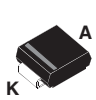
# STPS1H100-Y

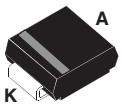
## Automotive high voltage power Schottky rectifier

## Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche capability specified
- ECOPACK®2 compliant component
- AEC-Q101 qualified




**SMA**
**(JEDEC DO-214AC)**
**STPS1H100AY**




**SMB**
**(JEDEC DO-214AA)**
**STPS1H100UY**

## Description

Schottky rectifiers packaged in SMA or SMB, and designed for high frequency miniature switched mode power supplies as DC/DC converters for automotive applications.

**Table 1. Device summary**

| Symbol | Value |
|---|---|
| $I_{F(AV)}$ | 1 A |
| $V_{RRM}$ | 100 V |
| $T_j$ (max) | 175 °C |
| $V_F$(max) | 0.62 V |

# 1 Characteristics

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

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 100 | V |
| $I_{F(RMS)}$ | Forward rms voltage | | 10 | A |
| $I_{F(AV)}$ | Average forward current | $T_L$ = 160 °C δ = 0.5 | 1 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ =10 ms sinusoidal | 50 | A |
| $I_{RRM}$ | Repetitive peak reverse current | $t_p$ = 2 µs F = 1 kHz square | 1 | A |
| $I_{RSM}$ | Non repetitive peak reverse current | $t_p$ = 100 µs square | 1 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | $t_p$ = 1 µs $T_j$ = 25 °C | 1500 | W |
| $T_{stg}$ | Storage temperature range | | - 65 to + 175 | °C |
| $T_j$ | Operating junction temperature (1) | | - 40 to + 175 | °C |
| dV/dt | Critical rate of rise of reverse voltage | | 10000 | V/µs |

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 |
|---|---|---|---|---|
| $R_{th(j-l)}$ | Junction to lead | SMA | 30 | °C/W |
| | | SMB | 25 | |

**Table 4. Static electrical characteristics**

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | | | 4 | µA |
| | | $T_j$ = 125 °C | | | 0.2 | 0.5 | mA |
| $V_F$(2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 1 A | | | 0.77 | V |
| | | $T_j$ = 125 °C | | | 0.58 | 0.62 | |
| | | $T_j$ = 25 °C | $I_F$ = 2 A | | | 0.86 | |
| | | $T_j$ = 125 °C | | | 0.65 | 0.7 | |

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

To evaluate the conduction losses use the following equation:

$P = 0.54 \times I_{F(AV)} + 0.08\ I_F{}^2{}_{(RMS)}$

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

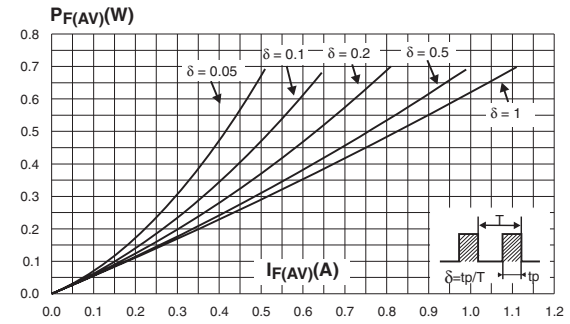



**Figure 2. Average forward current versus ambient temperature (δ = 0.5)**

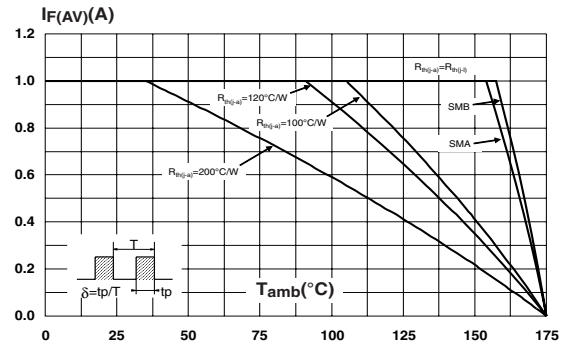



**Figure 3. Normalized avalanche power derating versus pulse duration**

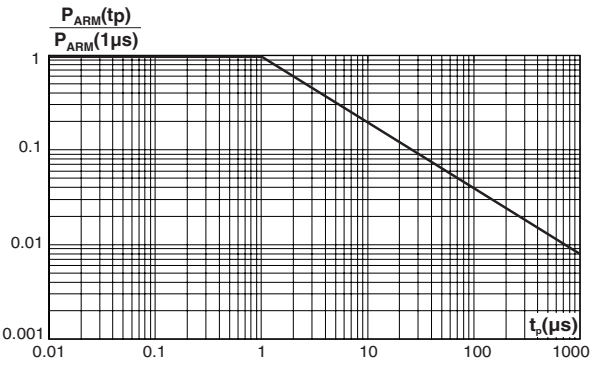



**Figure 4. Normalized avalanche power derating versus junction temperature**

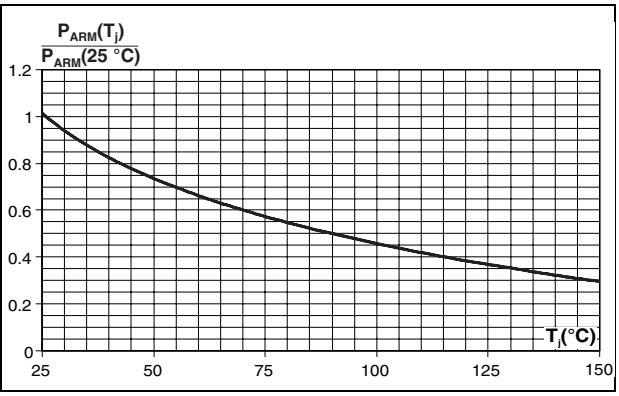



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)**

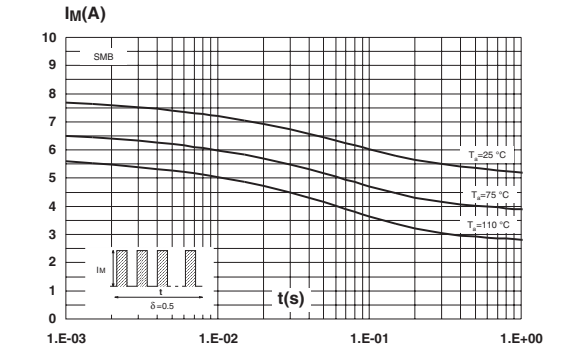



**Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)**

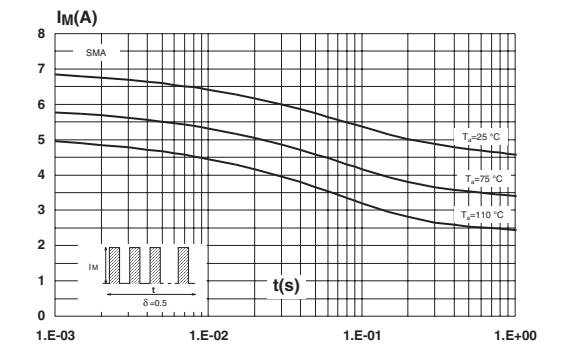


**Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)**

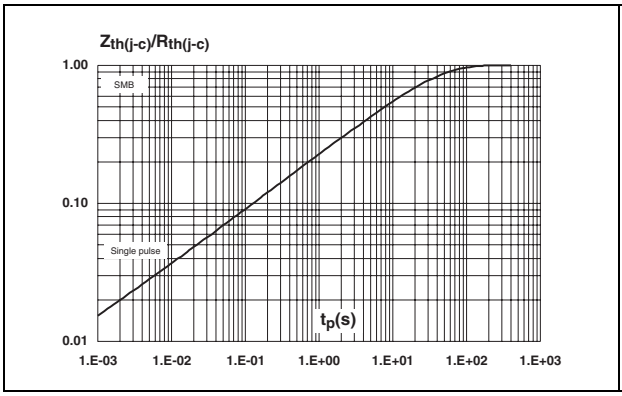



**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**

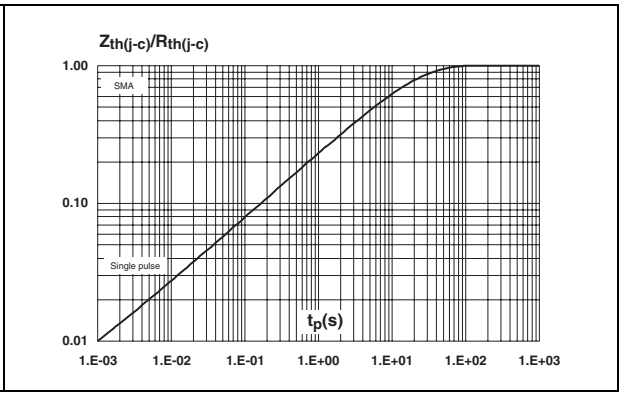



**Figure 9. Reverse leakage current versus reverse voltage applied (typical values)**

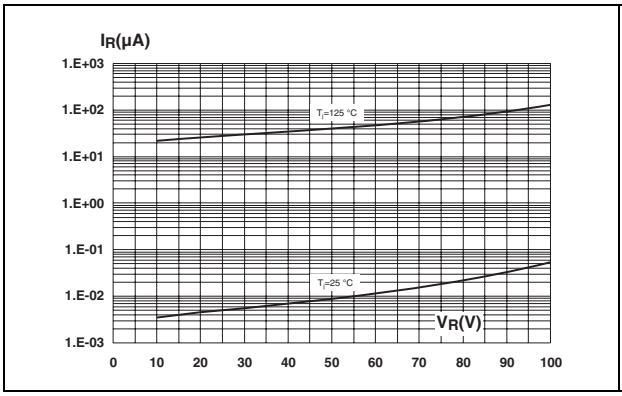



**Figure 10. Junction capacitance versus reverse voltage applied (typical values)**

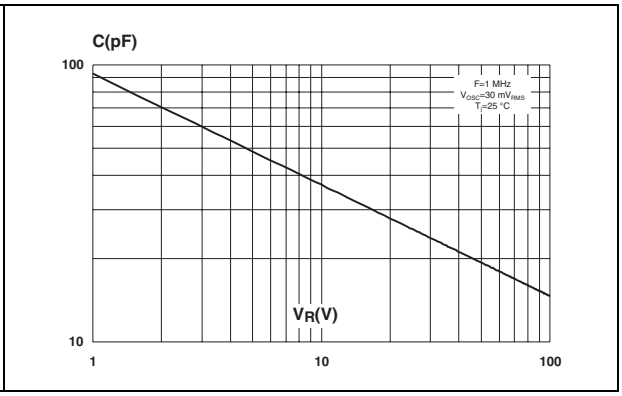



**Figure 11. Forward voltage drop versus forward current (maximum values)**

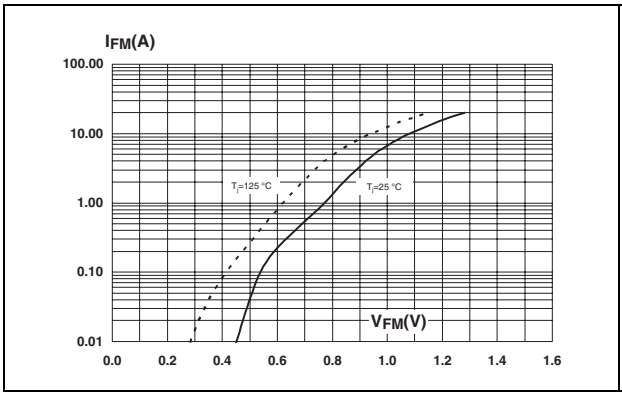



**Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (SMB)**

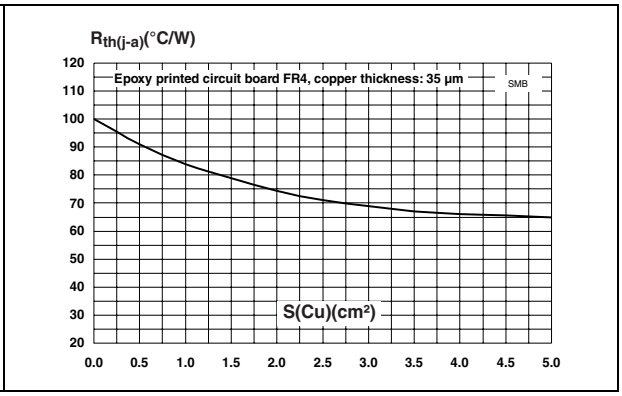
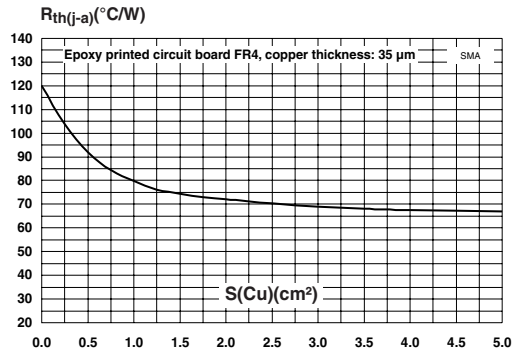


**Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (SMA)**

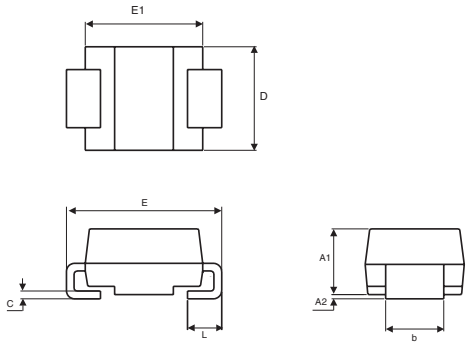


# 2 Package information

- Epoxy meets UL94, V0
- Lead-free package

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.

**Figure 14. SMA package dimensions**




| Ref | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.45 | 0.075 | 0.094 |
| A2 | 0.05 | 0.20 | 0.002 | 0.008 |
| b | 1.25 | 1.65 | 0.049 | 0.065 |
| c | 0.15 | 0.40 | 0.006 | 0.016 |
| D | 2.25 | 2.90 | 0.089 | 0.114 |
| E | 4.80 | 5.35 | 0.189 | 0.211 |
| E1 | 3.95 | 4.60 | 0.156 | 0.181 |
| L | 0.75 | 1.50 | 0.030 | 0.059 |

**Figure 15. SMA footprint dimensions in millimeters (inches)**

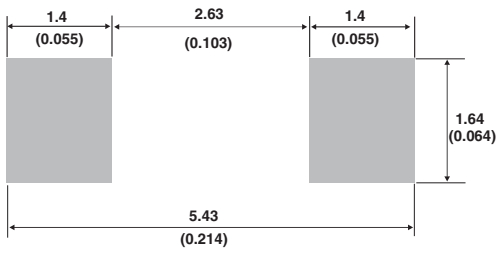
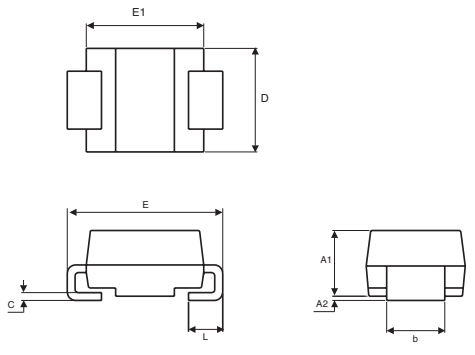
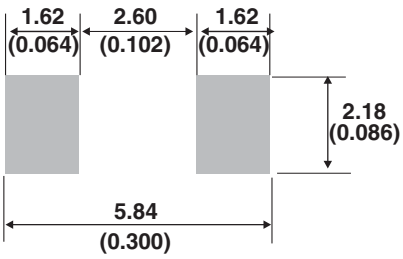


**Figure 16. SMB package dimensions**




| Ref | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.45 | 0.075 | 0.096 |
| A2 | 0.05 | 0.20 | 0.002 | 0.008 |
| b | 1.95 | 2.20 | 0.077 | 0.087 |
| c | 0.15 | 0.40 | 0.006 | 0.016 |
| D | 3.30 | 3.95 | 0.130 | 0.156 |
| E | 5.10 | 5.60 | 0.201 | 0.220 |
| E1 | 4.05 | 4.60 | 0.159 | 0.181 |
| L | 0.75 | 1.50 | 0.030 | 0.059 |

**Figure 17. SMB footprint dimensions in millimeters (inches)**



# 3 Ordering information

**Table 5. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS1H100AY | S11Y | SMA | 0.068 g | 5000 | Tape and reel |
| STPS1H100UY | G11Y | SMB | 0.107 g | 2500 | Tape and reel |

# 4 Revision history

**Table 6. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 03-Dec-2010 | 1 | First issue. |

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