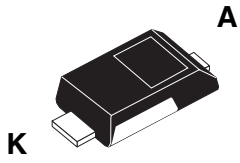
# STPS1L30MF

## Low drop power Schottky rectifier in flat package

## Main product characteristics

| | |
|---|---|
| $I_{F(AV)}$ | 1 A |
| $V_{RRM}$ | 30 V |
| $T_j$ (max) | 150° C |
| $V_F$ (max) | 0.39 V |






**STmite flat**
**(DO222-AA)**

## Features and benefits

- Very low profile package: 0.85 mm
- Backward compatible with standard STmite footprint
- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- Avalanche capability specified

### Order Code

| Part number | Marking |
|---|---|
| STPS1L30MF | F1L3 |

## Description

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

Packaged in STmite flat, this device is intended for use in very low voltage, high frequency inverters, free wheeling and polarity protection applications. Due to the very small size of the package this device fits battery powered equipment (cellular, notebook, PDA's, printers) as well as chargers and PCMCIA cards.

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

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 30 | V |
| $I_{F(RMS)}$ | RMS forward voltage | | 2 | A |
| $I_{F(AV)}$ | Average forward current | $T_c$ = 140° C $\delta$ = 0.5 | 1 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | 50 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | $t_p$ = 1 µs $T_j$ = 25° C | 1200 | W |
| $T_{stg}$ | Storage temperature range | | -65 to + 150 | °C |
| $T_j$ | Maximum operating junction temperature(1) | | 150 | °C |
| dV/dt | Critical rate of rise of reverse voltage (rated $V_R$, $T_j$ = 25° C) | | 10000 | V/µs |

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 |
|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case | 20 | °C/W |
| $R_{th(j-a)}$ (1) | Junction to ambient | 250 | °C/W |

1. Mounted with minimum recommended pad size, PC board FR4

**Table 3. Static electrical characteristics**

| Symbol | Parameter | Tests conditions | | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ (1) | Reverse leakage current | $T_j$ = 25° C | $V_R = V_{RRM}$ | | 0.13 | 0.39 | mA |
| | | $T_j$ = 85° C | | | 5.25 | 16.5 | |
| | | $T_j$ = 25° C | $V_R$ = 20 V | | 0.05 | 0.24 | |
| | | $T_j$ = 85° C | | | 3.5 | 10.5 | |
| | | $T_j$ = 25° C | $V_R$ = 10 V | | 0.03 | 0.15 | |
| | | $T_j$ = 85° C | | | 2.4 | 7 | |
| $V_F$ (1) | Forward voltage drop | $T_j$ = 25° C | $I_F$ = 1 A | | 0.33 | 0.39 | V |
| | | $T_j$ = 85° C | | | 0.28 | 0.34 | |
| | | $T_j$ = 25° C | $I_F$ = 2 A | | 0.39 | 0.45 | |
| | | $T_j$ = 85° C | | | 0.36 | 0.42 | |
| | | $T_j$ = 25° C | $I_F$ = 3 A | | 0.45 | 0.53 | |
| | | $T_j$ = 85° C | | | 0.43 | 0.51 | |
| | | $T_j$ = 25° C | $I_F$ = 4 A | | 0.50 | 0.60 | |
| | | $T_j$ = 85° C | | | 0.50 | 0.60 | |

1. Pulse test: = 380 µs, $\delta$ < 2%

To evaluate the conduction losses use the following equation: $P = 0.26 \times I_{F(AV)} + 0.08\ I_F{}^2{}_{(RMS)}$

**Figure 1. Conduction losses versus average current**

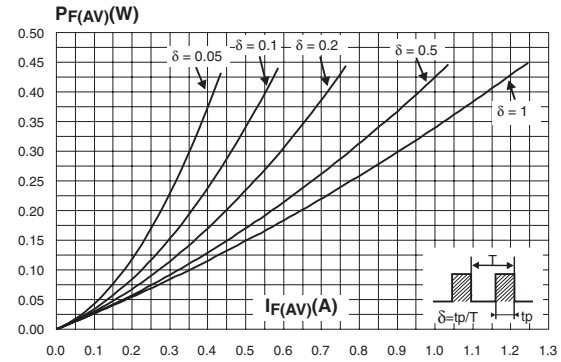



**Figure 2. Average forward current versus ambient temperature (δ = 0.5)**

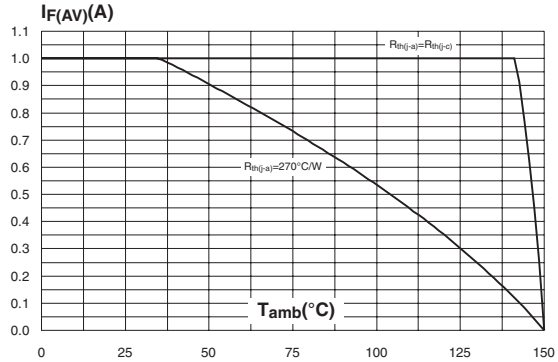





**Figure 3. Normalized avalanche power derating versus pulse duration**

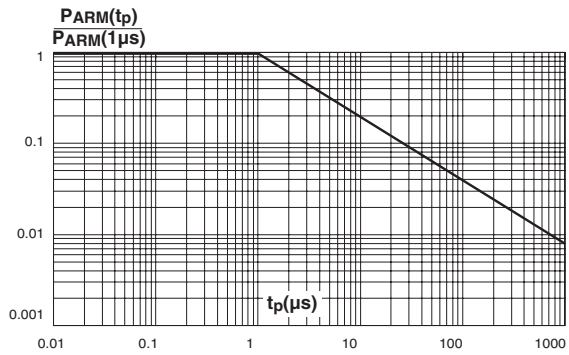



**Figure 4. Normalized avalanche power derating versus junction temperature**

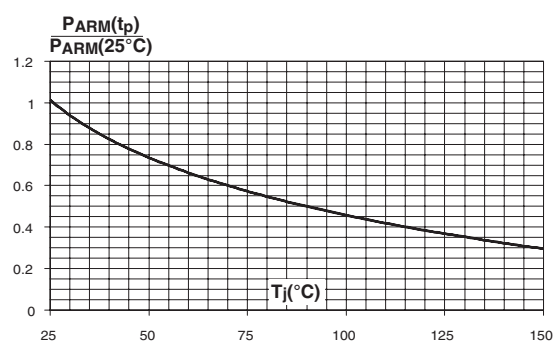



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)**

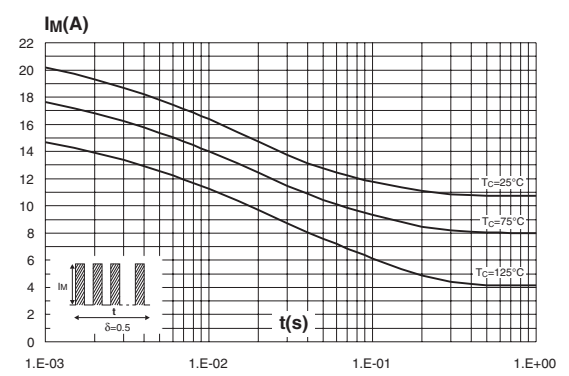



**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**

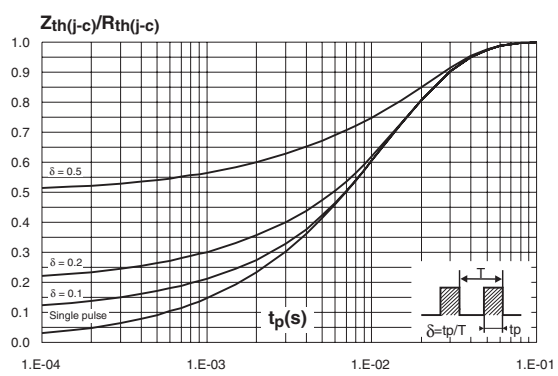


**Figure 7. Reverse leakage currrent versus reverse voltage applied (typical values)**

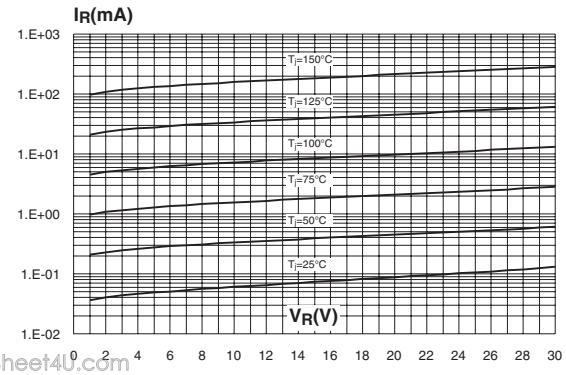





**Figure 8. Reverse leakage currrent versus junction temperature (typical values)**

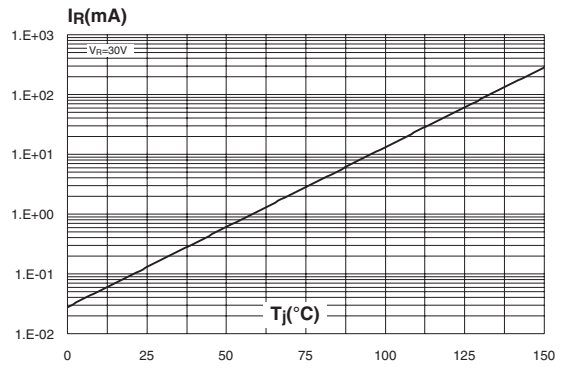



**Figure 9. Junction capacitance versus reverse voltage applied (typical values)**

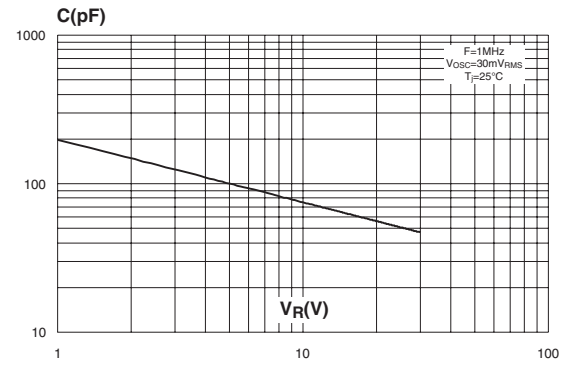



**Figure 10. Forward voltage drop versus forward current**

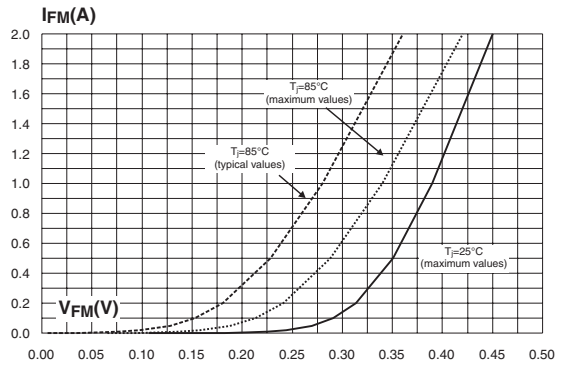
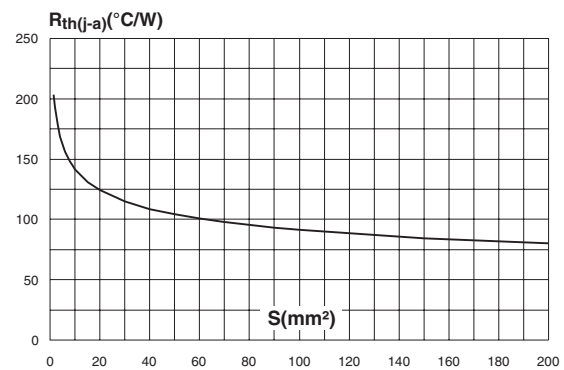
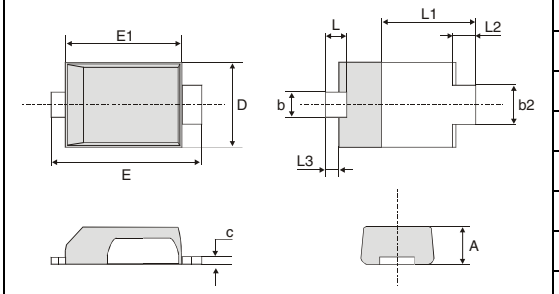



**Figure 11. Thermal resistance junction to ambient versus copper surface under tab (epoxy printed board FR4, Cu=35 µm, typical values)**



# 2 Package information

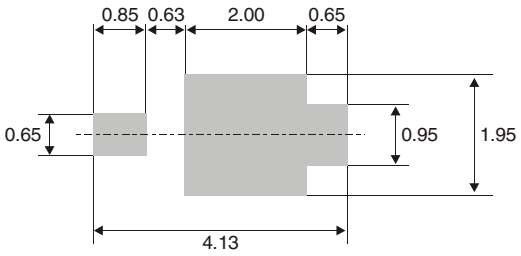
**Table 4. STmite flat dimensions**




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.80 | 0.85 | 0.95 | 0.031 | 0.033 | 0.037 |
| b | 0.40 | 0.55 | 0.65 | 0.016 | 0.022 | 0.026 |
| b2 | 0.70 | 0.85 | 1.00 | 0.027 | 0.033 | 0.039 |
| c | 0.10 | 0.15 | 0.25 | 0.004 | 0.006 | 0.009 |
| D | 1.75 | 1.90 | 2.05 | 0.069 | 0.075 | 0.081 |
| E | 3.60 | 3.80 | 3.90 | 0.142 | 0.150 | 0.154 |
| E1 | 2.80 | 2.95 | 3.10 | 0.110 | 0.116 | 0.122 |
| L | 0.50 | 0.55 | 0.80 | 0.020 | 0.022 | 0.031 |
| L1 | 2.10 | 2.40 | 2.60 | 0.083 | 0.094 | 0.102 |
| L2 | 0.45 | 0.60 | 0.75 | 0.018 | 0.024 | 0.030 |
| L3 | 0.20 | 0.35 | 0.50 | 0.008 | 0.014 | 0.020 |



**Figure 12. STmite flat recommended footprint (all 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

| Part number | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS1L30MF | F1L3 | STmite flat | 16 mg | 12000 | Tape and reel |

# 4 Revision history

| Date | Revision | Changes |
|---|---|---|
| 21-Aug-2006 | 1 | First issue. |

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