

# 1 Characteristics

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

| Symbol      | Parameter                                             |                |                                                    | Value       | Unit |
|-------------|-------------------------------------------------------|----------------|----------------------------------------------------|-------------|------|
| $V_{RRM}$   | Repetitive peak reverse voltage                       |                |                                                    | 150         | V    |
| $I_{F(AV)}$ | Average forward current, $\delta = 0.5$ , square wave | SMA Flat Notch | $T_L = 130\text{ °C}$                              | 3           | A    |
|             |                                                       | SMB            | $T_L = 130\text{ °C}$                              |             |      |
|             |                                                       | SMB Flat       | $T_L = 150\text{ °C}$                              |             |      |
|             |                                                       | DO-201AD       | $T_L = 140\text{ °C}$                              |             |      |
| $I_{FSM}$   | Surge non repetitive forward current                  | SMA Flat Notch | $t_p = 10\text{ ms sinusoidal}$                    | 75          | A    |
|             |                                                       | SMB            |                                                    | 80          |      |
|             |                                                       | SMB Flat       |                                                    | 80          |      |
|             |                                                       | DO-201AD       |                                                    | 100         |      |
| $P_{ARM}$   | Repetitive peak avalanche power                       |                | $t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ °C}$ | 210         | W    |
| $T_{stg}$   | Storage temperature range                             |                |                                                    | -65 to +175 | °C   |
| $T_j$       | Maximum operating junction temperature <sup>(1)</sup> |                |                                                    | +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 |
|---------------|---------------------------------------|----------------|------------|------|
| $R_{th(j-l)}$ | Junction to lead                      | SMA Flat Notch | 20         | °C/W |
|               |                                       | SMB            | 20         |      |
|               |                                       | SMB Flat       | 10         |      |
|               | Junction to lead, lead length = 10 mm | DO-201AD       | 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 | $T_j = 25\text{ °C}$  | $V_R = V_{RM}$     | -    | 0.4  | 2.0  | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                    | -    | 0.6  | 2.0  | mA            |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 3\text{ A}$ | -    | 0.78 | 0.82 | V             |
|             |                         | $T_j = 125\text{ °C}$ |                    | -    | 0.63 | 0.67 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 6\text{ A}$ | -    | 0.85 | 0.89 |               |
|             |                         | $T_j = 125\text{ °C}$ |                    | -    | 0.70 | 0.75 |               |

1. Pulse test:  $t_p = 5\text{ ms}$ ,  $\delta < 2\%$

2. Pulse test:  $t_p = 380\text{ }\mu\text{s}$ ,  $\delta < 2\%$

To evaluate the conduction losses, use the following equation:

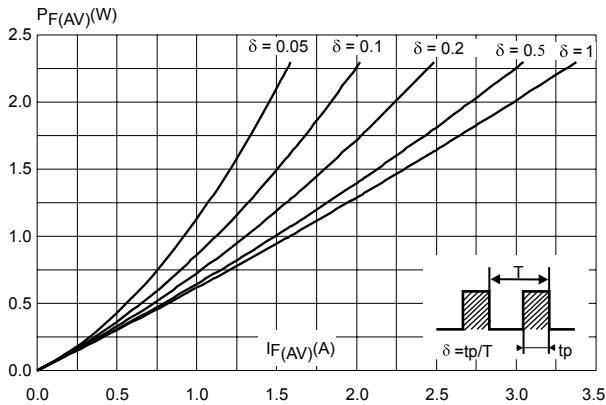
$$P = 0.59 \times I_{F(AV)} + 0.027 \times I_{F(RMS)}^2$$

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

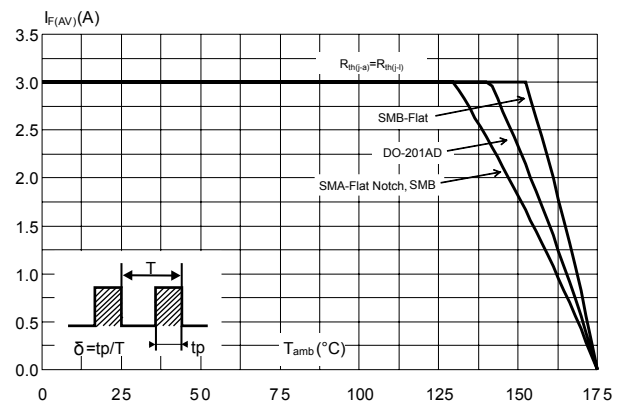
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

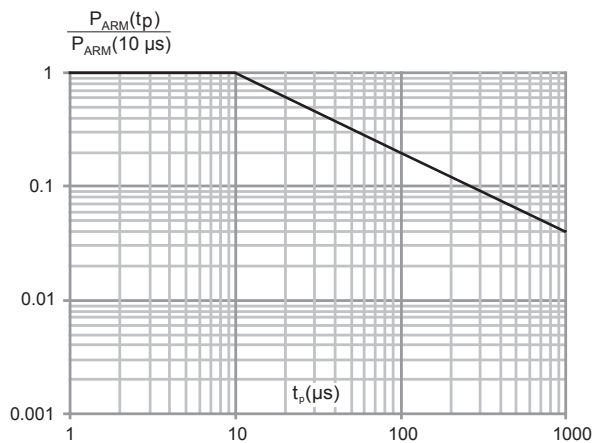
**Figure 1. Average forward power dissipation versus average forward current**



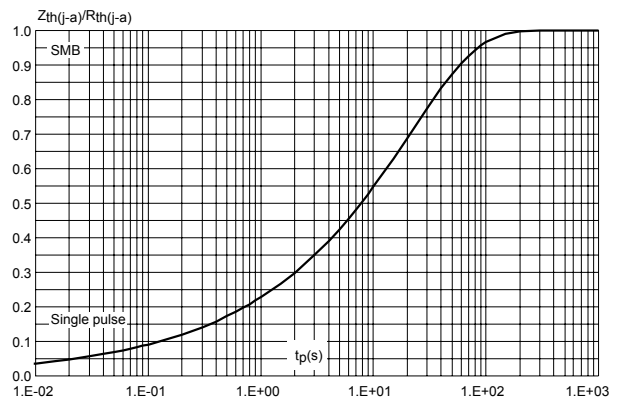
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



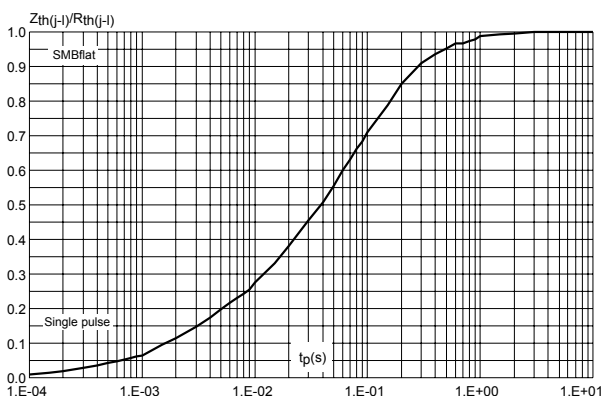
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125^\circ\text{C}$ )**



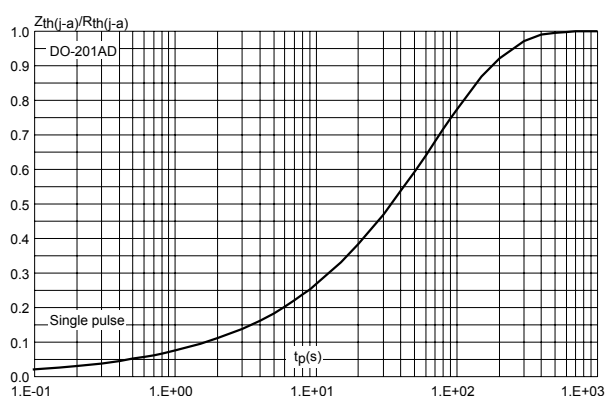
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)**



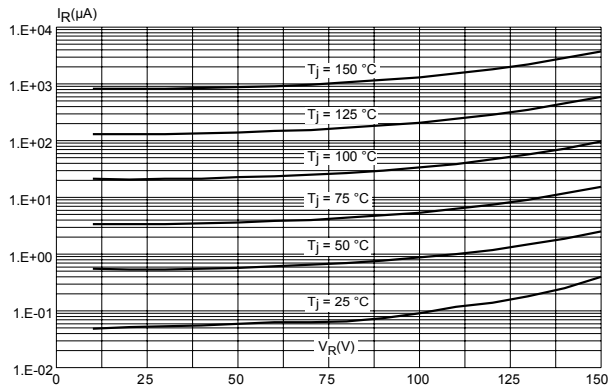
**Figure 5. Relative variation of thermal impedance junction to lead versus pulse duration (SMB flat)**



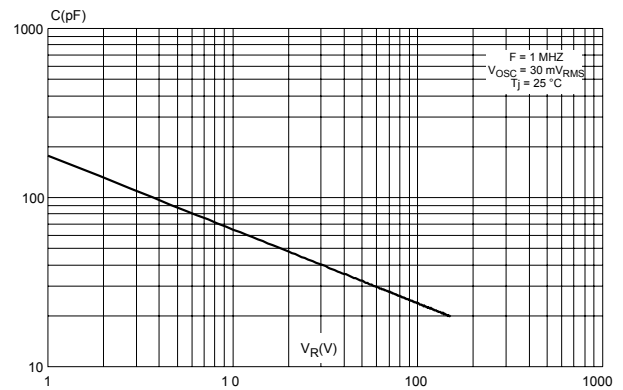
**Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-201AD)**



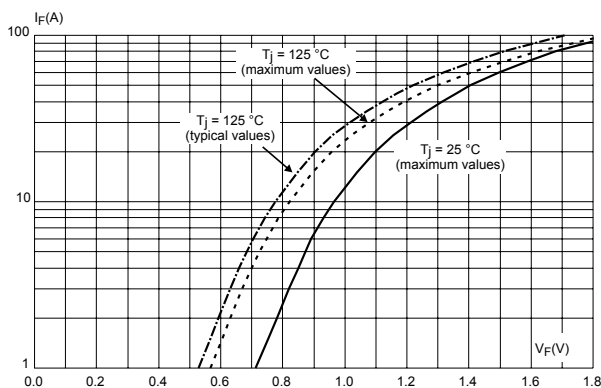
**Figure 7. Reverse leakage current versus reverse voltage applied (typical values)**



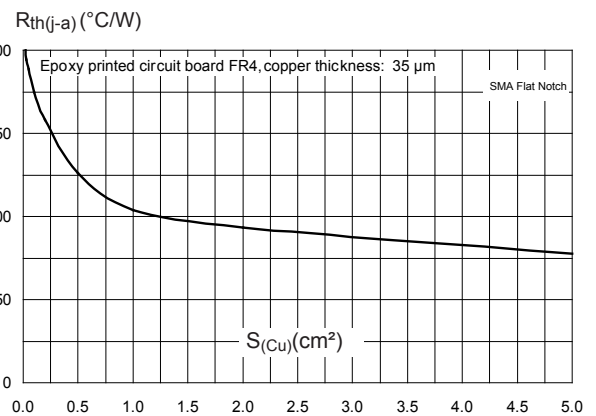
**Figure 8. Junction capacitance versus reverse voltage applied (typical values)**



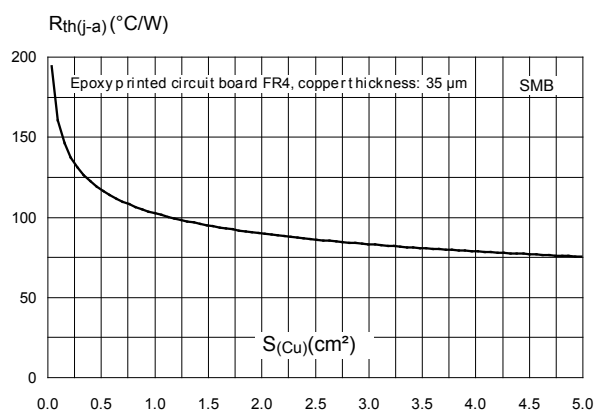
**Figure 9. Forward voltage drop versus forward current**



**Figure 10. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat Notch)**



**Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SMB)**



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

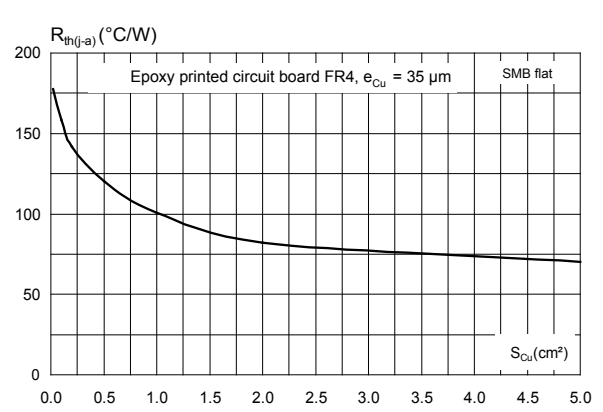
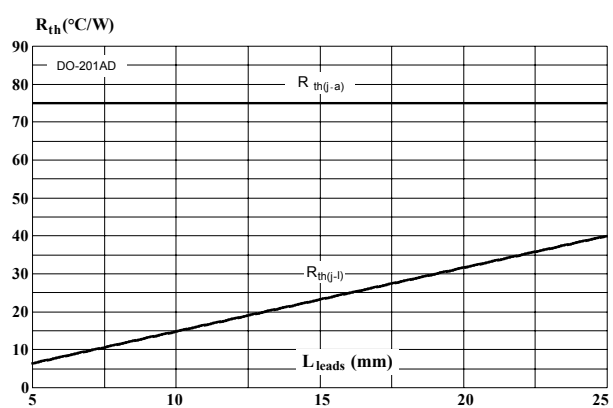


Figure 13. Thermal resistance versus lead length



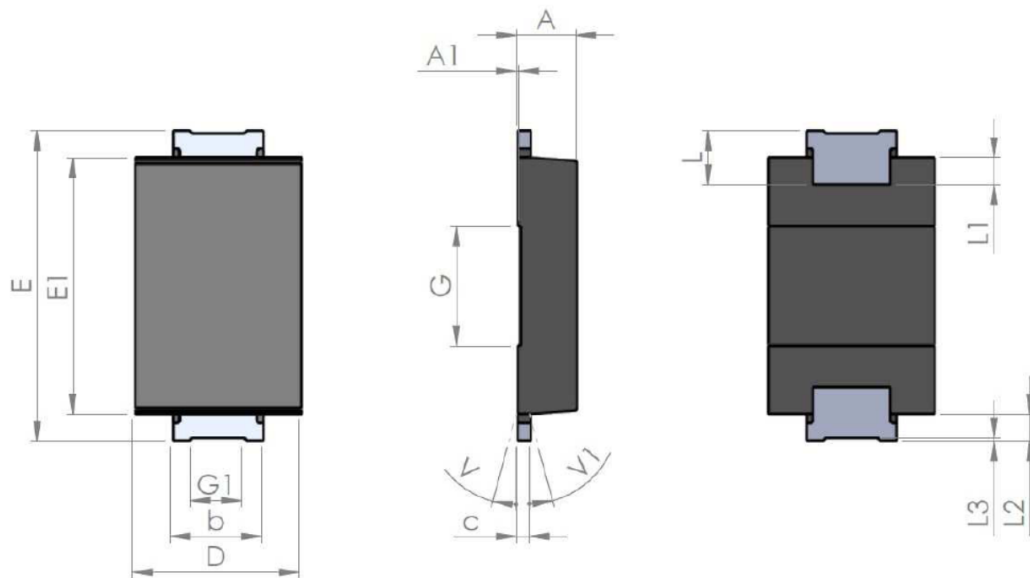
## 2 Package information

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 Flat Notch package information

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

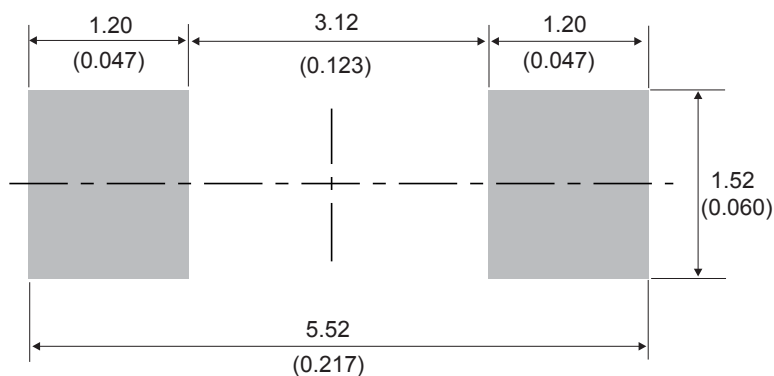
**Figure 14. SMA Flat Notch package outline**



**Table 4. 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°    |

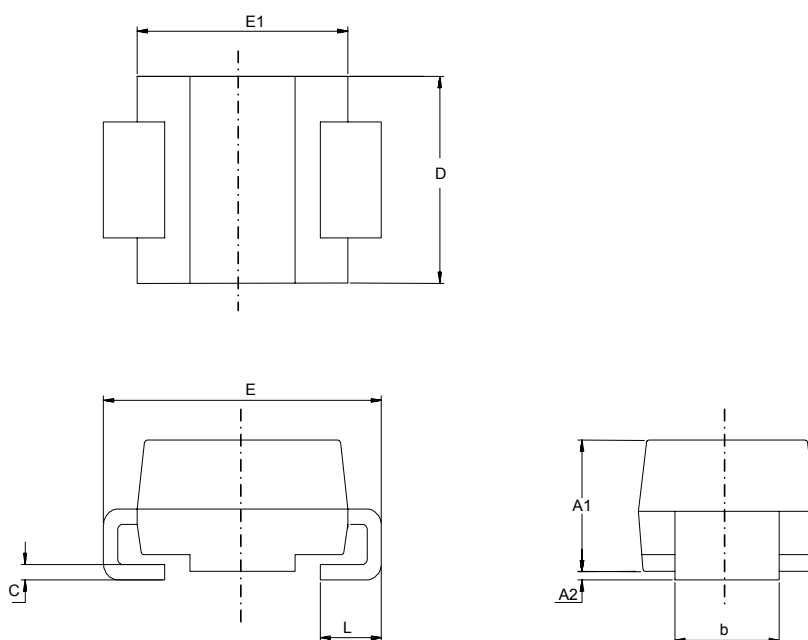
**Figure 15. SMA Flat Notch recommended footprint in mm (inches)**



## 2.2 SMB package information

- Epoxy meets UL94, V0
- Lead-free package

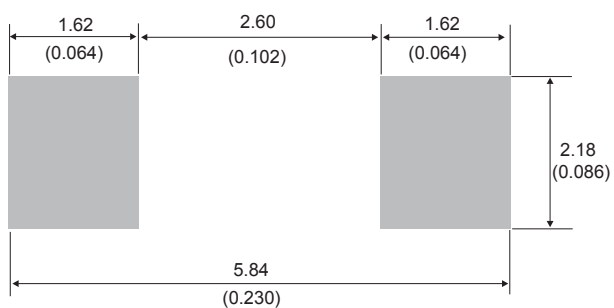
**Figure 16. SMB package outline**



**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 |

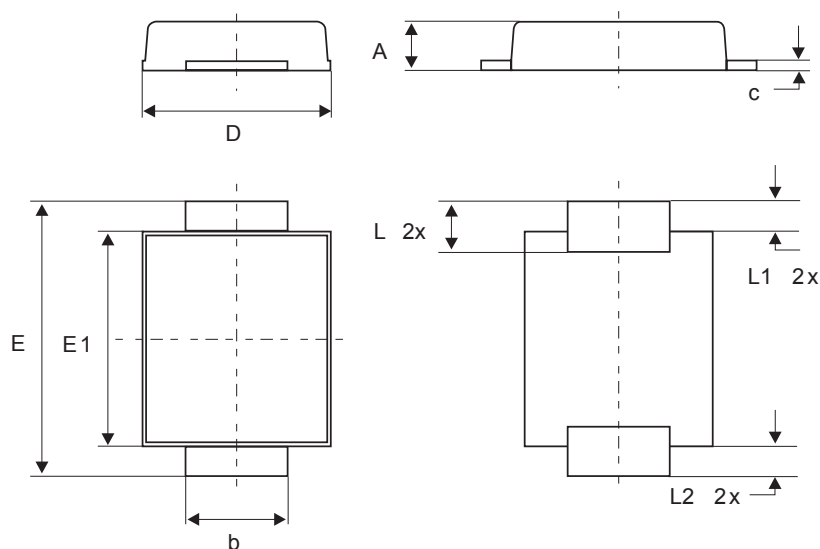
**Figure 17. SMB recommended footprint**



## 2.3 SMB Flat package information

- Epoxy meets UL94, V0
- Lead-free package

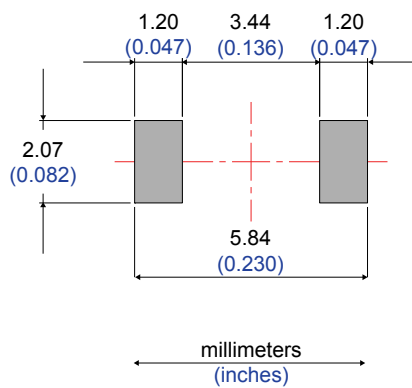
**Figure 18. SMB Flat package outline**



**Table 6. SMB Flat mechanical data**

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 0.90        |      | 1.10 | 0.035  |       | 0.044 |
| 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 |
| L1   |             | 0.40 |      |        | 0.016 |       |
| L2   |             | 0.60 |      |        | 0.024 |       |

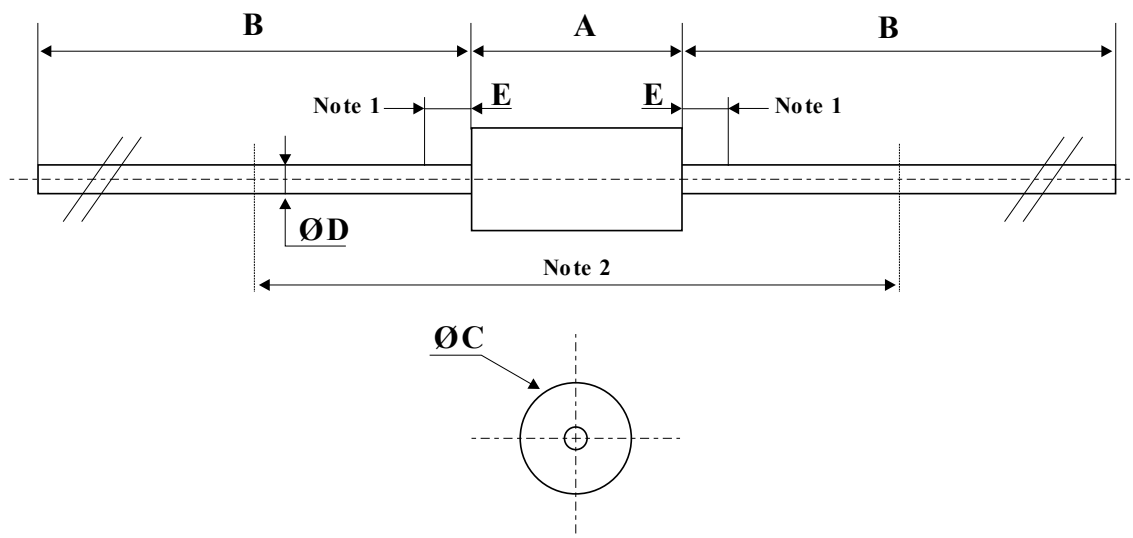
**Figure 19. Footprint recommendations, dimensions in mm (inches)**



## 2.4 DO-201AD package information

- Epoxy meets UL 94, V0

**Figure 20. DO-201AD package outline**



**Table 7. DO-201AD package mechanical data**

| Ref.                  | Dimensions  |      |      |                             |      |       |
|-----------------------|-------------|------|------|-----------------------------|------|-------|
|                       | Millimeters |      |      | Inches (for reference only) |      |       |
|                       | Min.        | Typ. | Max. | Min.                        | Typ. | Max.  |
| A                     |             | -    | 9.50 |                             | -    | 0.374 |
| B                     | 25.40       | -    |      | 1.000                       | -    |       |
| C                     |             | -    | 5.30 |                             | -    | 0.209 |
| D <sup>(1)</sup>      |             | -    | 1.30 |                             | -    | 0.051 |
| E                     |             | -    | 1.25 |                             |      | 0.049 |
| Note 2 <sup>(2)</sup> | 15.00       |      |      | 0.590                       |      |       |

- The lead diameter D is not controlled over zone E
- The minimum length, which must stay straight between the right angles after bending, is 15 mm (0.59")

### 3 Ordering information

**Table 8. Ordering information**

| Order code  | Marking  | Package        | Weight  | Base qty. | Delivery mode |
|-------------|----------|----------------|---------|-----------|---------------|
| STPS3150U   | G315     | SMB            | 0.107 g | 2500      | Tape and reel |
| STPS3150UF  | FG315    | SMB Flat       | 0.050 g | 5000      | Tape and reel |
| STPS3150    | STPS3150 | DO-201AD       | 1.120 g | 600       | Ammopack      |
| STPS3150RL  | STPS3150 | DO-201AD       | 1.120 g | 1900      | Tape and reel |
| STPS3150AFN | A3150    | SMA Flat Notch | 0.039 g | 10 000    | Tape and reel |

## Revision history

**Table 9. Document revision history**

| Date        | Version | Changes                                                                                                                        |
|-------------|---------|--------------------------------------------------------------------------------------------------------------------------------|
| May-2003    | 2A      | Last update.                                                                                                                   |
| 31-May-2006 | 3       | Reformatted to current standard. Added ECOPACK statement.<br>Updated SMB footprint in Figure 12. Changed nF to pF in Figure 8. |
| 8-Feb-2007  | 4       | Added SMB flat and SMB flat e package.                                                                                         |
| 20-Jul-2011 | 5       | Updated Table 2.                                                                                                               |
| 11-Aug-2016 | 6       | Updated Table 2 and all curves.                                                                                                |
| 08-Oct-2019 | 7       | Added <a href="#">Section 2.1 SMA Flat Notch package information</a> .                                                         |

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