



**SOD-123
STPS0503Z**

Description

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

Packaged in SOD-123, this device is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications. Due to the small size of the package this device fits GSM and PCMCIA requirements.

Table 1. Device summary

| | |
|-------------|--------|
| $I_{F(AV)}$ | 0.5 A |
| V_{RRM} | 30 V |
| $V_F(max)$ | 0.33 V |

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching

1 Characteristics

Table 2. Absolute ratings (limiting values)

| Symbol | Parameter | Value | Unit |
|--------------|---|----------------------------------|------------------|
| V_{RRM} | Repetitive peak reverse voltage | 30 | V |
| $I_{F(RMS)}$ | Forward rms current | 2 | A |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | $T_a = 55\text{ }^\circ\text{C}$ | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms sinusoidal}$ | A |
| dV/dt | Critical rate of rise of reverse voltage | 10000 | V/ μ s |
| T_{stg} | Storage temperature range | -65 to +150 | $^\circ\text{C}$ |
| T_j | Operating junction temperature range ⁽¹⁾ | -40 to +150 | $^\circ\text{C}$ |
| T_L | Maximum temperature for soldering during 10 s | 260 | $^\circ\text{C}$ |

1. $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ condition to avoid thermal runaway for a diode on its own heatsink

Table 3. Thermal resistance

| Symbol | Parameter | Value | Unit |
|---------------|---------------------|--------------------|--------------------|
| $R_{th(j-a)}$ | Junction to ambient | 340 ⁽¹⁾ | $^\circ\text{C/W}$ |

1. Copper area on PCB $S = 2.5\text{ mm}^2$

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | Typ. | Max. | Unit | |
|-------------|-------------------------|-----------------------------------|----------------------|------|-------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ }^\circ\text{C}$ | $V_R = 15\text{ V}$ | | 12 | μA |
| | | $T_j = 125\text{ }^\circ\text{C}$ | | 3 | 5 | mA |
| | | $T_j = 25\text{ }^\circ\text{C}$ | $V_R = V_{RRM}$ | | 130 | μA |
| | | $T_j = 125\text{ }^\circ\text{C}$ | | 9 | 21 | mA |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ }^\circ\text{C}$ | $I_F = 0.1\text{ A}$ | | 0.375 | V |
| | | $T_j = 125\text{ }^\circ\text{C}$ | | 0.20 | 0.22 | |
| | | $T_j = 25\text{ }^\circ\text{C}$ | $I_F = 0.5\text{ A}$ | | 0.43 | |
| | | $T_j = 125\text{ }^\circ\text{C}$ | | 0.31 | 0.33 | |

1. Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$

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

To evaluate the maximum conduction losses use the following equation:

$$P = 0.23 \times I_{F(AV)} + 0.18 I_{F(RMS)}^2$$

Figure 1. Conduction losses versus average current

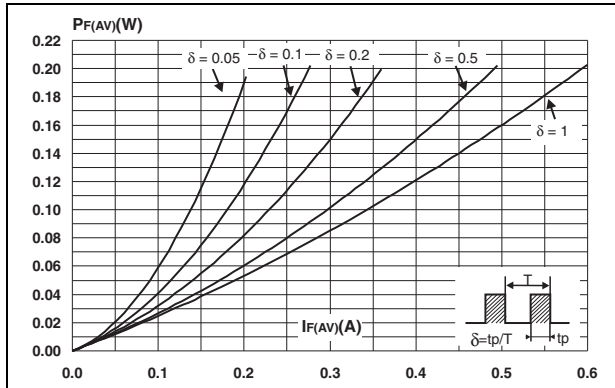


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

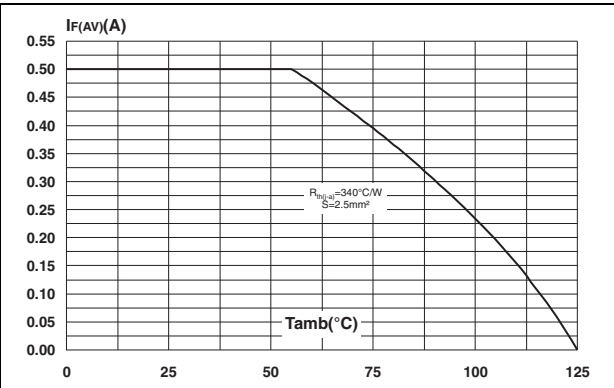


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

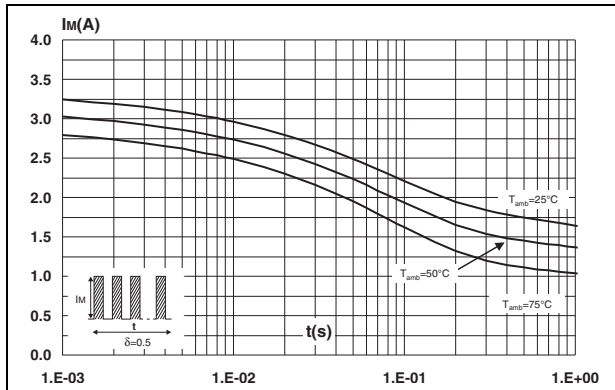


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration

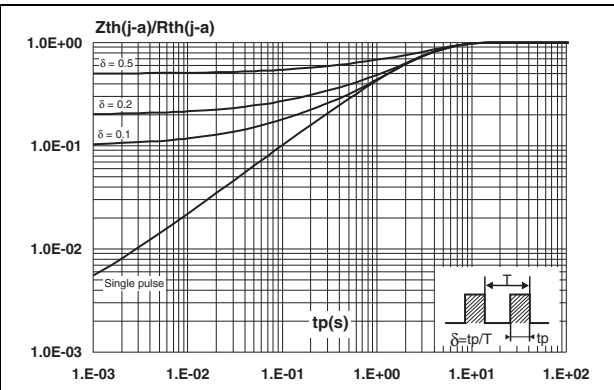


Figure 5. Reverse leakage current versus reverse voltage applied (typical values)

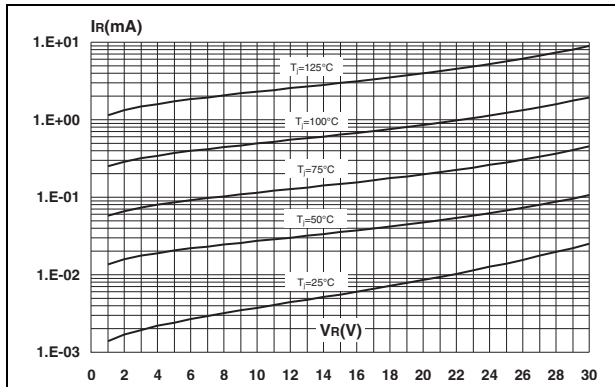


Figure 6. Reverse leakage current versus junction temperature (typical values)

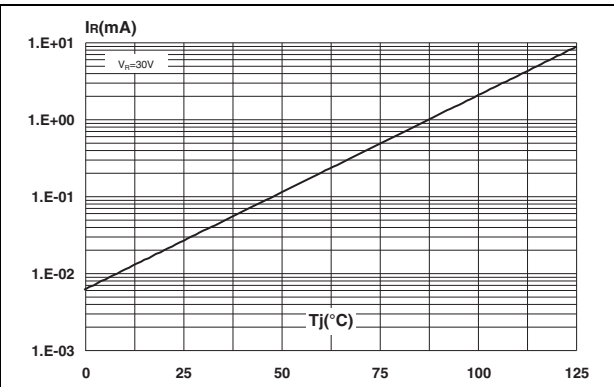


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

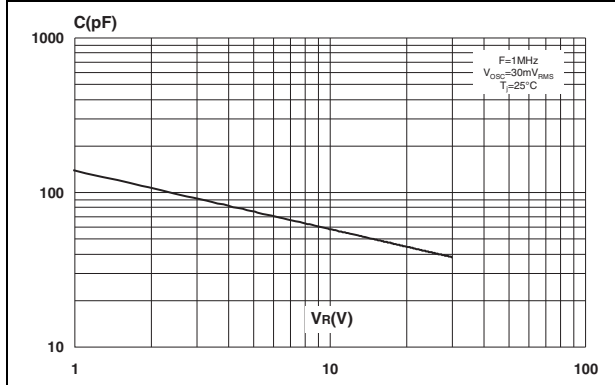


Figure 8. Forward voltage drop versus forward current

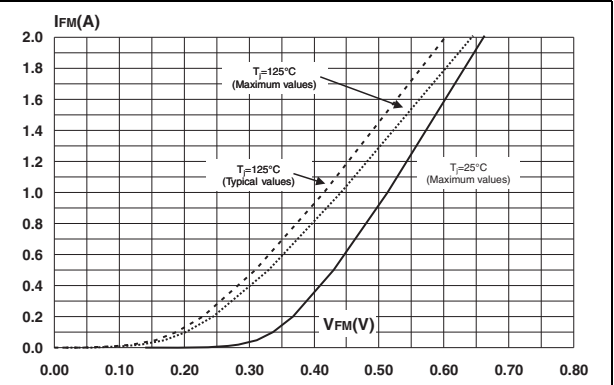
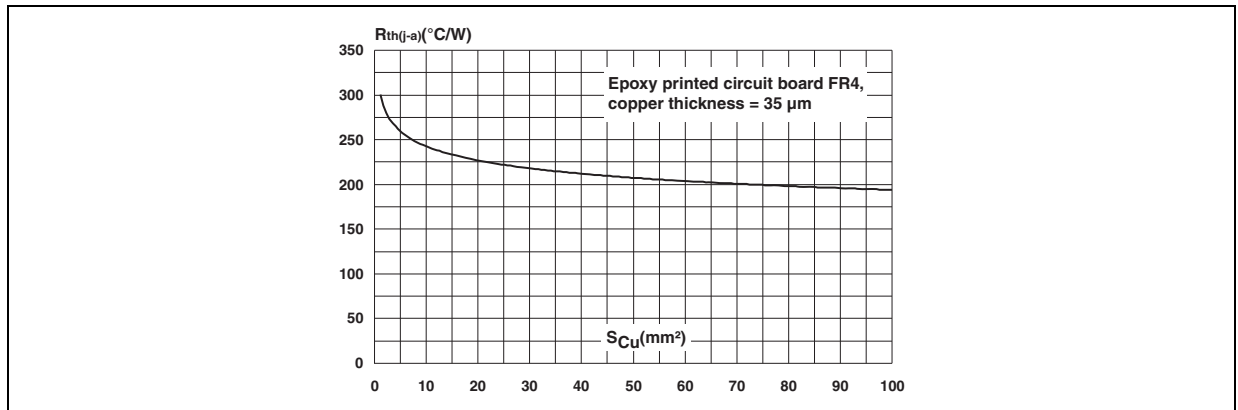


Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (typical values)



2 Package information

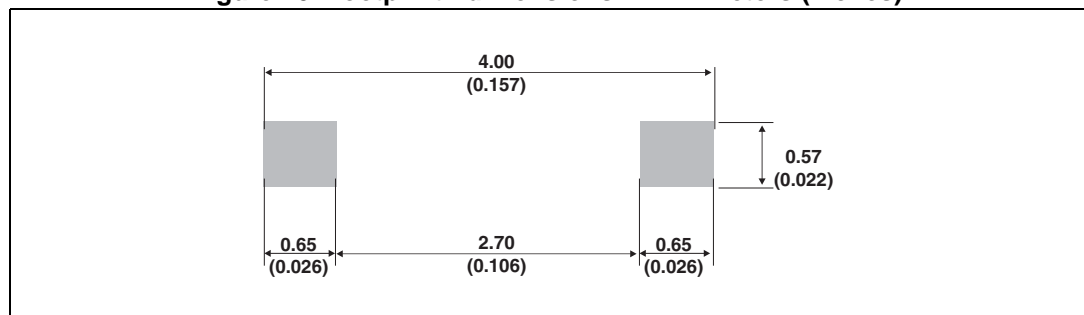
- Epoxy meets UL94, V0.
- Band indicates cathode.

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Table 5. SOD-123 dimensions

| Ref | Dimensions | | | |
|-----|-------------|------|------------|--------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | | 1.45 | | 0.057 |
| A1 | 0 | 0.1 | 0 | 0.004 |
| A2 | 0.85 | 1.35 | 0.033 | 0.053 |
| b | 0.55 Typ. | | 0.022 Typ. | |
| c | 0.15 Typ. | | 0.039 Typ. | |
| D | 2.55 | 2.85 | 0.1 | 0.112 |
| E | 1.4 | 1.7 | 0.055 | 0.067 |
| G | 0.25 | | 0.01 | |
| H | 3.55 | 3.75 | 0.14 | 0.1148 |

Figure 10. Footprint - dimensions in millimeters (inches)



3 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|---------|--------|----------|---------------|
| STPS0530Z | Z53 | SOD-123 | 0.01 g | 3000 | Tape and reel |

4 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| Mar-2003 | 1A | Initial release. |
| 17-Oct-2006 | 2 | Reformatted to current standards. Updated maximum junction temperatures to 150 °C and updated package illustration to show cathode bar on page 1 |
| 23-Apr-2014 | 3 | Updated Tj max to Tj range in Table 2 . |

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