

LOW DROP POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

| | |
|-------------------|-------|
| $I_{F(AV)}$ | 1 A |
| V_{RRM} | 30 V |
| $T_j(\text{max})$ | 150°C |
| $V_F(\text{max})$ | 0.3 V |

FEATURES AND BENEFITS

- Very low forward voltage drop for less power dissipation
- Optimized conduction/reverse losses trade-off which means the highest yield in the applications
- Surface mount miniature packages
- Avalanche capability specified

DESCRIPTION

Single Schottky rectifier suited to Switched Mode Power Supplies and high frequency DC to DC converters, freewheel diode and integrated circuit latch up protection.

Packaged in SMA and SMB, this device is especially intended for use in parallel with MOSFETs in synchronous rectification.

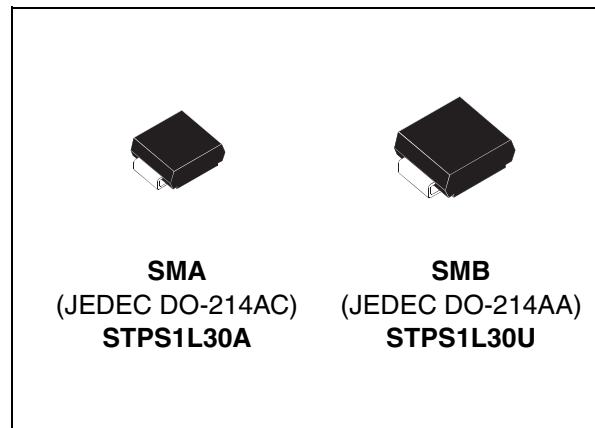


Table 2: Order Codes

| Part Number | Marking |
|-------------|---------|
| STPS1L30A | GB3 |
| STPS1L30U | G23 |

Table 3: Absolute Ratings (limiting values)

| Symbol | Parameter | Value | Unit |
|--------------|--|---|------------------|
| V_{RRM} | Repetitive peak reverse voltage | 30 | V |
| $I_{F(RMS)}$ | RMS forward current | 10 | A |
| $I_{F(AV)}$ | Average forward current | $T_L = 135^\circ\text{C} \quad \delta = 0.5$ | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ms sinusoidal}$ | A |
| I_{RRM} | Repetitive peak reverse current | $t_p = 2\mu\text{s} \quad F = 1\text{kHz square}$ | A |
| I_{RSM} | Non repetitive peak reverse current | $t_p = 100\mu\text{s square}$ | A |
| P_{ARM} | Repetitive peak avalanche power | $t_p = 1\mu\text{s} \quad T_j = 25^\circ\text{C}$ | W |
| T_{stg} | Storage temperature range | -65 to + 150 | °C |
| T_j | 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

STPS1L30

Table 4: Thermal Resistance

| Symbol | Parameter | Value | Unit |
|---------------|------------------|-------|------|
| $R_{th(j-l)}$ | Junction to lead | SMA | 30 |
| | | SMB | 25 |

Table 5: Static Electrical Characteristics

| Symbol | Parameter | Tests conditions | Min. | Typ | Max. | Unit |
|---------|-------------------------|---------------------------|-------------------|-------|-------|---------------|
| I_R^* | Reverse leakage current | $T_j = 25^\circ\text{C}$ | $V_R = V_{RRM}$ | | 200 | μA |
| | | $T_j = 100^\circ\text{C}$ | | 6 | 15 | mA |
| V_F^* | Forward voltage drop | $T_j = 25^\circ\text{C}$ | $I_F = 1\text{A}$ | | 0.395 | V |
| | | $T_j = 125^\circ\text{C}$ | | 0.26 | 0.3 | |
| | | $T_j = 25^\circ\text{C}$ | $I_F = 2\text{A}$ | | 0.445 | |
| | | $T_j = 125^\circ\text{C}$ | | 0.325 | 0.375 | |

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

To evaluate the conduction losses use the following equation: $P = 0.225 \times I_F(\text{AV}) + 0.075 I_F^2(\text{RMS})$

Figure 1: Average forward power dissipation versus average forward current

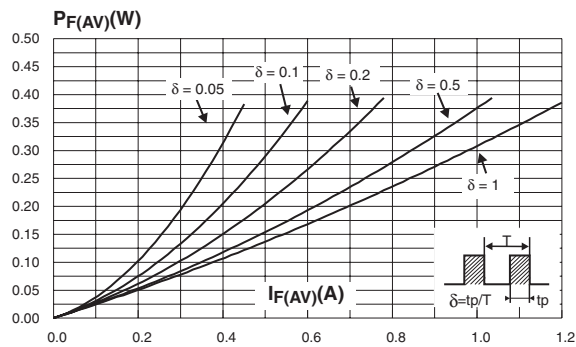


Figure 2: Average forward current versus ambient temperature (delta = 0.5)

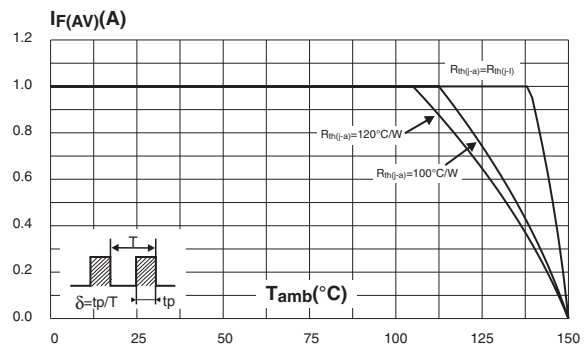


Figure 3: Normalized avalanche power derating versus pulse duration

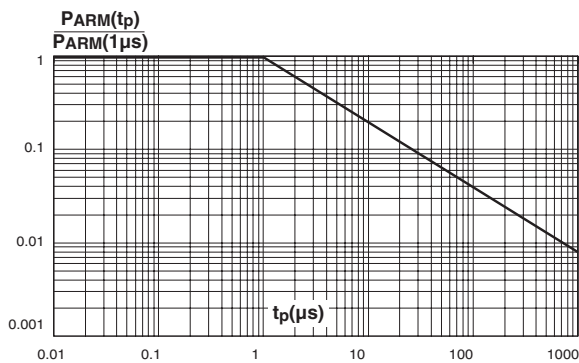


Figure 4: Normalized avalanche power derating versus junction temperature

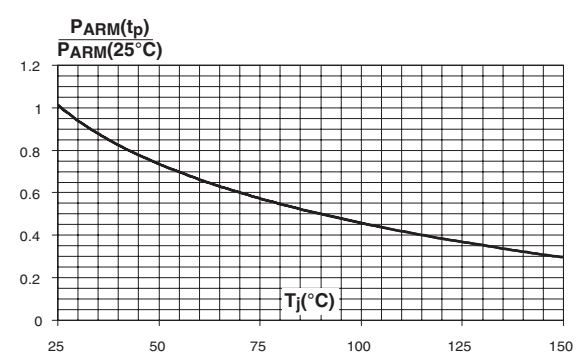


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)

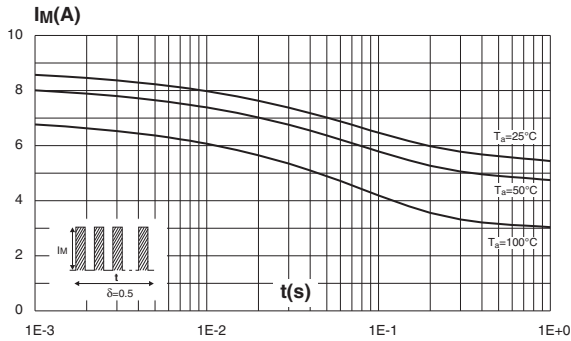


Figure 6: Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)

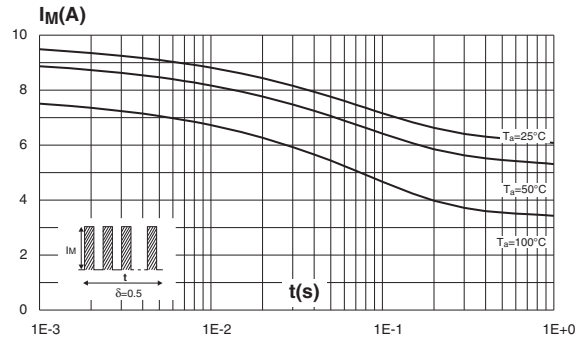


Figure 7: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35µm, recommended pad layout) (SMA)

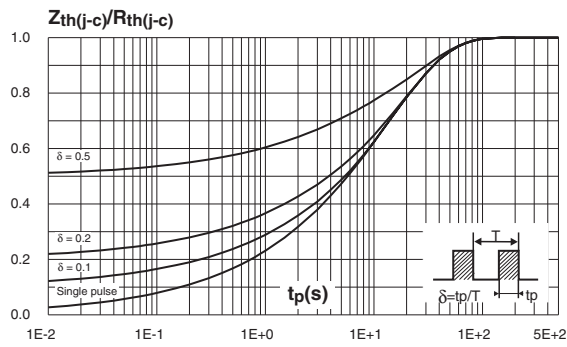


Figure 8: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35µm, recommended pad layout) (SMB)

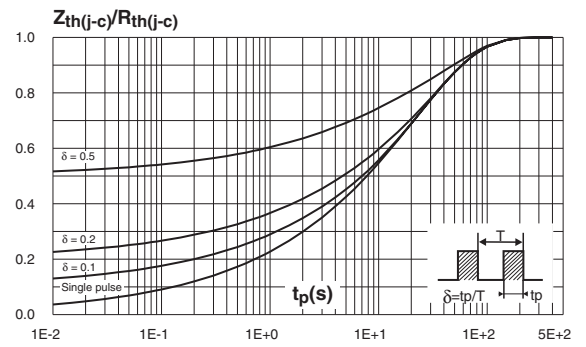


Figure 9: Reverse leakage current versus reverse voltage applied (typical values)

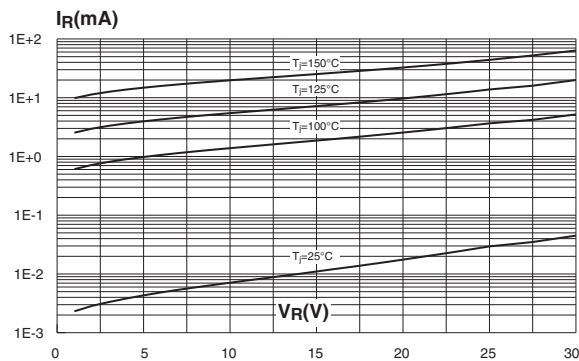


Figure 10: Junction capacitance versus reverse voltage applied (typical values)

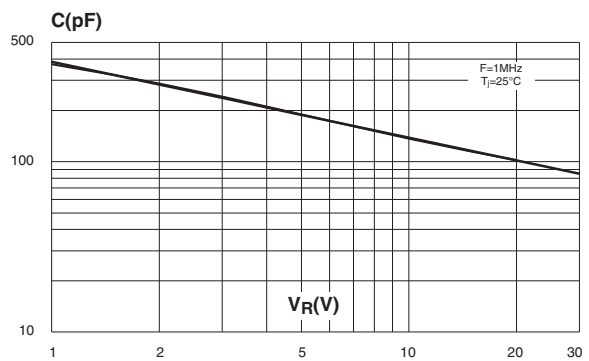


Figure 11: Forward voltage drop versus forward current (typical values, high level)

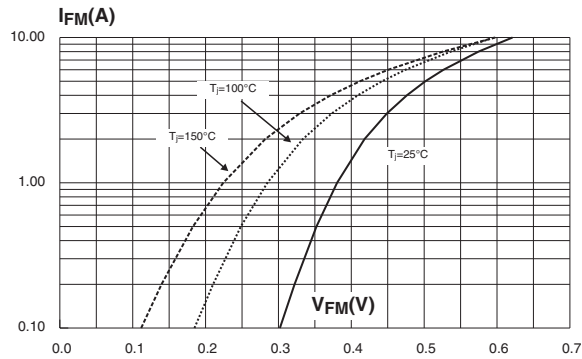


Figure 12: Forward voltage drop versus forward current (maximum values, low level)

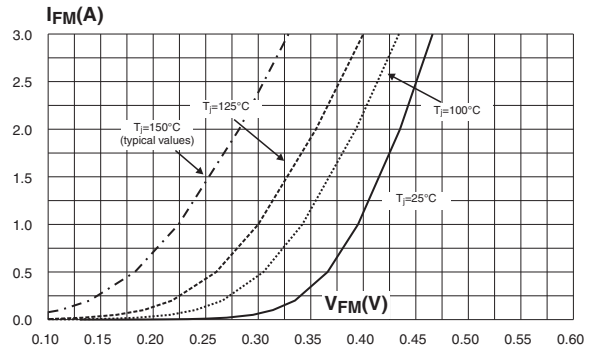


Figure 13: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35µm) (SMA)

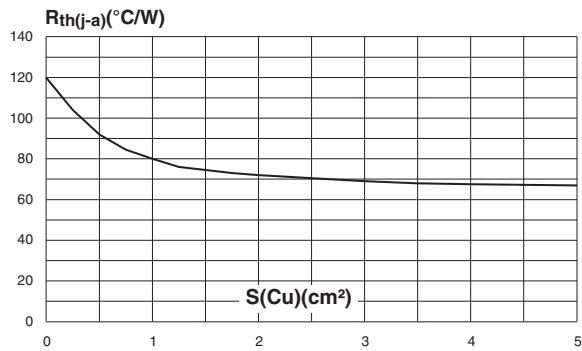


Figure 14: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35µm) (SMB)

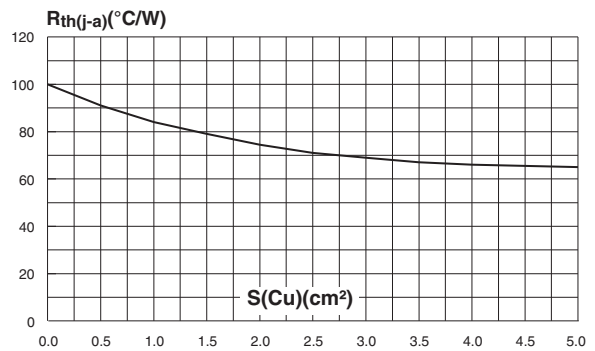


Figure 15: SMA Package Mechanical Data

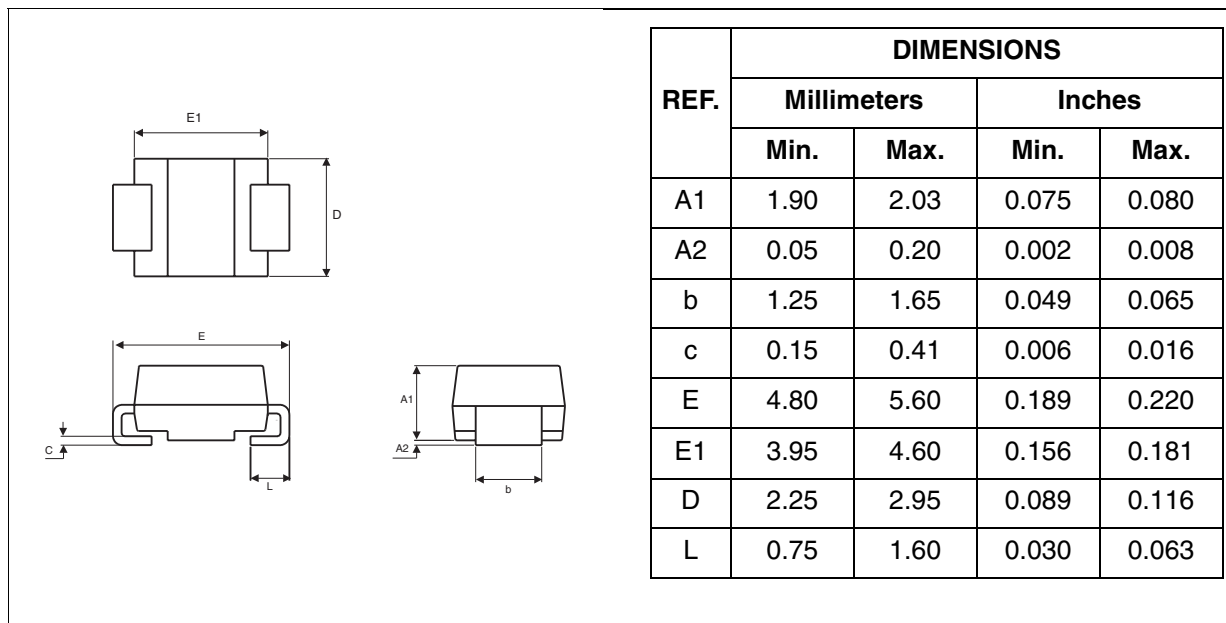
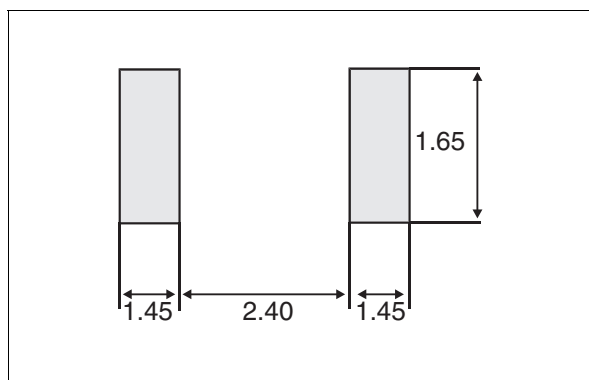
Figure 16: SMA Foot Print Dimensions
(in millimeters)

Figure 17: SMB Package Mechanical Data

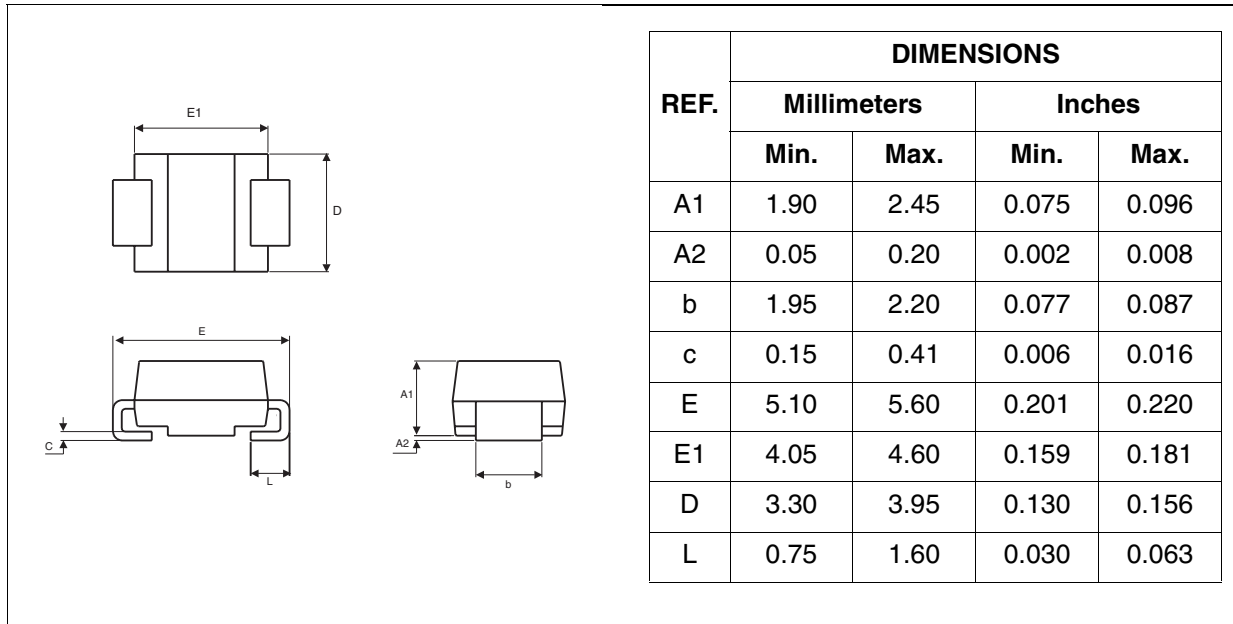


Figure 18: SMB Foot Print Dimensions (in millimeters)

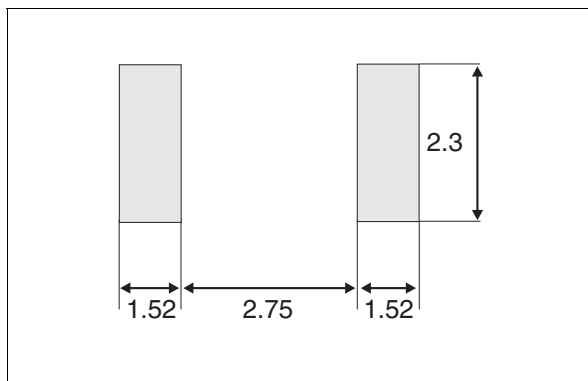


Table 6: Ordering Information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|---------|----------|---------------|
| STPS1L30A | GB3 | SMA | 0.068 g | 5000 | Tape & reel |
| STPS1L30U | G23 | SMB | 0.107 g | 2500 | Tape & reel |

- Band indicates cathode
- Epoxy meets UL94, V0

Table 7: Revision History

| Date | Revision | Description of Changes |
|----------|----------|---|
| Jul-2003 | 5A | Last update. |
| Aug-2004 | 6 | SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080). |

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