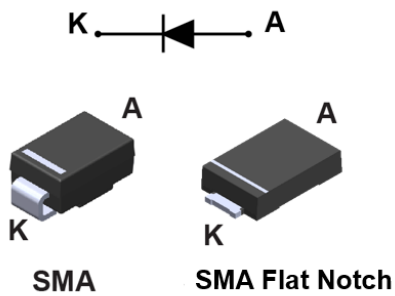


## 150 V, 1 A power Schottky rectifier



### Features

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extended battery life
- Low thermal resistance
- Surface mount miniature package
- Avalanche capability
- [ECOPACK2](#) compliant component

### Applications

- Switching diode
- SMPS
- DC/DC converter
- Telecom power

### Description

This 150 V power Schottky rectifier is ideal for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in SMA, SMA Flat Notch and axial, the [STPS1150](#) is optimized for use in consumer and computer applications where low drop forward voltage is required to reduce power dissipation.

| Product status  |        |
|-----------------|--------|
| STPS1150        |        |
| Product summary |        |
| Symbol          | Values |
| $I_{F(AV)}$     | 1 A    |
| $V_{RRM}$       | 150 V  |
| $T_j(max.)$     | 175 °C |
| $V_{F(typ.)}$   | 0.62 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                       |  | 150                             | V    |   |
| $I_{F(RMS)}$ | Forward rms current                                   |  | 15                              | A    |   |
| $I_{F(AV)}$  | Average forward current $\delta = 0.5$ , square wave  | SMA  | $T_L = 150\text{ °C}$           | 1    | A |
|              |   | SMA Flat Notch                                     | $T_L = 160\text{ °C}$           |      |   |
|              |   | DO-41  | $T_L = 150\text{ °C}$           |      |   |
| $I_{FSM}$    | Surge non repetitive forward current                  | SMA  | $t_p = 10\text{ ms sinusoidal}$ | 50   | A |
|              |   | SMA Flat Notch                                     |                                 | 50   |   |
|              |   | DO-41  |                                 | 75   |   |
| $P_{ARM}$    | Repetitive peak avalanche power                       | $t_p = 10\text{ }\mu\text{s}, T_j = 125\text{ °C}$ | 108                             | 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            | 30   | °C/W |
|               |                  |                     | SMA Flat Notch | 20   |      |
|               | Junction to lead | Lead length = 10 mm | DO-41          | 30   |      |

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 | $T_j = 25\text{ °C}$  | $V_R = V_{RRM}$    | -    | 0.2  | 1.0  | $\mu\text{A}$ |
|             |                         | $T_j = 125\text{ °C}$ |                    | -    | 0.2  | 1.0  | mA            |
| $V_F^{(2)}$ | Forward voltage drop    | $T_j = 25\text{ °C}$  | $I_F = 1\text{ A}$ | -    | 0.78 | 0.82 | V             |
|             |                         | $T_j = 125\text{ °C}$ |                    | -    | 0.62 | 0.67 |               |
|             |                         | $T_j = 25\text{ °C}$  | $I_F = 2\text{ A}$ | -    | 0.85 | 0.89 |               |
|             |                         | $T_j = 125\text{ °C}$ |                    | -    | 0.69 | 0.75 |               |

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

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

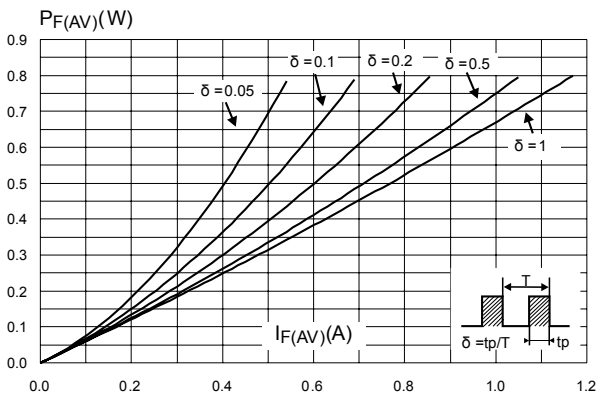
To evaluate the conduction losses use the following equation:  $P = 0.59 \times I_{F(AV)} + 0.08 I_{F(RMS)}^2$

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

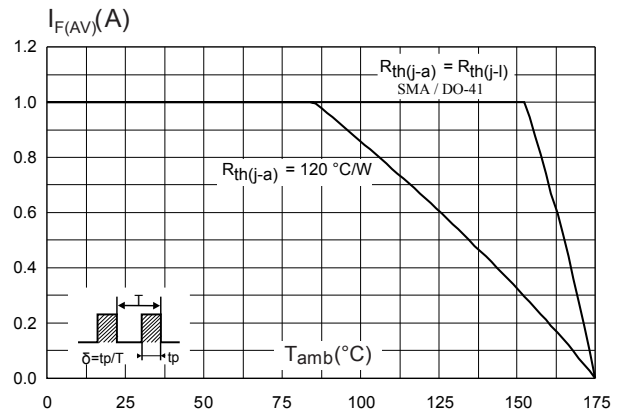
- AN604: Calculation of conduction losses in a power rectifier
- AN4021: Calculation of reverse losses on a power diode

## 1.1 Characteristics (curves)

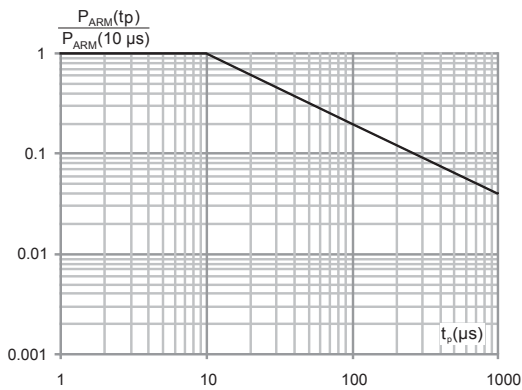
**Figure 1. Average forward power dissipation versus average forward current**



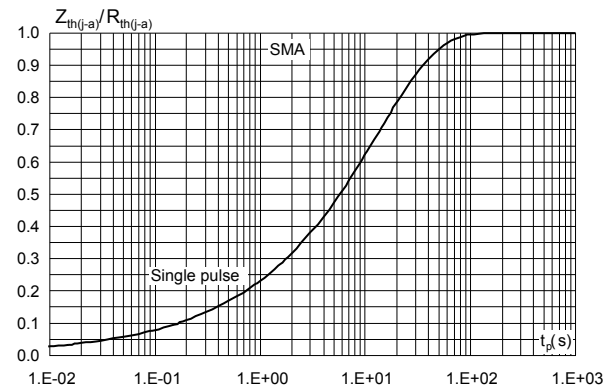
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ )**



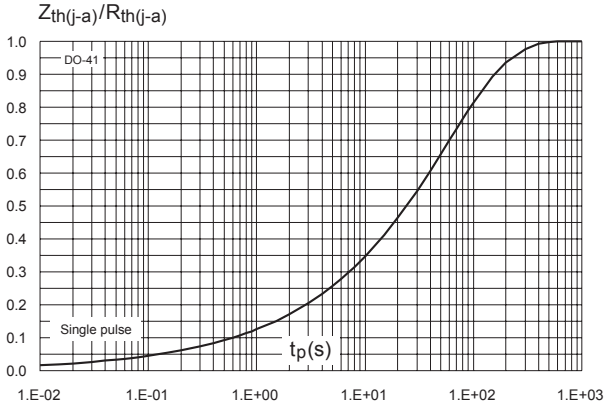
**Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125\text{ °C}$ )**



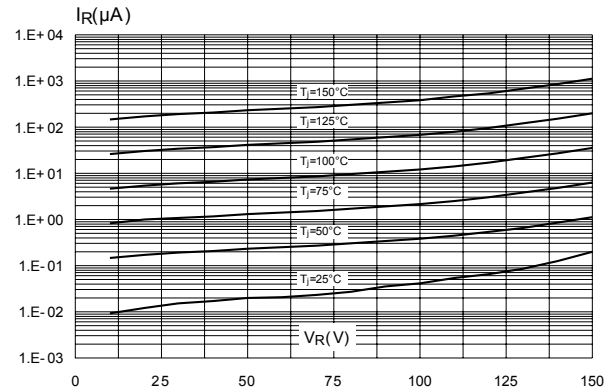
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration (SMA)**



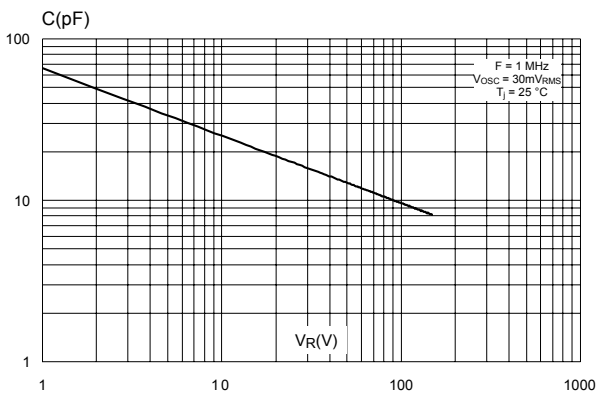
**Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration (DO-41)**



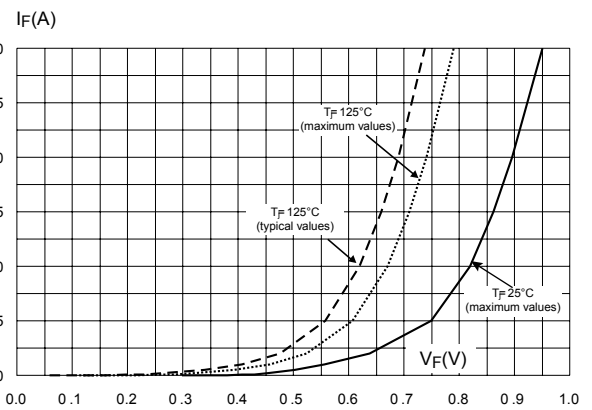
**Figure 6. Reverse leakage current versus reverse voltage applied (typical values)**



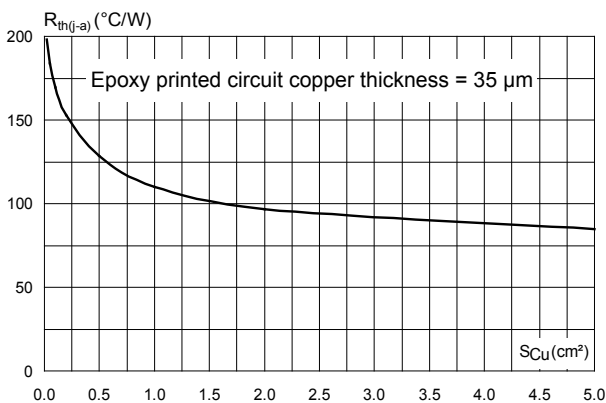
**Figure 7. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 8. Forward voltage drop versus forward current**



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



**Figure 10. Thermal resistance versus lead length (DO-41)**

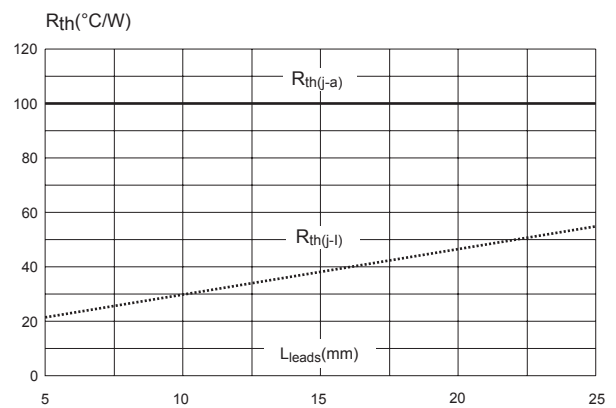
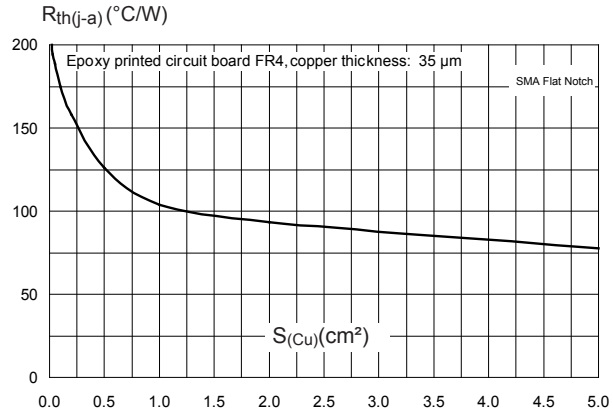


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (SMA Flat Notch)



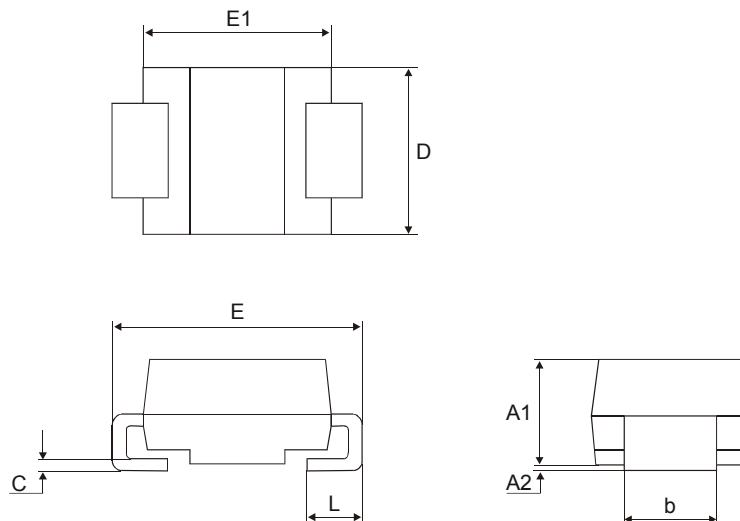
## 2 Package information

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 UL 94, V0
- Cooling method : by conduction (C)

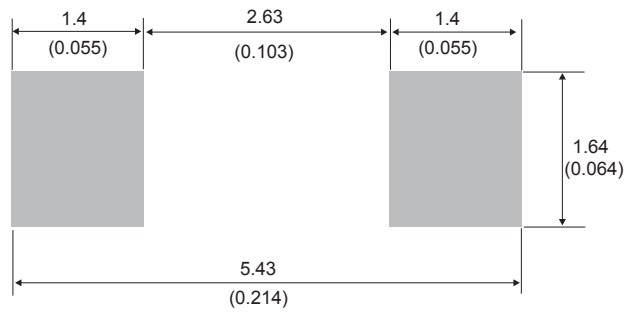
**Figure 12. SMA package outline**



**Table 4. SMA package mechanical data**

| Ref. | Dimensions  |      |      |                             |      |       |
|------|-------------|------|------|-----------------------------|------|-------|
|      | Millimeters |      |      | Inches (for reference only) |      |       |
|      | Min.        | Typ. | Max. | Min.                        | Typ. | 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 13. SMA recommended footprint in mm (inches)**



## 2.2 SMA Flat Notch package information

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

Figure 14. SMA Flat Notch package outline

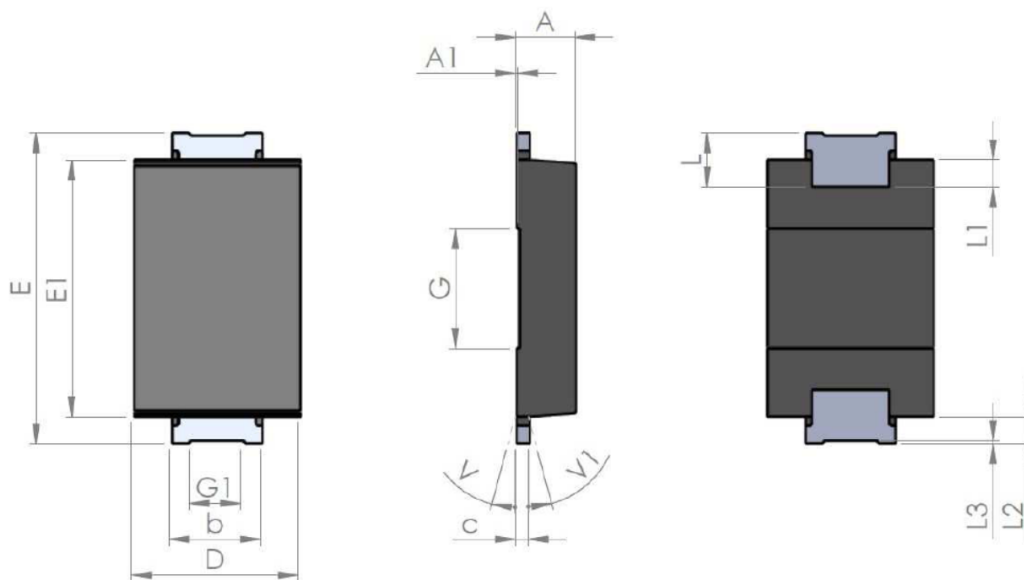
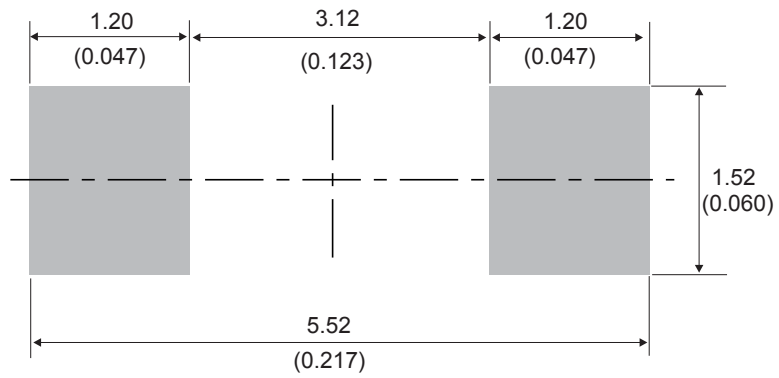


Table 5. SMA Flat Notch package mechanical data

| 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)



### 2.3 DO-41 package information

- Epoxy meets UL 94, V0

Figure 16. DO-41 package outline

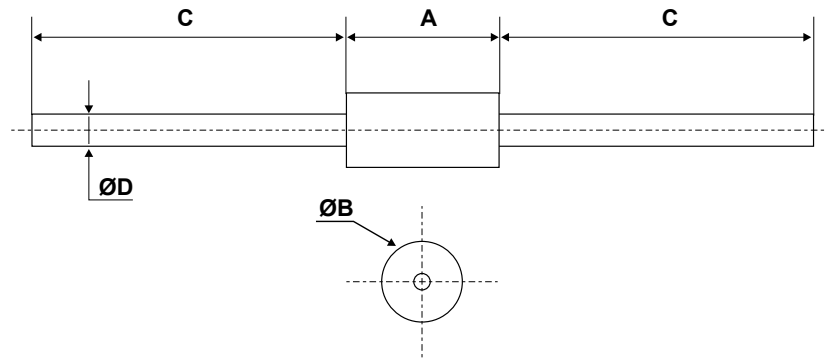


Table 6. DO-41 package mechanical data

| Ref. | Dimensions  |      |      |                             |      |        |
|------|-------------|------|------|-----------------------------|------|--------|
|      | Millimeters |      |      | Inches (for reference only) |      |        |
|      | Min.        | Typ. | Max. | Min.                        | Typ. | Max.   |
| A    | 4.1         | -    | 5.20 | 0.160                       | -    | 0.205  |
| B    | 2.00        | -    | 2.71 | 0.080                       | -    | 0.107  |
| C    | 25.40       | -    |      | 1.000                       | -    |        |
| D    | 0.71        | -    | 0.86 | 0.028                       | -    | 0.0034 |

### 3 Ordering Information

**Table 7. Ordering information**

| Order code  | Marking  | Package        | Weight  | Base qty. | Delivery mode |
|-------------|----------|----------------|---------|-----------|---------------|
| STPS1150AFN | A1150    | SMA Flat Notch | 0.039 g | 10 000    | Tape and reel |
| STPS1150A   | 1150     | SMA            | 0.068 g | 5000      | Tape and reel |
| STPS1150    | STPS1150 | DO-41          | 0.34 g  | 2000      | Ammopack      |
| STPS1150RL  | STPS1150 | DO-41          | 0.34 g  | 5000      | Tape and reel |

## Revision history

**Table 8. Document revision history**

| Date        | Version | Changes  |
|-------------|---------|--|
| Jul-2003    | 2A      | Last update.   |
| Aug-2004    | 3       | SMA package dimensions update. Reference A1 max. changed from 2.70 mm (0.106) to 2.03 mm (0.080).  |
| 31-May-2006 | 4       | Reformatted to current standard. Added ECOPACK statement. Updated SMA footprint in Figure 15. Changed nF to pF in Figure 10.   |
| 09-Feb-2011 | 5       | Added STmite and STmite flat package.  |
| 15-Apr-2014 | 6       | Updated : Features, Table 2, 3 and Figure 2. Updated Section 2: Package information.   |
| 28-Sep-2018 | 7       | Removed STmite and STmite flat package information. Updated Table 1. Absolute ratings (limiting values, at 25 °C, unless otherwise specified) and Figure 3. Normalized avalanche power derating versus pulse duration ( $T_j = 125\text{ °C}$ ). |
| 25-Sep-2019 | 8       | Added Section 2.2 SMA Flat Notch package information.  |

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