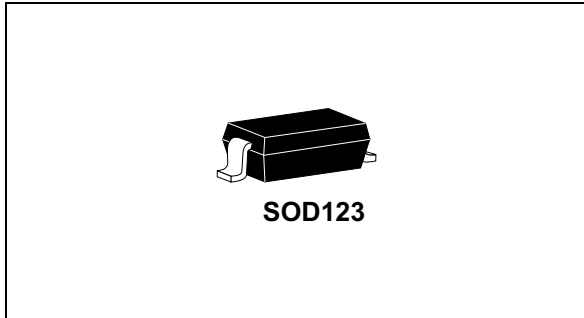


Automotive power Schottky rectifier

Datasheet - production data

**Description**

This single Schottky rectifier is 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 for automotive applications.

Table 1. Device summary

| Symbol | Value |
|-------------|--------|
| $I_{F(AV)}$ | 1 A |
| V_{RRM} | 40 V |
| T_j (max) | 150 °C |
| V_F (max) | 0.51 V |

Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- ECOPACK[®]2 compliant component
- AEC-Q101 qualified

1 Characteristics

Table 2. Absolute Ratings (limiting values)

| Symbol | Parameter | | Value | Unit |
|------------------|---|--|---------------|------|
| V _{RRM} | Repetitive peak reverse voltage | | 40 | V |
| I _F | Continuous forward current | T _{amb} = 60 °C | 1 | A |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal | 5.5 | A |
| I _{RRM} | Repetitive peak reverse current | t _p = 2 μs F = 1 kHz square | 0.5 | A |
| I _{RSM} | Non repetitive peak reverse current | t _p = 100 μs square | 1 | A |
| T _{stg} | Storage temperature range | | - 65 to + 150 | °C |
| T _j | Operating junction temperature ⁽¹⁾ | | - 40 to + 150 | °C |
| dV/dt | Critical rate of rise of reverse voltage | | 10000 | V/μs |

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 ⁽¹⁾ | 500 | °C/W |

1. Mounted on epoxy board.

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|-------------------------------|-------------------------|-------------------------|-----------------------|------|------|------|------|
| I _R ⁽¹⁾ | Reverse leakage current | T _j = 25 °C | V _R = 5 V | | | 10 | μA |
| | | T _j = 25 °C | V _R = 40 V | | | 40 | |
| | | T _j = 100 °C | | | 1.5 | 5 | mA |
| V _F ⁽²⁾ | Forward voltage drop | T _j = 25 °C | I _F = 1 A | | | 0.55 | V |
| | | T _j = 100 °C | | | 0.45 | 0.51 | |

1. Pulse test: t_p = 5 ms, δ < 2%

2. Pulse test: t_p = 380 ms, δ < 2%

To evaluate the maximum conduction losses use the following equation:

$$P = 0.2 \times I_{F(AV)} + 0.3 \times I_{F(RMS)}^2 \text{ at } T_j = 150 \text{ °C}$$

Figure 1. Average forward power dissipation versus average forward current

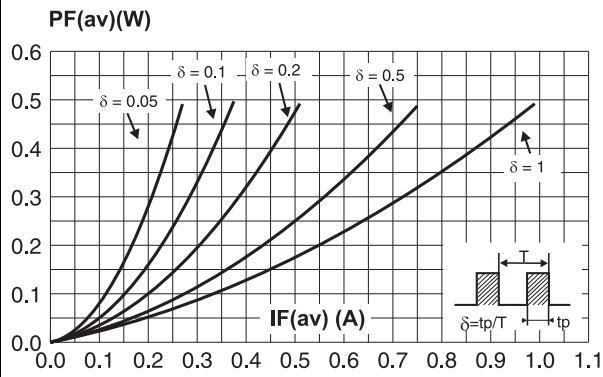


Figure 2. Average forward current versus ambient temperature ($\delta = 1$)

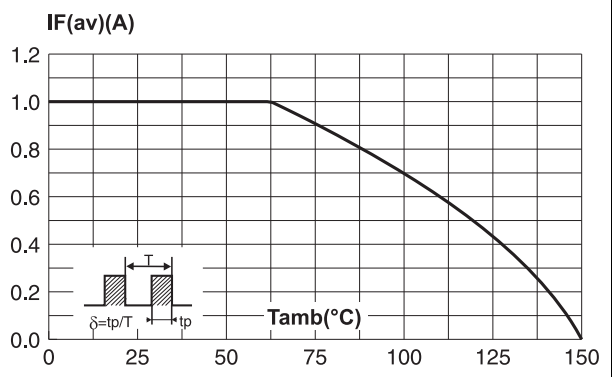


Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)

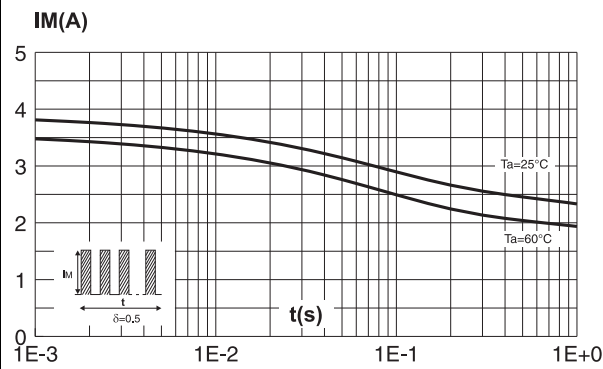
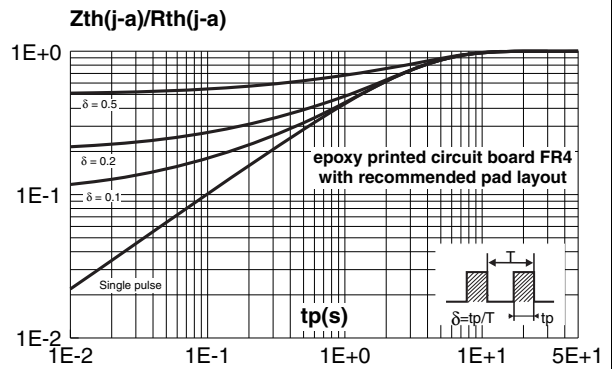
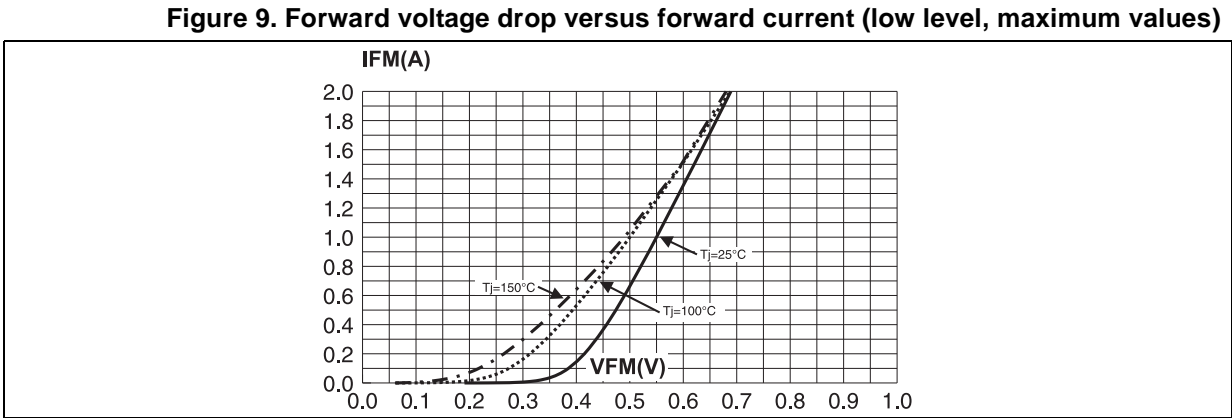
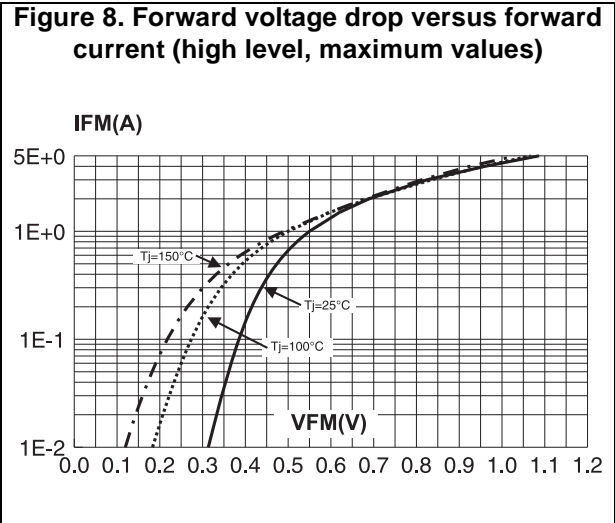
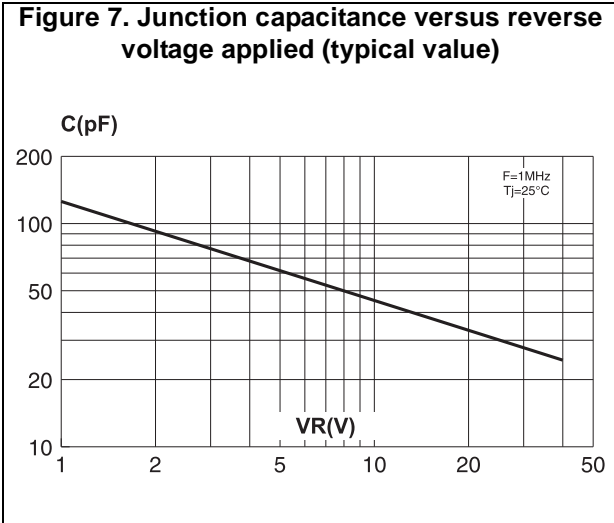
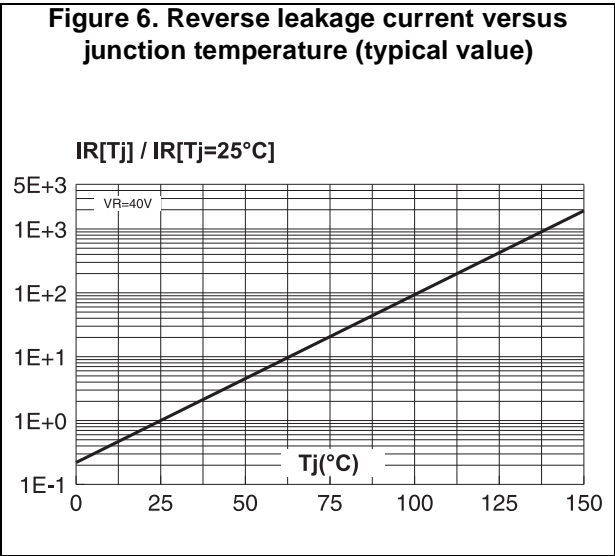
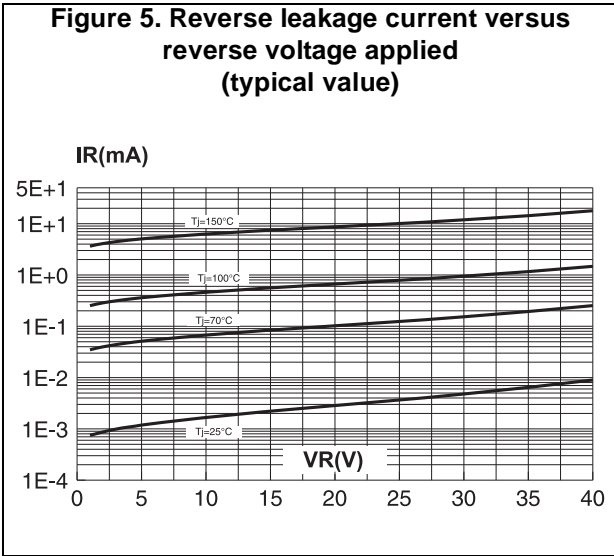


Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration





2 Package Information

- Epoxy meets UL94,V0
- Lead-free packages

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

2.1 SOD-123 package information

Figure 10. SOD123 package outline

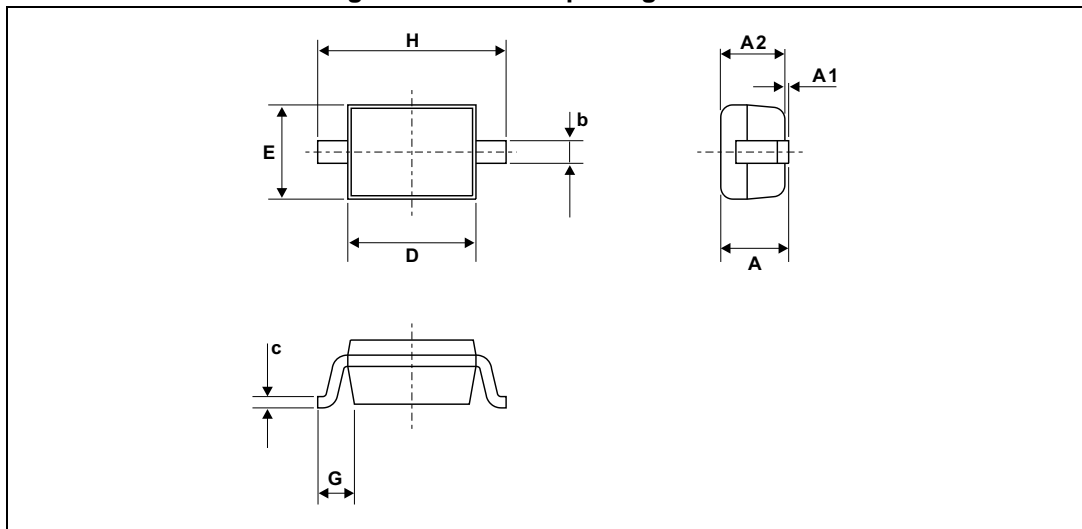
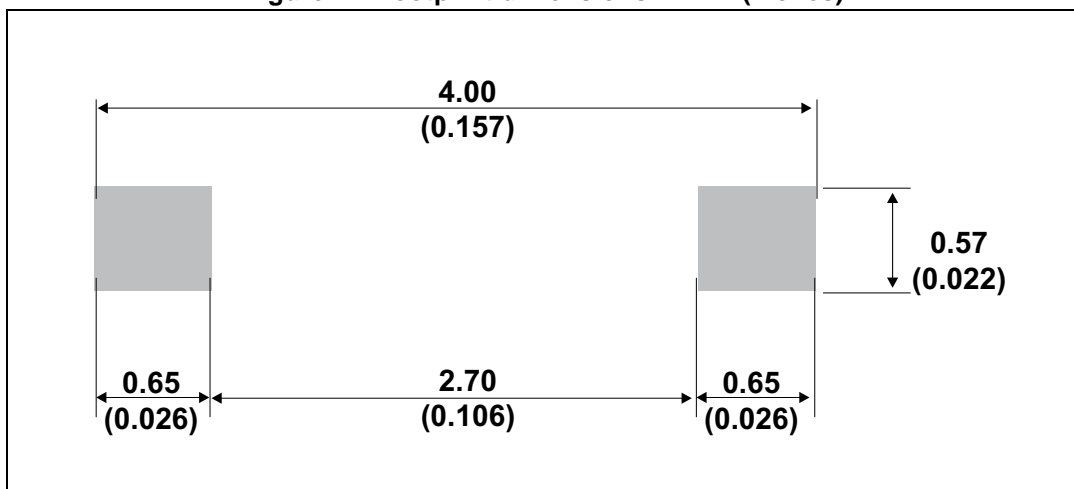


Table 5. SOD123 package mechanical data

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | 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 | | | 0.022 | |
| c | | 0.15 | | | 0.039 | |
| 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 | | 0.148 |

Figure 11. Footprint dimensions in mm (inches)



3 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|---------|--------|----------|---------------|
| STPS140ZY | Z1Y | SOD-123 | 0.01 g | 3000 | Tape and reel |

4 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 24-Oct-2012 | 1 | First issue. |
| 07-Jul-2015 | 2 | Updated Table 4 and reformatted to current standard. |

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