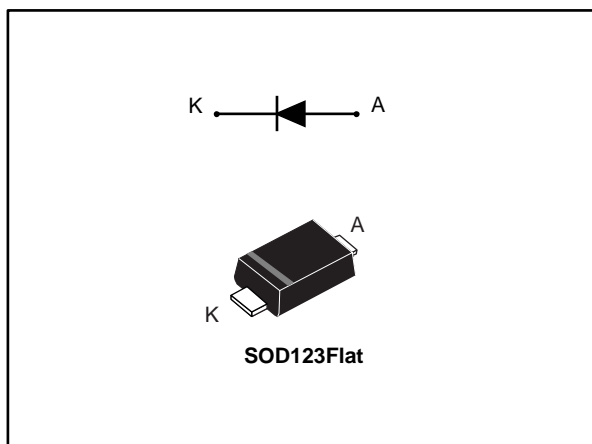


Automotive low drop power Schottky rectifier

Datasheet - production data



Description

Single chip Schottky rectifiers suited to switched mode power supplies and high frequency DC to DC converters.

Packaged in SOD123Flat, this device is especially intended for surface mounting and used in low voltage, high frequency inverters, free-wheeling and polarity protection in automotive applications.

Table 1: Device summary

| Symbol | Value |
|--------------|--------|
| $I_{F(AV)}$ | 2 A |
| V_{RRM} | 40 V |
| V_F (typ.) | 0.50 V |
| T_j (max.) | 175 °C |

Features

- AEC-Q101 qualified
- Very small conduction losses
- Negligible switching losses
- Low forward voltage drop
- Surface mount miniature packages
- Avalanche capability specified
- PPAP capable



1 Characteristics

Table 2: Absolute ratings (limiting values at 25 °C, unless otherwise specified)

| Symbol | Parameter | | Value | Unit |
|-------------|---|--|-------------|------|
| V_{RRM} | Repetitive peak reverse voltage | $T_j = -40\text{ °C to }+175\text{ °C}$ | 40 | V |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$, square wave | $T_L = 145\text{ °C}$ | 2 | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms sinusoidal}$ | 50 | A |
| P_{ARM} | Repetitive peak avalanche power | $t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ °C}$ | 65 | W |
| T_{stg} | Storage temperature range | | -65 to +175 | °C |
| T_j | Operating junction temperature range ⁽¹⁾ | | -40 to +175 | |

Notes:

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

Table 3: Thermal parameters

| Symbol | Parameter | Max. value | Unit |
|---------------|------------------|------------|------|
| $R_{th(j-l)}$ | Junction to lead | 20 | °C/W |

Table 4: Static electrical characteristics

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|-------------|-------------------------|-----------------------|--------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = V_{RRM}$ | - | | 35 | μA |
| | | $T_j = 125\text{ °C}$ | | - | 6 | 10 | mA |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 2\text{ A}$ | - | | 0.63 | V |
| | | $T_j = 125\text{ °C}$ | | - | 0.50 | 0.61 | |

Notes:

⁽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 conduction losses, use the following equation:

$$P = 0.46 \times I_{F(AV)} + 0.075 \times I_F^2(RMS)$$

For more information, please refer to the following application notes related to the power losses.

- AN604 (Calculation of conduction losses in a power rectifier)
- AN4021 (Calculation of reverse losses in a power diode)

1.1 Characteristics (curves)

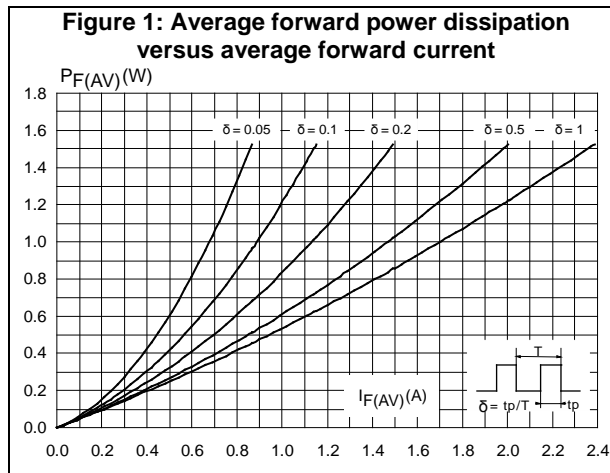


Figure 2: Average forward current versus ambient temperature ($\delta = 0.5$)

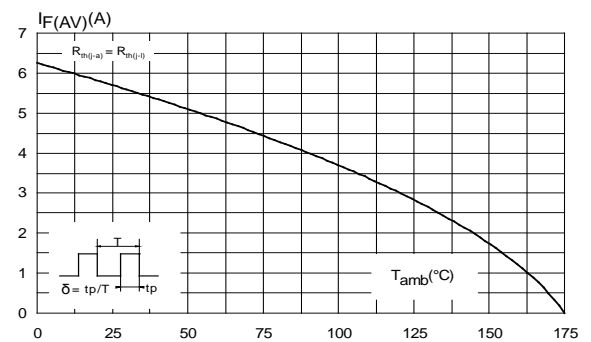


Figure 3: Normalized avalanche power derating versus pulse duration ($T_J = 125^{\circ}C$)

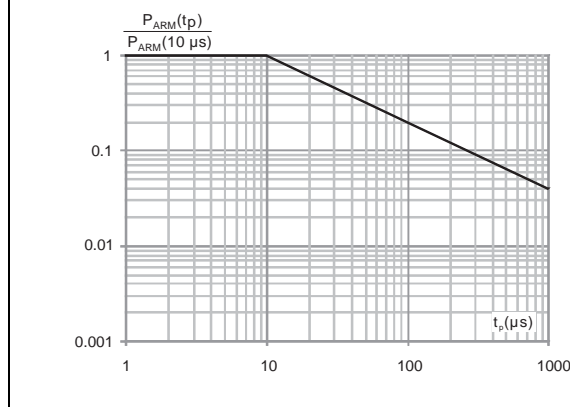


Figure 4: Relative variation of thermal impedance junction to lead versus pulse duration

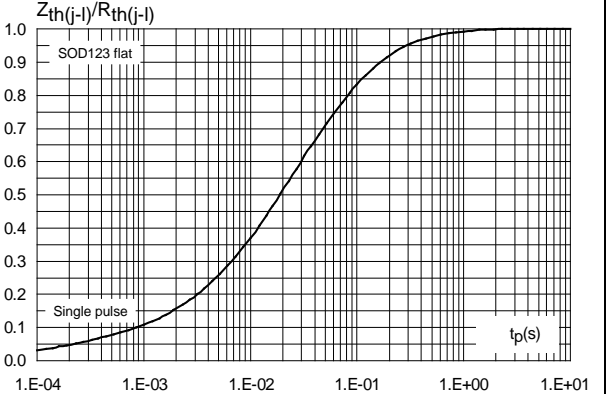


Figure 5: Reverse leakage current versus reverse voltage applied (typical values)

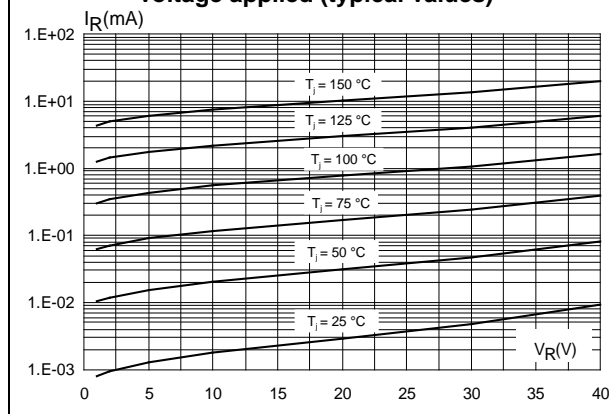


Figure 6: Junction capacitance versus reverse voltage applied (typical values)

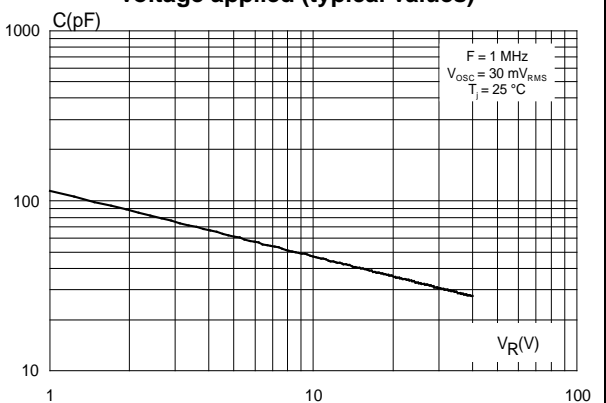
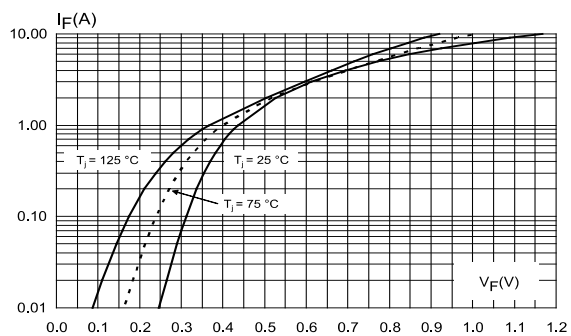
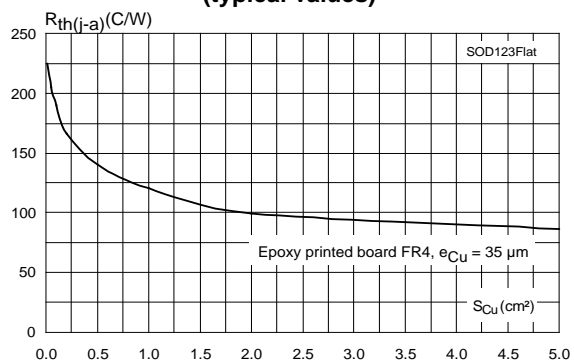


Figure 7: Forward voltage drop versus forward current (typical values)**Figure 8: Thermal resistance junction to ambient versus copper surface under each lead (typical values)**

2 Package information

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.

- Epoxy meets UL94, V0
- Cooling method: by conduction (C)

2.1 SOD123Flat package information

Figure 9: SOD123Flat package outline

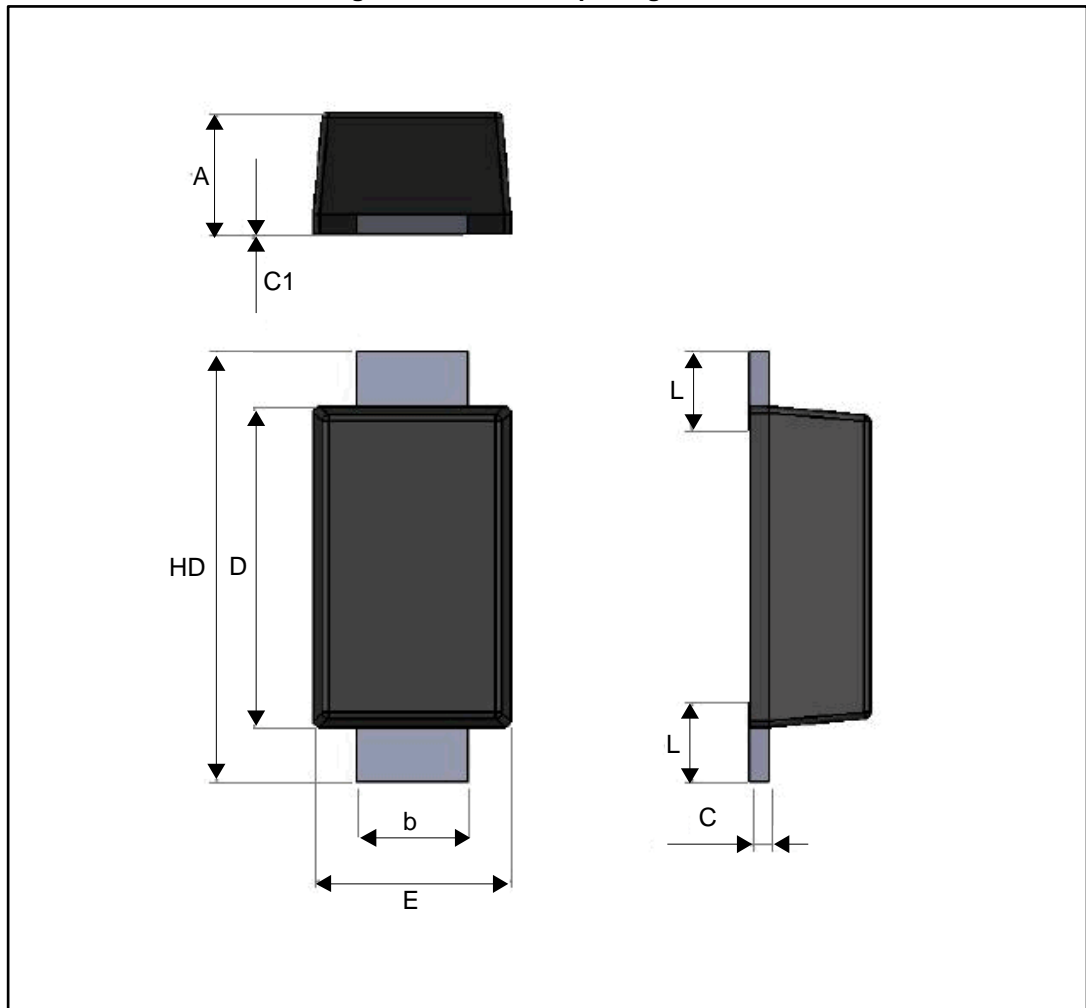
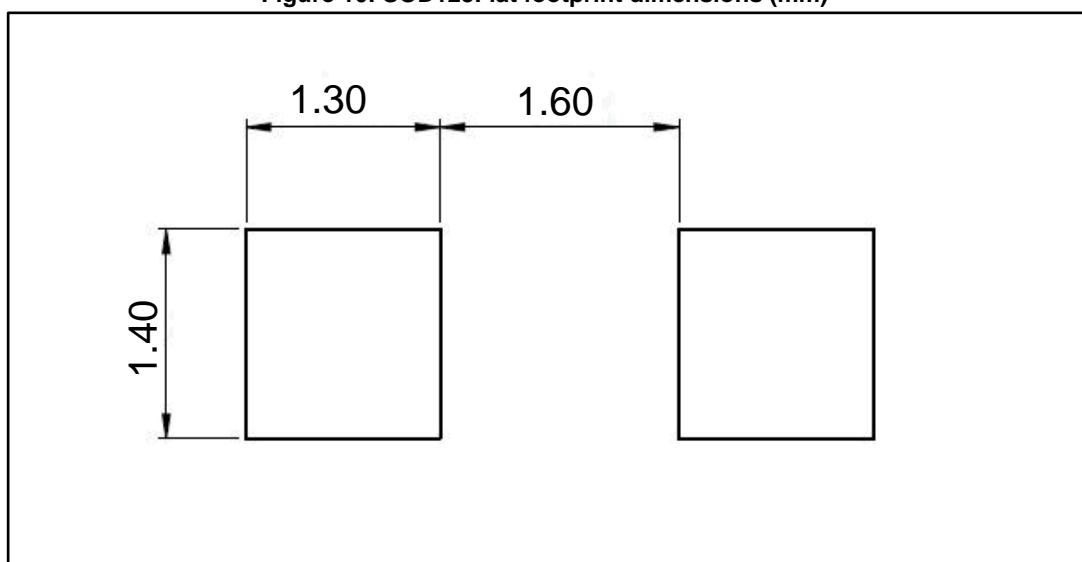


Table 5: SOD123Flat package mechanical data

| Ref. | Dimensions | | |
|------|-------------|------|------|
| | Millimeters | | |
| | Min. | Typ. | Max. |
| A | 0.86 | 0.98 | 1.10 |
| b | 0.80 | 0.90 | 1.00 |
| c | 0.08 | 0.15 | 0.25 |
| c1 | 0.00 | | 0.10 |
| D | 2.50 | 2.60 | 2.70 |
| E | 1.50 | 1.60 | 1.80 |
| HD | 3.30 | 3.50 | 3.70 |
| L | 0.45 | 0.65 | 0.85 |

Figure 10: SOD123Flat footprint dimensions (mm)



3 Ordering information

Table 6: Ordering information

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|-------------|---------|------------|---------|-----------|---------------|
| STPS2L40ZFY | 2Y4 | SOD123Flat | 12.5 mg | 3000 | Tape and reel |

4 Revision history

Table 7: Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 13-Oct-2016 | 1 | Initial release. |

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