# STPS0540-Y

## Automotive Schottky rectifier

## Features

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

## Description

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

Packages in SOD-123, these devices is intended for use in low voltage, high frequency inverters, free wheeling and polarity protection for automotive applications.

**SOD-123**
**STPS0540ZY**

**Table 1. Device summary**

| Symbol | Value |
|---|---|
| $I_{F(AV)}$ | 0.5 A |
| $V_{RRM}$ | 40 V |
| $V_F$(max) | 0.40 V |

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 40 | V |
| $I_{F(RMS)}$ | Forward rms voltage | | 2 | A |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | Ta = 60 °C | 0.5 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | 5.5 | A |
| dV/dt | Critical rate of rise of reverse voltage | | 10000 | V/µs |
| $T_{stg}$ | Storage temperature range | | -65 to + 150 | °C |
| $T_j$ | Operating junction temperature (1) | | -40 to + 150 | °C |

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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 | | typ. | max. | Unit |
|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | | 40 | µA |
| | | $T_j$ = 100 °C | | 1.5 | 5 | mA |
| $V_F$(2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 0.5 A | | 0.50 | V |
| | | $T_j$ = 100 °C | | 0.35 | 0.40 | |
| | | $T_j$ = 25 °C | $I_F$ = 1 A | | 0.55 | |
| | | $T_j$ = 100 °C | | 0.45 | 0.51 | |

1. Pulse test: $t_p$ = 5 ms, $\delta$ < 2%
2. Pulse test: $t_p$ = 380 µs, $\delta$ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.29 \times I_{F(AV)} + 0.22 \times I_{F}^{2}{}_{(RMS)}$

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

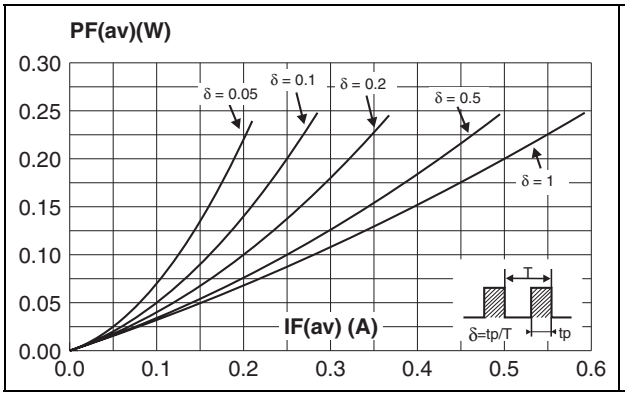



**Figure 2. Average forward current versus ambient temperature ( δ = 0.5)**

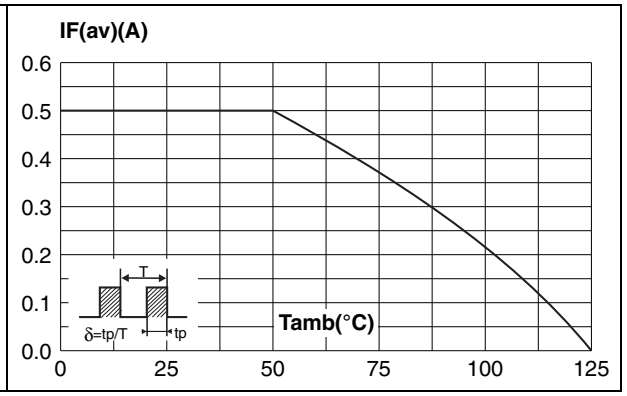



**Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)**

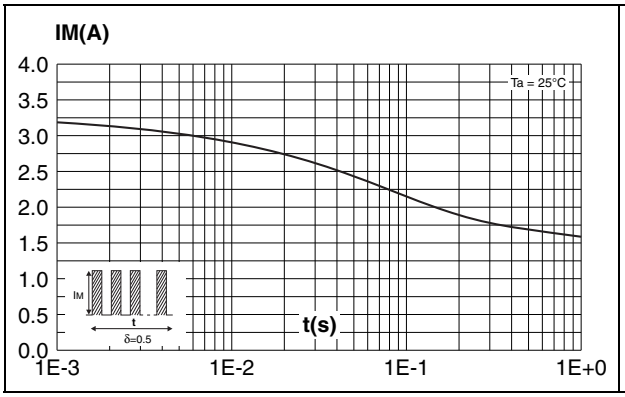



**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration**

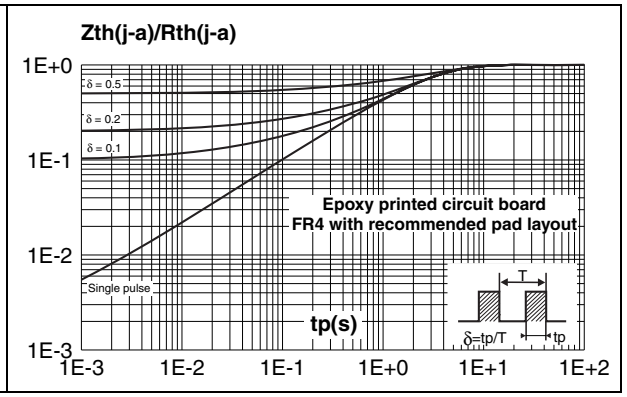



**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**

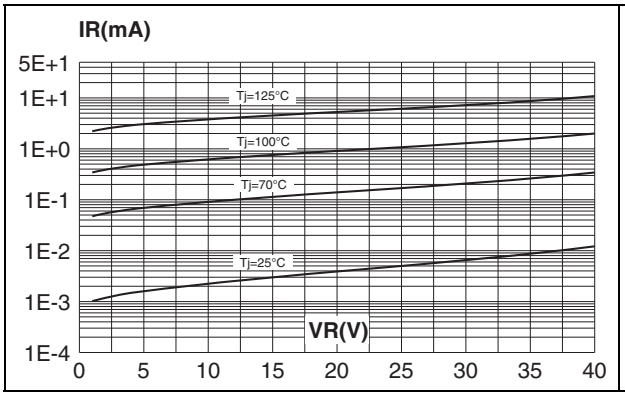



**Figure 6. Reverse leakage current versus junction temperature (typical values)**

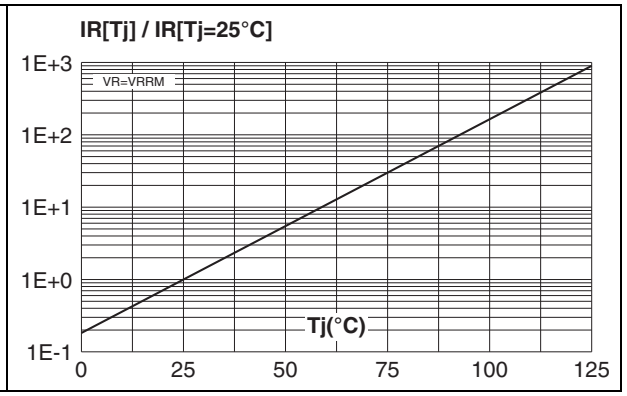


**Figure 7. Junction capacitance versus reverse voltage applied (typical values)**

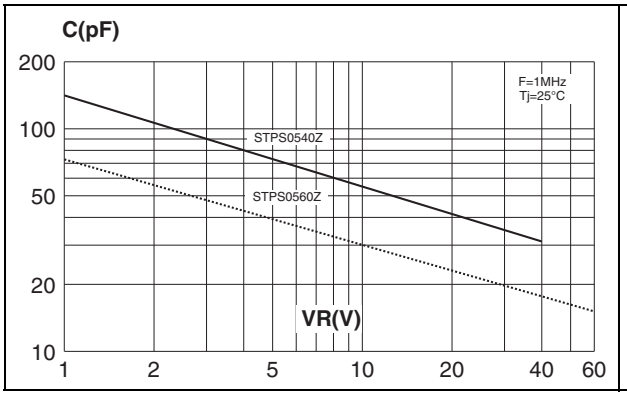
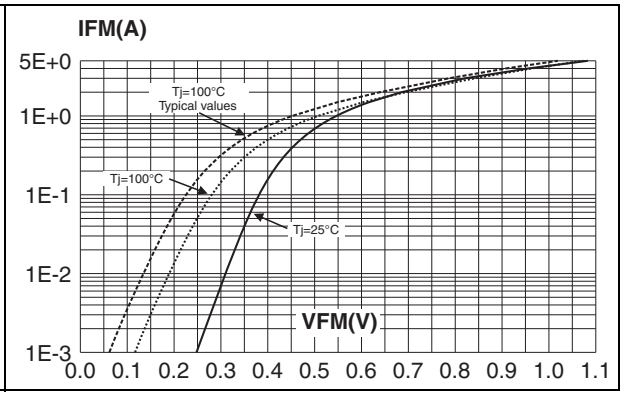



**Figure 8. Forward voltage drop versus forward current (maximum values)**

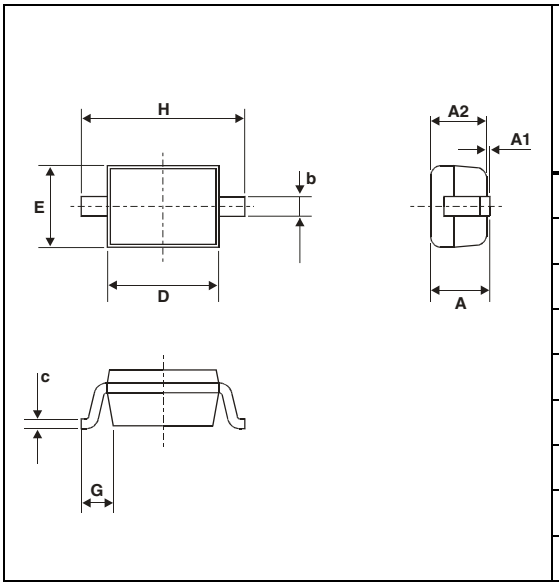


# 2 Package information

- Epoxy meets UL94, V0
- Band indicates cathode

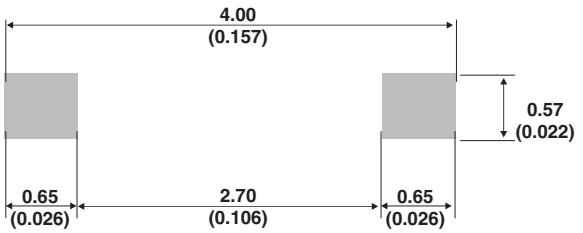
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

**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 | 0.148 |

**Figure 9. Footprint dimensions in mm (inches)**



# 3 Ordering information

**Table 6. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS0540ZY | Z5Y | SOD-123 | 0.01 g | 3000 | Tape and reel |

## 3.1 Revision history

**Table 7. Revision history**

| Date | Revision | Changes |
|---|---|---|
| 03-Nov-2011 | 1 | Initial release. |

# Mouser Electronics

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