

## LOW DROP POWER SCHOTTKY RECTIFIER

### MAIN PRODUCTS CHARACTERISTICS

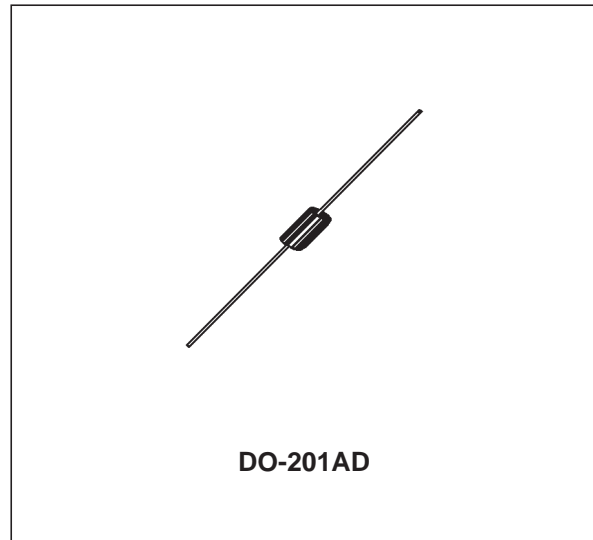
|                            |                |
|----------------------------|----------------|
| <b>I<sub>F(AV)</sub></b>   | <b>3 A</b>     |
| <b>V<sub>RRM</sub></b>     | <b>40 V</b>    |
| <b>T<sub>j</sub></b>       | <b>150°C</b>   |
| <b>V<sub>F</sub> (max)</b> | <b>0.475 V</b> |

### FEATURES AND BENEFITS

- 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-201AD these devices are intended for use in low voltage, high frequency inverters, free wheeling, polarity protection and small battery chargers.



### ABSOLUTE RATINGS (limiting values)

| Symbol              | Parameter                                |                                | Value         |        |        | Unit |
|---------------------|--|--------------------------------|---------------|--------|--------|------|
|                     |  |                                | 1N5820        | 1N5821 | 1N5822 |      |
| V <sub>RRM</sub>    | Repetitive peak reverse voltage          |                                | 20            | 30     | 40     | V    |
| I <sub>F(RMS)</sub> | RMS forward current                      |                                | 10            |        |        | A    |
| I <sub>F(AV)</sub>  | Average forward current                  | T <sub>L</sub> = 100°C δ = 0.5 |               |        | 3      | A    |
|                     |  | T <sub>L</sub> = 110°C δ = 0.5 | 3             | 3      |        | A    |
| I <sub>FSM</sub>    | Surge non repetitive forward current     | tp = 10 ms<br>Sinusoidal       | 80            |        |        | A    |
| P <sub>ARM</sub>    | Repetitive peak avalanche power          | tp = 1μs T <sub>j</sub> = 25°C | 1700          |        |        | W    |
| T <sub>stg</sub>    | Storage temperature range                |                                | - 65 to + 150 |        |        | °C   |
| T <sub>j</sub>      | Maximum operating junction temperature * |                                | 150           |        |        | °C   |
| dV/dt               | Critical rate of rise of reverse voltage |                                | 10000         |        |        | V/μs |

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

# 1N582x

## THERMAL RESISTANCES

| Symbol        | Parameter           |                     | Value | Unit          |
|---------------|---------------------|---------------------|-------|---------------|
| $R_{th(j-a)}$ | Junction to ambient | Lead length = 10 mm | 80    | $^{\circ}C/W$ |
| $R_{th(j-l)}$ | Junction to lead    | Lead length = 10 mm | 25    | $^{\circ}C/W$ |

## STATIC ELECTRICAL CHARACTERISTICS

| Symbol  | Parameter               | Tests Conditions     |                 | 1N5820 | 1N5821 | 1N5822 | Unit |
|---------|-------------------------|----------------------|-----------------|--------|--------|--------|------|
| $I_R^*$ | Reverse leakage current | $T_j = 25^{\circ}C$  | $V_R = V_{RRM}$ | 2      | 2      | 2      | mA   |
|         |                         | $T_j = 100^{\circ}C$ |                 | 20     | 20     | 20     | mA   |
| $V_F^*$ | Forward voltage drop    | $T_j = 25^{\circ}C$  | $I_F = 3 A$     | 0.475  | 0.5    | 0.525  | V    |
|         |                         | $T_j = 25^{\circ}C$  | $I_F = 9.4 A$   | 0.85   | 0.9    | 0.95   | V    |

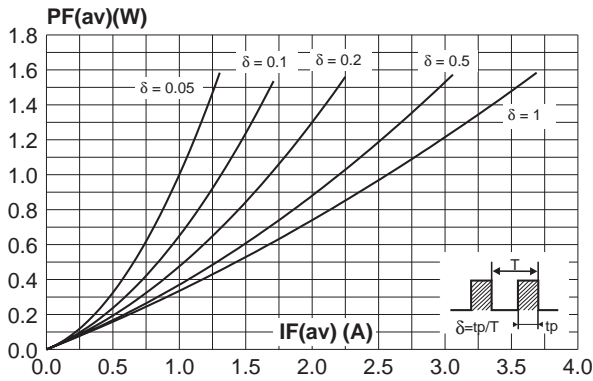
Pulse test : \*  $t_p = 380 \mu s$ ,  $\delta < 2\%$

To evaluate the conduction losses use the following equations :

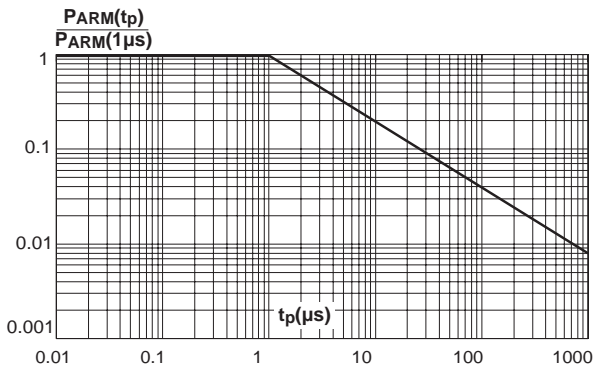
$$P = 0.33 \times I_{F(AV)} + 0.035 I_{F(RMS)}^2 \text{ for } 1N5820 / 1N5821$$

$$P = 0.33 \times I_{F(AV)} + 0.060 I_{F(RMS)}^2 \text{ for } 1N5822$$

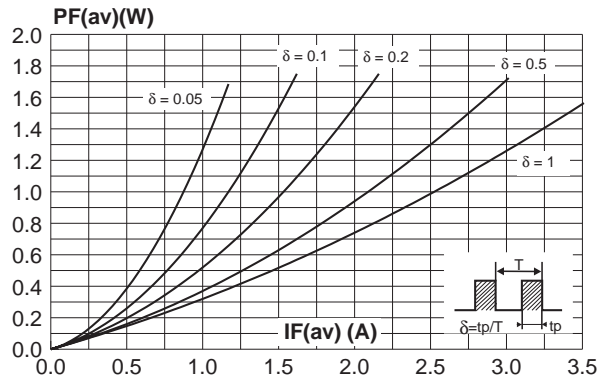
**Fig. 1:** Average forward power dissipation versus average forward current (1N5820/1N5821).



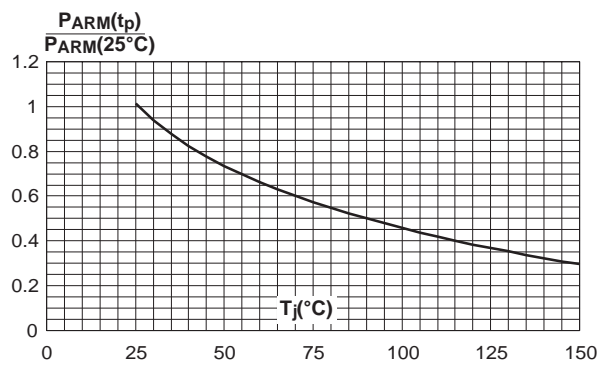
**Fig. 3:** Normalized avalanche power derating versus pulse duration.



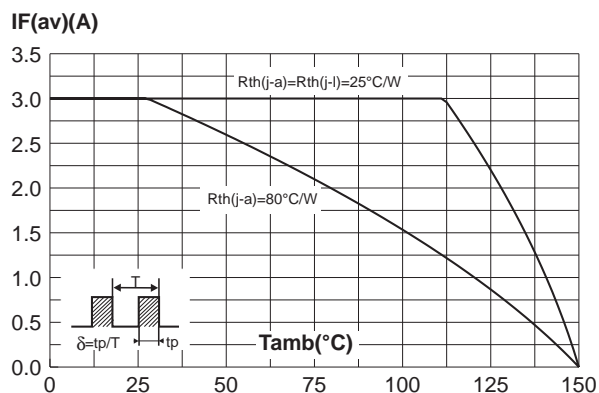
**Fig. 2:** Average forward power dissipation versus average forward current (1N5822).



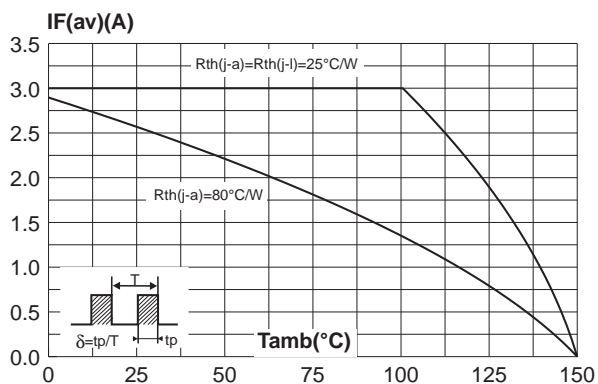
**Fig. 4:** Normalized avalanche power derating versus junction temperature.



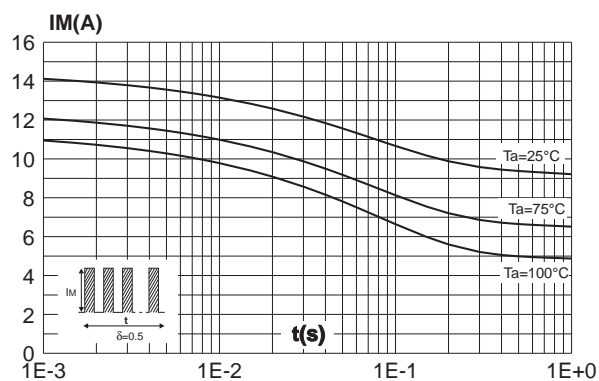
**Fig. 5-1:** Average forward current versus ambient temperature ( $\delta=0.5$ ) (1N5820/1N5821).



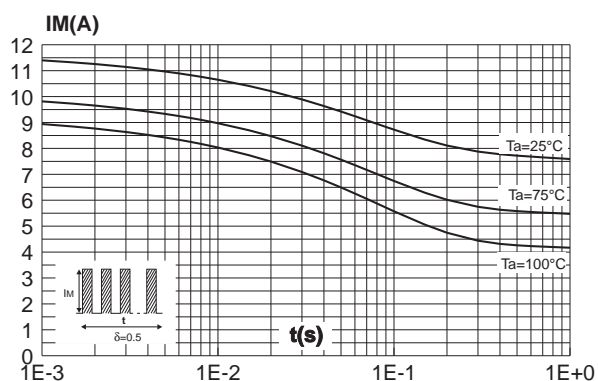
**Fig. 5-2:** Average forward current versus ambient temperature ( $\delta=0.5$ ) (1N5822).



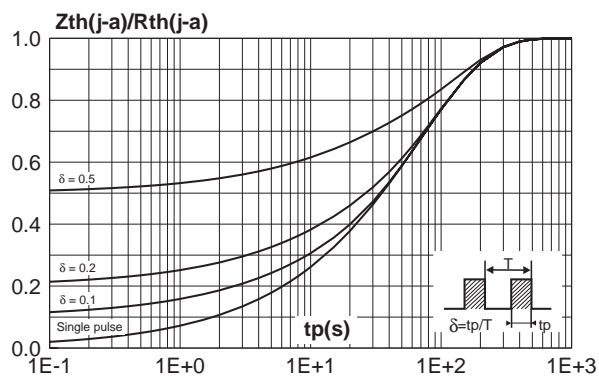
**Fig. 6-1:** Non repetitive surge peak forward current versus overload duration (maximum values) (1N5820/1N5821).



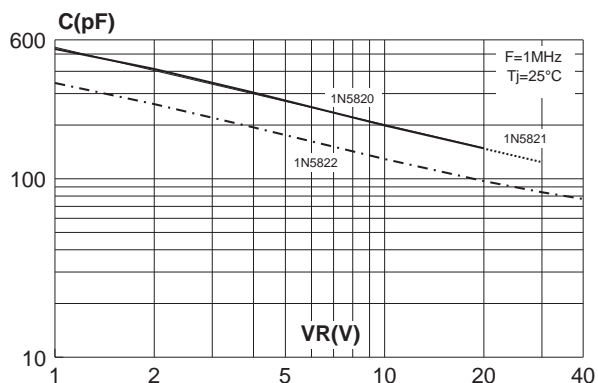
**Fig. 6-2:** Non repetitive surge peak forward current versus overload duration (maximum values) (1N5822).



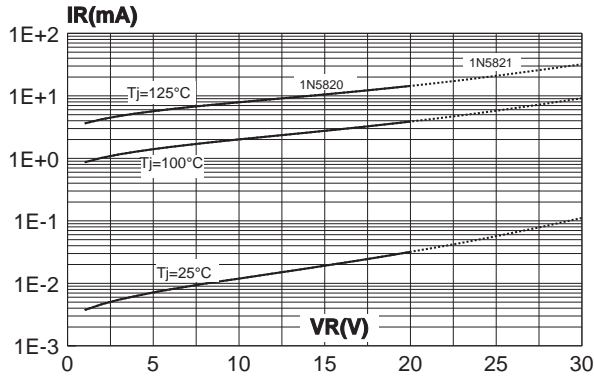
**Fig. 7:** Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board,  $e(\text{Cu})=35\text{mm}$ , recommended pad layout).



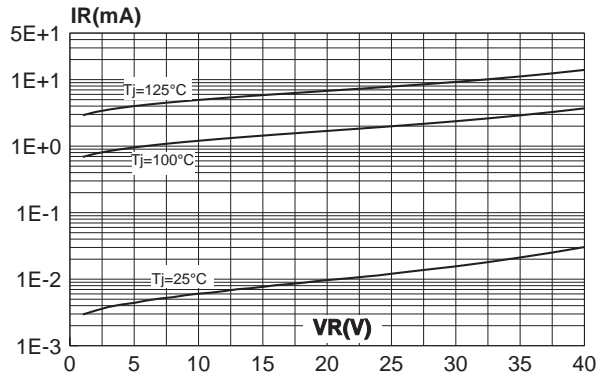
**Fig. 8:** Junction capacitance versus reverse voltage applied (typical values).



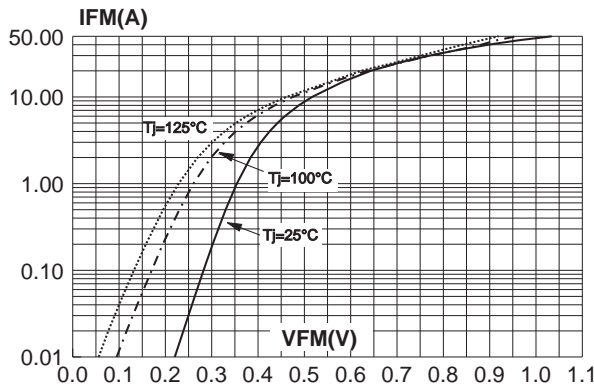
**Fig. 9-1:** Reverse leakage current versus reverse voltage applied (typical values) (1N5820/1N5821).



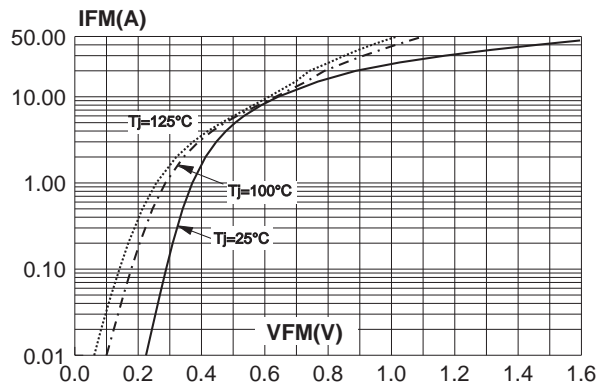
**Fig. 9-2:** Reverse leakage current versus reverse voltage applied (typical values) (1N5822).



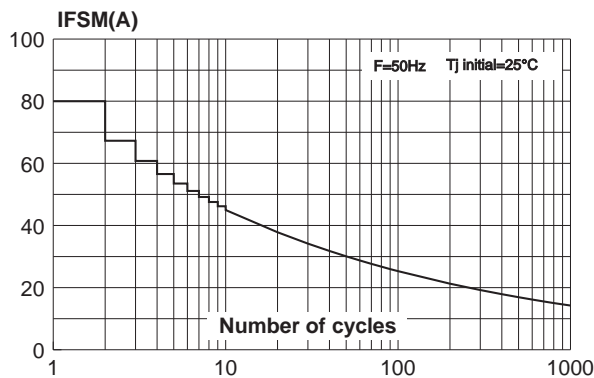
**Fig. 10-1:** Forward voltage drop versus forward current (typical values) (1N5820/1N5821).



**Fig. 10-2:** Forward voltage drop versus forward current (typical values) (1N5822).

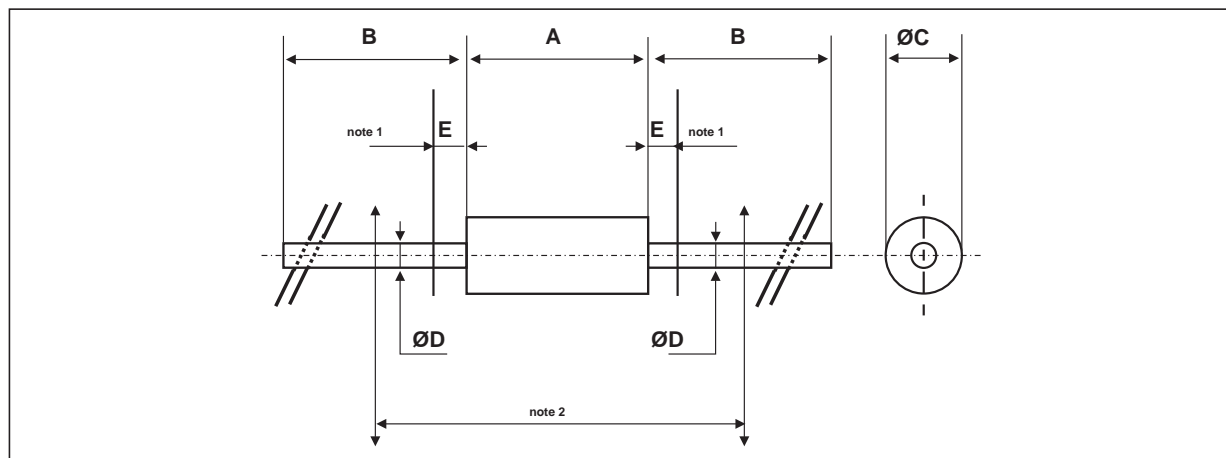


**Fig. 11:** Non repetitive surge peak forward current versus number of cycles.



## PACKAGE MECHANICAL DATA

DO-201AD plastic



| REF.                   | DIMENSIONS  |      |        |       | NOTES   |
|------------------------|-------------|------|--------|-------|---|
|                        | Millimeters |      | Inches |       |   |
|                        | Min.        | Max. | Min.   | Max.  |   |
| A                      |             | 9.50 |        | 0.374 | 1 - The lead diameter $\blacktriangledown$ D is not controlled over zone E<br>2 - The minimum axial length within which the device may be placed with its leads bent at right angles is 0.59" (15 mm) |
| B                      | 25.40       |      | 1.000  |       |   |
| $\blacktriangledown$ C |             | 5.30 |        | 0.209 |   |
| $\blacktriangledown$ D |             | 1.30 |        | 0.051 |   |
| E                      |             | 1.25 |        | 0.049 |   |

| Ordering type | Marking                     | Package  | Weight | Base qty | Delivery mode |
|---------------|-----------------------------|----------|--------|----------|---------------|
| 1N582x        | Part number<br>cathode ring | DO-201AD | 1.12g  | 600      | Ammopack      |
| 1N582xRL      | Part number<br>cathode ring | DO-201AD | 1.12g  | 1900     | Tape & reel   |

• EPOXY MEETS UL94,V0

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany  
Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore  
Spain - Sweden - Switzerland - United Kingdom - United States.

<http://www.st.com>