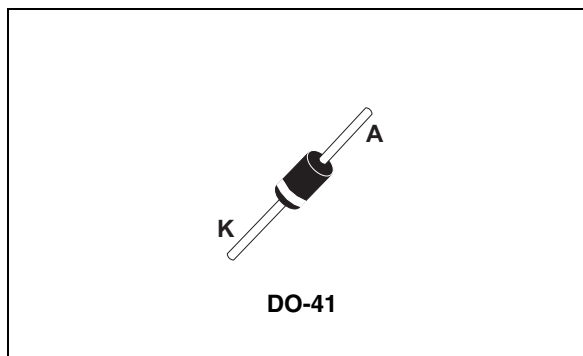


### Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Low forward voltage drop
- Avalanche capability specified

### Description

Axial Power Schottky rectifier suited for Switch Mode Power Supplies and high frequency DC to DC converters. Packaged in DO-41 these devices are intended for use in low voltage, high frequency inverters, free wheeling, polarity protection and small battery chargers.



**Table 1. Device summary**

| Symbol      | Value | Unit |
|-------------|-------|------|
| $I_{F(AV)}$ | 1     | A    |
| $V_{RRM}$   | 40    | V    |
| $T_j$       | 150   | °C   |
| $V_F$ (max) | 0.45  | V    |

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

| Symbol              | Parameter   |   | Value        |        |        | Unit |
|---------------------|---|---|--------------|--------|--------|------|
|                     |   |   | 1N5817       | 1N5818 | 1N5819 |      |
| V <sub>RRM</sub>    | Repetitive peak reverse voltage                       |   | 20           | 30     | 40     | V    |
| I <sub>F(RMS)</sub> | Forward rms current                                   |   | 10           |        |        | A    |
| I <sub>F(AV)</sub>  | Average forward current                               | T <sub>L</sub> = 125 °C, δ = 0.5              | 1            |        |        | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current                  | t <sub>p</sub> = 10 ms Sinusoidal             | 25           |        |        | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power                       | t <sub>p</sub> = 1 μs, T <sub>j</sub> = 25 °C | 1200         | 1200   | 900    | W    |
| T <sub>stg</sub>    | Storage temperature range                             |   | -65 to + 150 |        |        | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature <sup>(1)</sup> |   | 150          |        |        | °C   |
| dV/dt               | Critical rate of rise of reverse voltage              |   | 10000        |        |        | V/μs |

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 resistances**

| Symbol               | Parameter           |                     | Value | Unit |
|----------------------|---------------------|---------------------|-------|------|
| R <sub>th(j-a)</sub> | Junction to ambient | Lead length = 10 mm | 100   | °C/W |
| R <sub>th(j-l)</sub> | Junction to lead    | Lead length = 10 mm | 45    | °C/W |

**Table 4. Static electrical characteristics**

| Symbol                        | Parameter               | Tests conditions        |                                   | 1N5817 | 1N5818 | 1N5819 | 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> | 0.5    | 0.5    | 0.5    | mA   |
|                               |                         | T <sub>j</sub> = 100 °C |                                   | 10     | 10     | 10     | mA   |
| V <sub>F</sub> <sup>(1)</sup> | Forward voltage drop    | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 1 A              | 0.45   | 0.50   | 0.55   | V    |
|                               |                         | T <sub>j</sub> = 25 °C  | I <sub>F</sub> = 3 A              | 0.75   | 0.80   | 0.85   | V    |

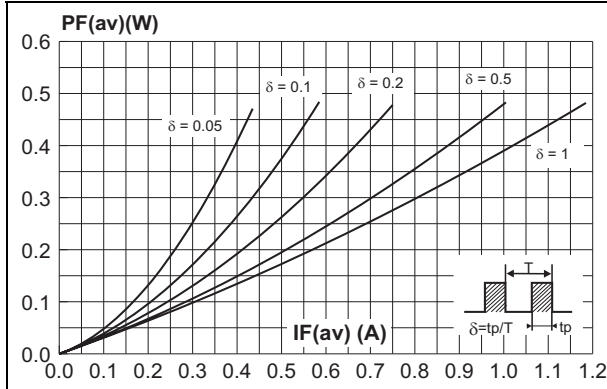
1. Pulse test : t<sub>p</sub> = 380 μs, δ < 2%

To evaluate the conduction losses use the following equations :

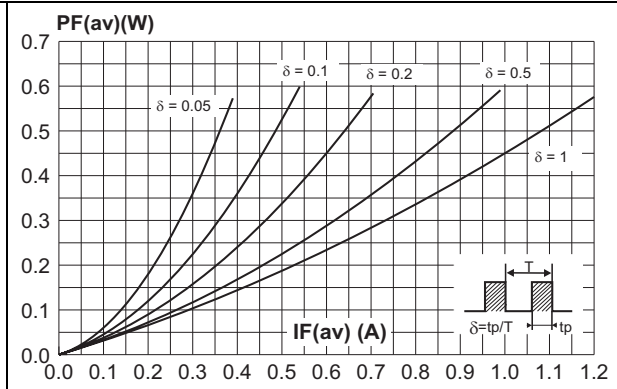
$$P = 0.3 \times I_{F(AV)} + 0.090 I_{F2(RMS)}^2 \text{ for 1N5817 / 1N5818}$$

$$P = 0.3 \times I_{F(AV)} + 0.150 I_{F2(RMS)}^2 \text{ for 1N5819}$$

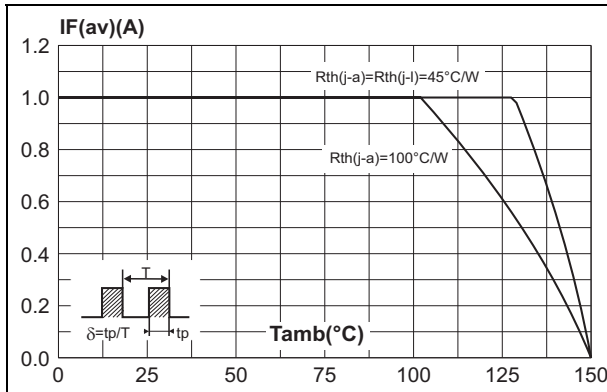
**Figure 1. Average forward power dissipation versus average forward current (1N5817/1N5818)**



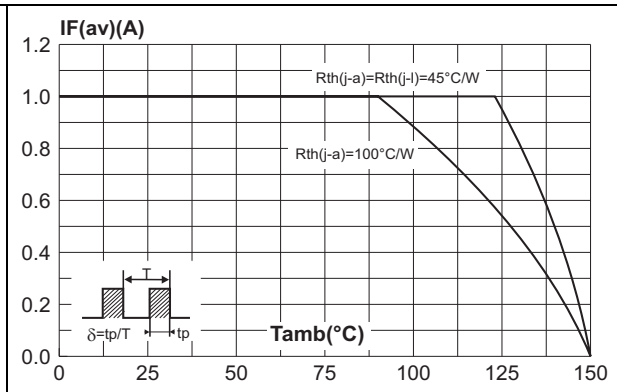
**Figure 2. Average forward power dissipation versus average forward current (1N5819)**



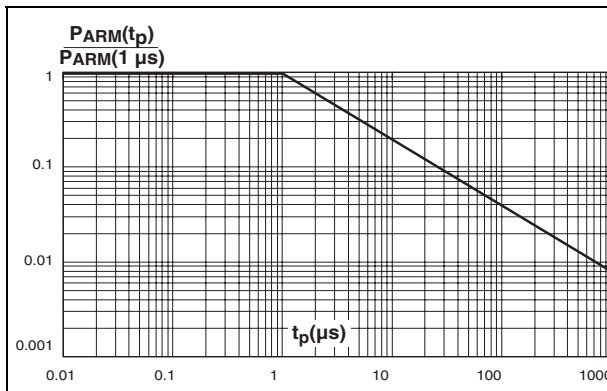
**Figure 3. Average forward current versus ambient temperature (delta = 0.5) (1N5817/1N5818)**



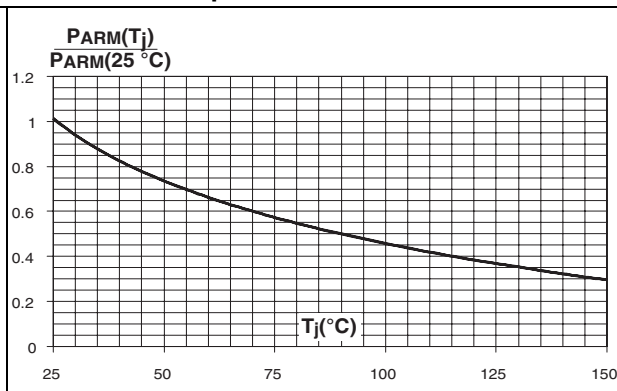
**Figure 4. Average forward current versus ambient temperature (delta = 0.5) (1N5819)**



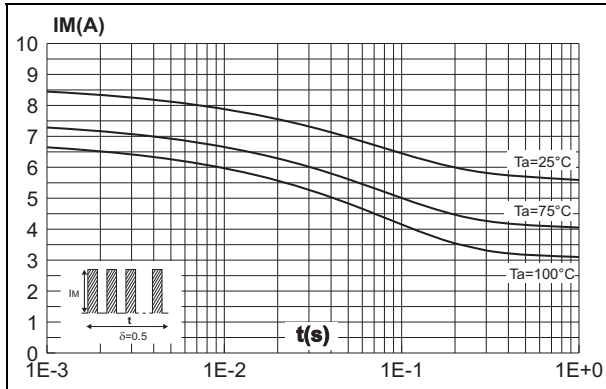
**Figure 5. Normalized avalanche power derating versus pulse duration**



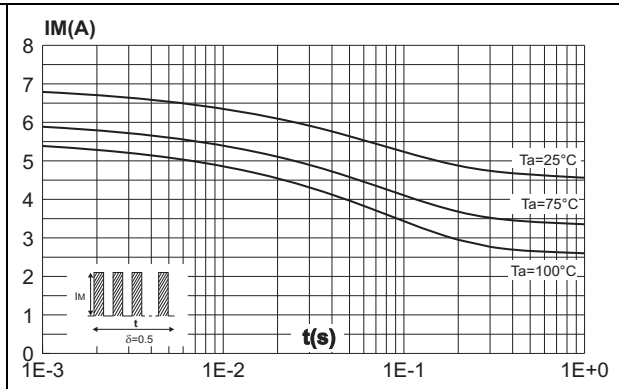
**Figure 6. Normalized avalanche power derating versus junction temperature**



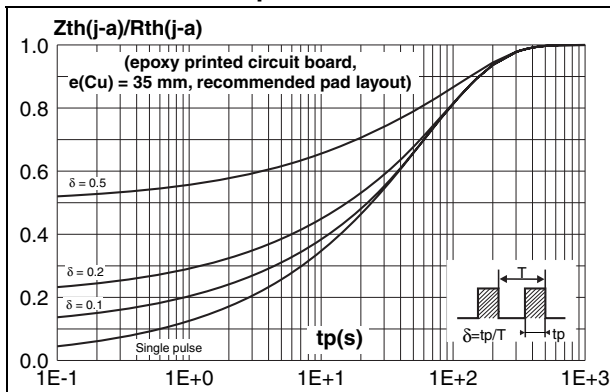
**Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) (1N5817/1N5818)**



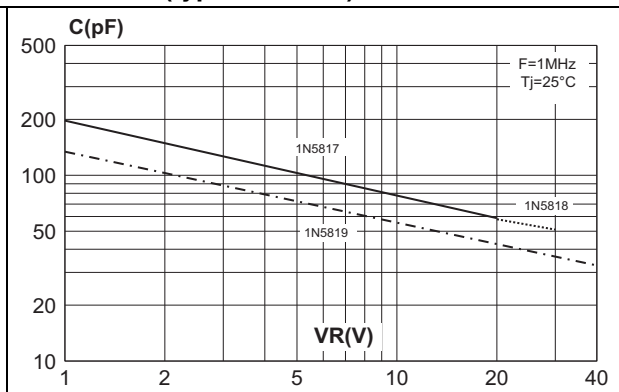
**Figure 8. Non repetitive surge peak forward current versus overload duration (maximum values) (1N5819)**



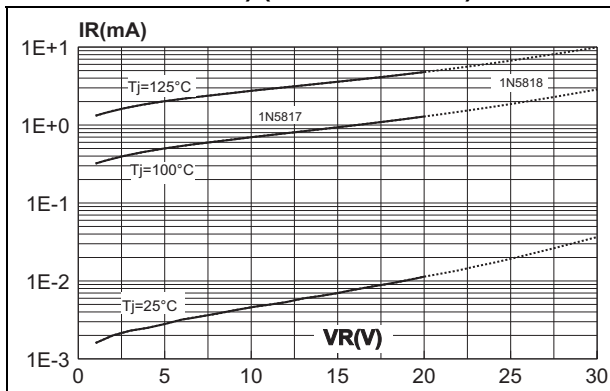
**Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration**



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



**Figure 11. Reverse leakage current versus reverse voltage applied (typical values) (1N5817/1N5818)**



**Figure 12. Reverse leakage current versus reverse voltage applied (typical values) (1N5819)**

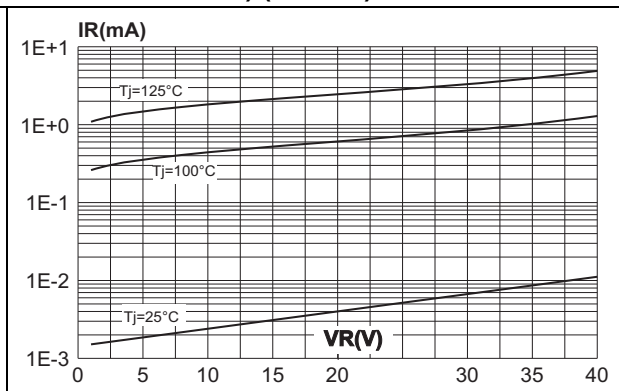


Figure 13. Forward voltage drop versus forward current (typical values) (1N5817/1N5818)

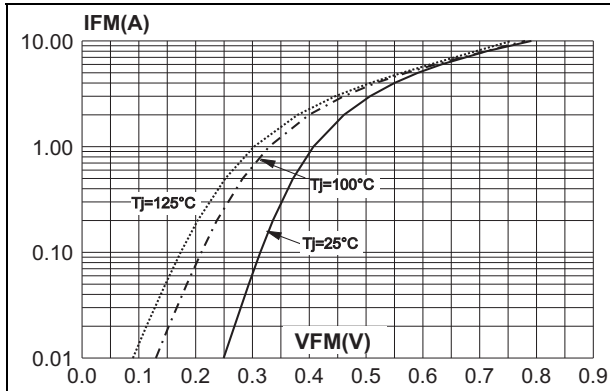


Figure 14. Forward voltage drop versus forward current (typical values) (1N5819)

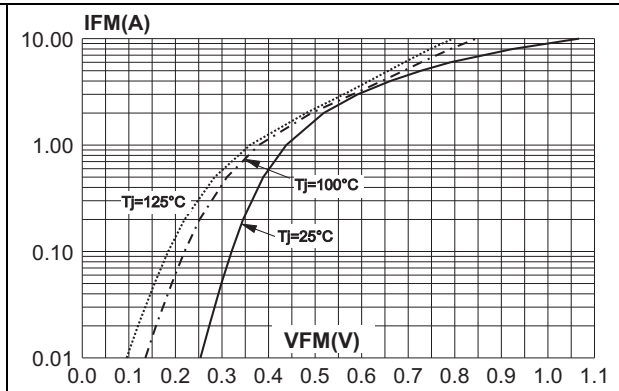
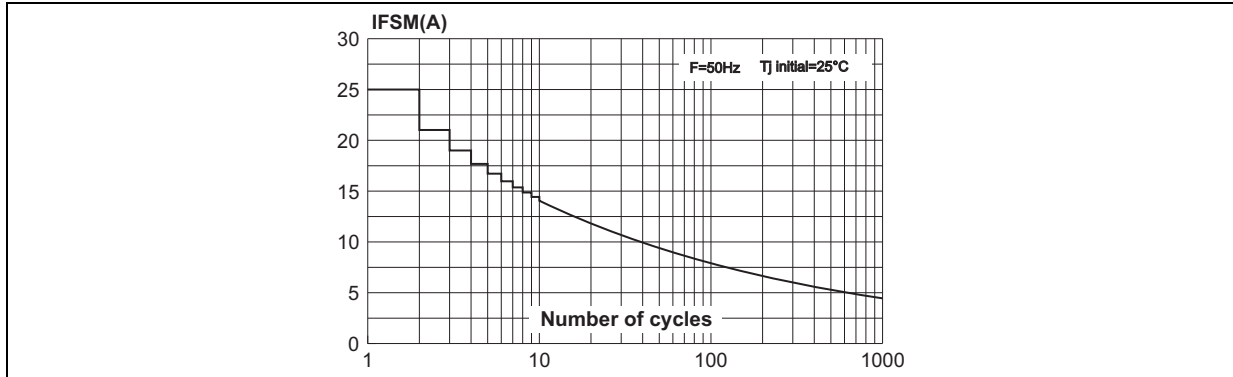


Figure 15. Non repetitive surge peak forward current versus number of cycles



## 2 Package Information

- Epoxy meets UL94, V0
- Band indicates cathode

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.

**Table 5. DO-41 (Plastic) dimensions**

|   | Dimensions  |      |        |       |
|---|-------------|------|--------|-------|
|   | Millimeters |      | Inches |       |
|   | Min.        | Max. | Min.   | Max.  |
|   | A           | 4.07 | 5.20   | 0.160 |
| B | 2.04        | 2.71 | 0.080  | 0.107 |
| C | 25.4        |      | 1      |       |
| D | 0.71        | 0.86 | 0.028  | 0.034 |

## 3 Ordering information

**Table 6. Ordering information**

| Order code | Marking                  | Package | Weight | Base qty | Delivery mode |
|------------|--------------------------|---------|--------|----------|---------------|
| 1N581x     | Part number cathode ring | DO-41   | 0.34 g | 2000     | Ammopack      |
| 1N581xRL   | Part number cathode ring | DO-41   | 0.34 g | 5000     | Tape and reel |

## 4 Revision history

**Table 7. Document revision history**

| Date        | Revision | Changes   |
|-------------|----------|---|
| Jul-2003    | 4A       | Last update.  |
| 04-Jul-2011 | 5        | Updated <a href="#">Table 5.: DO-41 (Plastic) dimensions.</a> |

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