|
| I <sub>R</sub> <sup>(1)</sup> | Reverse leakage current | T <sub>j</sub> = 25 °C  | V <sub>R</sub> = V <sub>RRM</sub> | -    | 90    | $\mu$ A |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 15    | 30      |
| V <sub>F</sub> <sup>(1)</sup> | Forward voltage drop    | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 2 A              | -    | 0.450 | V       |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 0.325 |         |
|                               |                         | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 4 A              | -    | 0.530 |         |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 0.430 |         |

1. Pulse test: t<sub>p</sub> = 380  $\mu$ s,  $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

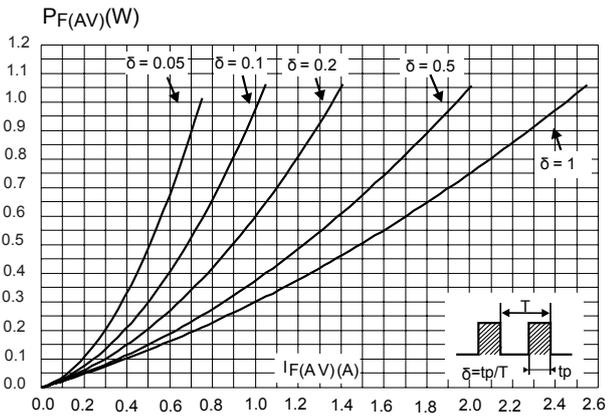
$$P = 0.24 \times I_{F(AV)} + 0.068 \times I_{F(RMS)}^2$$

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

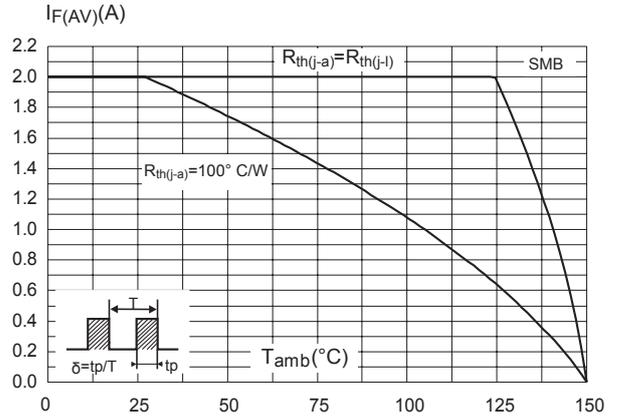
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

### 1.1 Characteristics (curves)

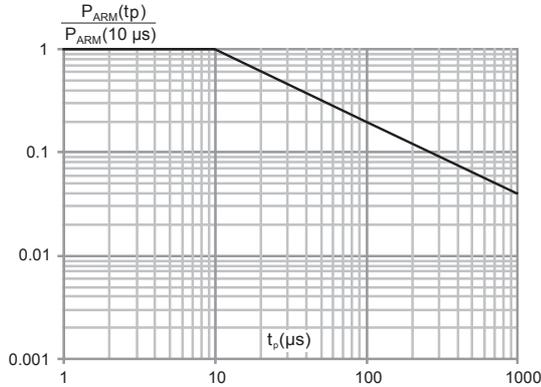
**Figure 1. Average forward power dissipation versus average forward current**



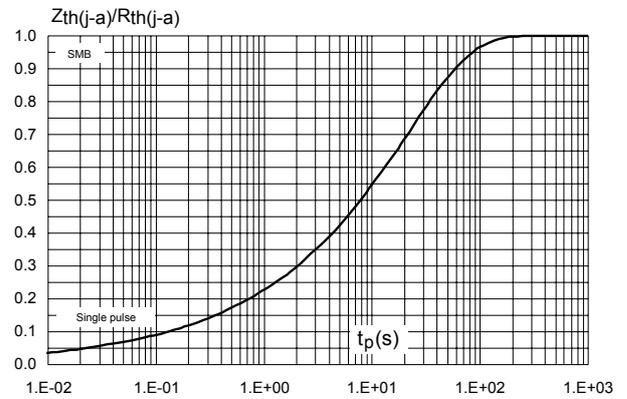
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**

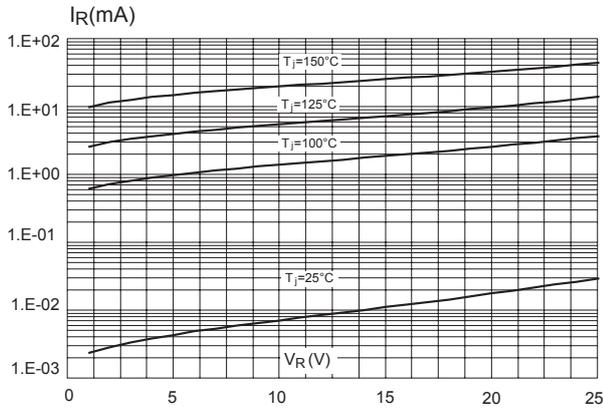
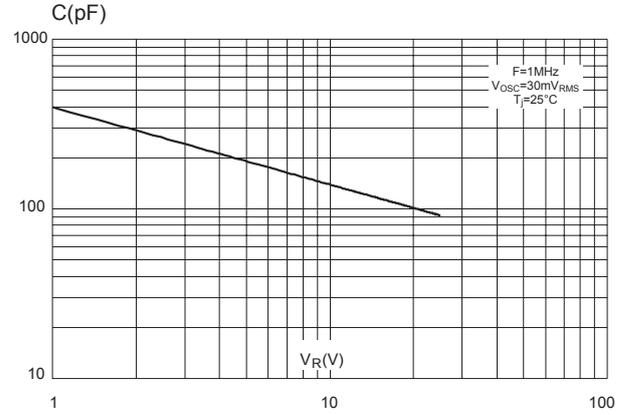
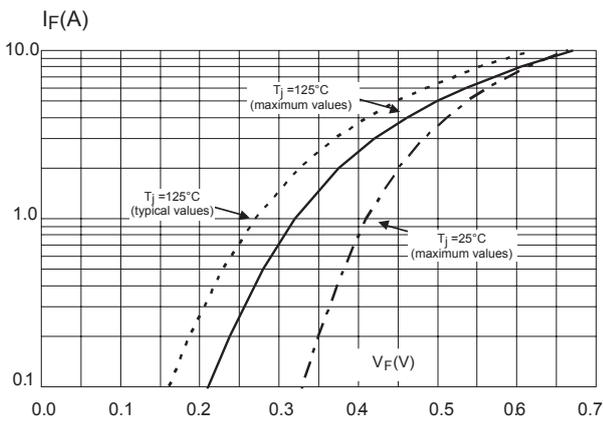
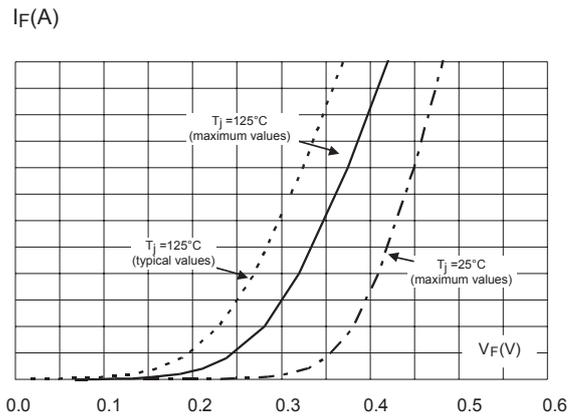
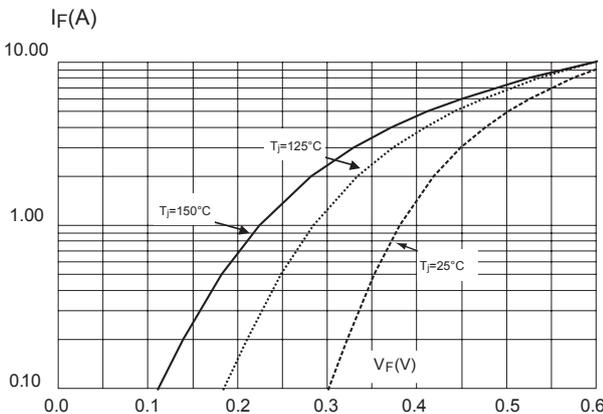
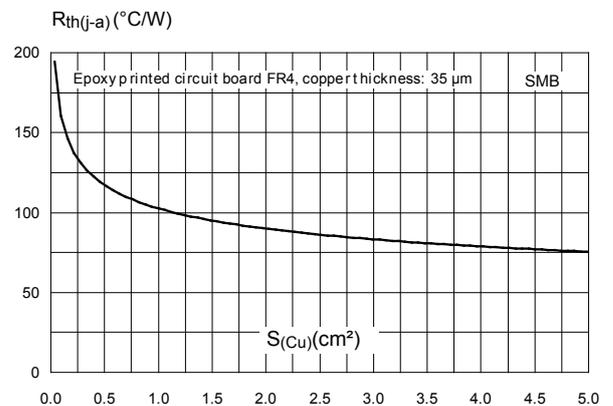


**Figure 3. Normalized avalanche power derating versus junction temperature ( $T_j = 125^{\circ}C$ )**



**Figure 4. Relative variation of thermal impedance junction to ambient 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 (high level)**

**Figure 8. Forward voltage drop versus forward current (low level)**

**Figure 9. Forward voltage drop versus forward current (typical values)**

**Figure 10. Thermal resistance junction to ambient versus copper surface area under each lead**


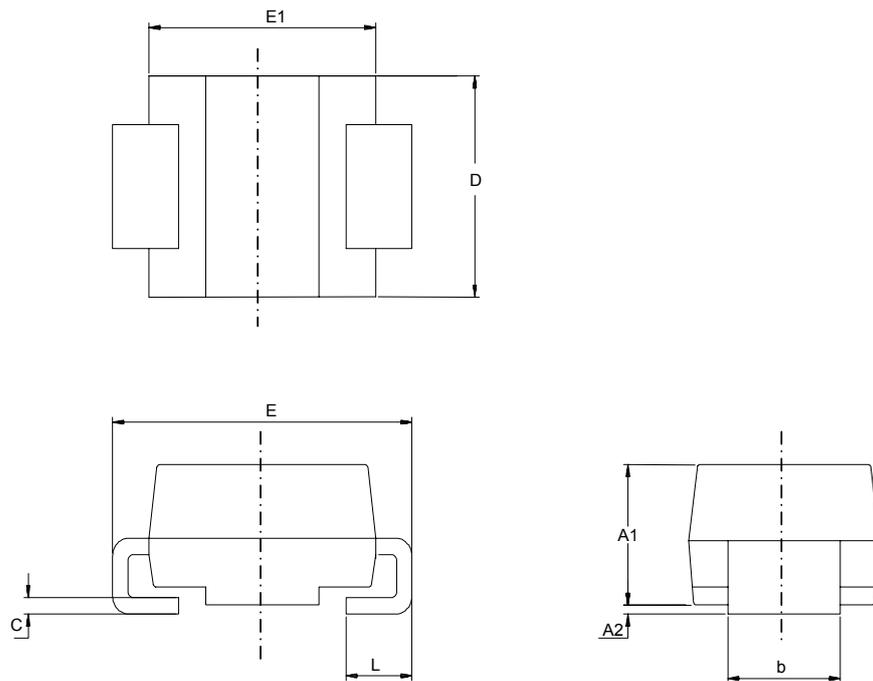
## 2 Package information

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 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

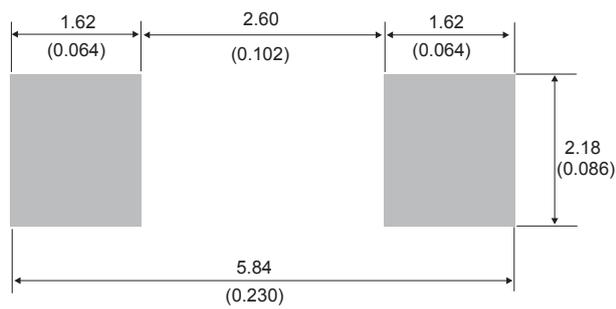
**Figure 11. SMB package outline**



**Table 4. SMB package mechanical data**

| Ref. | Dimensions  |      |                             |        |
|------|-------------|------|-----------------------------|--------|
|      | Millimeters |      | Inches (for reference only) |        |
|      | Min.        | Max. | Min.                        | Max.   |
| A1   | 1.90        | 2.45 | 0.0748                      | 0.0965 |
| A2   | 0.05        | 0.20 | 0.0020                      | 0.0079 |
| b    | 1.95        | 2.20 | 0.0768                      | 0.0867 |
| c    | 0.15        | 0.40 | 0.0059                      | 0.0157 |
| D    | 3.30        | 3.95 | 0.1299                      | 0.1556 |
| E    | 5.10        | 5.60 | 0.2008                      | 0.2205 |
| E1   | 4.05        | 4.60 | 0.1594                      | 0.1811 |
| L    | 0.75        | 1.50 | 0.0295                      | 0.0591 |

**Figure 12. SMB recommended footprint**



### 3 Ordering information

**Table 5. Ordering information**

| Order code | Marking | Package | Weight  | Base qty. | Delivery mode |
|------------|---------|---------|---------|-----------|---------------|
| STPS2L25U  | G23     | SMB     | 0.107 g | 2500      | Tape and reel |

## Revision history

**Table 6. Document revision history**

| Date        | Version | Changes   |
|-------------|---------|---|
| Jul-2003    | 4A      | Last update.  |
| 08-Feb-2007 | 5       | Reformatted to current standard. Added ECOPACK statement. Added SMB flat package.   |
| 09-Oct-2018 | 6       | Updated <a href="#">Table 1</a> . Absolute ratings (limiting values at 25 °C, unless otherwise specified) and <a href="#">Figure 3</a> . Normalized avalanche power derating versus junction temperature ( $T_j = 125\text{ °C}$ ). Removed SMB flat package. |

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