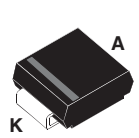
# STPS160-Y

## Automotive power Schottky rectifier

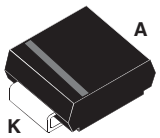
**Datasheet – production data**

## Features

- Very small conduction losses
- Negligible switching losses
- Low forward voltage drop
- Surface mount miniature packages
- Avalanche capability specified
- ECOPACK®2 compliant components
- AEC-Q101 qualified




**SMA**
**(JEDEC DO-214AC)**
**STPS160AY**




**SMB**
**(JEDEC DO-214AA)**
**STPS160UY**

**Table 1. Device summary**

| Symbol | Value |
|---|---|
| $I_{F(AV)}$ | 1 A |
| $V_{RRM}$ | 60 V |
| $T_{j\ (max)}$ | 150 °C |
| $V_{F\ (max)}$ | 0.57 V |

## Description

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

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

# 1 Characteristics

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

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 60 | V |
| $I_{F(AV)}$ | Average forward current | $T_L$ = 130 °C, δ = 0.5 | 1 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ =10 ms sinusoidal | 75 | 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 | 2400 | W |
| $T_{stg}$ | Storage temperature range | | -65 to + 150 | °C |
| $T_j$ | Operating junction temperature range(1) | | -40 to + 150 | °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 | 23 | |

**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 | | | 1.1 | 4 | mA |
| $V_F$(2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 1 A | | | 0.67 | V |
| | | $T_j$ = 125 °C | | | 0.49 | 0.57 | |
| | | $T_j$ = 25 °C | $I_F$ = 2 A | | | 0.8 | |
| | | $T_j$ = 125 °C | | | 0.58 | 0.65 | |

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

To evaluate the conduction losses use the following equation:

$P = 0.49 \times I_{F(AV)} + 0.08\ I_F{}^2{}_{(RMS)}$

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

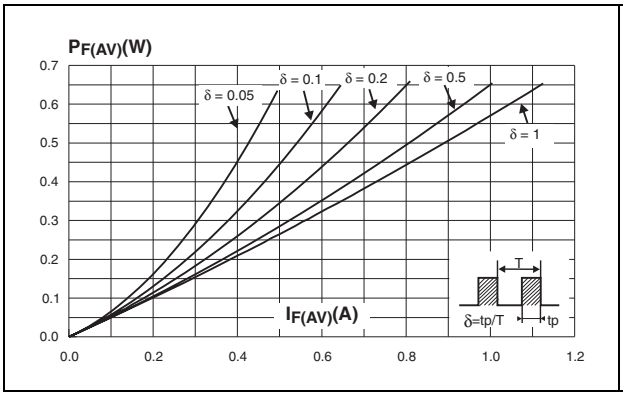



**Figure 2. Average forward current versus ambient temperature (δ = 0.5)**

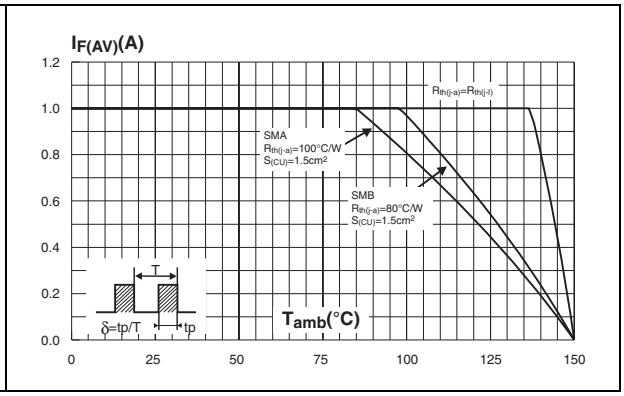



**Figure 3. Normalized avalanche power derating versus pulse duration**

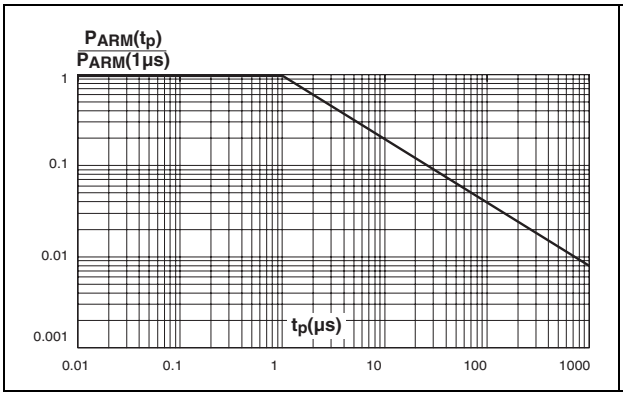



**Figure 4. Normalized avalanche power derating versus junction temperature**

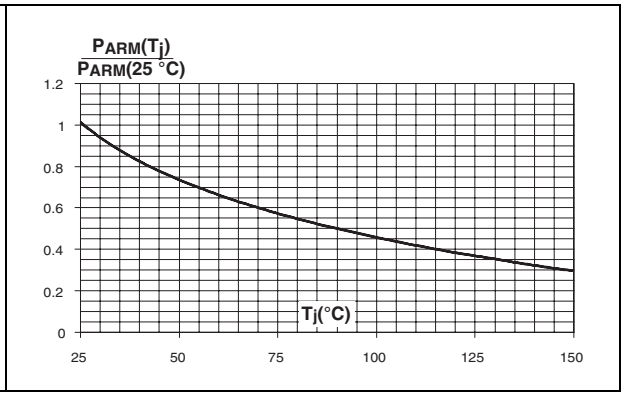



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) (SMA)**

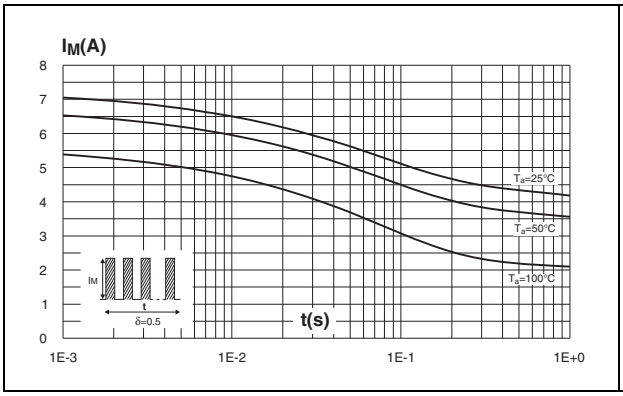



**Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)**

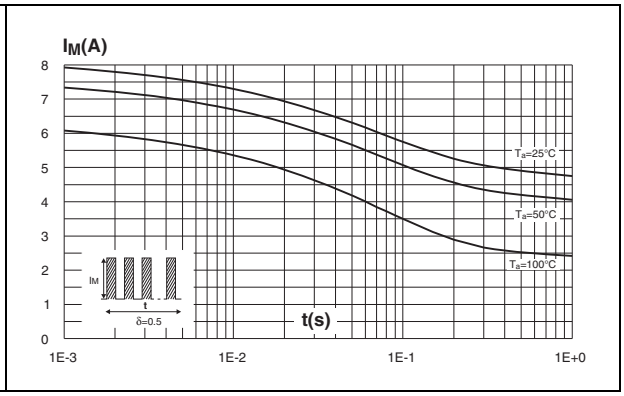


**Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**

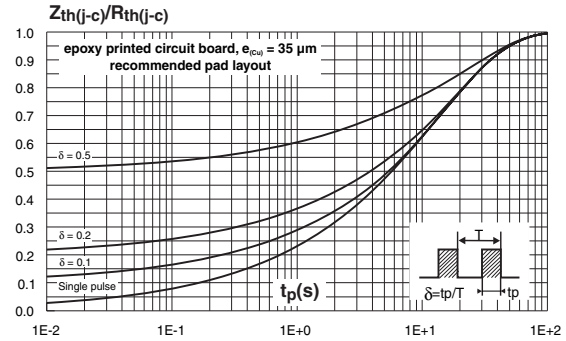



**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)**

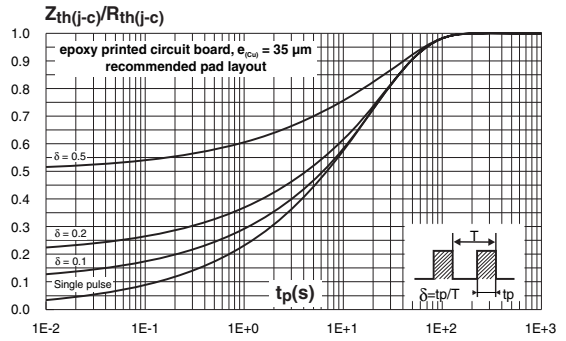



**Figure 9. Reverse leakage current versus reverse voltage applied (typical values)**

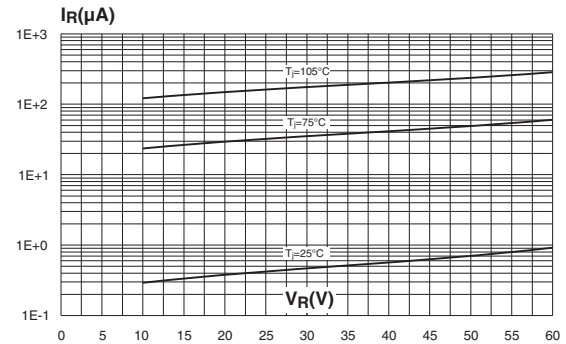



**Figure 10. Junction capacitance versus reverse voltage applied (typical values)**

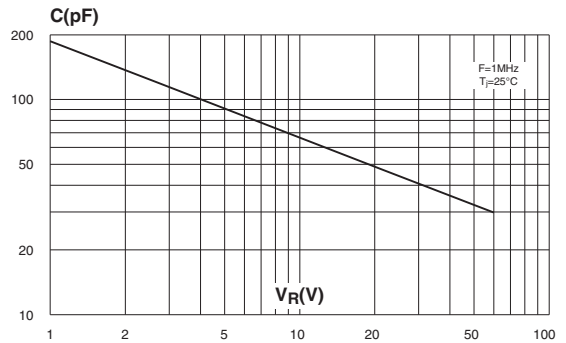



**Figure 11. Forward voltage drop versus forward current (maximum values)**

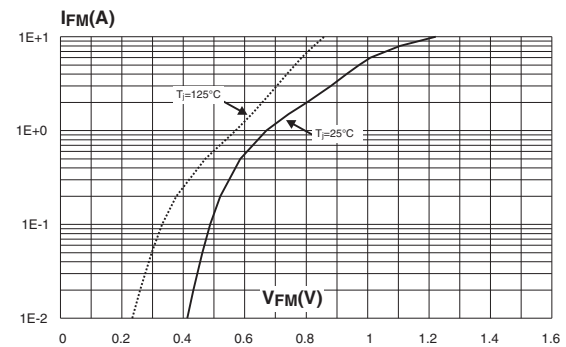



**Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (SMA)**

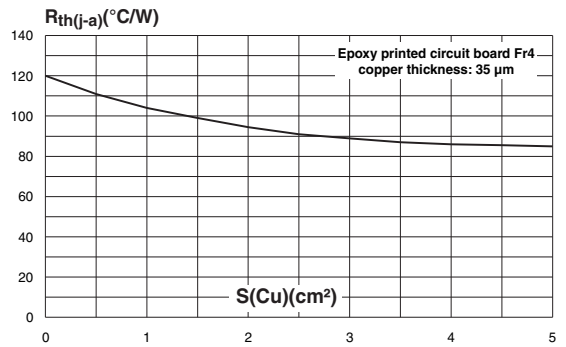
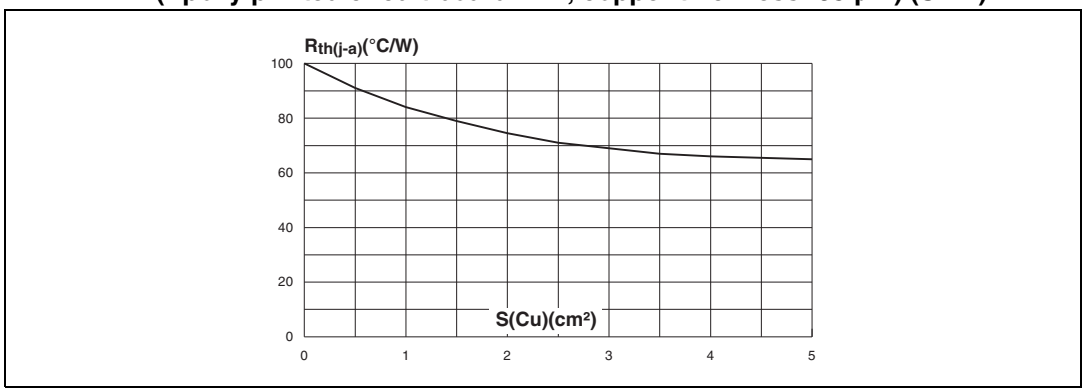


**Figure 13. Thermal resistance junction to ambient versus copper surface under lead (Epoxy printed circuit board FR4, copper thickness: 35 µm) (SMB)**

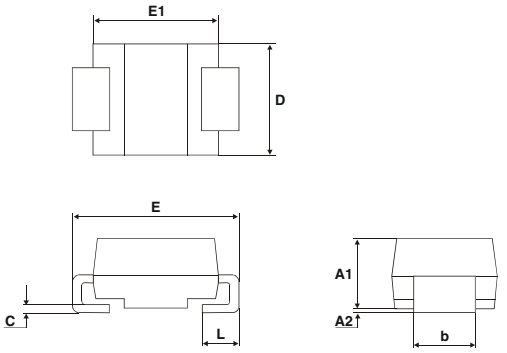


# 2 Package information

- 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. SMA 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 14. Footprint, dimensions in mm (inches)**

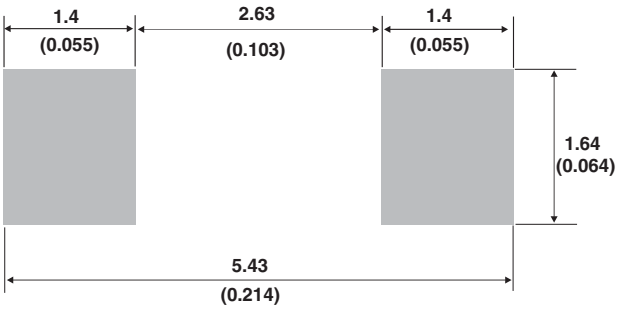
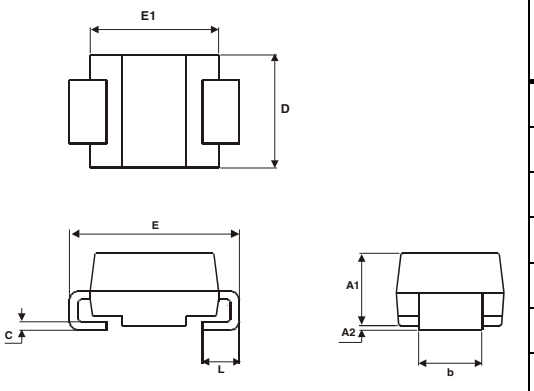
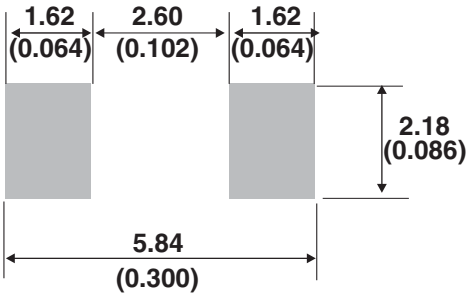


**Table 6. SMB dimensions**




| 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 15. Footprint, dimensions in mm (inches)**



# 3 Ordering information

**Table 7. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS160AY | GA6Y | SMA | 0.068 g | 5000 | Tape and reel |
| STPS160UY | E16Y | SMB | 0.107 g | 2500 | Tape and reel |

# 4 Revision history

**Table 8. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 28-Jun-2012 | 1 | Initial release. |

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