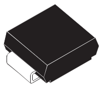
# STPS130

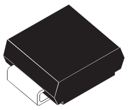
## POWER SCHOTTKY RECTIFIER

**Table 1: Main Product Characteristics**

| | |
|---|---|
| **$I_{F(AV)}$** | **1 A** |
| **$V_{RRM}$** | **30 V** |
| **$T_j$ (max)** | **150°C** |
| **$V_F$(max)** | **0.46 V** |



**SMA**
(JEDEC DO-214AC)
**STPS130A**



**SMB**
(JEDEC DO-214AA)
**STPS130U**

### 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.

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

**Table 2: Order Codes**

| Part Number | Marking |
|---|---|
| STPS130A | S130 |
| STPS130U | G12 |

**Table 3: Absolute Ratings** (limiting values)

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 30 | V |
| $I_{F(RMS)}$ | RMS forward voltage | | 7 | A |
| $I_{F(AV)}$ | Average forward current | $T_L$ = 130°C  $\delta = 0.5$ | 1 | A |
| $I_{FSM}$ | Surge non repetitive forward current | tp = 10ms sinusoidal | 45 | A |
| $I_{RRM}$ | Repetitive peak reverse current | tp = 2µs  F = 1kHz square | 1 | A |
| $I_{RSM}$ | Non repetitive peak reverse current | tp = 100µs square | 1 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | tp = 1µs  Tj = 25°C | 1200 | 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 |

* : $\frac{dPtot}{dTj} > \frac{1}{Rth(j-a)}$ thermal runaway condition for a diode on its own heatsink

### Table 4: Thermal Resistance

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{th(j-l)}$ | Junction to lead | SMA | 30 | °C/W |
| | | SMB | 23 | |

### Table 5: Static Electrical Characteristics

| Symbol | Parameter | Tests conditions | | Min. | Typ | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ * | Reverse leakage current | $T_j$ = 25°C | $V_R = V_{RRM}$ | | | 10 | µA |
| | | $T_j$ = 125°C | | | 1.5 | 10 | mA |
| $V_F$ ** | Forward voltage drop | $T_j$ = 25°C | $I_F$ = 1A | | | 0.55 | V |
| | | $T_j$ = 125°C | | | 0.37 | 0.46 | |
| | | $T_j$ = 25°C | $I_F$ = 2A | | | 0.63 | |
| | | $T_j$ = 125°C | | | 0.45 | 0.55 | |

Pulse test: * tp = 380 µs, $\delta < 2\%$
** tp = 5 ms, $\delta < 2\%$

To evaluate the conduction losses use the following equation: $P = 0.37 \times I_{F(AV)} + 0.090\, I_F^2{}_{(RMS)}$

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

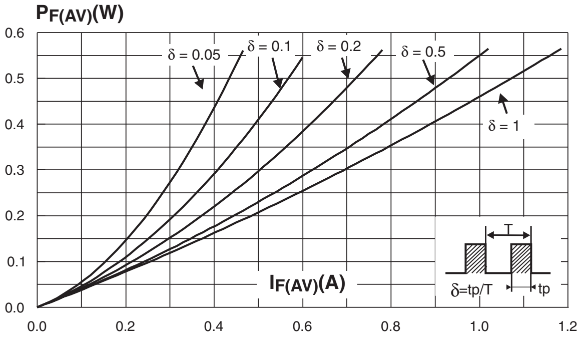


**Figure 2: Average forward current versus ambient temperature (δ = 0.5)**

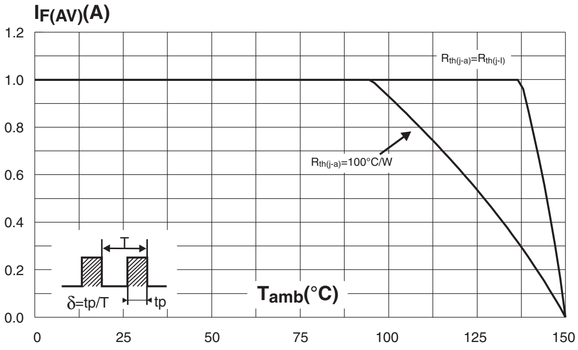


**Figure 3: Normalized avalanche power derating versus pulse duration**

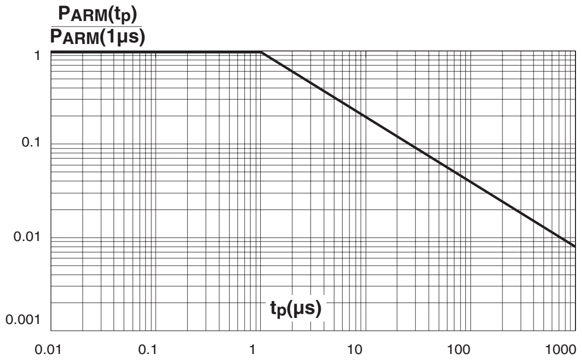


**Figure 4: Normalized avalanche power derating versus junction temperature**

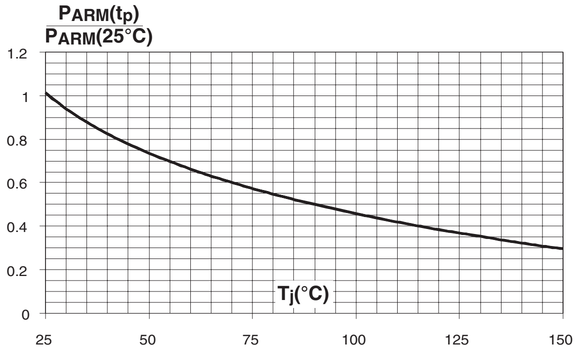


**Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)**

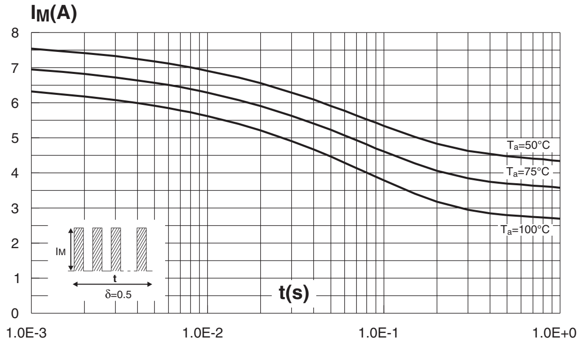


**Figure 6: Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)**

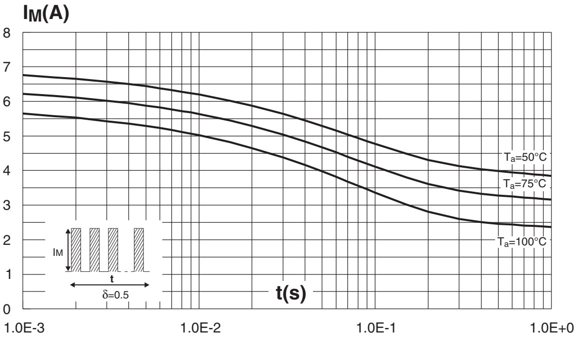


**Figure 7: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35µm, recommended pad layout) (SMA)**

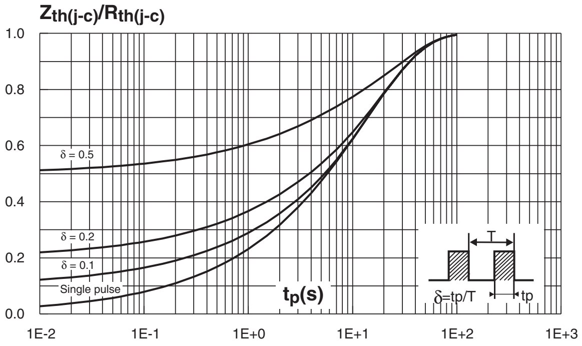


**Figure 8: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35µm, recommended pad layout) (SMB)**

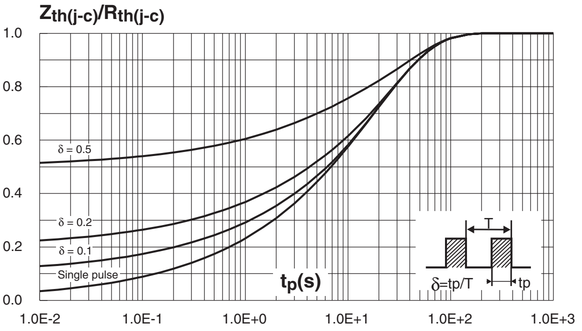


**Figure 9: Reverse leakage current versus reverse voltage applied (typical values)**

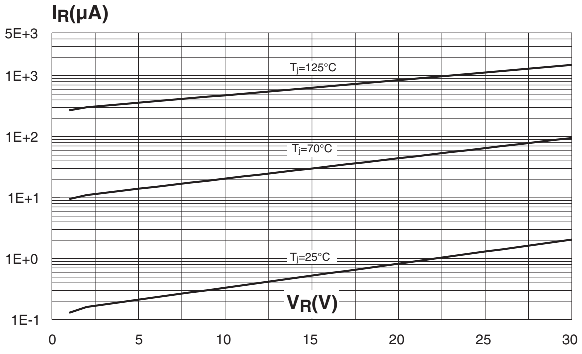


**Figure 10: Junction capacitance versus reverse voltage applied (typical values)**

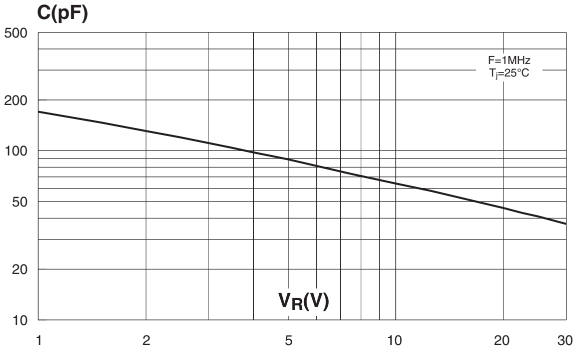


**Figure 11: Forward voltage drop versus forward current (maximum values)**

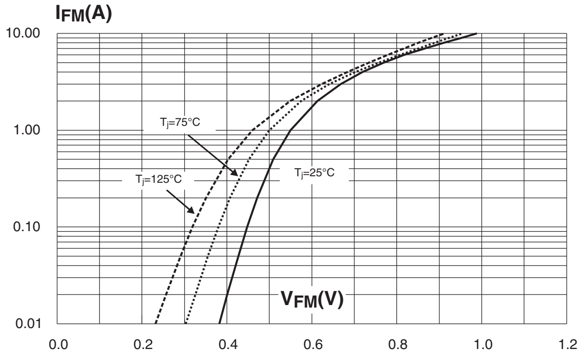


**Figure 12: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35µm) (SMA)**

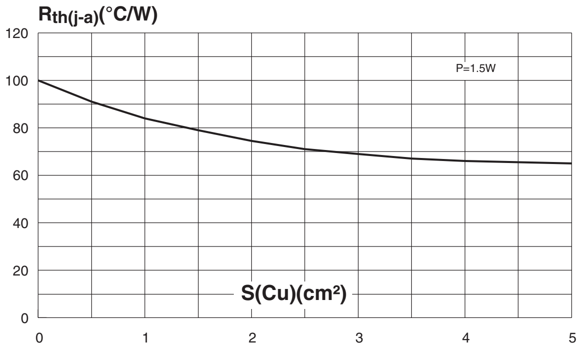


**Figure 13: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35µm) (SMB)**

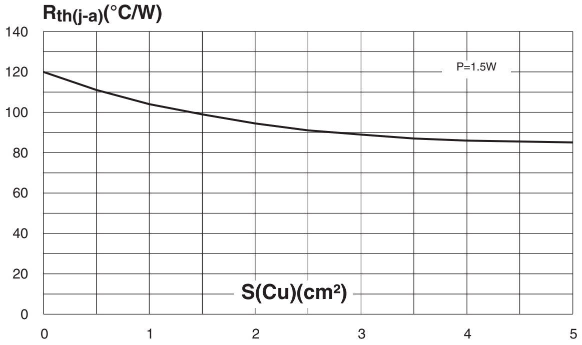
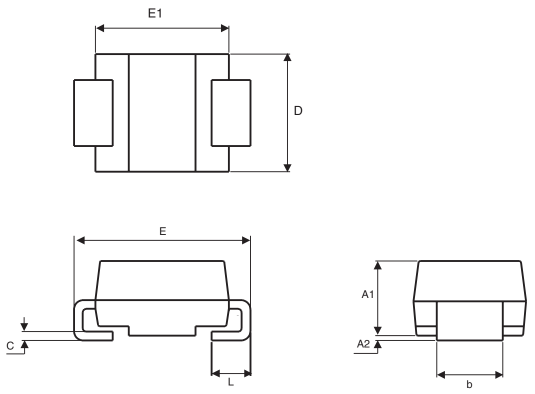


**Figure 14: SMA Package Mechanical Data**



| REF. | DIMENSIONS | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.03 | 0.075 | 0.080 |
| A2 | 0.05 | 0.20 | 0.002 | 0.008 |
| b | 1.25 | 1.65 | 0.049 | 0.065 |
| c | 0.15 | 0.41 | 0.006 | 0.016 |
| E | 4.80 | 5.60 | 0.189 | 0.220 |
| E1 | 3.95 | 4.60 | 0.156 | 0.181 |
| D | 2.25 | 2.95 | 0.089 | 0.116 |
| L | 0.75 | 1.60 | 0.030 | 0.063 |

**Figure 15: SMA Foot Print Dimensions**
(in millimeters)

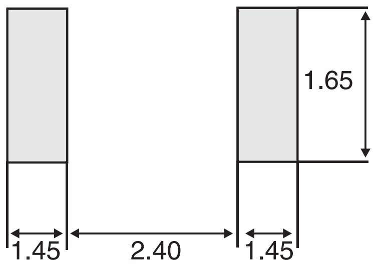
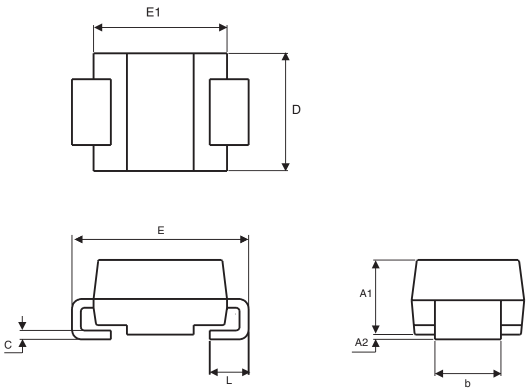


**Figure 16: SMB Package Mechanical Data**



| 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 | 0.41 | 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 | 1.60 | 0.030 | 0.063 |

**Figure 17: SMB Foot Print Dimensions**
(in millimeters)

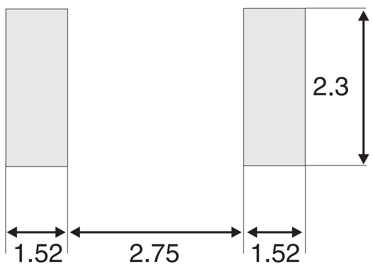


**Table 6: Ordering Information**

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS130A | S130 | SMA | 0.068 g | 5000 | Tape & reel |
| STPS130U | G12 | 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 | 4A | Last update. |
| Aug-2004 | 5 | SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080). |

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