STPS3150

Power Schottky rectifier

## Features

- Negligible switching losses
- Low forward voltage drop for higher efficiency and extented battery life
- Low thermal resistance
- ECOPACK®2 compliant component

## Description

150 V Power Schottky rectifier are suited for switch mode power supplies on up to 24 V rails and high frequency converters.

Packaged in Axial, SMB, and low-profile SMB, this device is intended for use in consumer and computer applications like TV, STB, PC and DVD where low drop forward voltage is required to reduce power dissipation.

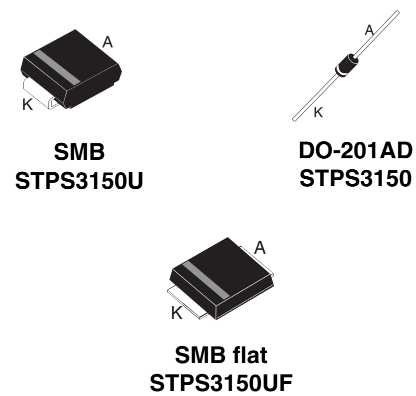



**Table 1. Device summary**

| Symbol | Value |
|---|---|
| $I_{F(AV)}$ | 3 A |
| $V_{RRM}$ | 150 V |
| $T_j$ (max) | 175 °C |
| $V_F$ (max) | 0.67 V |

# 1 Characteristics

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

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 150 | V |
| $I_{F(AV)}$ | Average forward current | SMB | $T_L$ = 130 °C δ = 0.5 | 3 | A |
| | | DO-201AD | $T_L$ = 140 °C δ = 0.5 | | |
| | | SMB flat | $T_L$ = 150 °C δ = 0.5 | | |
| $I_{FSM}$ | Surge non repetitive forward current | SMB | $t_p$ = 10 ms sinusoidal | 80 | A |
| | | DO-201AD | | 100 | |
| | | SMB flat | | 80 | |
| $T_{stg}$ | Storage temperature range | | | -65 to + 175 | °C |
| $T_j$ | Operating junction temperature(1) | | | 175 | °C |

1. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ condition to avoid thermal runaway for a diode on its own heatsink

**Table 3. Thermal resistance**

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $R_{th(j-l)}$ | Junction to lead | | SMB flat | 10 | °C/W |
| | | | SMB | 20 | |
| | | Lead length = 10 mm | DO-201AD | 15 | |

**Table 4. Static electrical characteristics**

| Symbol | Parameter | Tests conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$ (1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | | 0.4 | 2.0 | µA |
| | | $T_j$ = 125 °C | | | 0.6 | 2.0 | mA |
| $V_F$ (2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 3 A | | 0.78 | 0.82 | V |
| | | $T_j$ = 125 °C | | | 0.63 | 0.67 | |
| | | $T_j$ = 25 °C | $I_F$ = 6 A | | 0.85 | 0.89 | |
| | | $T_j$ = 125 °C | | | 0.70 | 0.75 | |

1. $t_p$ = 5 ms, δ < 2%
2. $t_p$ = 380 µs, δ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.59 \times I_{F(AV)} + 0.023\ I_F{}^2{}_{(RMS)}$

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

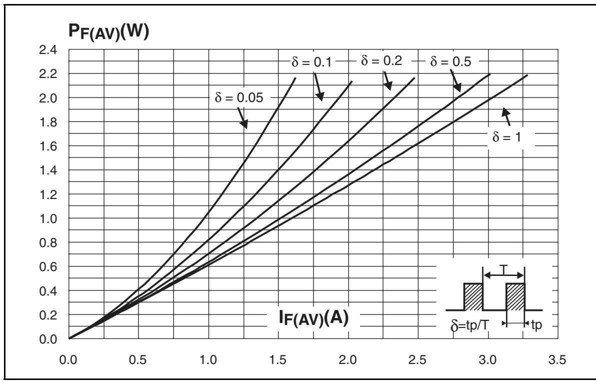



**Figure 2. Average forward current versus ambient temperature (δ = 0.5) (DO-201AD / SMB)**

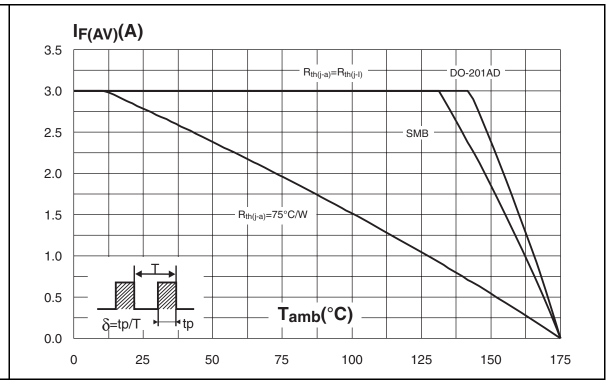



**Figure 3. Average forward current versus ambient temperature (δ = 0.5) (SMB flat)**

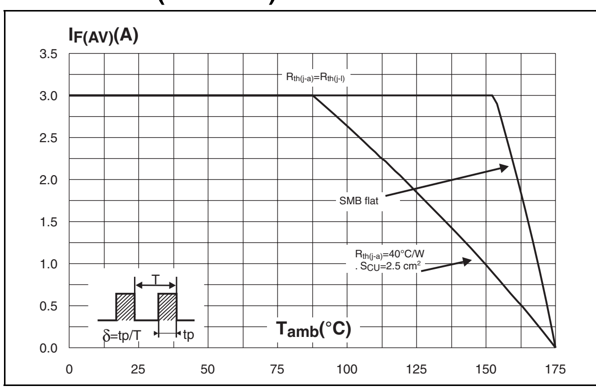



**Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values)**

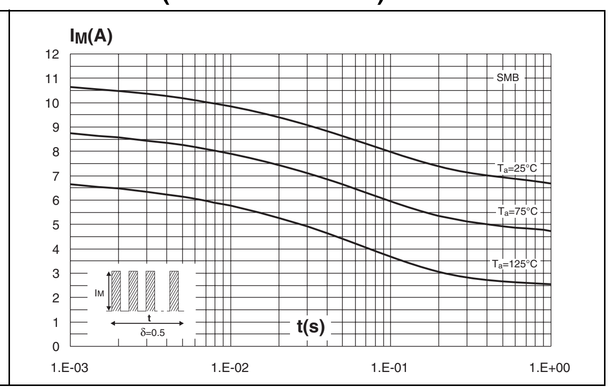



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)**

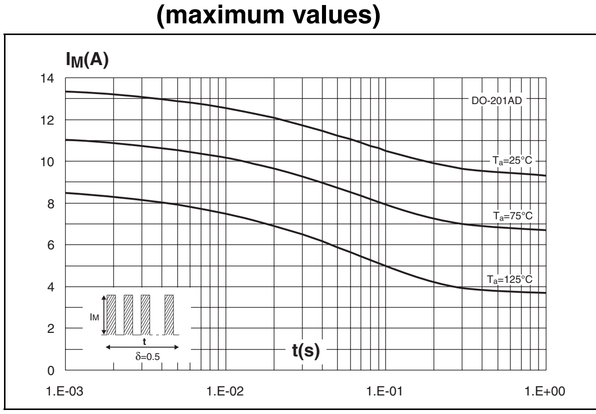



**Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values)**

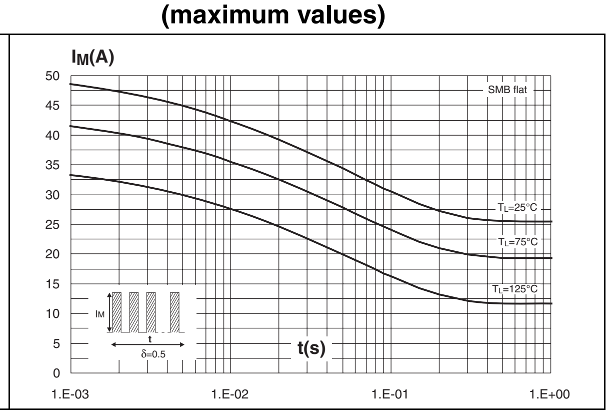


**Figure 7. Normalized avalanche power derating versus pulse duration**

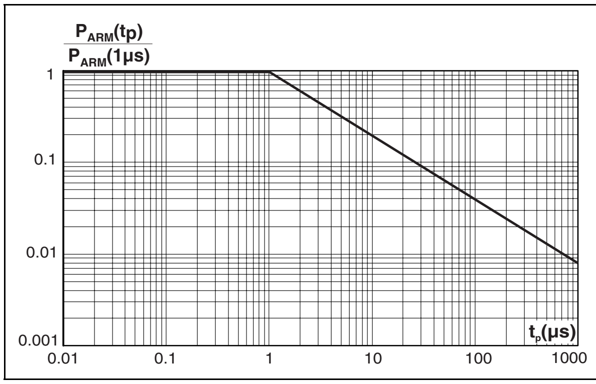



**Figure 8. Normalized avalanche power derating versus junction temperature**

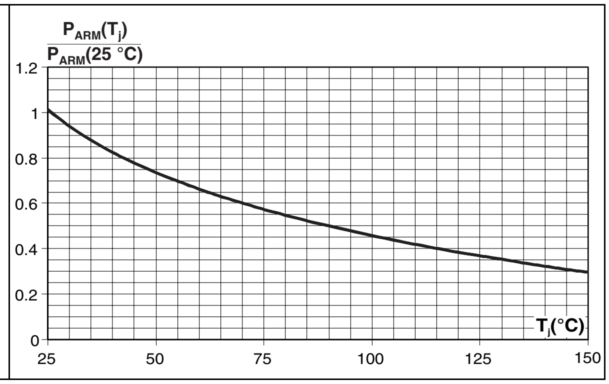



**Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration**

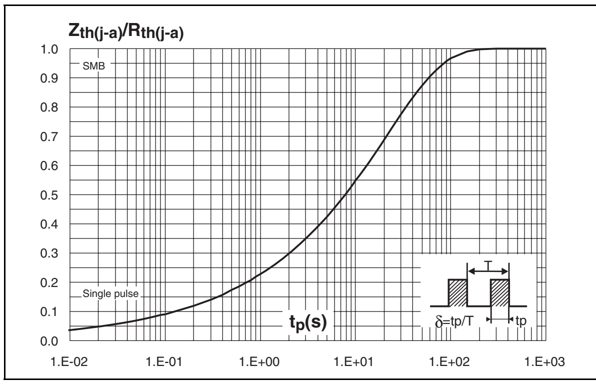



**Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration**

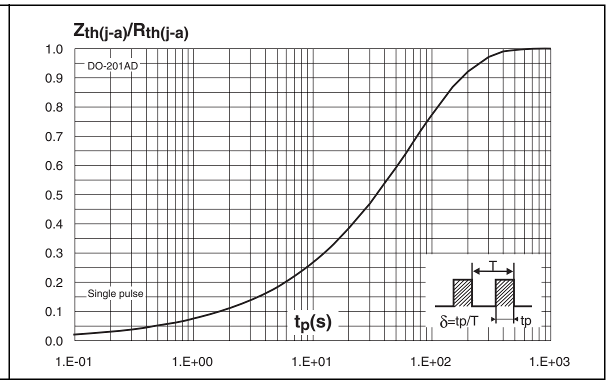



**Figure 11. Relative variation of thermal impedance junction to lead versus pulse duration**

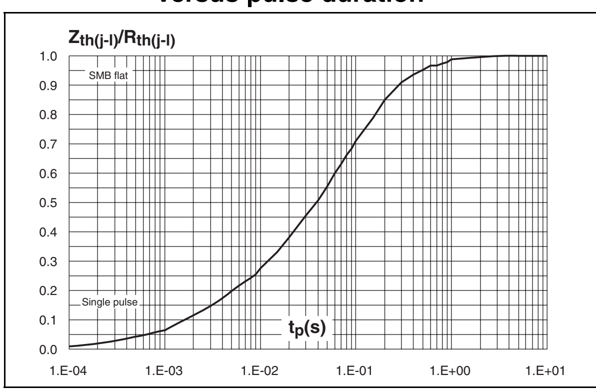



**Figure 12. Reverse leakage current versus reverse voltage applied (typical values)**

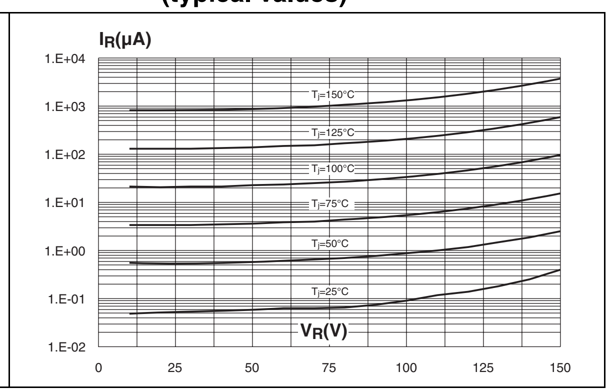


**Figure 13. Junction capacitance versus reverse voltage applied (typical values)**

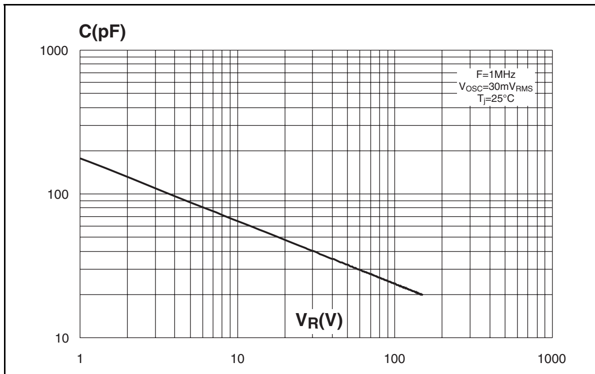



**Figure 14. Forward voltage drop versus forward current**

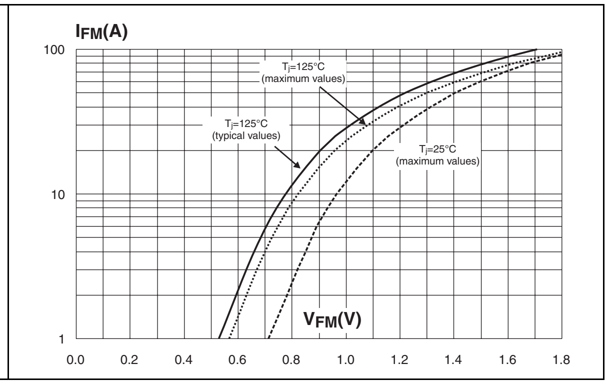



**Figure 15. Thermal resistance junction to ambient versus copper surface under each lead**

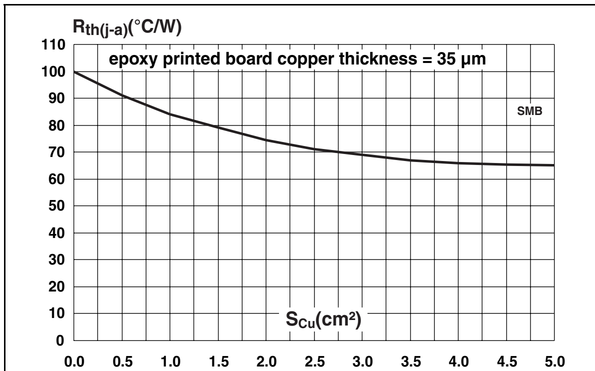



**Figure 16. Thermal resistance junction to ambient versus copper surface under each lead**

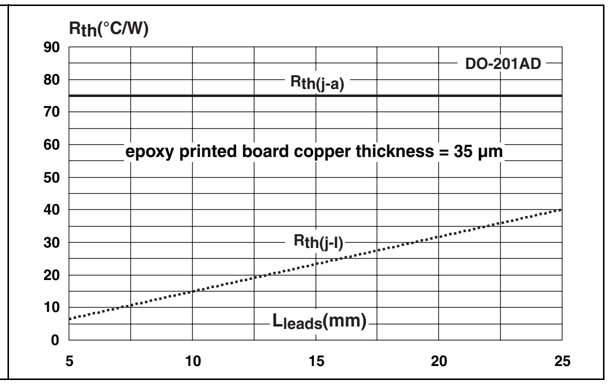
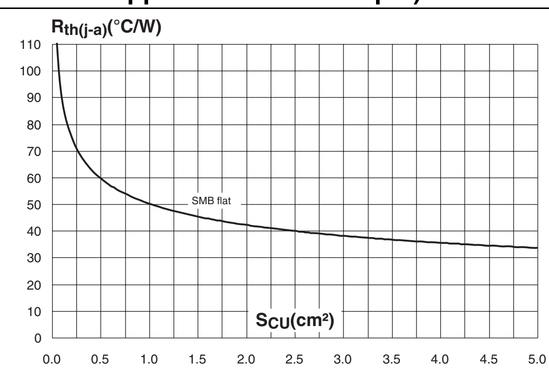



**Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board copper thickness = 35 µm)**

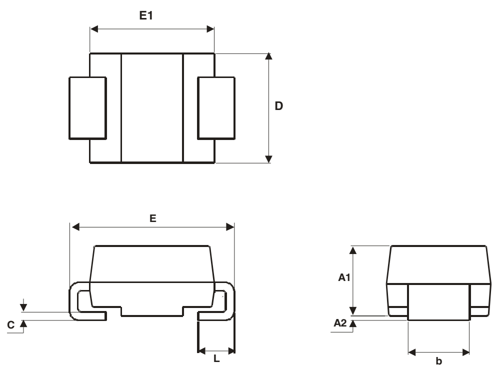


# 2 Package information

- Epoxy meets UL94, V0
- Lead-free package

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. ECOPACK® is an ST trademark.

Table 5. SMB dimensions




| 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 18. SMB footprint (dimensions in mm)

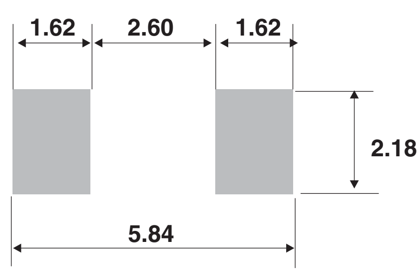
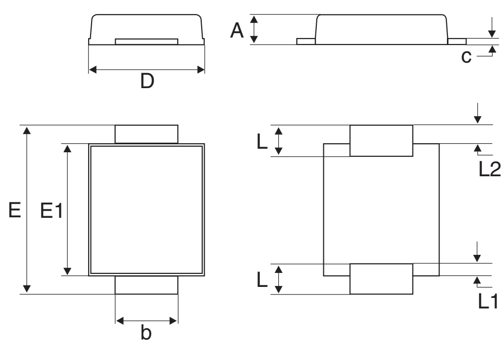


**Table 6. SMB Flat dimensions**




| Ref. | Dimensions | | | | | |
|---|---|---|---|---|---|---|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.035 | | 0.043 |
| b[(1)] | 1.95 | | 2.20 | 0.077 | | 0.087 |
| c[(1)] | 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 19. SMB Flat footprint (dimensions in mm)**

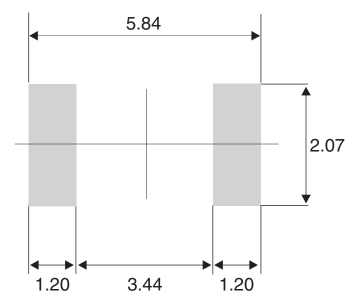
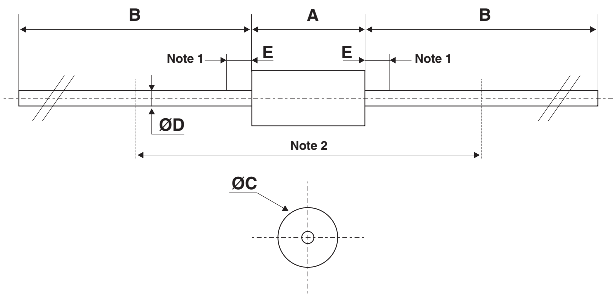


**Table 7. DO-201AD dimensions**




| REF. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | | 9.50 | | 0.374 |
| B | 25.40 | | 1.000 | |
| C | | 5.30 | | 0.209 |
| D[1] | | 1.30 | | 0.051 |
| E | | 1.25 | | 0.049 |
| Note 2[2] | 15 | | 0.59 | |

1. The lead diameter D is not controlled over zone E
2. 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 | 0.50 g | 5000 | Tape and reel |
| STPS3150 | STPS3150 | DO-201AD | 1.12 g | 600 | Ammopack |
| STPS3150RL | STPS3150 | DO-201AD | 1.12 g | 1900 | Tape and reel |

# 4 Revision history

**Table 9. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| May-2003 | 2A | Last update. |
| 31-May-2006 | 3 | Reformatted to current standard. Added ECOPACK statement. Updated SMB footprint in Figure 12. Changed nF to pF in Figure 8. |
| 08-Feb-2007 | 4 | Added SMB flat and SMB flat e package. |
| 20-Jul-2011 | 5 | Updated *Table 2.* |

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