

## LOW DROP POWER SCHOTTKY RECTIFIER

### MAIN PRODUCT CHARACTERISTICS

|                            |               |
|----------------------------|---------------|
| <b>I<sub>F(AV)</sub></b>   | <b>3 A</b>    |
| <b>V<sub>RRM</sub></b>     | <b>25 V</b>   |
| <b>T<sub>j</sub> (max)</b> | <b>150°C</b>  |
| <b>V<sub>F</sub> (max)</b> | <b>0.44 V</b> |

### FEATURES AND BENEFITS

- VERY LOW FORWARD VOLTAGE DROP FOR LESS POWER DISSIPATION
- OPTIMIZED CONDUCTION/REVERSE LOSSES TRADE-OFF WHICH MEANS THE HIGHEST EFFICIENCY IN THE APPLICATIONS
- HIGH POWER SURFACE MOUNT MINIATURE PACKAGE
- AVALANCHE CAPABILITY SPECIFIED

### DESCRIPTION

Single Schottky rectifier suited to Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in SMC, this device is especially intended for use as an antiparallel diode on synchronous rectification freewheel MOSFET's at the secondary of 3.3V SMPS and DC/DC units.



### ABSOLUTE RATINGS (limiting values)

| Symbol              | Parameter                                |                                 | Value         | Unit |
|---------------------|--|---------------------------------|---------------|------|
| V <sub>RRM</sub>    | Repetitive peak reverse voltage          |                                 | 25            | V    |
| I <sub>F(RMS)</sub> | RMS forward current                      |                                 | 10            | A    |
| I <sub>F(AV)</sub>  | Average forward current                  | T <sub>L</sub> = 115°C δ = 0.5  | 3             | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current     | tp = 10 ms Sinusoidal           | 75            | A    |
| I <sub>RRM</sub>    | Repetitive peak reverse current          | tp = 2 μs square F=1kHz         | 1             | A    |
| I <sub>RSM</sub>    | Non repetitive peak reverse current      | tp = 100 μs square              | 1             | A    |
| T <sub>stg</sub>    | Storage temperature range                |                                 | - 65 to + 150 | °C   |
| P <sub>ARM</sub>    | Repetitive peak avalanche power          | tp = 1 μs T <sub>j</sub> = 25°C | 1500          | W    |
| T <sub>j</sub>      | Maximum operating junction temperature * |                                 | 150           | °C   |
| dV/dt               | Critical rate of rise of reverse voltage |                                 | 10000         | V/μs |

\* :  $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  thermal runaway condition for a diode on its own heatsink

# STPS3L25S

## THERMAL RESISTANCES

| Symbol        | Parameter        | Value | Unit |
|---------------|------------------|-------|------|
| $R_{th(j-l)}$ | Junction to lead | 20    | °C/W |

## STATIC ELECTRICAL CHARACTERISTICS

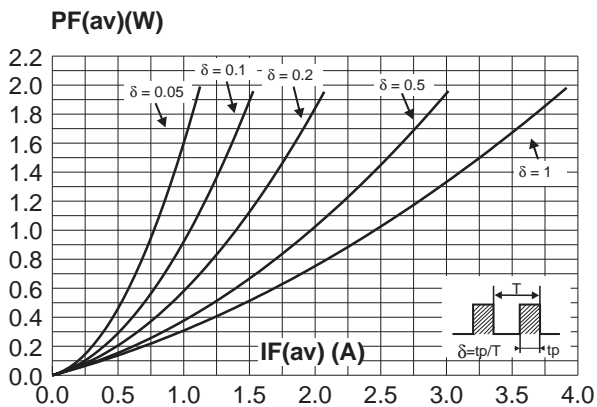
| Symbol  | Tests Conditions        | Tests Conditions          | Min.               | Typ. | Max. | Unit          |
|---------|-------------------------|---------------------------|--------------------|------|------|---------------|
| $I_R^*$ | Reverse leakage current | $T_j = 25^\circ\text{C}$  | $V_R = V_{RRM}$    |      | 90   | $\mu\text{A}$ |
|         |                         | $T_j = 125^\circ\text{C}$ |                    | 15   | 30   | $\text{mA}$   |
| $V_F^*$ | Forward voltage drop    | $T_j = 25^\circ\text{C}$  | $I_F = 3\text{ A}$ |      | 0.49 | V             |
|         |                         | $T_j = 125^\circ\text{C}$ |                    | 0.37 | 0.44 |               |
|         |                         | $T_j = 25^\circ\text{C}$  | $I_F = 6\text{ A}$ |      | 0.6  |               |
|         |                         | $T_j = 125^\circ\text{C}$ |                    | 0.5  | 0.58 |               |

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

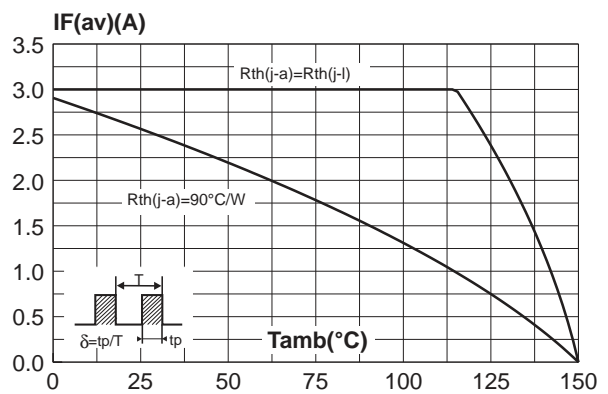
To evaluate the maximum conduction losses use the following equation :

$$P = 0.3 \times I_{F(AV)} + 0.047 \times I_{F(RMS)}^2$$

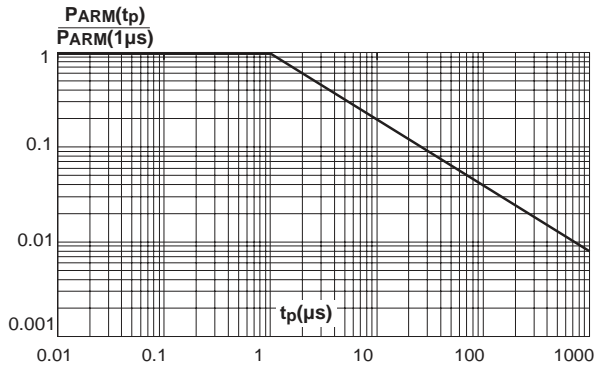
**Fig. 1:** Average forward power dissipation versus average forward current.



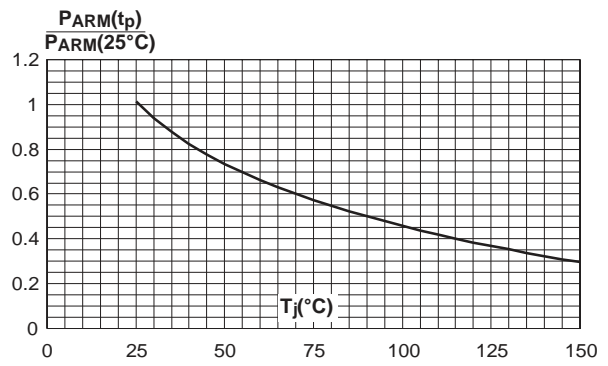
**Fig. 2:** Average forward current versus ambient temperature ( $\delta=0.5$ ).



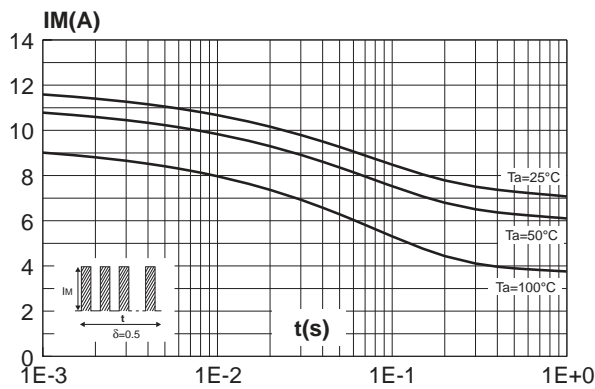
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



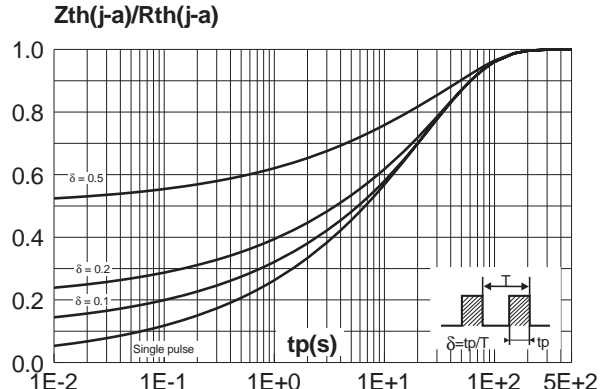
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



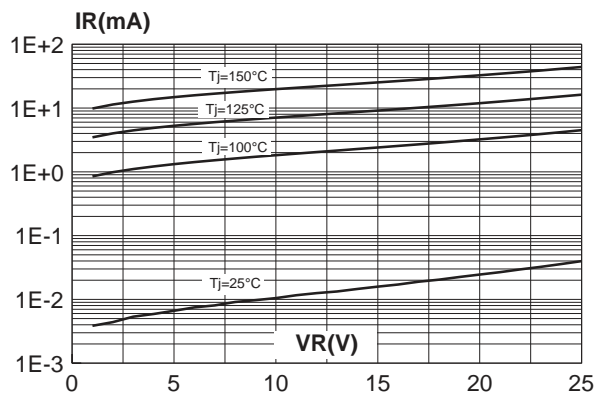
**Fig. 5:** Non repetitive surge peak forward current versus overload duration (maximum values).



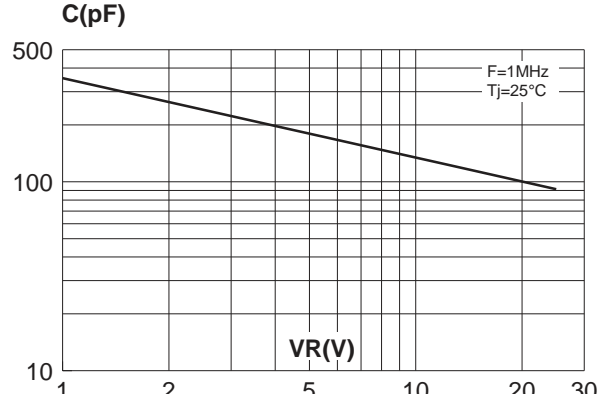
**Fig. 6:** Relative variation of thermal impedance junction to ambient versus pulse duration.



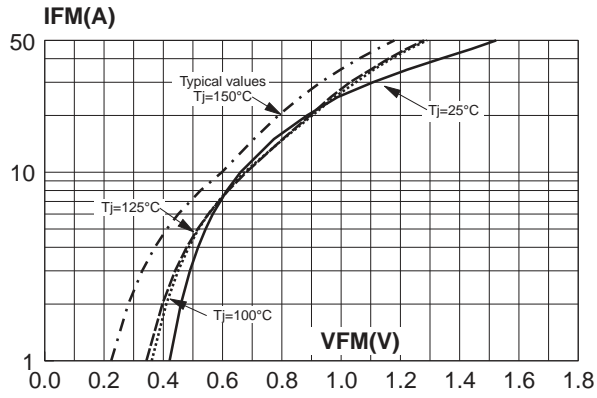
**Fig. 7:** Reverse leakage current versus reverse voltage applied (typical values).



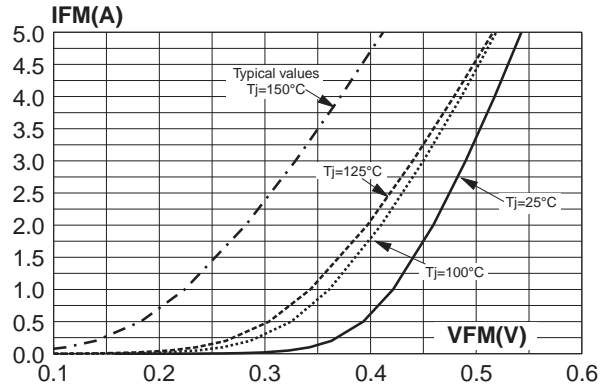
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values).



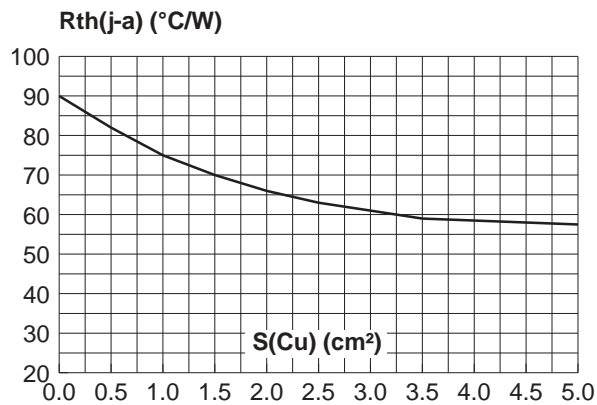
**Fig. 9-1:** Forward voltage drop versus forward current (maximum values, high level).



**Fig. 9-2:** Forward voltage drop versus forward current (maximum values, low level).

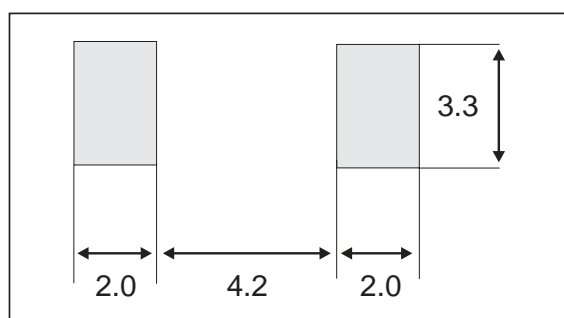


**Fig. 10:** Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness:



**PACKAGE MECHANICAL DATA**  
 SMC

| REF. | DIMENSIONS  |      |        |       |
|------|-------------|------|--------|-------|
|      | Millimeters |      | Inches |       |
|      | Min.        | Max. | Min.   | Max.  |
| A1   | 1.90        | 2.45 | 0.075  | 0.096 |
| A2   | 0.05        | 0.20 | 0.002  | 0.008 |
| b    | 2.90        | 3.2  | 0.114  | 0.126 |
| c    | 0.15        | 0.41 | 0.006  | 0.016 |
| E    | 7.75        | 8.15 | 0.305  | 0.321 |
| E1   | 6.60        | 7.15 | 0.260  | 0.281 |
| E2   | 4.40        | 4.70 | 0.173  | 0.185 |
| D    | 5.55        | 6.25 | 0.218  | 0.246 |
| L    | 0.75        | 1.60 | 0.030  | 0.063 |

**FOOT PRINT DIMENSIONS** (in millimeters)


| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|--------|----------|---------------|
| STPS3L25S     | S23     | SMC     | 0.243g | 2500     | Tape & reel   |

- BAND INDICATES CATHODE
- EPOXY MEETS UL94,V0

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