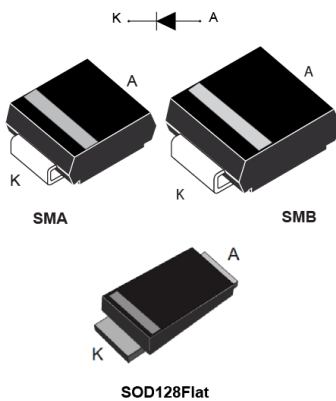



## Automotive 100 V - 2 A power Schottky diode



### Features

- AEC-Q101 qualified 
- PPAP capable
- $V_{RRM}$  guaranteed from  $-40^{\circ}\text{C}$  to  $175^{\circ}\text{C}$
- Low leakage current
- Avalanche capability specified
- ECOPACK2 compliant

### Applications

- DC/DC converter
- Auxiliary power supply
- Freewheeling function
- Reverse battery polarity protection

### Description

This high quality Schottky barrier rectifier device is designed for high frequency miniature switched mode power supplies such as adaptors or on-board DC/DC converters for automotive applications.

Packaged in SMB, SMA and SOD128Flat, the STPS2H100-Y provides a high level of performance in compact and flat packages which can withstand high operating junction temperature.



#### Product status link

[STPS2H100-Y](#)

#### Product summary

|              |                       |
|--------------|-----------------------|
| $I_{F(AV)}$  | 2 A                   |
| $V_{RRM}$    | 100 V                 |
| $T_j$ (max.) | $175^{\circ}\text{C}$ |
| $V_F$ (typ.) | 0.60 V                |

# 1 Characteristics

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

| Symbol             | Parameter   |  | Value       | Unit |   |
|--------------------|---|--|-------------|------|---|
| V <sub>RRM</sub>   | Repetitive peak reverse voltage (T <sub>j</sub> = -40°C to + 175°C) |  | 100         | V    |   |
| I <sub>F(AV)</sub> | Average forward current, δ = 0.5 square wave                        | T <sub>L</sub> = 135 °C<br>SMB                 | 2           | A    |   |
|                    |   | T <sub>L</sub> = 130 °C<br>SMA                 |             |      |   |
|                    |   | T <sub>L</sub> = 150 °C<br>SOD128Flat          |             |      |   |
| I <sub>FSM</sub>   | Surge non repetitive forward current                                | t <sub>p</sub> = 10 ms sinusoidal              | SMA, SMB    | 75   | A |
|                    |   |  | SOD128Flat  | 55   |   |
| P <sub>ARM</sub>   | Repetitive peak avalanche power                                     | t <sub>p</sub> = 10 μs, T <sub>j</sub> = 125°C | 173         | W    |   |
| T <sub>stg</sub>   | Storage temperature range   |  | -65 to +175 | °C   |   |
| T <sub>j</sub>     | Operating junction temperature range <sup>(1)</sup>                 |  | -40 to +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 parameter**

| Symbol               | Parameter        | Max. value | Unit |
|----------------------|------------------|------------|------|
| R <sub>th(j-l)</sub> | Junction to lead | SMA        | 30   |
|                      |                  | SMB        | 25   |
|                      |                  | SOD128Flat | 16   |
|                      |                  |            | °C/W |

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 <sub>R</sub> <sup>(1)</sup> | Reverse leakage current | T <sub>j</sub> = 25 °C  | V <sub>R</sub> = V <sub>RRM</sub> | -    |      | 1    | μA   |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 0.4  | 1    | mA   |
| V <sub>F</sub> <sup>(2)</sup> | Forward voltage drop    | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 2 A              | -    |      | 0.79 | V    |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 0.60 | 0.65 |      |
|                               |                         | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 4 A              | -    |      | 0.88 |      |
|                               |                         | T <sub>j</sub> = 125 °C |                                   | -    | 0.69 | 0.74 |      |

1. Pulse test: t<sub>p</sub> = 5 ms, δ < 2%

2. Pulse test: t<sub>p</sub> = 380 μs, δ < 2%

To evaluate the conduction losses, use the following equation:

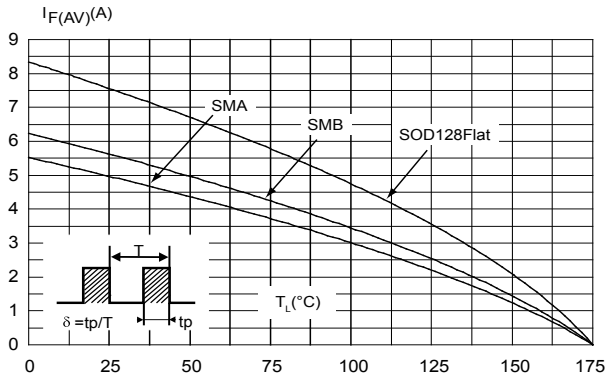
$$P = 0.56 \times I_{F(AV)} + 0.045 \times I_{F(RMS)}^2$$

For more information, please refer to the following application notes related to the power losses :

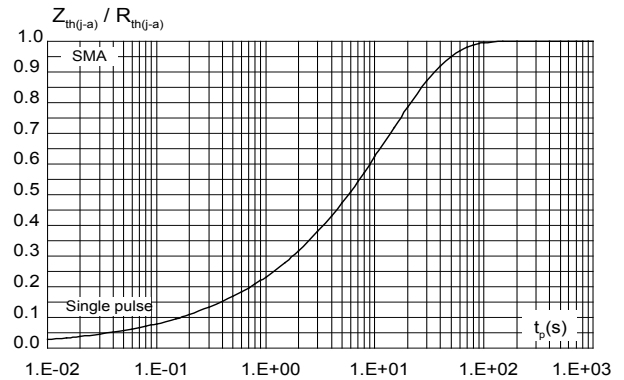
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

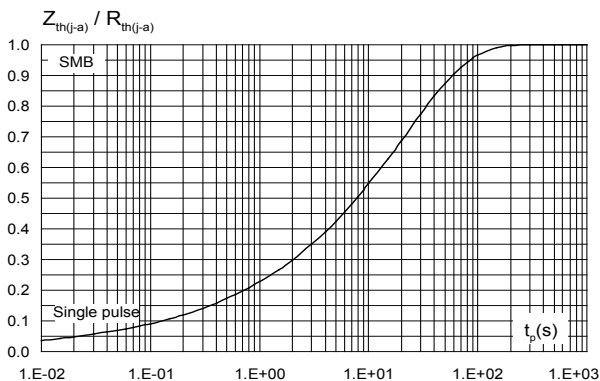
**Figure 1. Average forward current versus lead temperature ( $\delta = 0.5$ )**



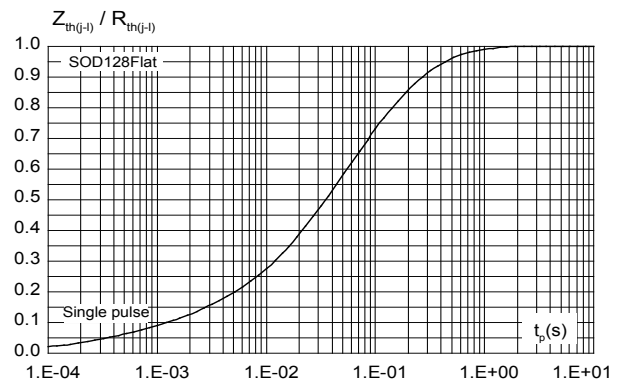
**Figure 2. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**



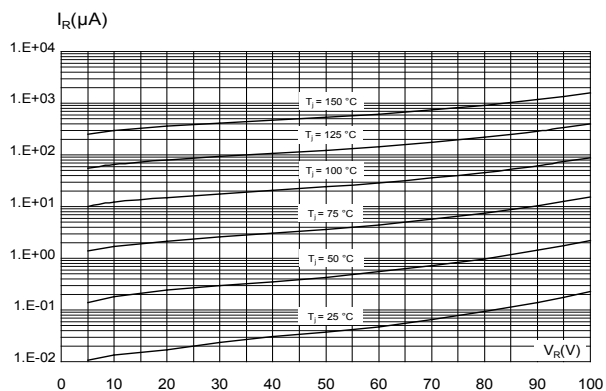
**Figure 3. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)**



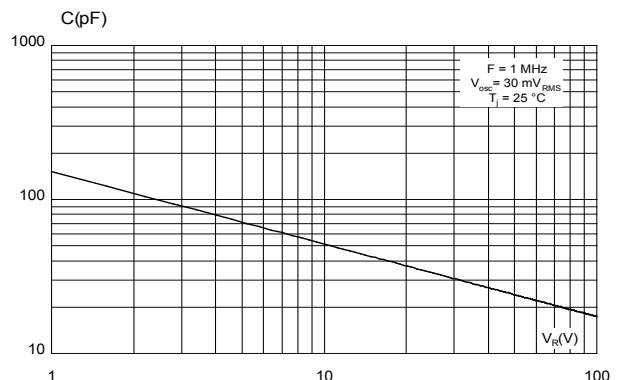
**Figure 4. Relative variation of thermal impedance junction to lead versus pulse duration (SOD128Flat)**



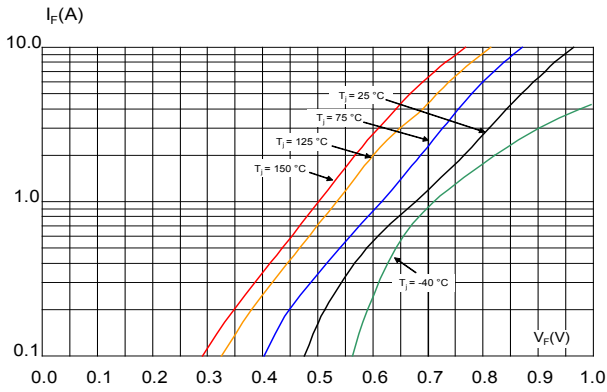
**Figure 5. Reverse leakage current versus reverse voltage applied (typical values)**



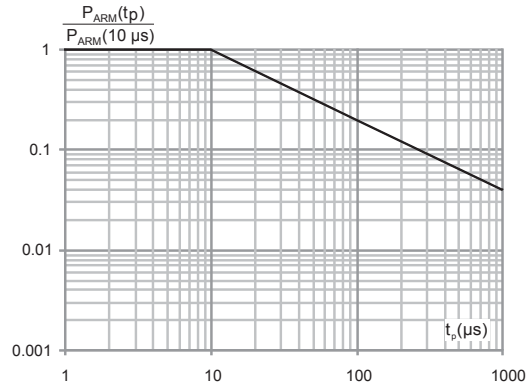
**Figure 6. Junction capacitance versus reverse voltage applied (typical values)**



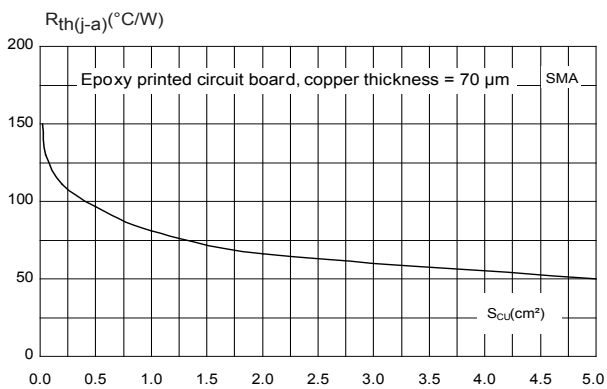
**Figure 7. Forward voltage drop versus forward current (typical values)**



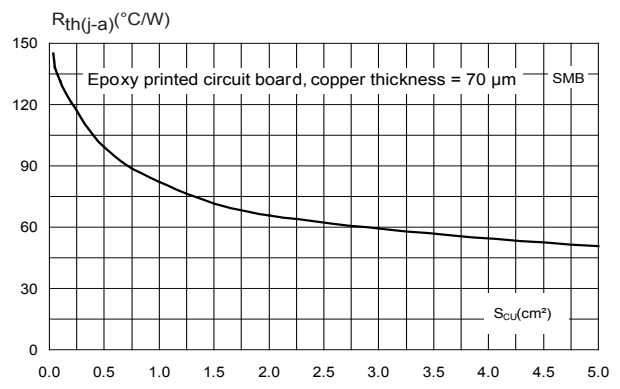
**Figure 8. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



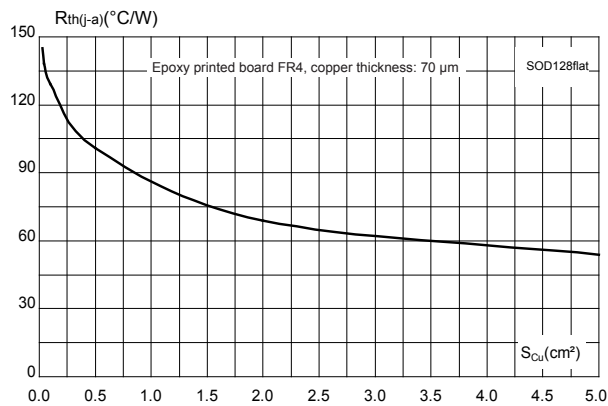
**Figure 9. Thermal resistance junction to ambient versus copper surface under each lead (SMA, typical values)**



**Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMB, typical values)**



**Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SOD128Flat, typical values)**



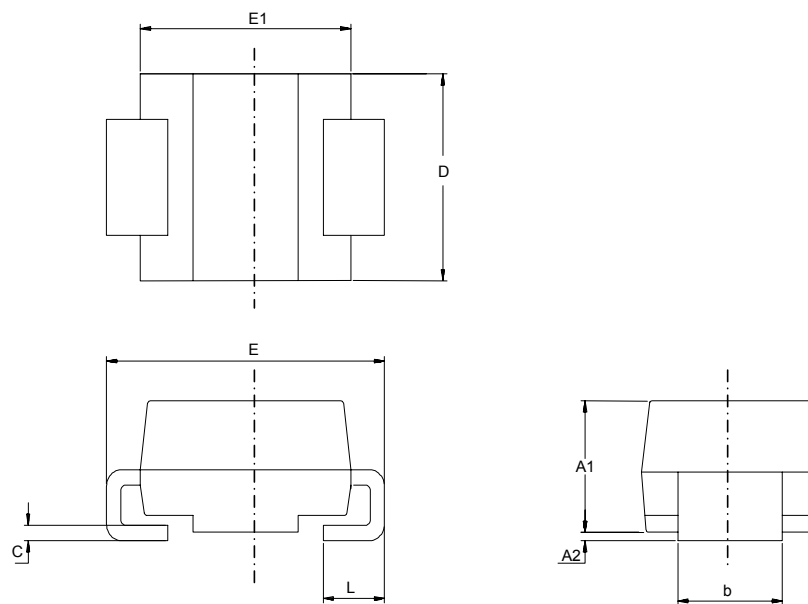
## 2 Package information

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](http://www.st.com). ECOPACK is an ST trademark.

### 2.1 SMA package information

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

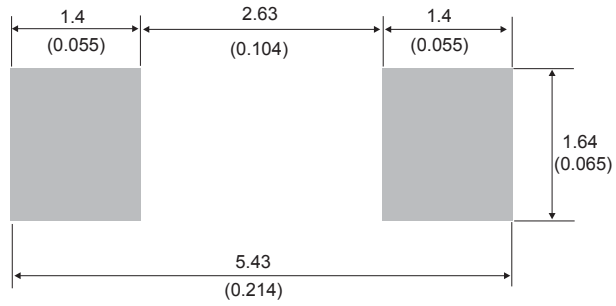
**Figure 12. SMA package outline**



**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 |

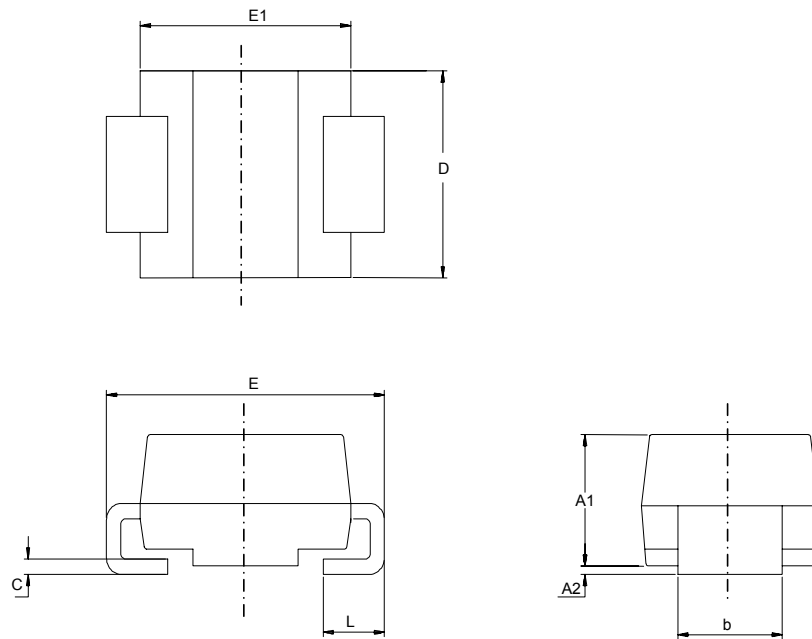
Figure 13. SMA recommended footprint in mm (inches)



## 2.2 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

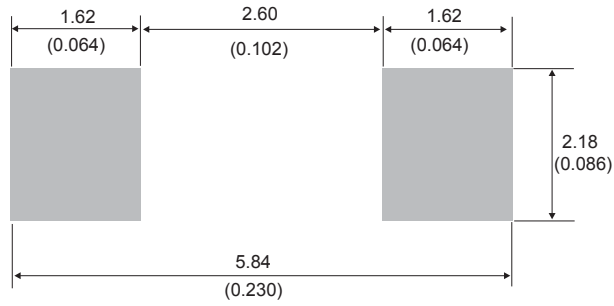
**Figure 14. SMB package outline**



**Table 5. SMB 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    | 1.95        | 2.20 | 0.076                       | 0.087 |
| c    | 0.15        | 0.40 | 0.005                       | 0.016 |
| D    | 3.30        | 3.95 | 0.129                       | 0.156 |
| E    | 5.10        | 5.60 | 0.200                       | 0.221 |
| E1   | 4.05        | 4.60 | 0.159                       | 0.182 |
| L    | 0.75        | 1.50 | 0.029                       | 0.060 |

Figure 15. SMB recommended footprint

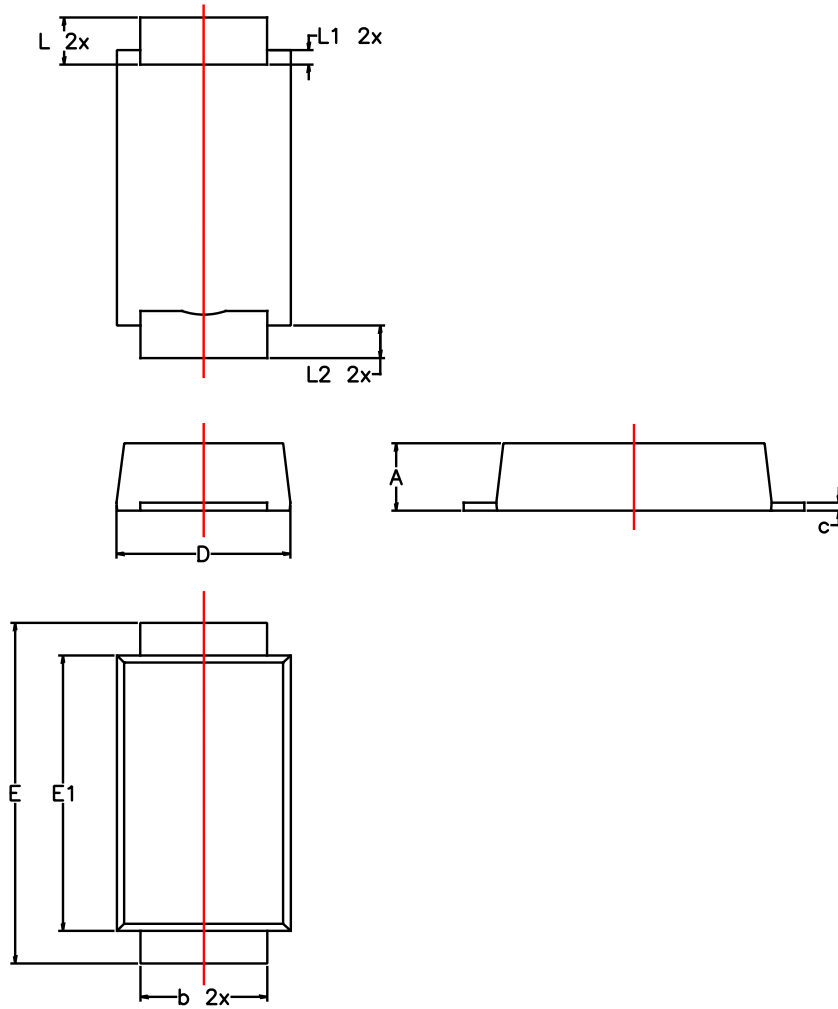




### 2.3 SOD128Flat package information

- Lead-free package

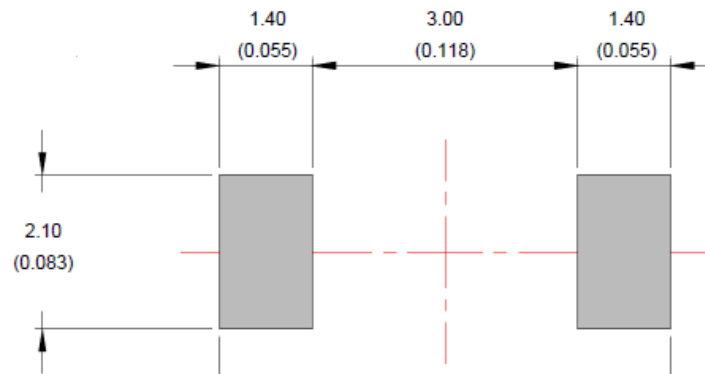
Figure 16. SOD128Flat package outline



**Table 6. SOD128Flat package mechanical data**

| Ref. | Dimensions  |      |            |       |
|------|-------------|------|------------|-------|
|      | Millimeters |      | Inches     |       |
|      | Min.        | Max. | Min.       | Max.  |
| A    | 0.93        | 1.03 | 0.037      | 0.041 |
| b    | 1.69        | 1.81 | 0.067      | 0.071 |
| c    | 0.10        | 0.22 | 0.004      | 0.009 |
| D    | 2.30        | 2.50 | 0.091      | 0.098 |
| E    | 4.60        | 4.80 | 0.181      | 0.189 |
| E1   | 3.70        | 3.90 | 0.146      | 0.154 |
| L    | 0.55        | 0.85 | 0.026      | 0.033 |
| L1   | 0.30 typ.   |      | 0.012 typ. |       |
| L2   | 0.45 typ.   |      | 0.018 typ. |       |

**Figure 17. SOD128Flat footprint in mm (inches)**



*Note:* For package and tape orientation, reel and inner box dimensions and tape outline please check [TN1173](#)

### 3 Ordering information

Table 7. Ordering information

| Order code   | Marking | Package    | Weight  | Base qty. | Delivery mode |
|--------------|---------|------------|---------|-----------|---------------|
| STPS2H100AY  | S21Y    | SMA        | 68 mg   | 5000      | Tape and reel |
| STPS2H100UY  | G21Y    | SMB        | 107 mg  | 2500      | Tape and reel |
| STPS2H100AFY | 2H100Y  | SOD128Flat | 26.4 mg | 3000      | Tape and reel |

## Revision history

**Table 8. Document revision history**

| Date        | Version | Changes   |
|-------------|---------|---|
| 10-Dec-2010 | 1       | Initial release.  |
| 11-Feb-2021 | 2       | Added SOD128Flat package information. Minor text changes. |

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