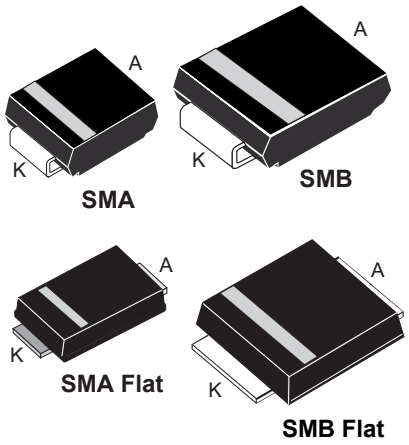
# STPS2H100

Datasheet

## 100 V 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 component

## Description

This Schottky rectifier is designed for high frequency miniature switched mode power supplies such as adaptors and on board DC/DC converters.

Packaged in SMA, SMA Flat, SMB and SMB Flat, the STPS2H100 is ideal for use in lighting and telecom power applications.

| Product status link | |
|---|---|
| STPS2H100 | |
| **Product summary** | |
| **Symbol** | **Value** |
| $I_{F(AV)}$ | 2 A |
| $V_{RRM}$ | 100 V |
| $T_j$ (max.) | 175 °C |
| $V_F$ (max.) | 0.65 V |

# 1 Characteristics

**Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified)**

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 100 | V |
| $I_{F(AV)}$ | Average forward current | SMA | $T_l$ = 130 °C, δ = 0.5 | 2 | A |
| | | SMB | $T_l$ = 135 °C, δ = 0.5 | | |
| | | SMA Flat | $T_l$ = 145 °C, δ = 0.5 | | |
| | | SMB Flat | $T_l$ = 150 °C, δ = 0.5 | | |
| $I_{FSM}$ | Surge non repetitive forward current | | $t_p$ = 10 ms sinusoidal | 75 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | | $t_p$ = 10 µs, $T_j$ = 125 °C | 173 | W |
| $T_{stg}$ | Storage temperature range | | | -65 to +175 | °C |
| $T_j$ | Maximum operating junction temperature(1) | | | 175 | °C |

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

**Table 2. Thermal resistance parameters**

| Symbol | Parameter | | Max. value | Unit |
|---|---|---|---|---|
| $R_{th(j-l)}$ | Junction to lead | SMA | 30 | °C/W |
| | | SMA Flat | 20 | |
| | | SMB | 25 | |
| | | SMB Flat | 15 | |

**Table 3. Static electrical characteristics**

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | - | | 1.00 | µA |
| | | $T_j$ = 125 °C | | - | 0.40 | 1.00 | mA |
| $V_F$(2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 2 A | - | | 0.79 | V |
| | | $T_j$ = 125 °C | | - | 0.60 | 0.65 | |
| | | $T_j$ = 25 °C | $I_F$ = 4 A | - | | 0.88 | |
| | | $T_j$ = 125 °C | | - | 0.69 | 0.74 | |

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:

$P = 0.56 \times I_{F(AV)} + 0.045 \times I_F{}^2{}_{(RMS)}$

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 on a power diode

## 1.1 Characteristics (curves)

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

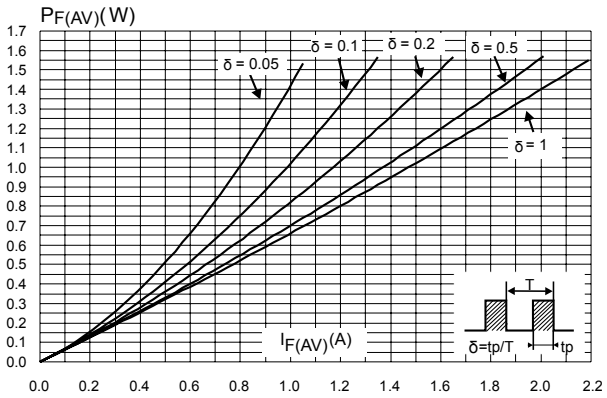



**Figure 2. Average forward current versus ambient temperature (δ = 0.5, SMA / SMB)**

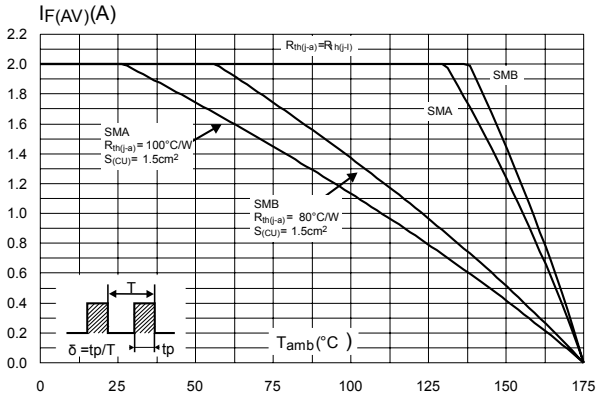



**Figure 3. Average forward current versus ambient temperature (δ = 0.5, SMB Flat)**

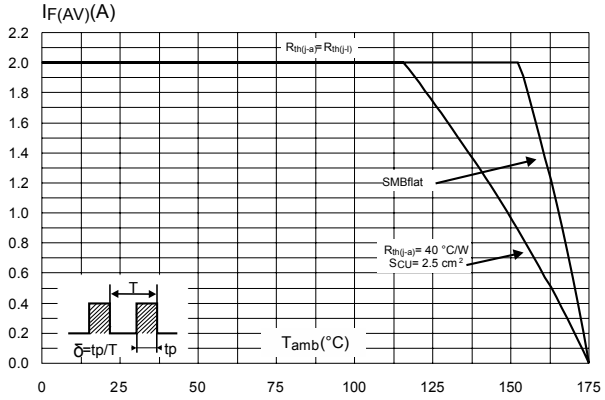



**Figure 4. Average forward current versus ambient temperature (δ = 0.5, SMA Flat)**

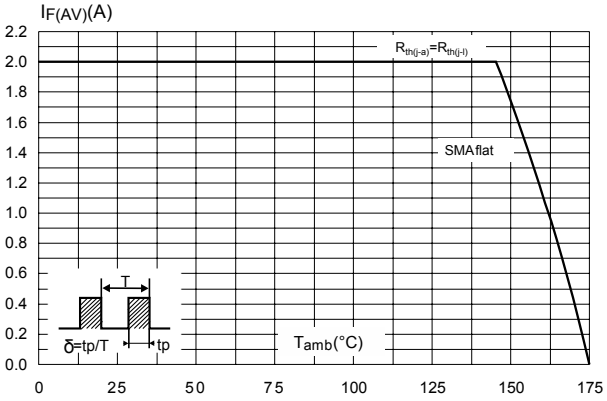


**Figure 5. Normalized avalanche power derating versus junction temperature ($T_j$ = 125 °C)**

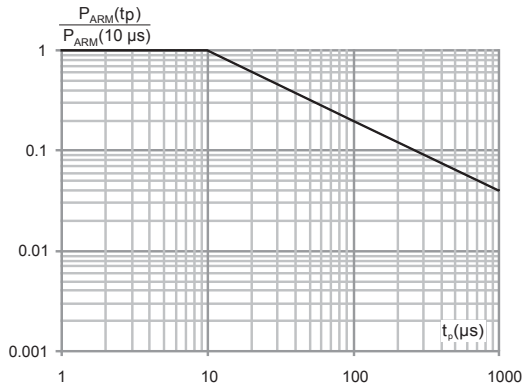



**Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**

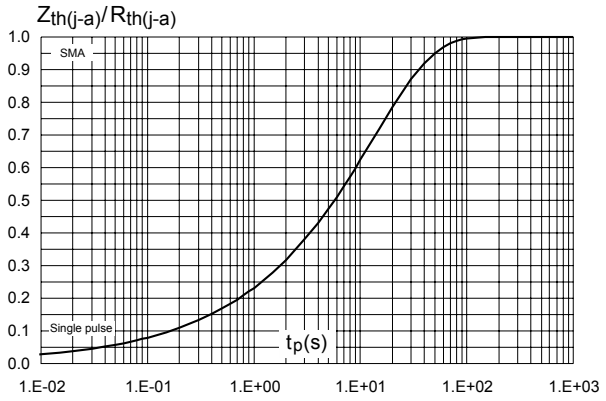



**Figure 7. Relative variation of thermal impedance junction to lead versus pulse duration (SMA Flat)**

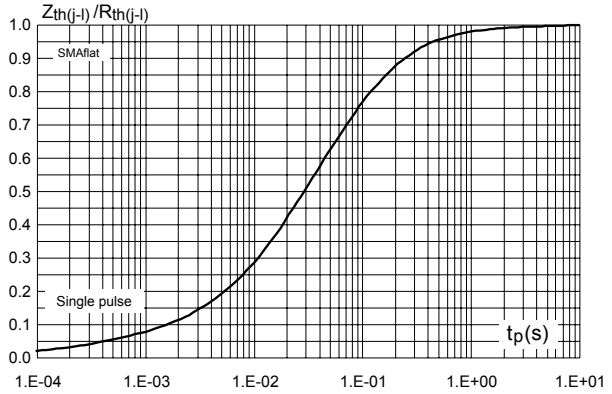



**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)**

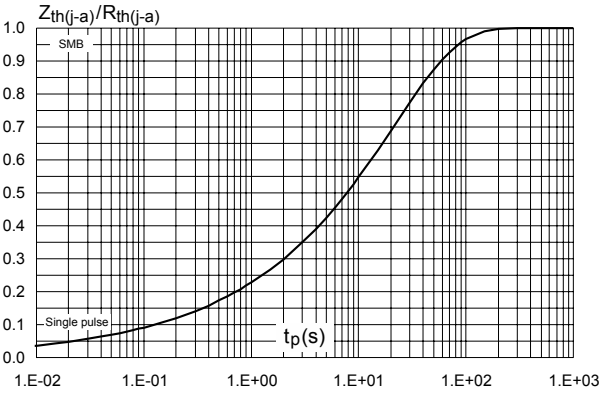



**Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration (SMB Flat)**

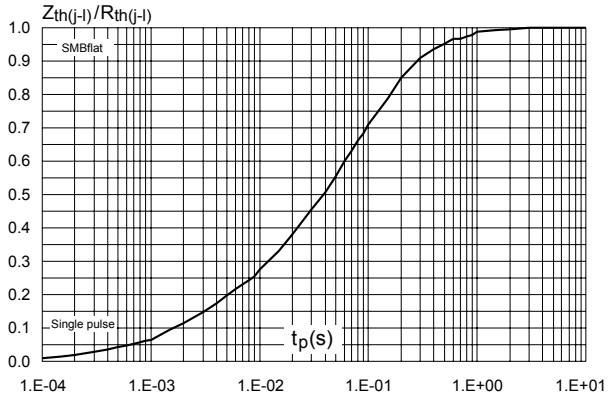



**Figure 10. Reverse leakage current versus reverse voltage applied (typical values)**

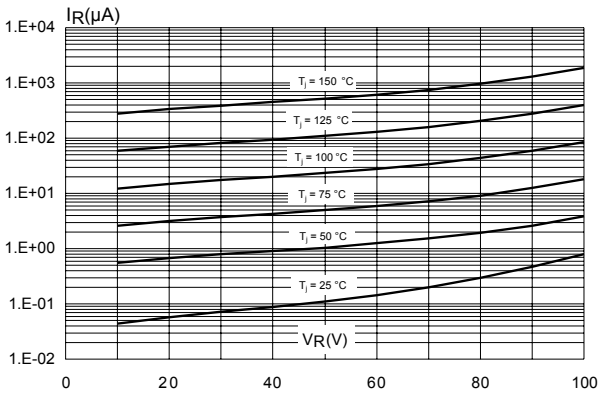


**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**

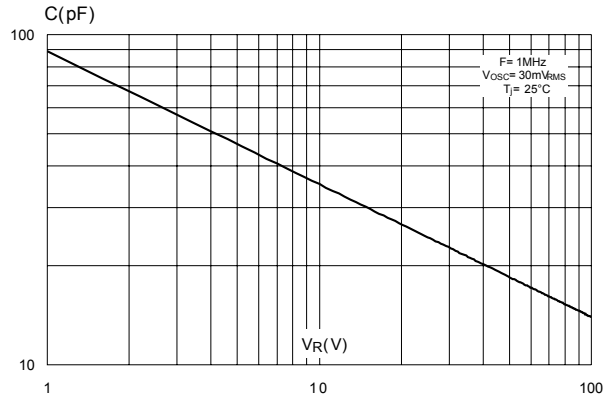



**Figure 12. Forward voltage drop versus forward current (low level)**

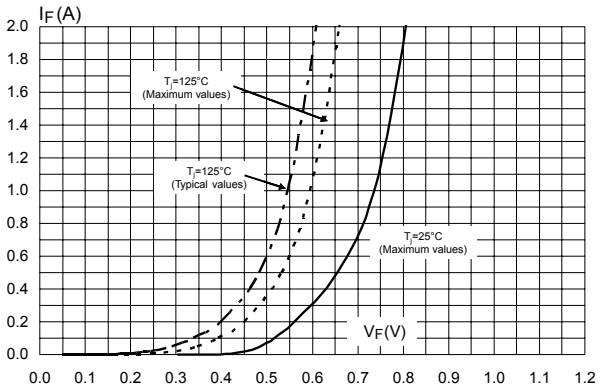



**Figure 13. Forward voltage drop versus forward current (high level)**

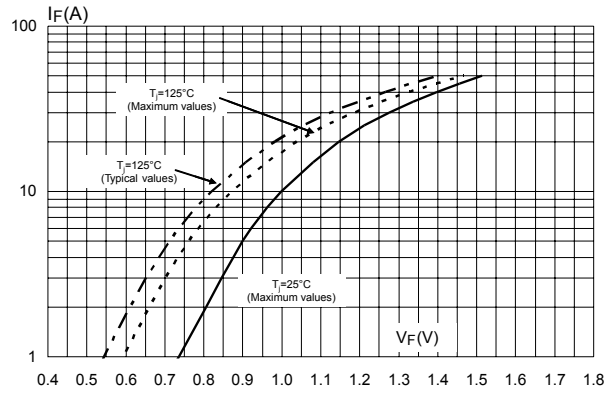



**Figure 14. Thermal resistance junction to ambient versus copper surface under each lead (SMA)**

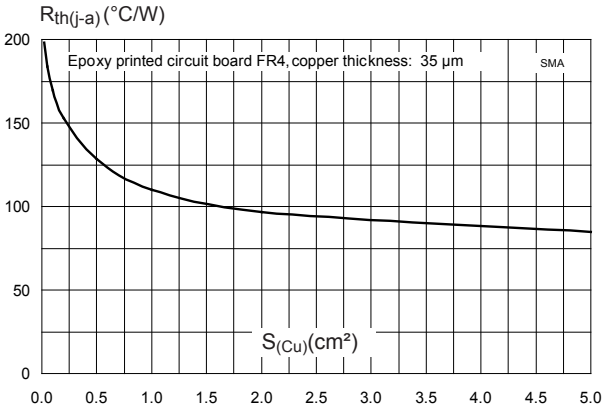



**Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat)**

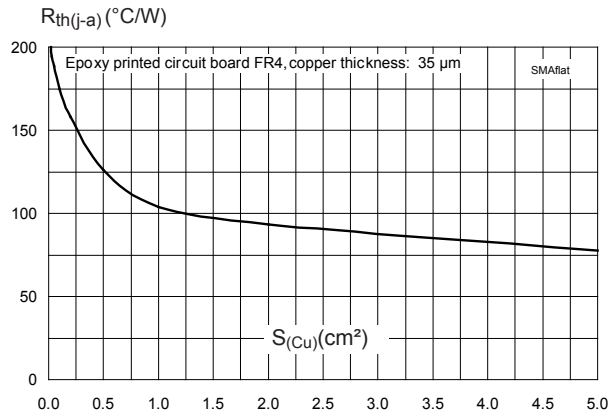



**Figure 16. Thermal resistance junction to ambient versus copper surface under each lead (SMB)**

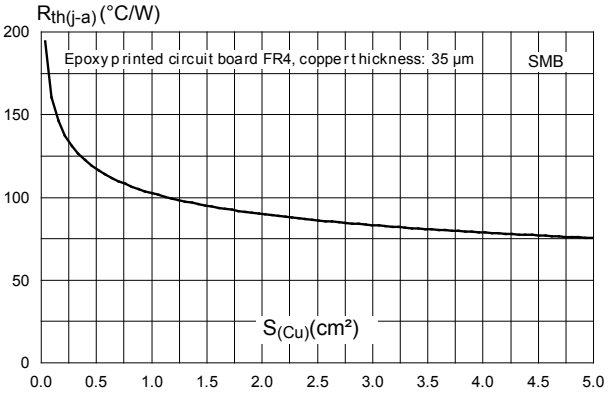
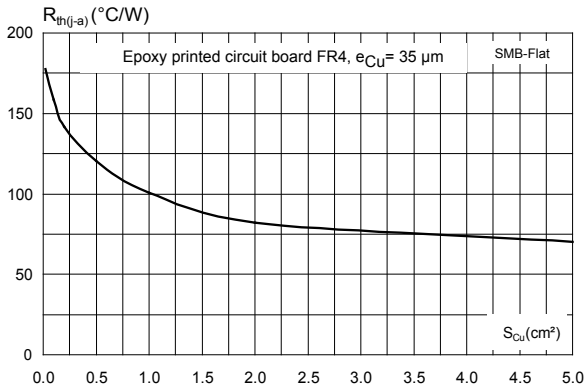


**Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (SMB Flat)**



# 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.

## 2.1 SMA Flat package information

- Epoxy meets UL94, V0
- Lead-free package

**Figure 18. SMA Flat package outline**

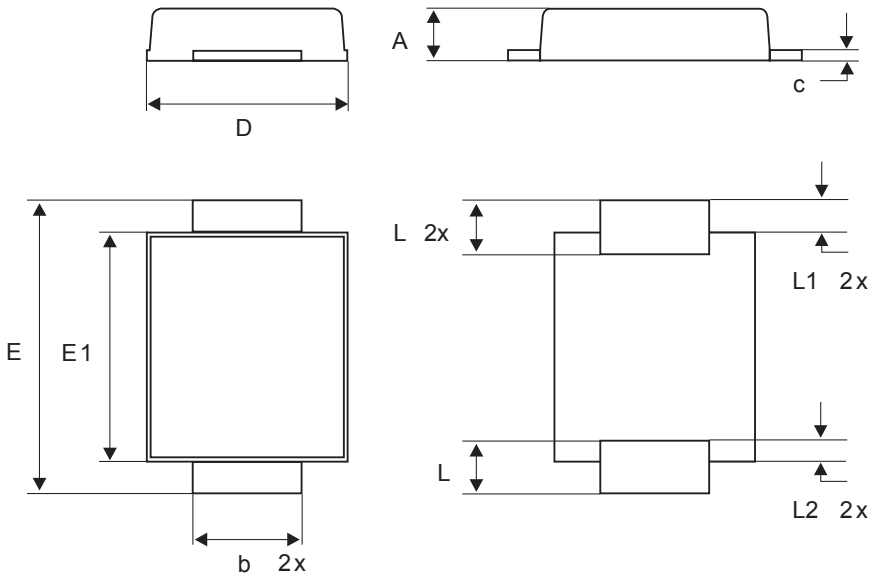
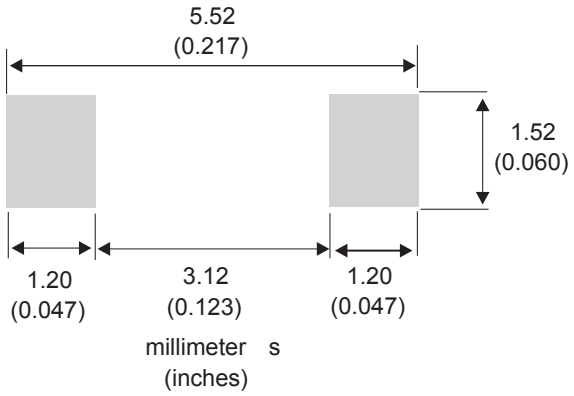



**Table 4. SMA Flat package mechanical data**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.075 | | 0.097 |
| b | 1.25 | | 1.65 | 0.049 | | 0.065 |
| c | 0.15 | | 0.40 | 0.006 | | 0.016 |
| D | 2.25 | | 2.95 | 0.089 | | 0.116 |
| E | 4.80 | | 5.60 | 0.189 | | 0.220 |
| E1 | 3.95 | | 4.60 | 0.156 | | 0.181 |
| L | 0.75 | | 1.50 | 0.030 | | 0.059 |
| L1 | | 0.50 | | | 0.020 | |
| L2 | | 0.50 | | | 0.020 | |

Figure 19. **SMA Flat recommended footprint in mm (inches)**



## 2.2 SMA package information

- Epoxy meets UL94, V0
- Lead-free package

**Figure 20. SMA package outline**

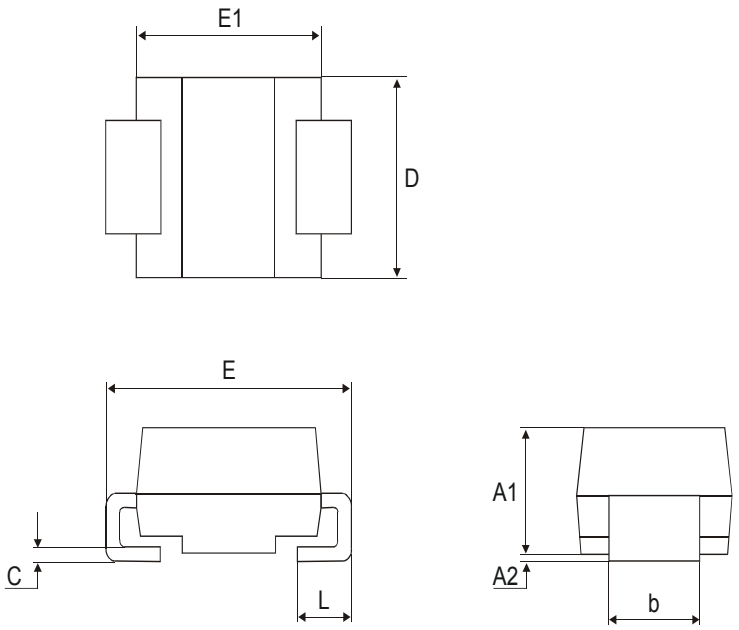
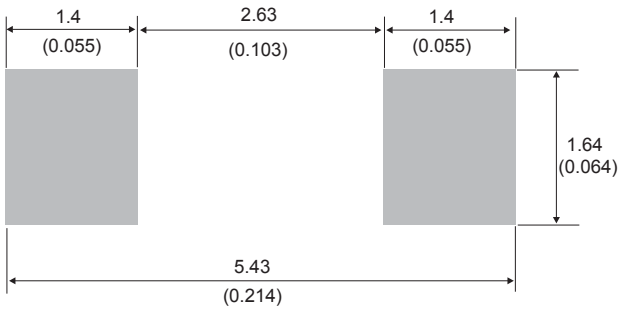



**Table 5. SMA package mechanical data**

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.45 | 0.075 | 0.097 |
| 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 21. **SMA recommended footprint in mm (inches)**



## 2.3 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

**Figure 22. SMB package outline**

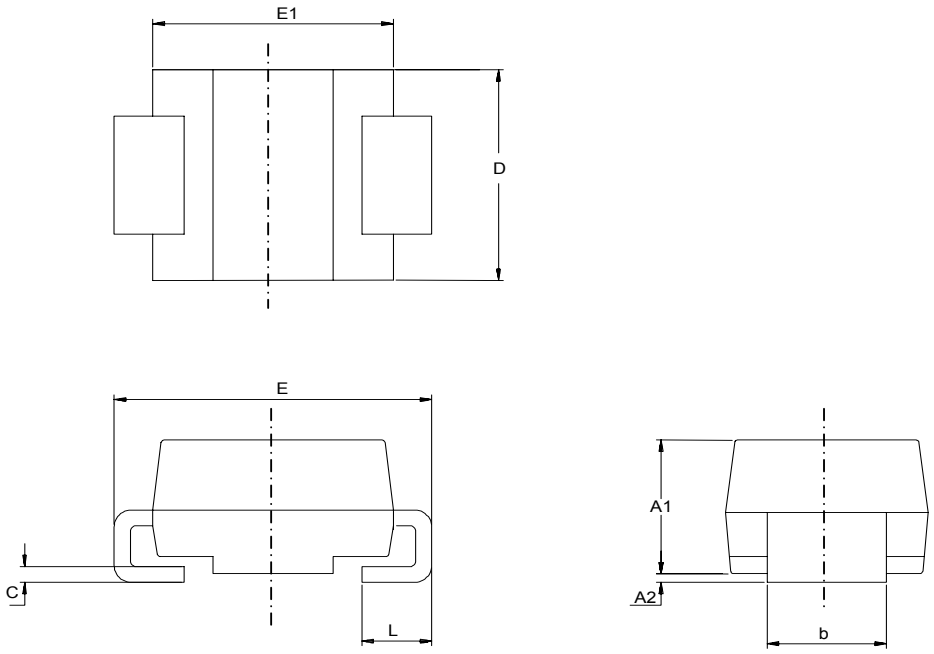
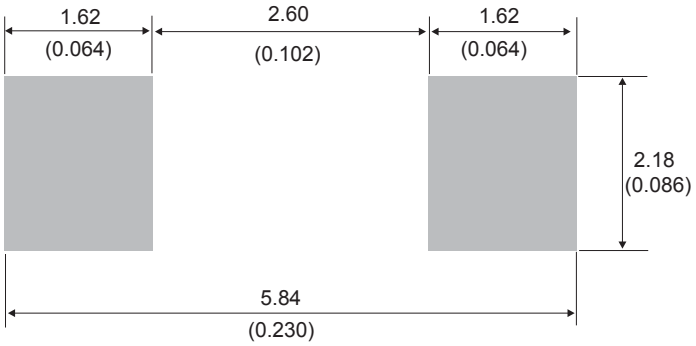



**Table 6. SMB package mechanical data**

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.45 | 0.0748 | 0.0965 |
| A2 | 0.05 | 0.20 | 0.0020 | 0.0079 |
| b | 1.95 | 2.20 | 0.0768 | 0.0867 |
| c | 0.15 | 0.40 | 0.0059 | 0.0157 |
| D | 3.30 | 3.95 | 0.1299 | 0.1556 |
| E | 5.10 | 5.60 | 0.2008 | 0.2205 |
| E1 | 4.05 | 4.60 | 0.1594 | 0.1811 |
| L | 0.75 | 1.50 | 0.0295 | 0.0591 |

Figure 23. **SMB recommended footprint**



## 2.4 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

**Figure 24. SMB Flat package outline**

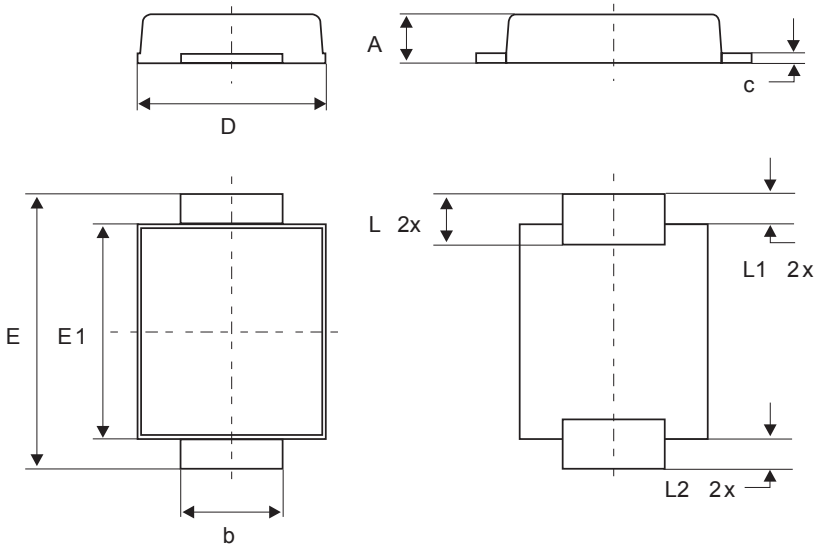
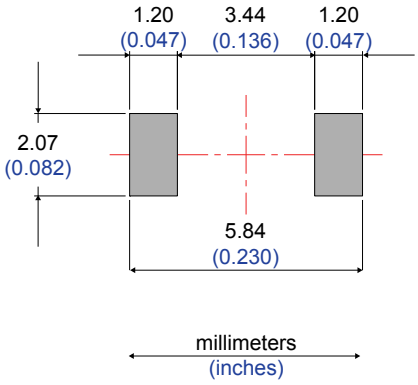



**Table 7. SMB Flat mechanical data**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.035 | | 0.043 |
| 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 |
| L1 | | 0.40 | | | 0.016 | |
| L2 | | 0.60 | | | 0.024 | |

**Figure 25. Footprint recommendations, dimensions in mm (inches)**



# 3 Ordering Information

Table 8. **Ordering information**

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|---|---|---|---|---|---|
| STPS2H100A | S21 | SMA | 0.068 g | 5000 | Tape and reel |
| STPS2H100AF | F21 | SMA Flat | 0.035 g | 10000 | Tape and reel |
| STPS2H100U | G21 | SMB | 0.107 g | 2500 | Tape and reel |
| STPS2H100UF | FG21 | SMB Flat | 0.050 g | 5000 | Tape and reel |

## Revision history

Table 9. **Document revision history**

| Date | Version | Changes |
|---|---|---|
| Jul-2003 | 4A | Last update. |
| Aug-2004 | 5 | SMA package dimensions update. Reference A1 max. changed from 2.70 (0.106 inches) to 2.03 mm (0.080 inches). |
| 08-Feb-2007 | 6 | Reformatted to current standards. Added ECOPACK statement. Added SMBflat package. |
| 15-Feb-2010 | 7 | Updated weight for SMBflat in Table 9. |
| 24-Jun-2013 | 8 | Added SMAflat package |
| 17-May-2018 | 9 | Removed figure 6.<br>Updated Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified) and Section ● Description.<br>Minor text changes to improve readability. |