

POWER SCHOTTKY RECTIFIER

Table 1: Main Product Characteristics

| | |
|-------------------|--------|
| $I_{F(AV)}$ | 1 A |
| V_{RRM} | 150 V |
| $T_j(\text{max})$ | 175°C |
| $V_F(\text{max})$ | 0.67 V |

FEATURES AND BENEFITS

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability specified

DESCRIPTION

150V Power Schottky rectifier are suited for switch Mode Power Supplies on up to 24V rails and high frequency converters.

Packaged in SMA and Axial, this device is intended for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

Table 3: Absolute Ratings (limiting values)

| Symbol | Parameter | | | Value | Unit |
|--------------|--|-------|---|--------------|------------------|
| V_{RRM} | Repetitive peak reverse voltage | | | 150 | V |
| $I_{F(RMS)}$ | RMS forward voltage | | | 15 | A |
| $I_{F(AV)}$ | Average forward current | SMA | $T_L = 160^\circ\text{C}$ $\delta = 0.5$ | 1 | A |
| | | DO-41 | $T_L = 150^\circ\text{C}$ $\delta = 0.5$ | | |
| I_{FSM} | Surge non repetitive forward current | SMA | Half wave, single phase, | 50 | A |
| | | DO-41 | 50Hz | | |
| P_{ARM} | Repetitive peak avalanche power | | $t_p = 1\mu\text{s}$ $T_j = 25^\circ\text{C}$ | 1500 | W |
| T_{stg} | Storage temperature range | | | -65 to + 150 | °C |
| T_j | Maximum operating junction temperature * | | | 175 | °C |
| dV/dt | Critical rate of rise of reverse voltage (rated V_R , $T_j = 25^\circ\text{C}$) | | | 10000 | V/ μs |

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

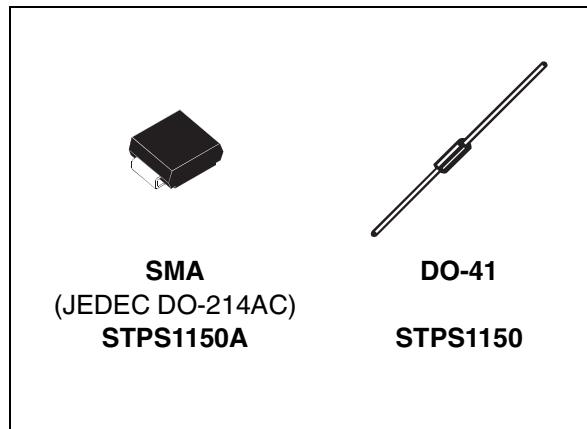


Table 2: Order Codes

| Part Number | Marking |
|-------------|----------|
| STPS1150A | 1150 |
| STPS1150 | STPS1150 |
| STPS1150RL | STPS1150 |

STPS1150

Table 4: Thermal Resistance

| Symbol | Parameter | Value | Unit |
|---------------|------------------------------|-------|------|
| $R_{th(j-l)}$ | Junction to lead | SMA | 20 |
| | Lead length = 10 mm DO-41 | 30 | °C/W |

Table 5: Static Electrical Characteristics

| Symbol | Parameter | Tests conditions | Min. | Typ | Max. | Unit |
|---------|-------------------------|---------------------------|-------------------|------|------|---------------|
| I_R * | Reverse leakage current | $T_j = 25^\circ\text{C}$ | | 0.2 | 1 | μA |
| | | $T_j = 125^\circ\text{C}$ | | 0.2 | 1 | mA |
| V_F * | Forward voltage drop | $T_j = 25^\circ\text{C}$ | $I_F = 1\text{A}$ | 0.78 | 0.82 | V |
| | | $T_j = 125^\circ\text{C}$ | | 0.62 | 0.67 | |
| | | $T_j = 25^\circ\text{C}$ | $I_F = 2\text{A}$ | 0.85 | 0.89 | |
| | | $T_j = 125^\circ\text{C}$ | | 0.69 | 0.75 | |

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

To evaluate the conduction losses use the following equation: $P = 0.59 \times I_F(\text{AV}) + 0.08 I_F^2 (\text{RMS})$

Figure 1: Average forward power dissipation versus average forward current

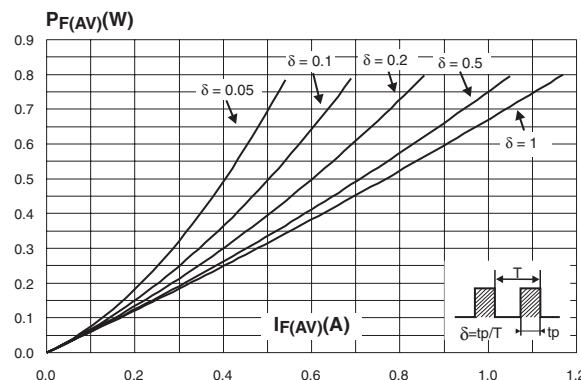


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$)

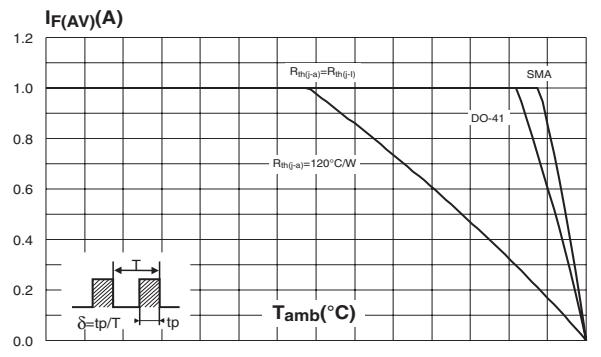


Figure 3: Normalized avalanche power derating versus pulse duration

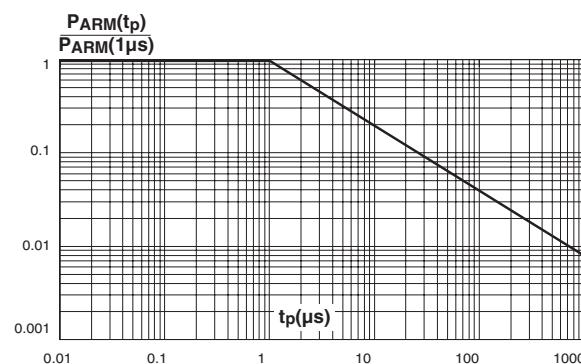


Figure 4: Normalized avalanche power derating versus junction temperature

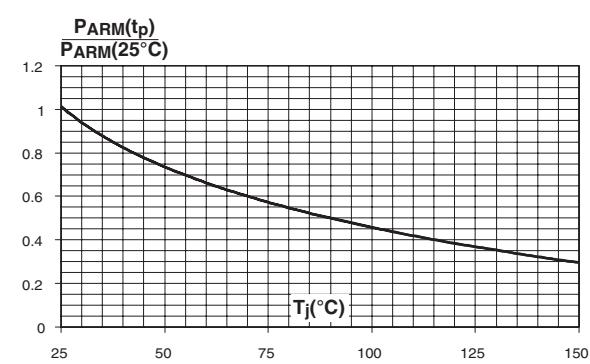


Figure 5: Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)

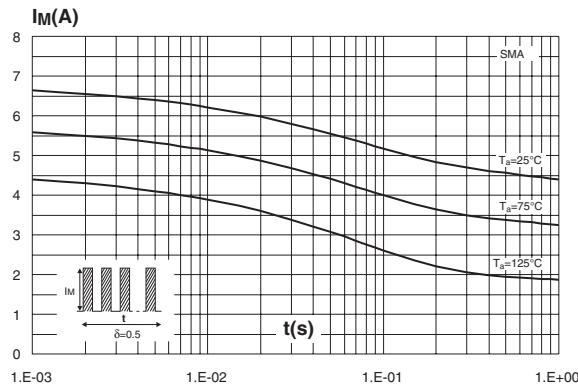


Figure 7: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, e(Cu)=35μm, recommended pad layout) (SMA)

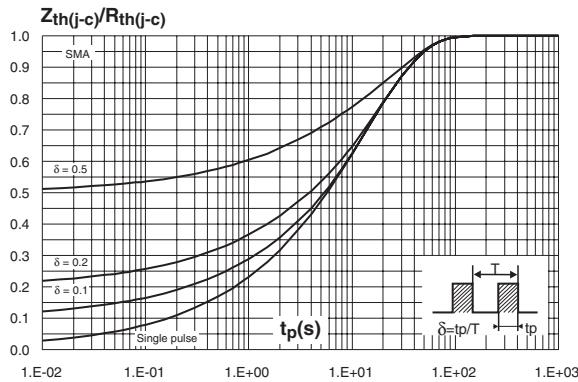


Figure 9: Reverse leakage current versus reverse voltage applied (typical values)

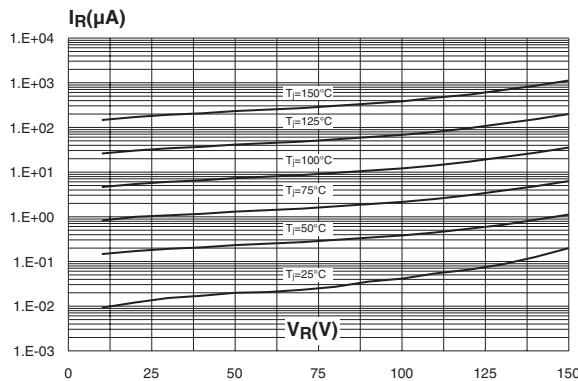


Figure 6: Non repetitive surge peak forward current versus overload duration (maximum values) (DO-41)

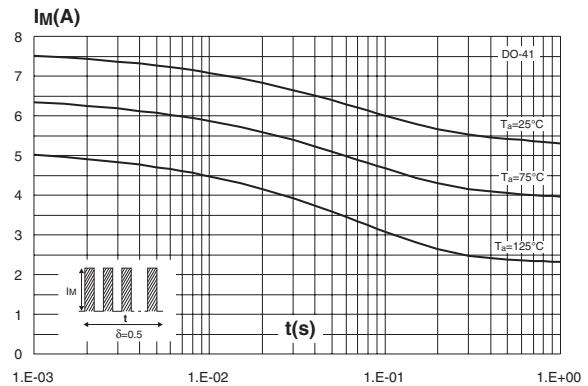


Figure 8: Relative variation of thermal impedance junction to ambient versus pulse duration (DO-41)

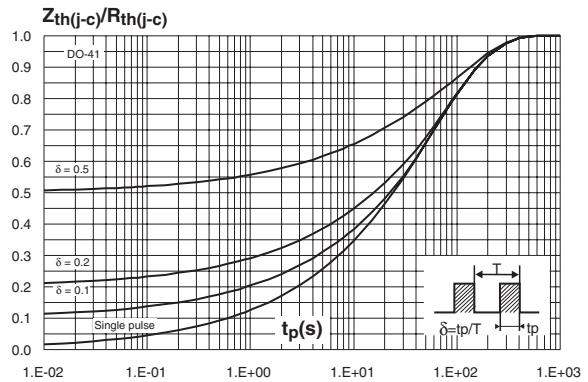


Figure 10: Junction capacitance versus reverse voltage applied (typical values)

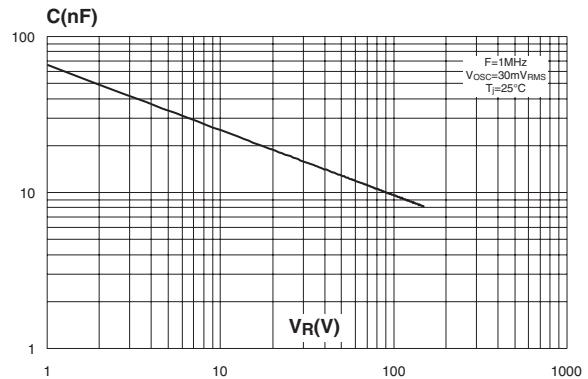


Figure 11: Forward voltage drop versus forward current (maximum values, high level)

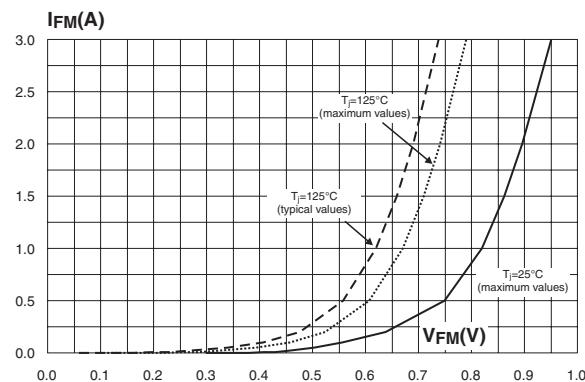


Figure 13: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness: 35 μ m) (SMA)

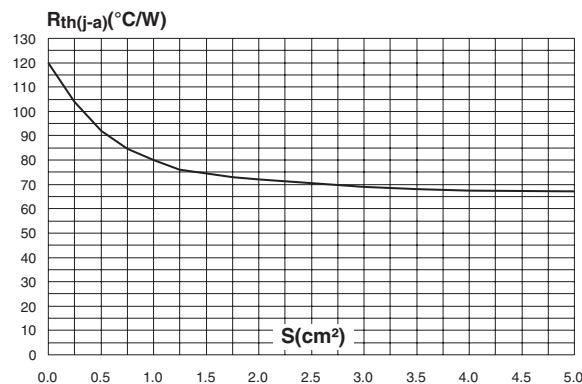


Figure 12: Forward voltage drop versus forward current (maximum values, low level)

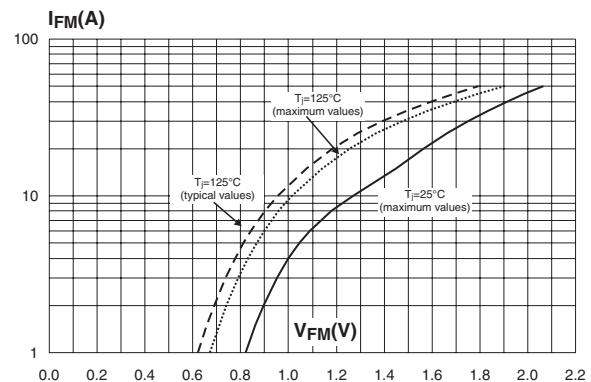


Figure 14: Thermal resistance versus lead length (DO-41)

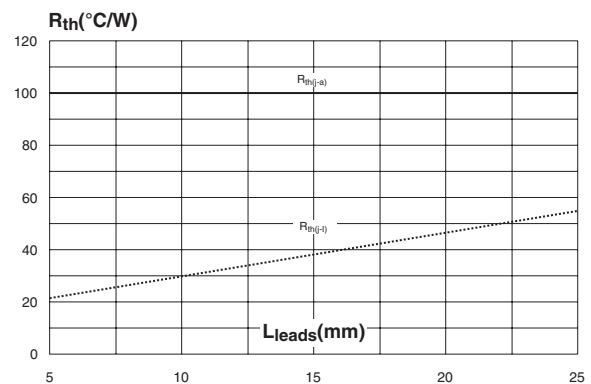


Figure 15: SMA Package Mechanical Data

| 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 |

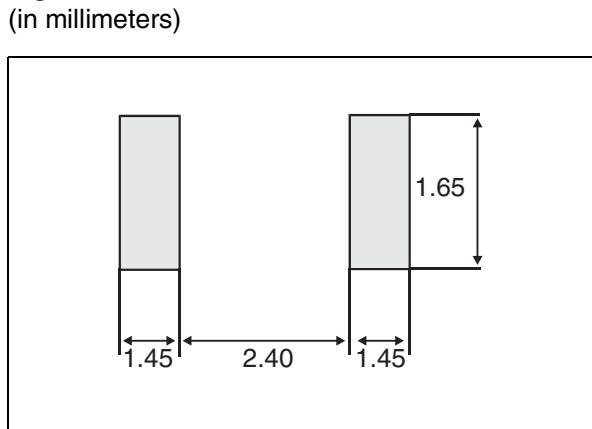
Figure 16: SMA Foot Print Dimensions

Figure 17: DO-41 Package Mechanical Data

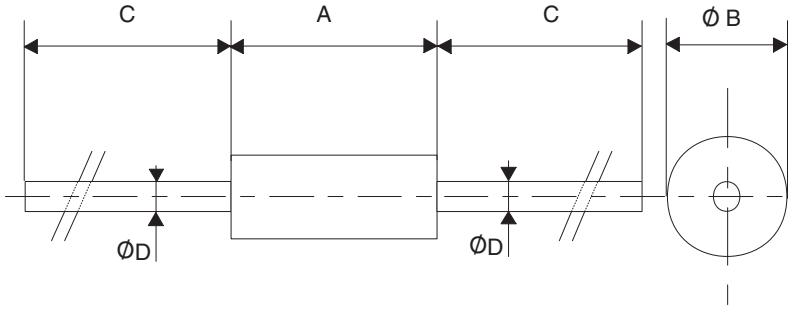
|  | | DIMENSIONS | | | |
|--|--|-------------|-------|--------|-------|
| REF. | | Millimeters | | Inches | |
| | | Min. | Max. | Min. | Max. |
| A | | 4.07 | 5.20 | 0.160 | 0.205 |
| B | | 2.04 | 2.71 | 0.080 | 0.107 |
| C | | 28 | | 1.102 | |
| D | | 0.712 | 0.863 | 0.028 | 0.034 |

Table 6: Ordering Information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|----------|---------|---------|----------|---------------|
| STPS1150A | 1150 | SMA | 0.068 g | 5000 | Tape & reel |
| STPS1150 | STPS1150 | DO-41 | 0.34 g | 2000 | Ammopack |
| STPS1150RL | STPS1150 | DO-41 | 0.34 g | 5000 | Tape & reel |

- Band indicates cathode
- Epoxy meets UL94, V0

Table 7: Revision History

| Date | Revision | Description of Changes |
|----------|----------|---|
| Jul-2003 | 2A | Last update. |
| Aug-2004 | 3 | SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080). |

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