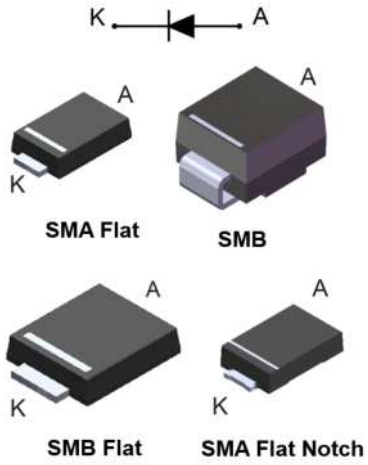
# STPS2L30

Datasheet

## 30 V, 2 A low drop power Schottky rectifier




### Features

- Low forward voltage drop for less power dissipation
- Optimized conduction/reverse losses trade-off which lead to the highest efficiency in the applications
- Surface mount miniature package
- Avalanche rated
- ECOPACK2 component

### Applications

- Cordless appliance
- SSD
- Battery charger
- Telecom power
- DC / DC converter

### Description

Single chip Schottky rectifiers designed for high frequency miniature switched mode power supplies such as adaptors and on board DC/DC converters.

Packaged in SMA, SMA Flat, SMA Flat Notch and SMB Flat, the STPS2L30 is ideal for use in parallel with MOSFETs in synchronous rectification.

| Product status |
|---|
| STPS2L30 |

| Product summary | |
|---|---|
| **Symbol** | **Value** |
| $I_{F(AV)}$ | 2 A |
| $V_{RRM}$ | 30 V |
| $T_{j(max.)}$ | 150 °C |
| $V_{F(typ.)}$ | 0.325 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 | | | 30 | V |
| $I_{F(AV)}$ | Average forward current, δ = 0.5, square wave | SMA | $T_L$ = 120 °C | 2 | A |
| | | SMA Flat, SMA Flat Notch | $T_L$ = 130 °C | | |
| | | SMB Flat | $T_L$ = 135 °C | | |
| $I_{FSM}$ | 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 | 108 | W |
| $T_{stg}$ | Storage temperature range | | | -65 to +150 | °C |
| $T_j$ | Maximum operating junction temperature(1) | | | +150 | °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 parameter**

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

For more information, please refer to the following application note :

- AN5088 : Rectifiers thermal management, handling and mounting recommendations

**Table 3. Static electrical characteristics**

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | - | | 200 | µA |
| | | $T_j$ = 100 °C | | - | 6 | 15 | mA |
| $V_F$(1) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 2 A | - | | 0.45 | V |
| | | $T_j$ = 125 °C | | - | 0.325 | 0.375 | |
| | | $T_j$ = 25 °C | $I_F$ = 4 A | - | | 0.53 | |
| | | $T_j$ = 125 °C | | - | 0.43 | 0.51 | |

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

To evaluate the conduction losses, use the following equation:

$P = 0.24 \times I_{F(AV)} + 0.068 \times I_F{}^2{}_{(RMS)}$

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**

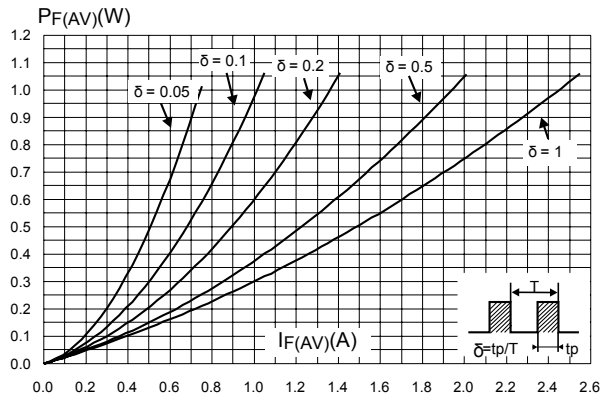



**Figure 2. Average forward current versus ambient temperature (δ = 0.5) SMA**

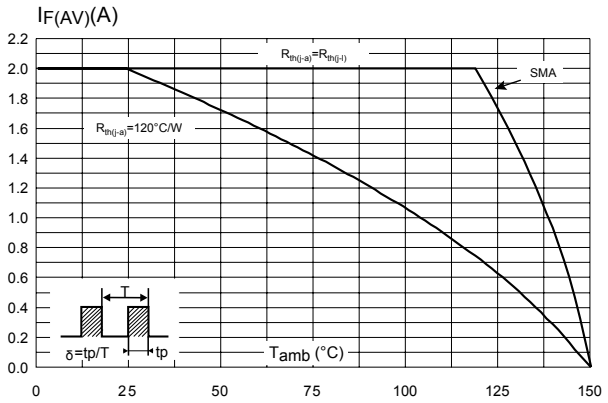



**Figure 3. Average forward current versus ambient temperature (δ = 0.5, SMB Flat)**

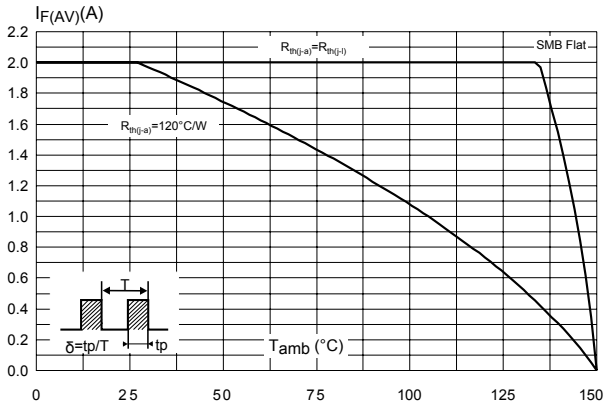



**Figure 4. Average forward current versus ambient temperature (δ = 0.5, SMA Flat, SMA Flat Notch)**

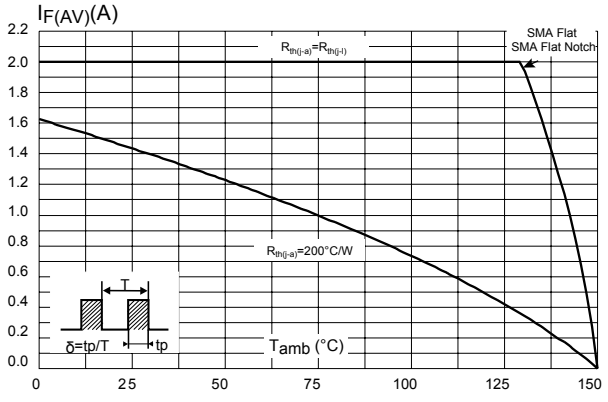


**Figure 5. Normalized avalanche power derating versus pulse duration ($T_j$ = 125 °C)**

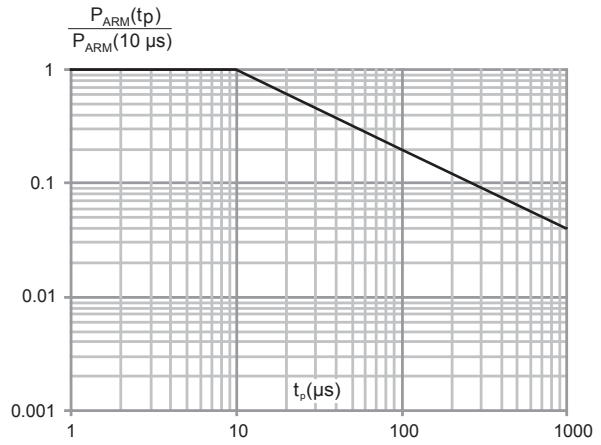



**Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**

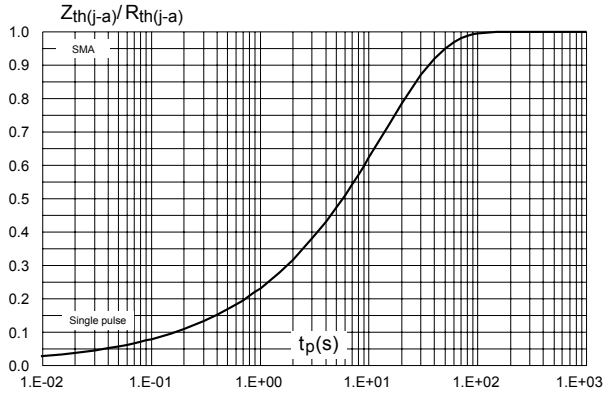



**Figure 7. Relative variation of thermal impedance junction to lead versus pulse duration (SMB Flat)**

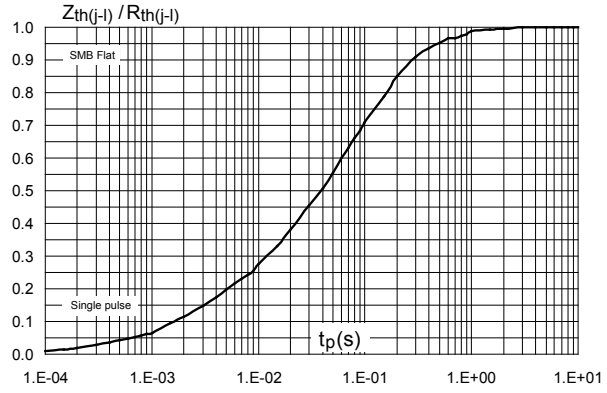



**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA Flat, SMA Flat Notch)**

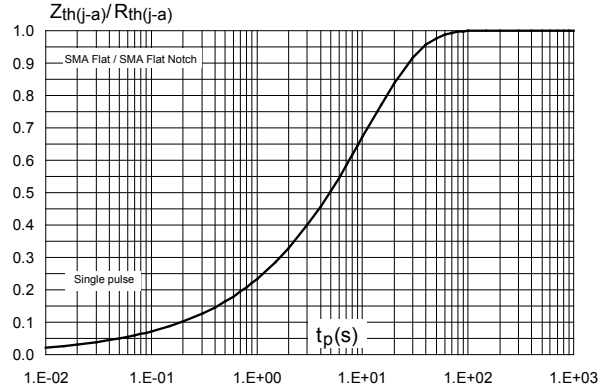



**Figure 9. Reverse leakage current versus reverse voltage applied (typical values)**

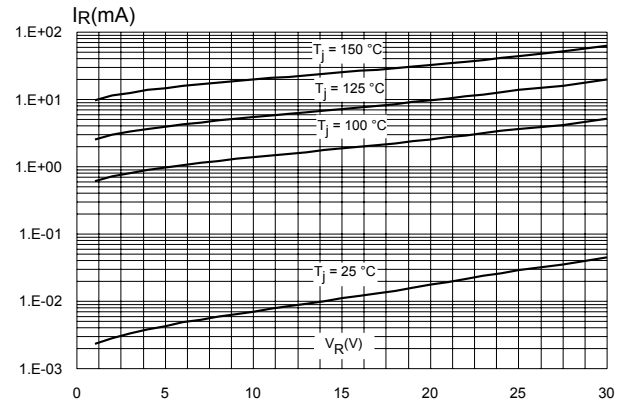



**Figure 10. Junction capacitance versus reverse voltage applied (maximum values)**

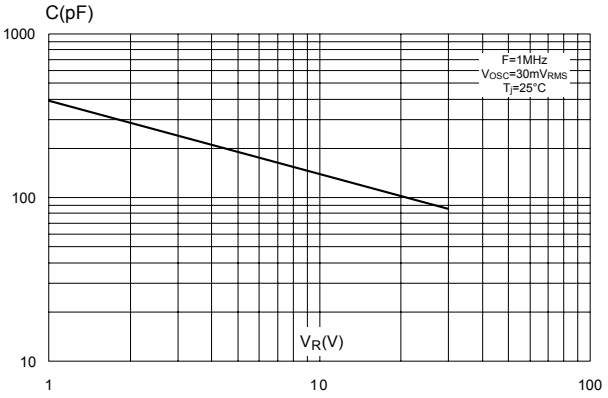


**Figure 11. Forward voltage drop versus forward current (high level)**

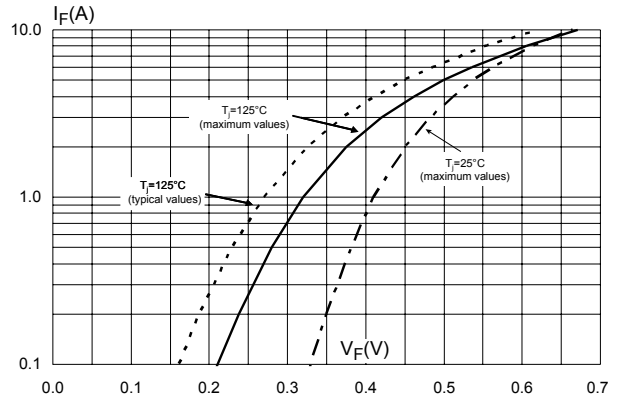



**Figure 12. Forward voltage drop versus forward current (low level)**

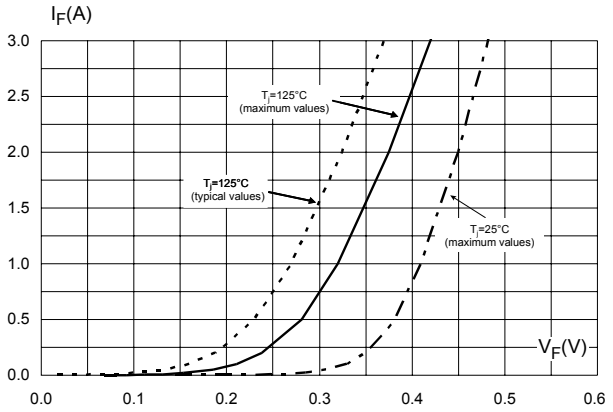



**Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (SMA)**

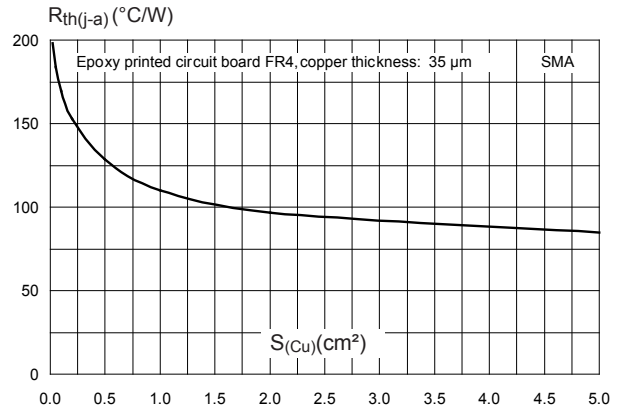



**Figure 14. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat, SMA Flat Notch)**

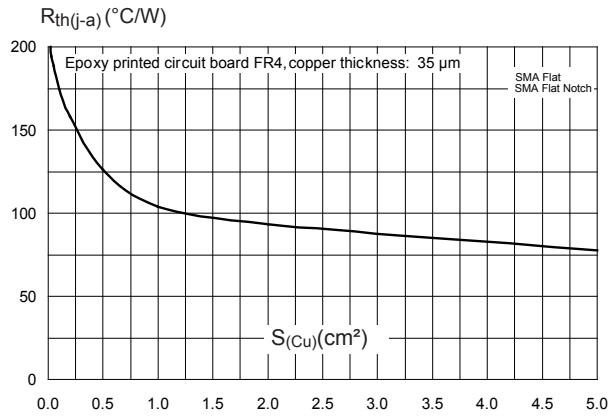
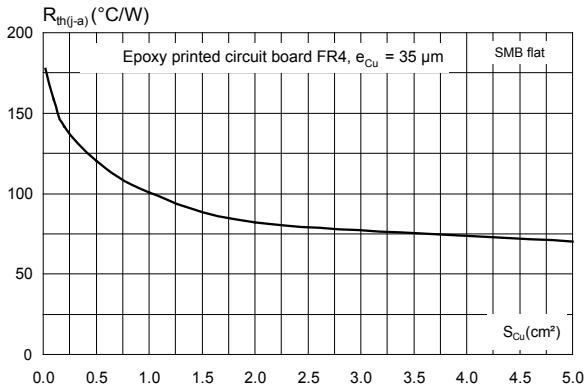



**Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (SMB Flat)**



# 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 package information

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

**Figure 16. SMA package outline**

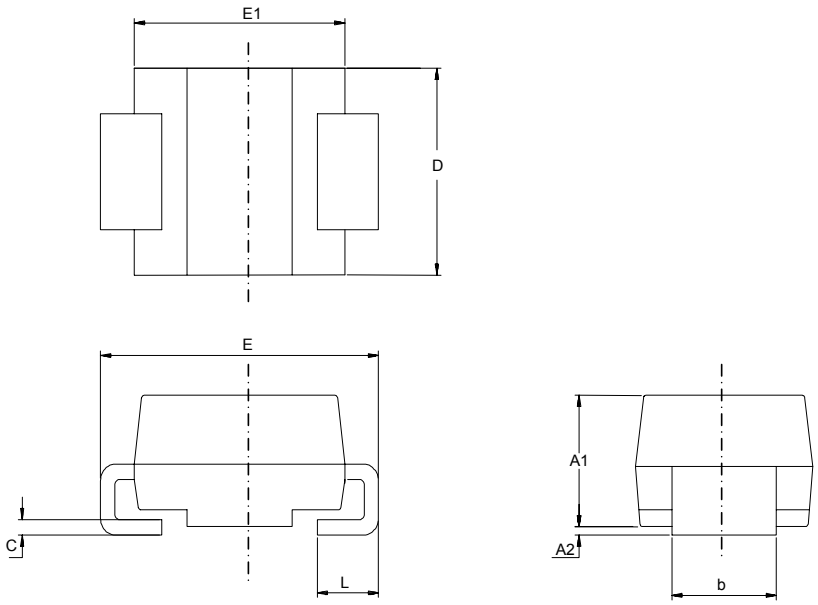
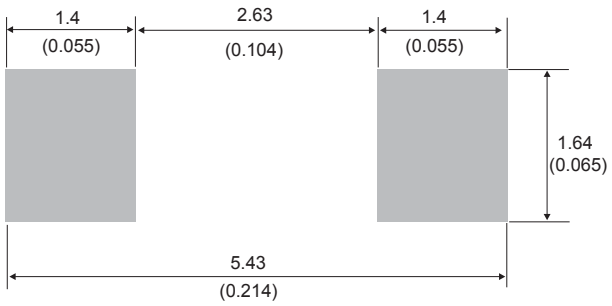



**Table 4. SMA package mechanical data**

| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches (for reference only) | |
| | Min. | Max. | Min. | Max. |
| A1 | 1.90 | 2.45 | 0.074 | 0.097 |
| A2 | 0.05 | 0.20 | 0.001 | 0.008 |
| b | 1.25 | 1.65 | 0.049 | 0.065 |
| c | 0.15 | 0.40 | 0.005 | 0.016 |
| D | 2.25 | 2.90 | 0.088 | 0.115 |
| E | 4.80 | 5.35 | 0.188 | 0.211 |
| E1 | 3.95 | 4.60 | 0.155 | 0.182 |
| L | 0.75 | 1.50 | 0.029 | 0.060 |

Figure 17. **SMA recommended footprint in mm (inches)**



## 2.2 SMA Flat package information

- Epoxy meets UL94, V0
- Lead-free package

**Figure 18. SMA Flat package outline**

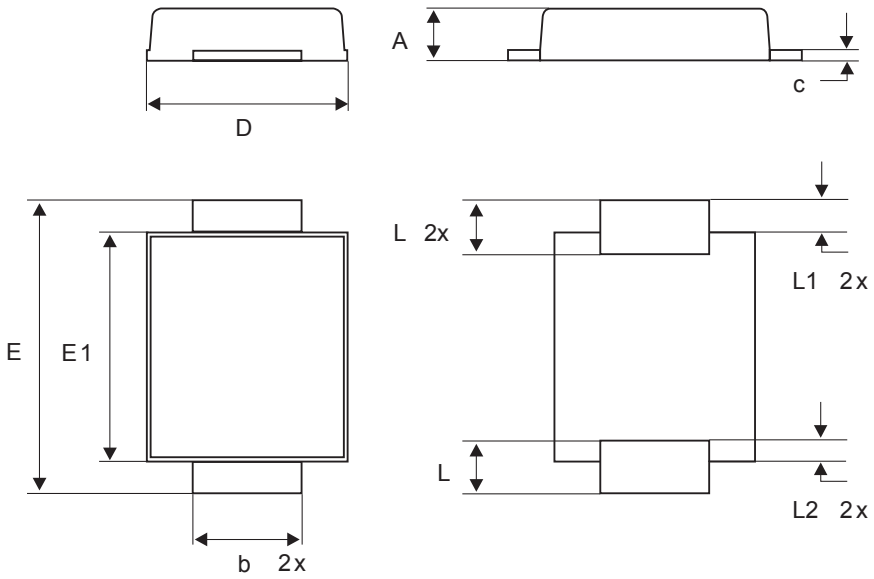
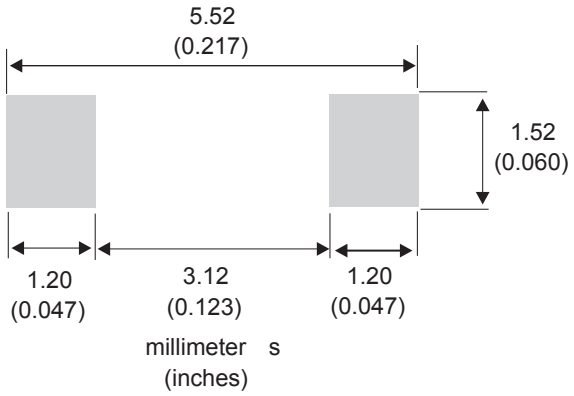



**Table 5. SMA Flat package mechanical data**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches (for reference only) | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.035 | | 0.044 |
| b | 1.25 | | 1.65 | 0.049 | | 0.065 |
| c | 0.15 | | 0.40 | 0.005 | | 0.016 |
| D | 2.25 | | 2.95 | 0.088 | | 0.117 |
| E | 4.80 | | 5.60 | 0.188 | | 0.221 |
| E1 | 3.95 | | 4.60 | 0.155 | | 0.182 |
| L | 0.75 | | 1.50 | 0.029 | | 0.060 |
| L1 | | 0.50 | | | 0.020 | |
| L2 | | 0.50 | | | 0.020 | |

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



## 2.3 SMA Flat Notch package information

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

**Figure 20. SMA Flat Notch package outline**

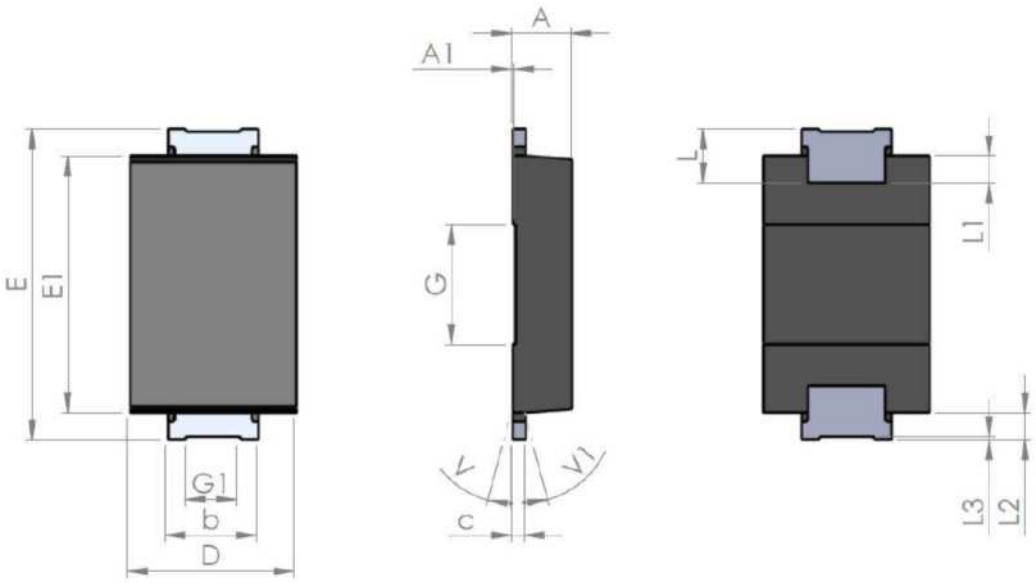
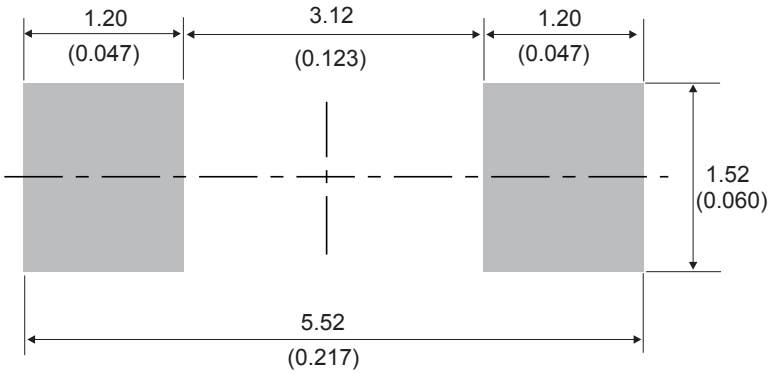



**Table 6. SMA Flat Notch package mechanical data**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches (for reference only) | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A1 | 0.90 | | 1.10 | 0.035 | | 0.044 |
| A1 | | 0.05 | | | 0.002 | |
| b | 1.25 | | 1.65 | 0.049 | | 0.065 |
| C | 0.15 | | 0.40 | 0.005 | | 0.016 |
| D | 2.25 | | 2.90 | 0.088 | | 0.115 |
| E | 5.00 | | 5.35 | 0.196 | | 0.211 |
| E1 | 3.95 | | 4.60 | 0.155 | | 0.182 |
| G | | 2.00 | | | 0.079 | |
| G1 | | 0.85 | | | 0.033 | |
| L | 0.75 | | 1.20 | 0.029 | | |
| L1 | | 0.45 | | | 0.018 | |
| L2 | | 0.45 | | | 0.018 | |
| L3 | | 0.05 | | | 0.002 | |
| V | | | 8° | | | 8° |
| V1 | | | 8° | | | 8° |

Figure 21. **SMA Flat Notch recommended footprint in mm (inches)**



## 2.4 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

**Figure 22. SMB Flat package outline**

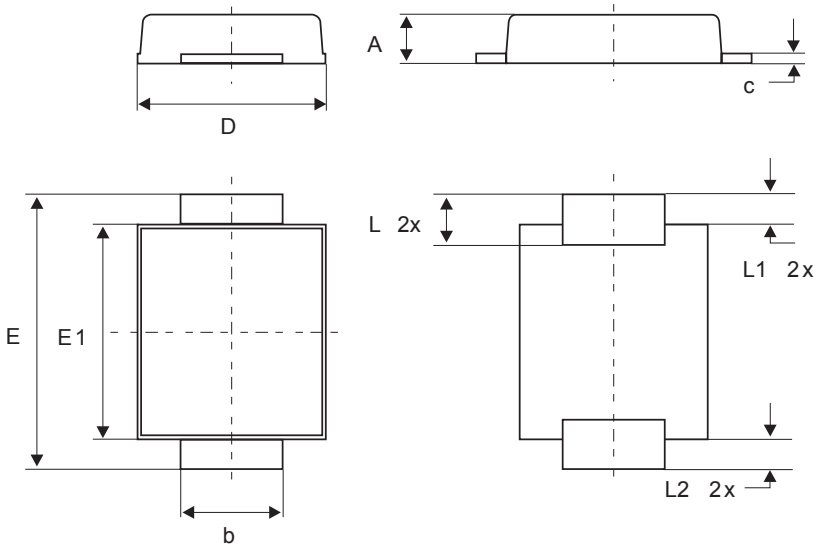
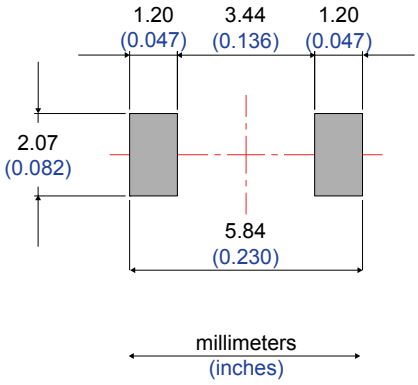



**Table 7. SMB Flat mechanical data**

| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches (for reference only) | | |
| | 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 23. Footprint recommendations, dimensions in mm (inches)**



# 3 Ordering information

Table 8. **Ordering information**

| Order code | Marking | Package | Weight | Base qty. | Delivery mode |
|---|---|---|---|---|---|
| STPS2L30A | G30 | SMA | 0.068 g | 5000 | Tape and reel |
| STPS2L30UF | FG30 | SMB Flat | 0.050 g | 5000 | Tape and reel |
| STPS2L30AFN | A23 | SMA Flat Notch | 0.039 g | 10 000 | Tape and reel |
| STPS2L30AF | F30 | SMA Flat | 0.035 g | 10000 | Tape and reel |

## Revision history

**Table 9. Document revision history**

| Date | Version | Changes |
|---|---|---|
| Jul-2003 | 3A | Last update. |
| Aug-2004 | 4 | SMA package dimensions update. Reference A1 max. changed from 2.70mm (0.106inc.) to 2.03mm (0.080). |
| 31-Jan-2007 | 5 | Reformatted to current standard. Added ECOPACK statement. Added SMB flat package. |
| 23-Apr-2008 | 6 | Reformatted to current standards. Added SMA flat package. |
| 30-Nov-2018 | 7 | Updated Table 1. Absolute ratings (limiting values at 25 °C, unless otherwise specified) and Figure 5. Normalized avalanche power derating versus pulse duration ($T_j$ = 125 °C). |
| 26-Sep-2019 | 8 | Added Section 2.3 SMA Flat Notch package information. |

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