
**Table 1. Device summary**

| Symbol      | Value  |
|-------------|--------|
| $I_{F(AV)}$ | 2 A    |
| $V_{RRM}$   | 100 V  |
| $T_j$ (max) | 175 °C |
| $V_F$ (max) | 0.65 V |

### Features

- Negligible switching losses
- High junction temperature capability
- Low leakage current
- Good trade-off between leakage current and forward voltage drop
- Avalanche capability specified

### Description

Schottky rectifiers designed for high frequency miniature switched mode power supplies such as adapters and on board DC/DC converters. Available in SMA, low-profile SMA, SMB, low-profile SMB.

# 1 Characteristics

**Table 2. Absolute ratings (limiting values -T<sub>amb</sub> = 25° C unless otherwise stated)**

| Symbol             | Parameter   |           | Value  | Unit |    |
|--------------------|---|-----------|--|------|----|
| V <sub>RRM</sub>   | Repetitive peak reverse voltage                       |           | 100  | V    |    |
| I <sub>F(AV)</sub> | Average forward current                               | SMA / SMB | T <sub>L</sub> = 130 °C δ = 0.5              | 2    | A  |
|                    |   | SMAflat   | T <sub>L</sub> = 145 °C δ = 0.5              |      |    |
|                    |   | SMBflat   | T <sub>L</sub> = 150 °C δ = 0.5              |      |    |
| I <sub>FSM</sub>   | Surge non repetitive forward current                  |           | t <sub>p</sub> = 10 ms sinusoidal            | 75   | A  |
| P <sub>ARM</sub>   | Repetitive peak avalanche power                       |           | t <sub>p</sub> = 1 μs T <sub>j</sub> = 25 °C | 2400 | W  |
| T <sub>stg</sub>   | Storage temperature range                             |           | -65 to + 175                                 |      | °C |
| T <sub>j</sub>     | Maximum operating junction temperature <sup>(1)</sup> |           | 175  |      | °C |

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

**Table 3. Thermal resistance**

| Symbol               | Parameter        |         | Value | Unit |
|----------------------|------------------|---------|-------|------|
| R <sub>th(j-l)</sub> | Junction to lead | SMA     | 30    | °C/W |
|                      |                  | SMAflat | 20    |      |
|                      |                  | SMB     | 25    |      |
|                      |                  | SMBflat | 15    |      |

**Table 4. 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 |                                   |      | 0.6  | 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:

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

Figure 1. Average forward power dissipation versus average forward current

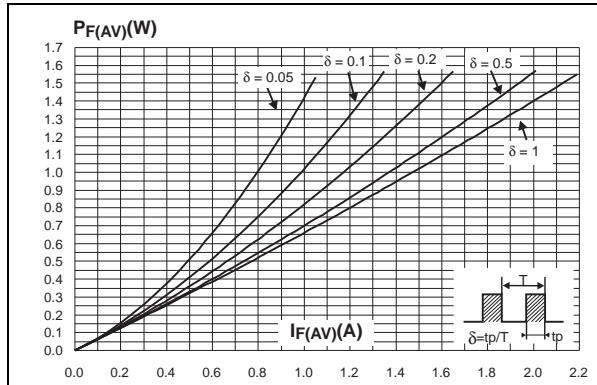


Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (SMA / SMB)

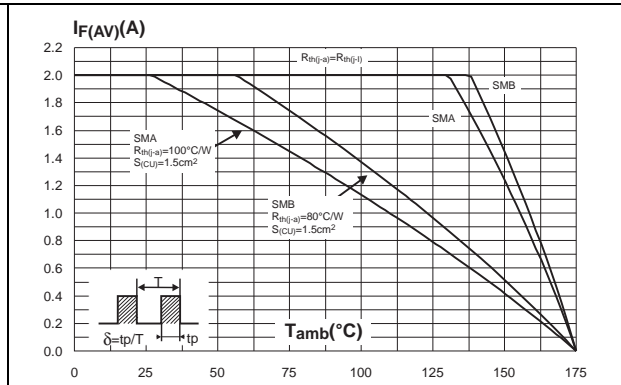


Figure 3. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (SMBflat)

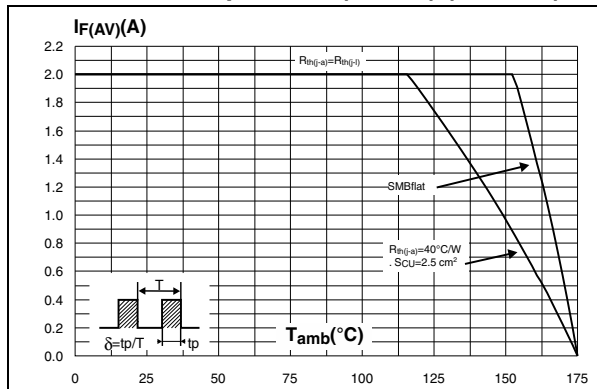


Figure 4. Average forward current versus ambient temperature ( $\delta = 0.5$ ) (SMAflat)

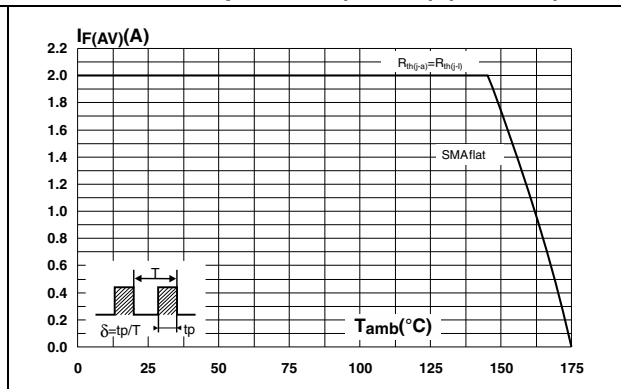


Figure 5. Normalized avalanche power derating versus pulse duration

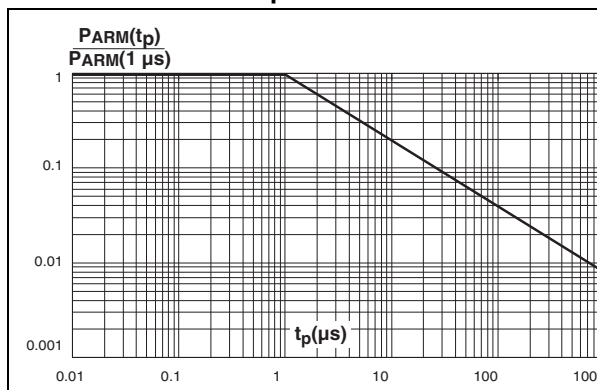


Figure 6. Normalized avalanche power derating versus junction temperature

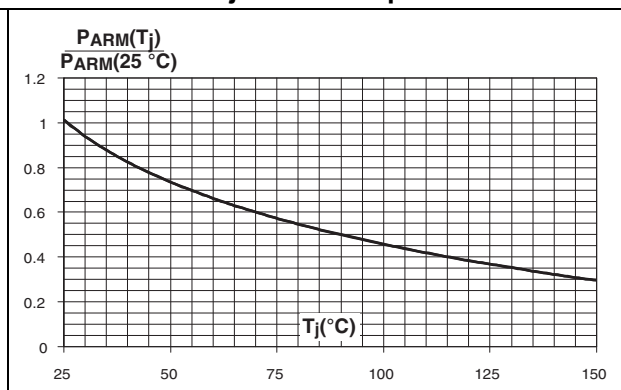


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)

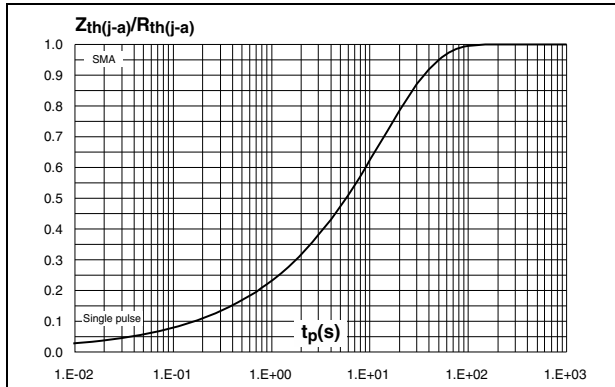


Figure 8. Relative variation of thermal impedance junction to lead versus pulse duration (SMAflat)

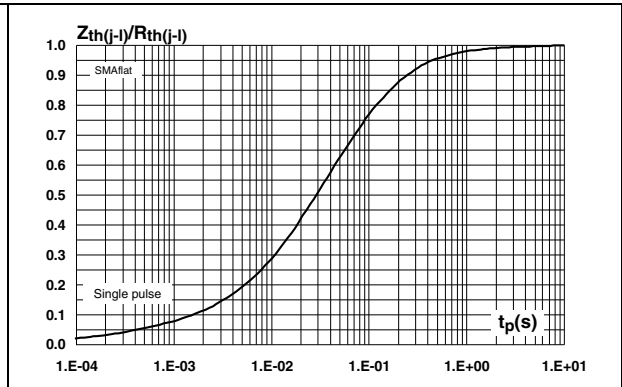


Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

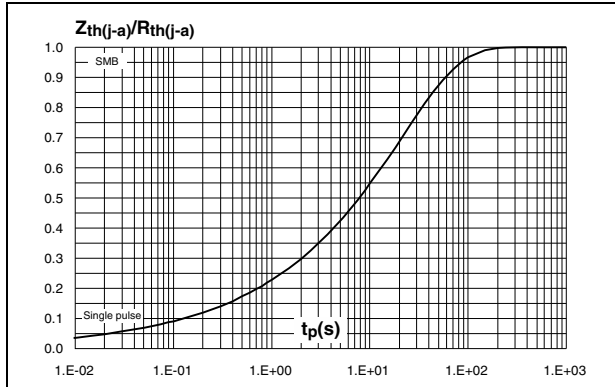


Figure 10. Relative variation of thermal impedance junction to lead versus pulse duration (SMBflat)

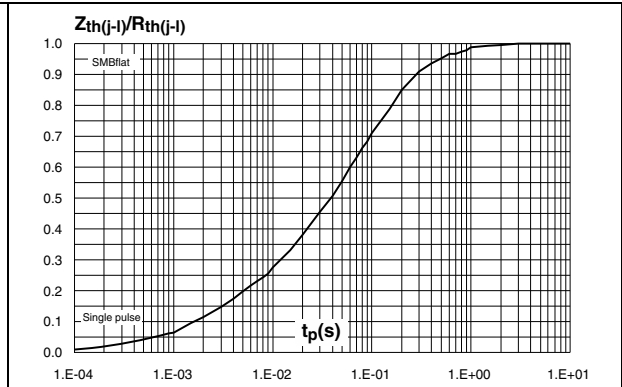


Figure 11. Reverse leakage current versus reverse voltage applied (typical values)

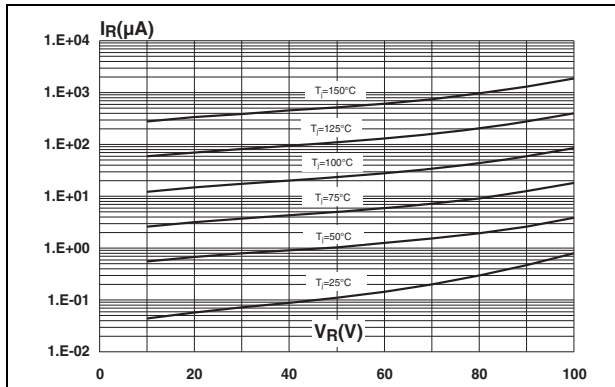


Figure 12. Junction capacitance versus reverse voltage applied (typical values)

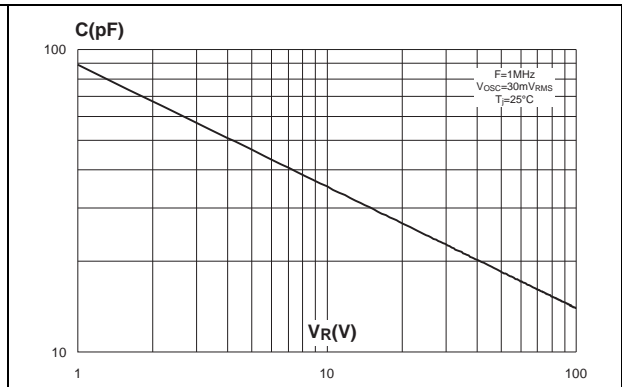


Figure 13. Forward voltage drop versus forward current (low level)

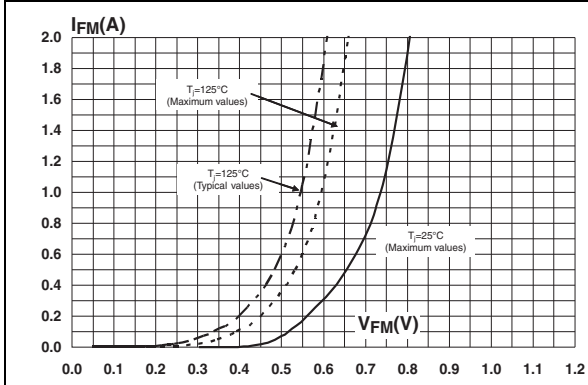


Figure 14. Forward voltage drop versus forward current (high level)

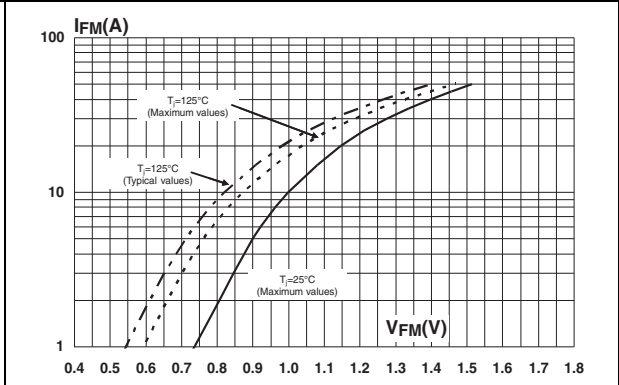


Figure 15. Thermal resistance junction to ambient versus copper surface under each lead (SMA)

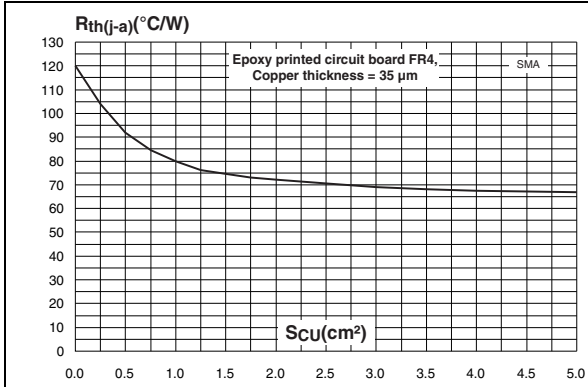


Figure 16. Thermal resistance junction to ambient versus copper surface under each lead (SMAflat)

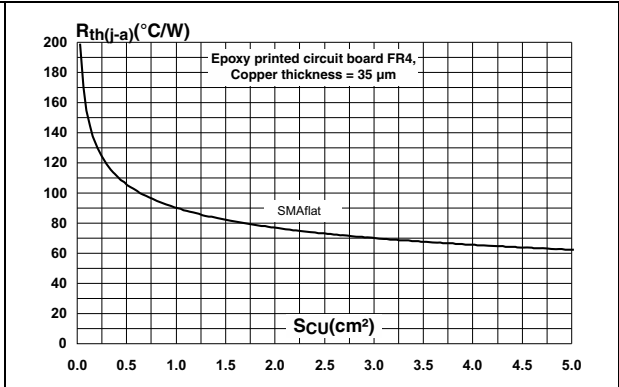


Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (SMB)

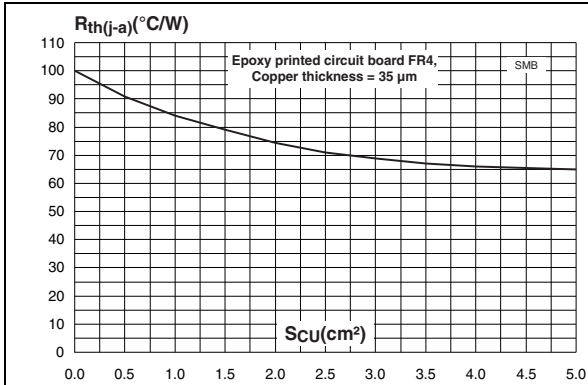
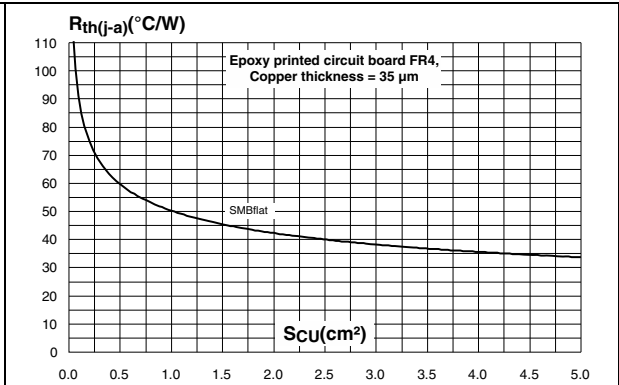


Figure 18. Thermal resistance junction to ambient versus copper surface under each lead (SMBflat)



## 2 Package information

- Epoxy meets UL94, V0
- Lead-free packages

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.

Figure 19. SMA dimension definitions

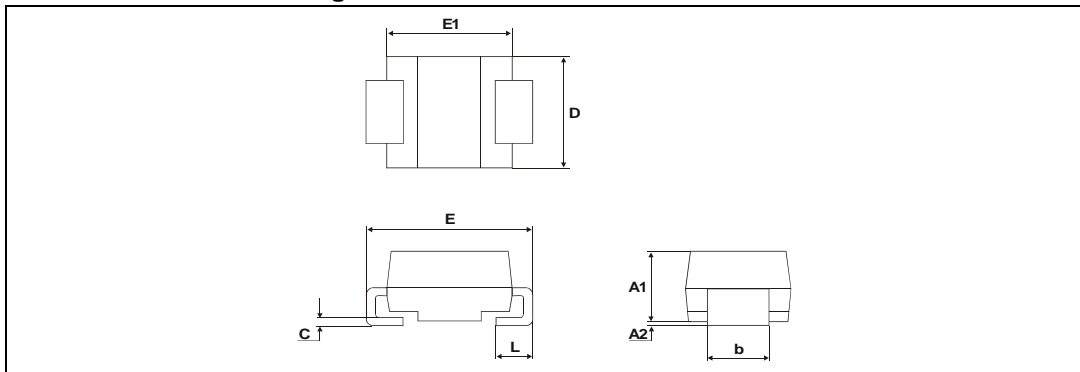


Table 5. SMA dimension values

| 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 20. SMA footprint (dimensions in mm)

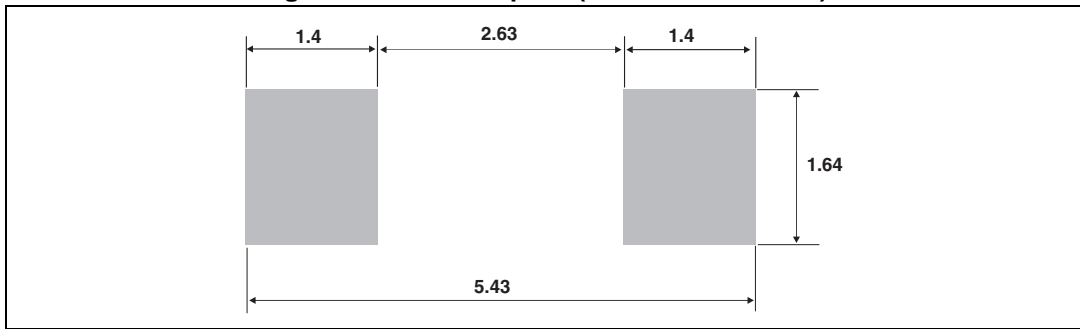


Figure 21. SMB dimension definitions

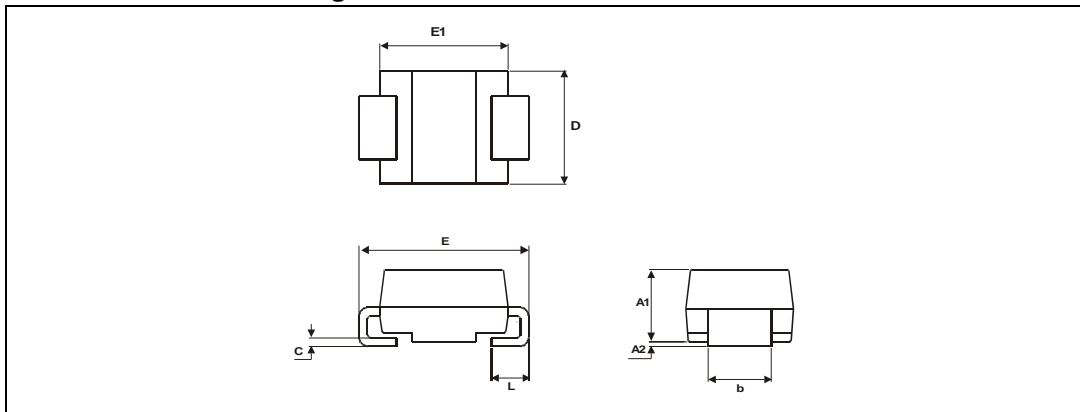


Table 6. SMB dimension values

| 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 |
| E    | 5.10        | 5.60 | 0.201  | 0.220 |
| E1   | 4.05        | 4.60 | 0.159  | 0.181 |
| D    | 3.30        | 3.95 | 0.130  | 0.156 |
| L    | 0.75        | 1.50 | 0.030  | 0.059 |

Figure 22. SMB footprint (dimensions in mm)

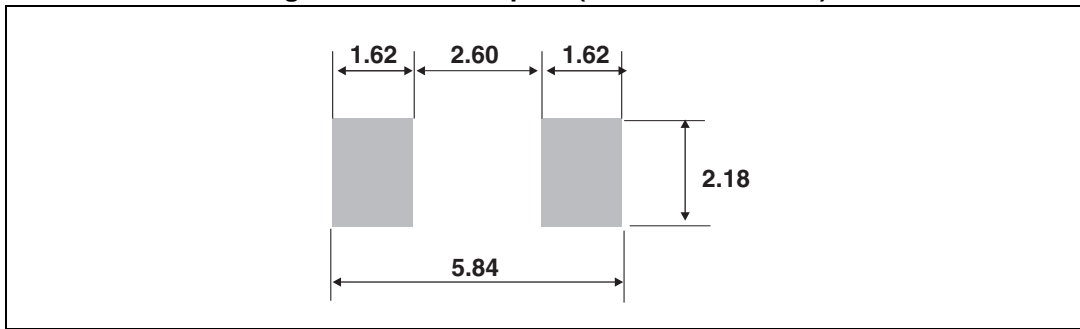


Figure 23. SMAflat dimension definitions

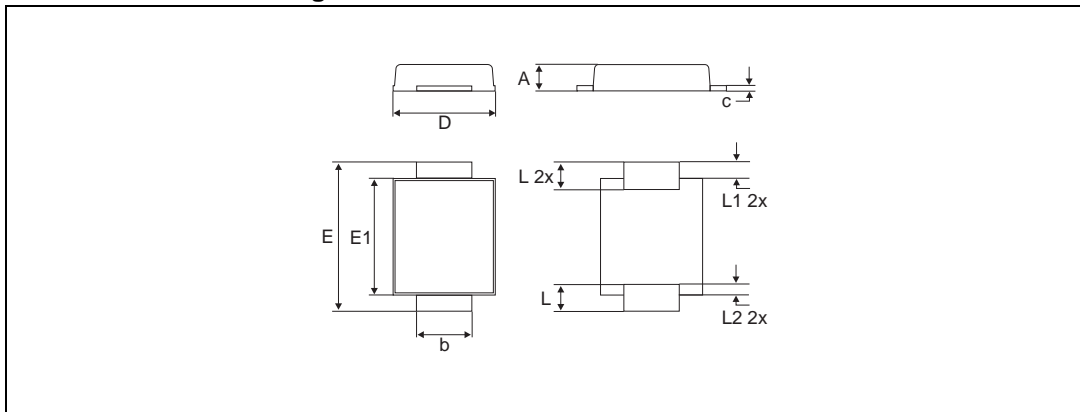


Table 7. SMAflat dimensions

| Ref. | Dimensions  |      |      |        |       |       |
|------|-------------|------|------|--------|-------|-------|
|      | Millimeters |      |      | Inches |       |       |
|      | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A    | 0.90        |      | 1.10 | 0.035  |       | 0.043 |
| b    | 1.25        |      | 1.65 | 0.049  |       | 0.065 |
| c    | 0.15        |      | 0.40 | 0.006  |       | 0.016 |
| D    | 2.25        |      | 2.95 | 0.088  |       | 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 |      |        | 0.019 |       |
| L2   |             | 0.50 |      |        | 0.019 |       |



Figure 24. SMAflat footprint dimensions

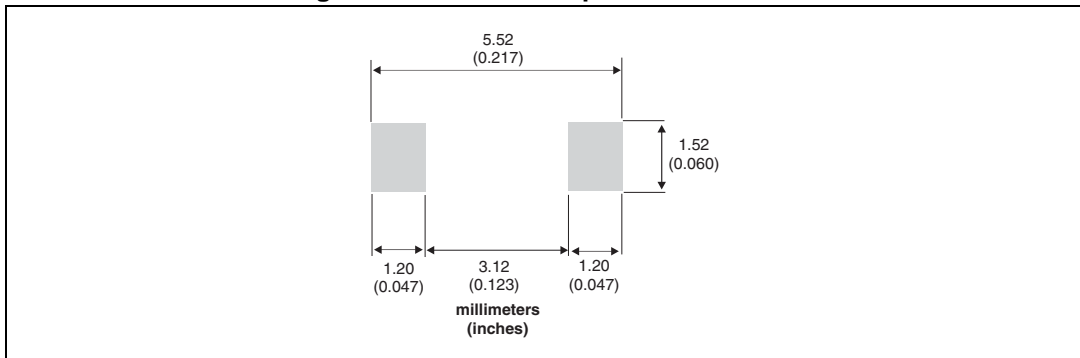


Figure 25. SMBflat dimension definitions

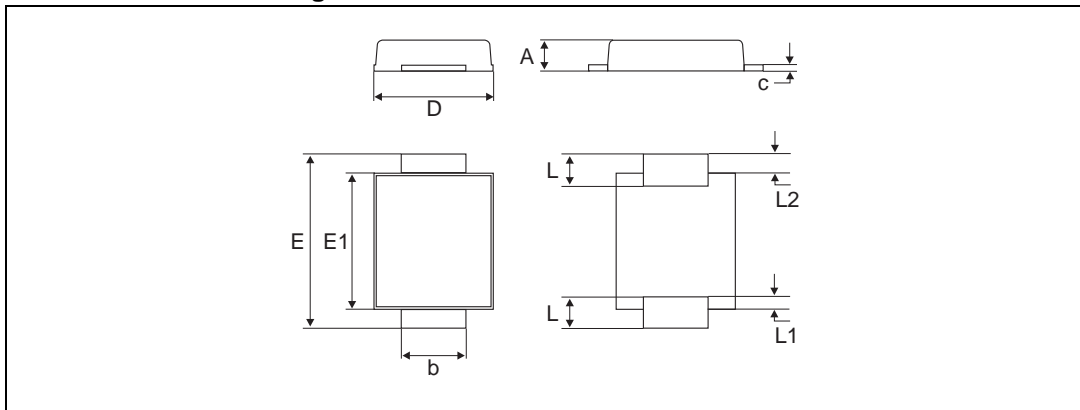
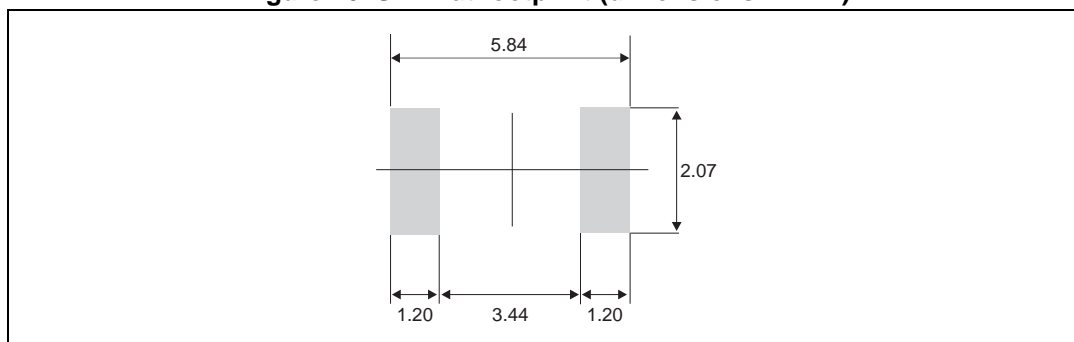


Table 8. SMBflat dimensions

| Ref.             | Dimensions  |      |      |        |       |       |
|------------------|-------------|------|------|--------|-------|-------|
|                  | Millimeters |      |      | Inches |       |       |
|                  | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A                | 0.90        |      | 1.10 | 0.035  |       | 0.043 |
| b <sup>(1)</sup> | 1.95        |      | 2.20 | 0.077  |       | 0.087 |
| c <sup>(1)</sup> | 0.15        |      | 0.40 | 0.006  |       | 0.016 |
| D                | 3.30        |      | 3.95 | 0.130  |       | 0.156 |
| E                | 5.10        |      | 5.60 | 0.200  |       | 0.220 |
| E1               | 4.05        |      | 4.60 | 0.189  |       | 0.181 |
| L                | 0.75        |      | 1.50 | 0.029  |       | 0.059 |
| L1               |             | 0.40 |      |        | 0.016 |       |
| L2               |             | 0.60 |      |        | 0.024 |       |

1. Applies to plated leads

Figure 26. SMBflat footprint (dimensions in mm)



### 3 Ordering information

**Table 9. Ordering information**

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

### 4 Revision history

**Table 10. Document revision history**

| Date        | Revision | 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 <a href="#">Table 9</a> .  |
| 24-Jun-2013 | 8        | Added SMAflat package  |

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