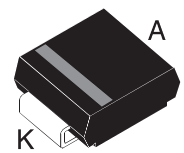
# STPS2L25

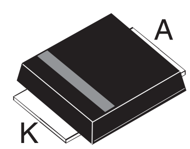
## Low drop power Schottky rectifier

### Main product characteristics

| | |
|---|---|
| $I_{F(AV)}$ | 2 A |
| $V_{RRM}$ | 25 V |
| $T_j$ (max) | 150° C |
| $V_F$(max) | 0.375 V |




**SMB**
**STPS2L25U**




**SMB flat**
**STPS2L25UF**

### 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
- Avalanche capability specified

### Description

Single Schottky rectifier suited to switched mode power supplies and high frequency DC to DC converters.

Packaged in SMB, SMB flat for thermal resistance characteristic improvement, this device is especially intended for use in parallel with MOSFETs in synchronous rectification.

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

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 25 | V |
| $I_{F(AV)}$ | Average forward current | SMB | $T_L$ = 125° C δ = 0.5 | 2 | A |
| | | SMB flat | $T_L$ = 135° C δ = 0.5 | | |
| $I_{FSM}$ | Surge non repetitive forward current | | $t_p$ = 10 ms sinusoidal | 75 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | | $t_p$ = 1 µs Tj = 25° C | 1500 | W |
| $T_{stg}$ | Storage temperature range | | | -65 to + 150 | °C |
| $T_j$ | Operating junction temperature(1) | | | 150 | °C |

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

# 1 Characteristics

**Table 2. Thermal resistance**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{th(j-l)}$ | Junction to lead | SMB | 25 | °C/W |
| | | SMB flat | 15 | |

**Table 3. Static electrical characteristics**

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25° C | $V_R = V_{RRM}$ | | | 90 | µA |
| | | $T_j$ = 125° C | | | 15 | 30 | mA |
| $V_F$(1) | Forward voltage drop | $T_j$ = 25° C | $I_F$ = 2 A | | | 0.45 | V |
| | | $T_j$ = 125° C | | | 0.325 | 0.375 | |
| | | $T_j$ = 25° C | $I_F$ = 4 A | | | 0.53 | |
| | | $T_j$ = 125° C | | | 0.43 | 0.51 | |

1. Pulse test: tp = 380 µs, δ < 2%

To evaluate the maximum conduction losses, use the following equation:

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

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

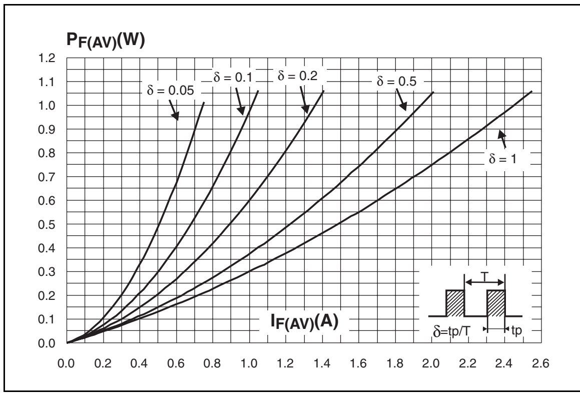



**Figure 2. Average forward current versus ambient temperature (δ = 0.5) SMB**

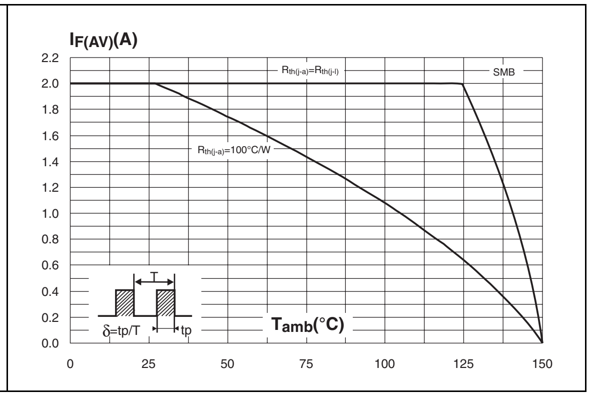



**Figure 3. Average forward current versus ambient temperature (δ = 0.5) SMB flat**

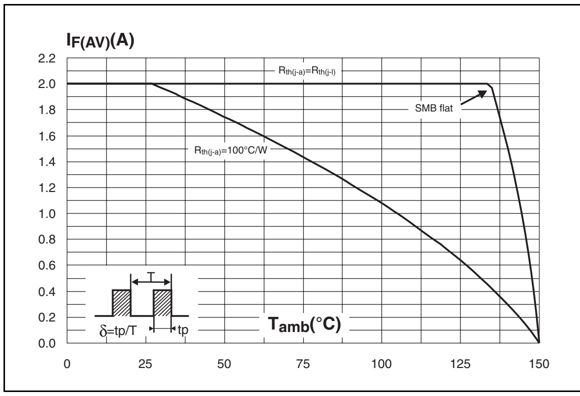



**Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values) SMB**

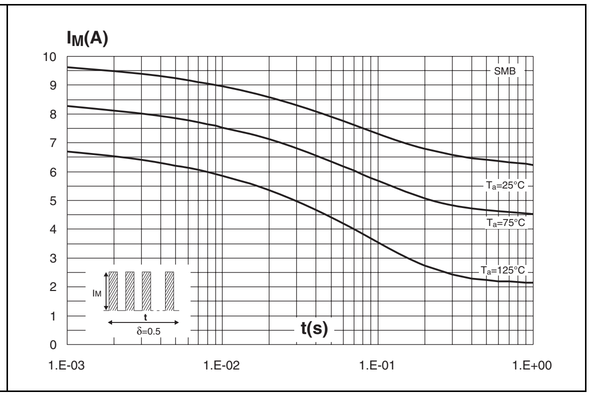



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) SMB flat**

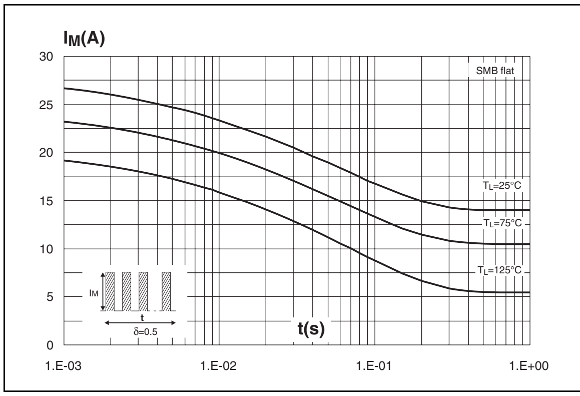



**Figure 6. Normalized avalanche power derating versus pulse duration**

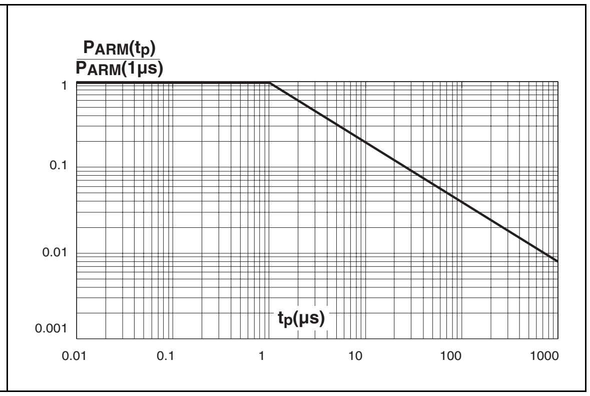


**Figure 7. Normalized avalanche power derating versus junction temperature**

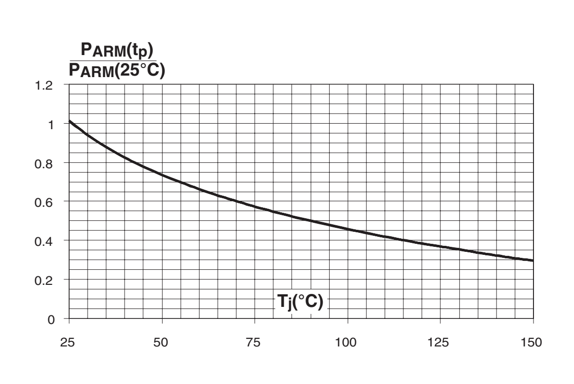



**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - SMB**

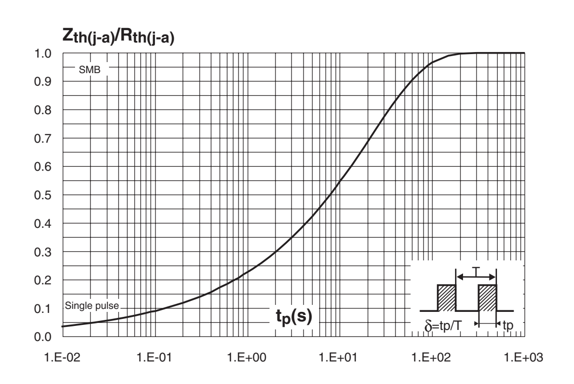



**Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration - SMB flat**

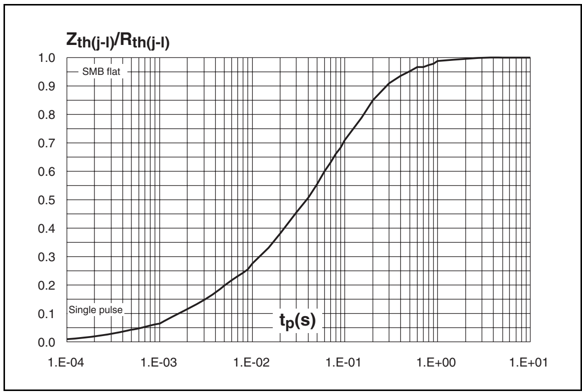



**Figure 10. Reverse leakage current versus reverse voltage applied (typical values)**

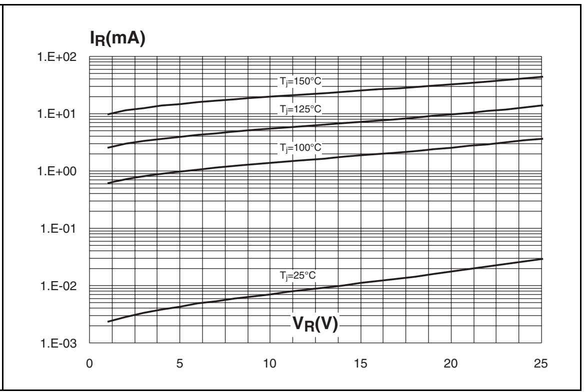



**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**

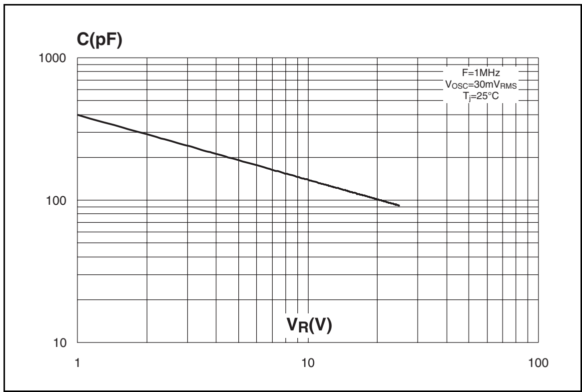



**Figure 12. Forward voltage drop versus forward current (typical values)**

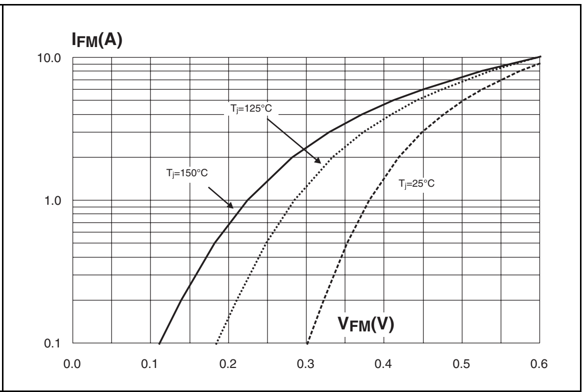


**Figure 13. Forward voltage drop versus forward current (maximum values, high level)**

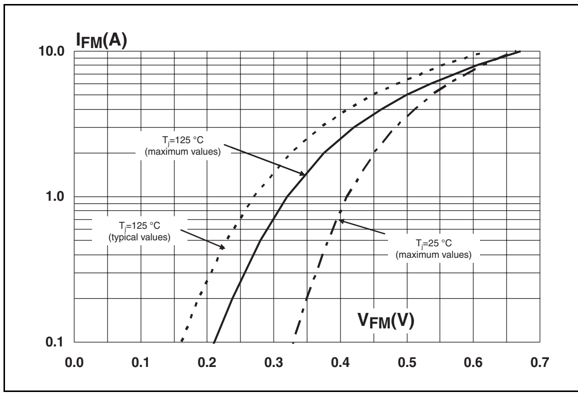



**Figure 14. Forward voltage drop versus forward current (maximum values, low level)**

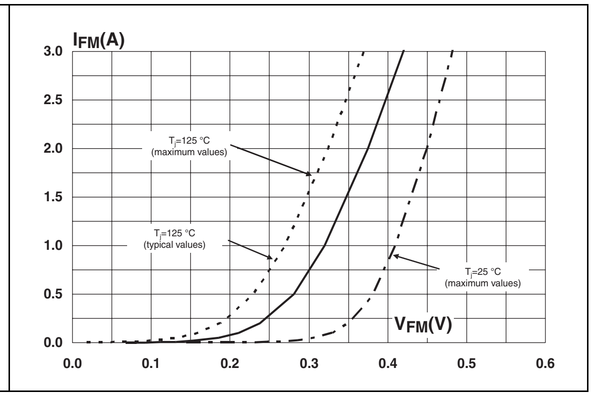
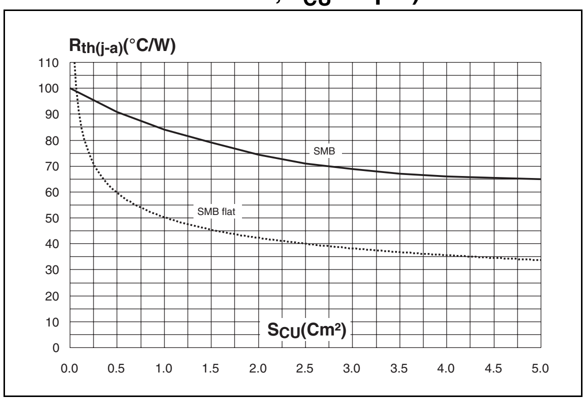


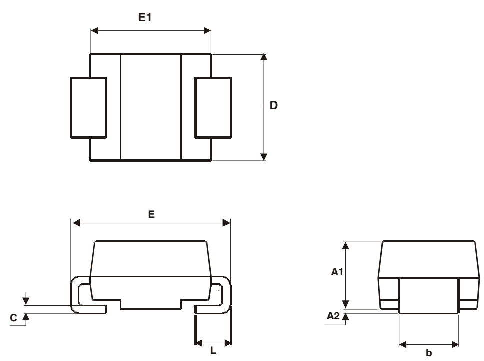

**Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, $e_{CU}$=35µm)**



# 2 Package information

- Epoxy meets UL94, V0

**Table 4. SMB dimensions**




| 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 | 1.95 | 2.20 | 0.077 | 0.087 |
| c | 0.15 | 0.40 | 0.006 | 0.016 |
| E | 5.10 | 5.60 | 0.201 | 0.220 |
| E1 | 4.05 | 4.60 | 0.159 | 0.181 |
| D | 3.30 | 3.95 | 0.130 | 0.156 |
| L | 0.75 | 1.50 | 0.030 | 0.059 |

**Figure 16. SMB footprint (dimensions in mm)**

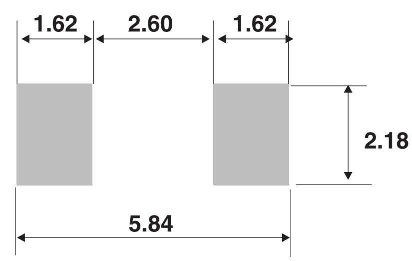
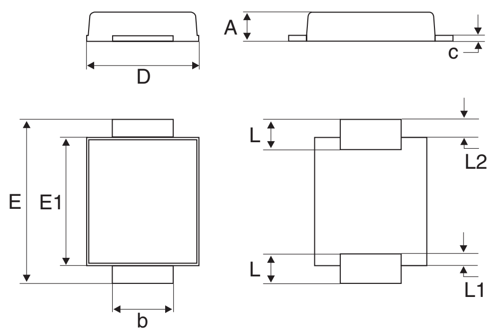


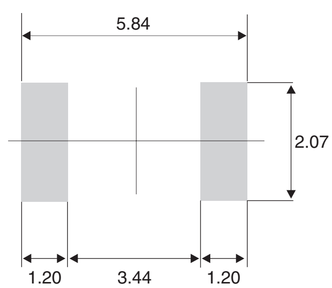
Table 5. SMB Flat dimensions




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.035 | | 0.043 |
| b(1) | 1.95 | | 2.20 | 0.077 | | 0.087 |
| c(1) | 0.15 | | 0.40 | 0.006 | | 0.016 |
| D | 3.30 | | 3.95 | 0.130 | | 0.156 |
| E | 5.10 | | 5.60 | 0.200 | | 0.220 |
| E1 | 4.05 | | 4.60 | 0.189 | | 0.181 |
| L | 0.75 | | 1.50 | 0.029 | | 0.059 |
| L1 | | 0.40 | | | 0.016 | |
| L2 | | 0.60 | | | 0.024 | |

1. Applies to plated leads

Figure 17. SMB Flat footprint (dimensions in mm)




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.

# 3 Ordering information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS2L25U | G23 | SMB | 0.107 g | 2500 | Tape and reel |
| STPS2L25UF | FG23 | SMB flat | 0.50 g | 5000 | Tape and reel |

# 4 Revision history

| Date | Revision | Changes |
|---|---|---|
| July 2003 | 4A | Last update |
| 08-Feb-2007 | 5 | Reformatted to current standard. Added ECOPACK statement. Added SMB flat package. |

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