

Description

High voltage Schottky rectifier suited for switch mode power supply and other power converters.

Packaged in DPAK, this device is intended for use in high frequency circuitries where low switching losses is required.

Table 1. Device summary

| Symbol | Value |
|--------------|--------|
| $I_{F(AV)}$ | 10 A |
| V_{RRM} | 45 V |
| T_j | 175 °C |
| $V_{F(typ)}$ | 0.50 V |

Features

- Very small conduction losses
- Extremely fast switching
- Low thermal resistance
- Negligible switching losses
- Low forward voltage drop
- Low capacitance
- Avalanche specification
- ECOPACK[®]2 compliant component for DPAK on demand

1 Characteristics

Table 2. Absolute ratings (limiting values, at 25 °C unless otherwise stated)

| Symbol | Parameter | Value | Unit |
|--------------------|--|---|----------|
| V_{RRM} | Repetitive peak reverse voltage | 45 | V |
| $I_{F(RMS)}$ / pin | Forward rms current | 7 | A |
| $I_{F(AV)}$ | Average forward current, $\delta = 0.5$, square wave | $T_c = 150\text{ °C}$ | 10 A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms}$ sinusoidal | 75 A |
| P_{ARM} | Repetitive peak avalanche power | $t_p = 10\text{ }\mu\text{s}$, $T_j = 125\text{ °C}$ | 285 W |
| T_{stg} | Storage temperature range | -65 to +175 | °C |
| T_j | Maximum operating junction temperature ⁽¹⁾ | 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 | Max. value | Unit |
|---------------|------------------|------------|------|
| $R_{th(j-c)}$ | Junction to case | 3 | °C/W |

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit | |
|-------------|-------------------------|-----------------------|---------------------|------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = V_{RRM}$ | - | | 100 | μA |
| | | $T_j = 125\text{ °C}$ | | - | 7 | 15 | mA |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 10\text{ A}$ | - | | 0.63 | V |
| | | $T_j = 125\text{ °C}$ | | - | 0.50 | 0.57 | |
| | | $T_j = 25\text{ °C}$ | $I_F = 20\text{ A}$ | - | | 0.84 | |
| | | $T_j = 125\text{ °C}$ | | - | 0.65 | 0.72 | |

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:

$$P = 0.42 \times I_{F(AV)} + 0.015 \times I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

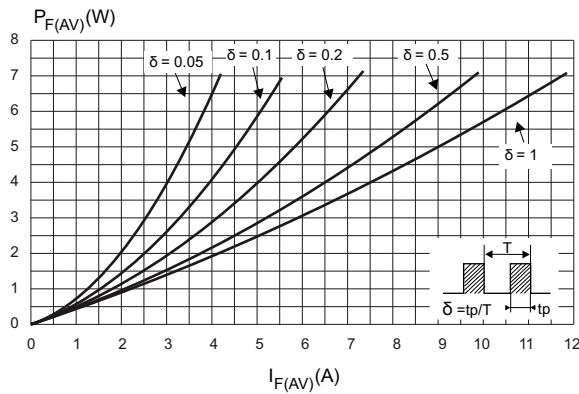


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

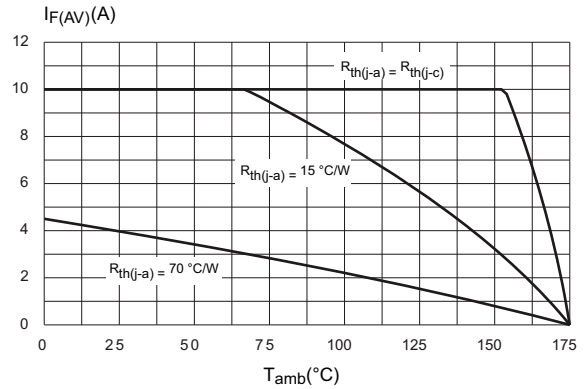


Figure 3. Normalized avalanche power derating versus pulse duration at $T_j = 125\text{ }^\circ\text{C}$

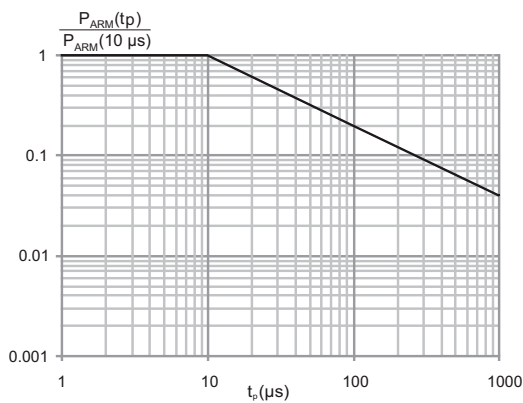


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

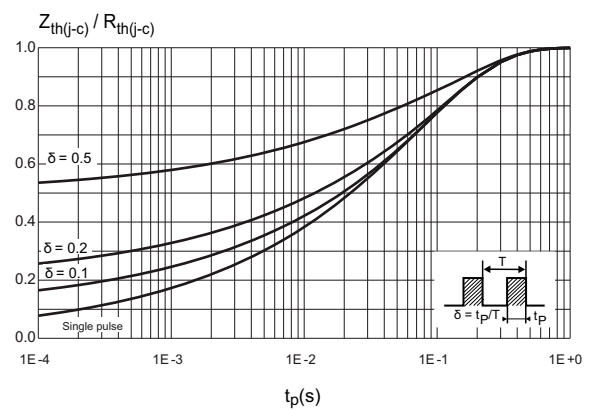


Figure 5. Reverse leakage current versus reverse reverse voltage applied (typical values)

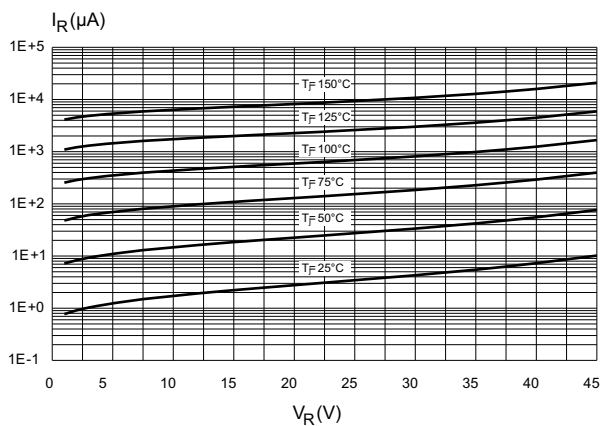


Figure 6. Junction capacitance versus reverse voltage applied (typical values)

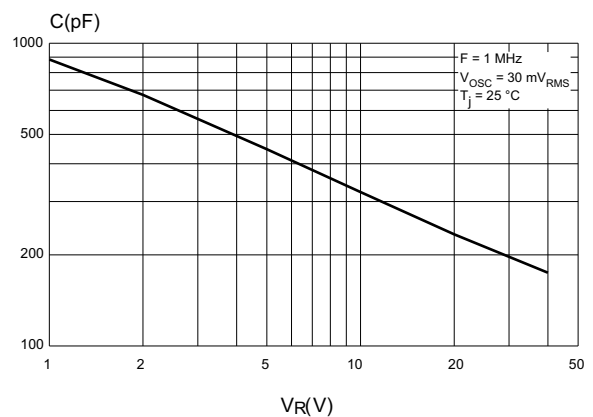


Figure 7. Forward voltage drop versus forward current

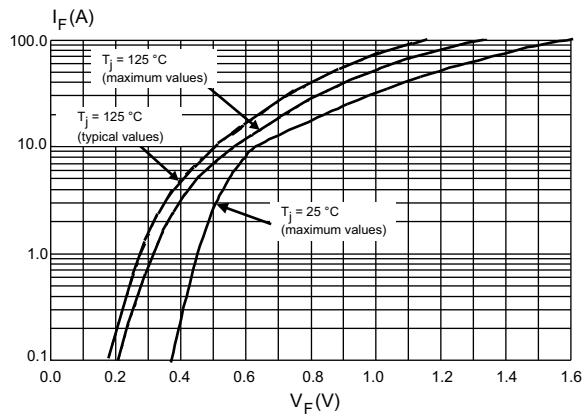
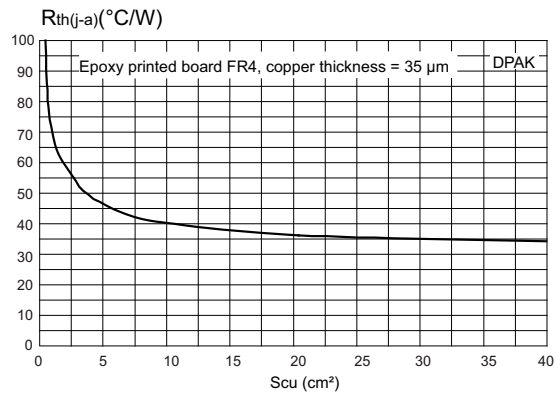


Figure 8. Thermal resistance junction to ambient versus copper surface under tab



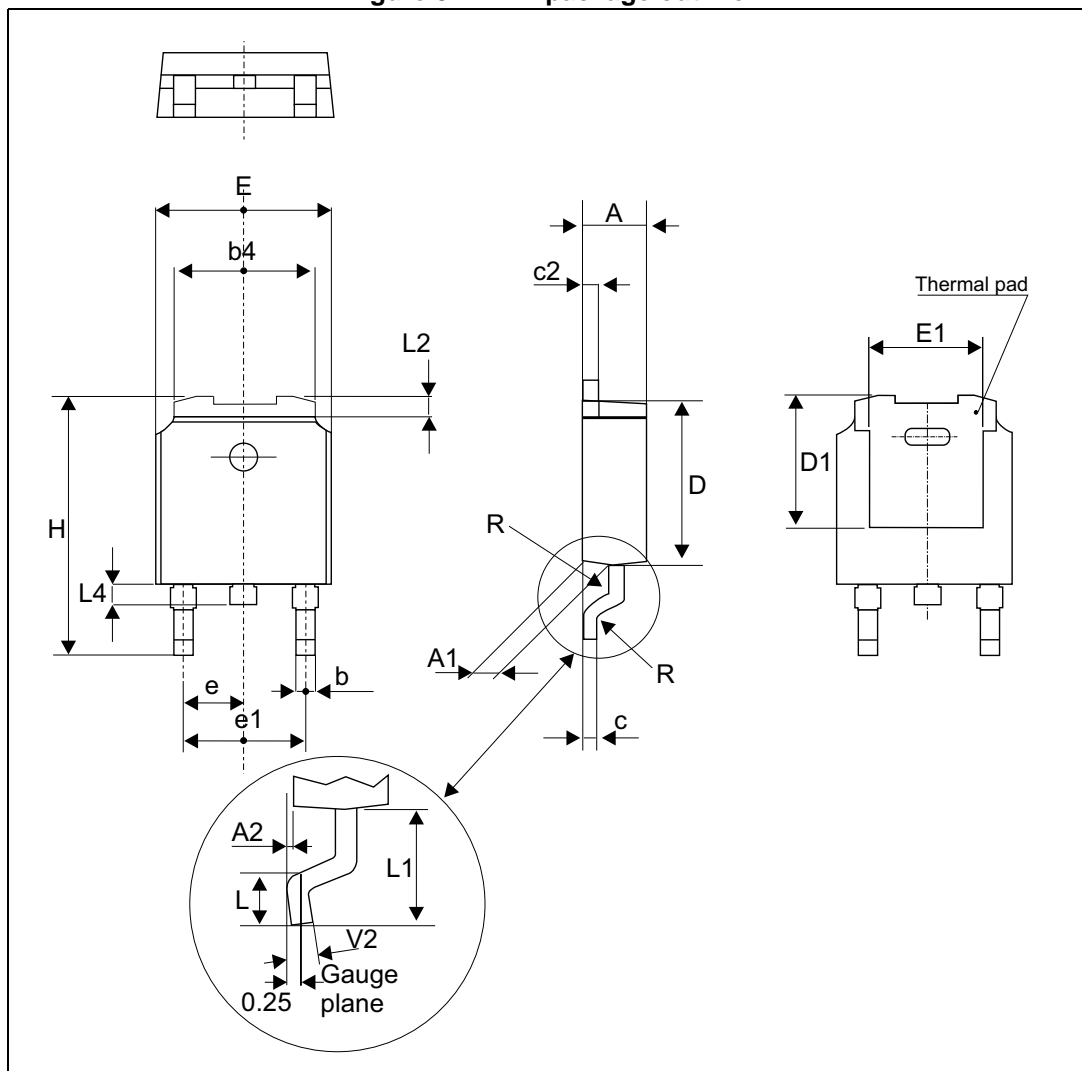
2 Package Information

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

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.

2.1 DPAK package information

Figure 9. DPAK package outline

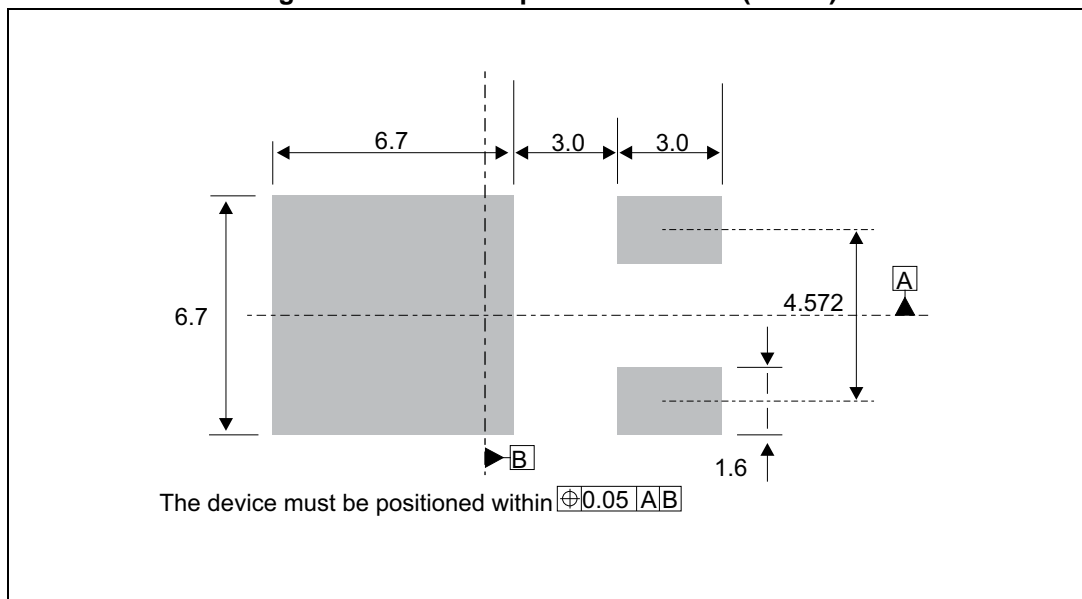


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DPAK package mechanical data

| Ref. | Dimensions | | | | | |
|------|-------------|------|-------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.18 | | 2.40 | 0.085 | | 0.094 |
| A1 | 0.90 | | 1.10 | 0.035 | | 0.043 |
| A2 | 0.03 | | 0.23 | 0.001 | | 0.009 |
| b | 0.64 | | 0.90 | 0.025 | | 0.035 |
| b4 | 4.95 | | 5.46 | 0.194 | | 0.214 |
| c | 0.46 | | 0.61 | 0.018 | | 0.024 |
| c2 | 0.46 | | 0.60 | 0.018 | | 0.023 |
| D | 5.97 | | 6.22 | 0.235 | | 0.244 |
| D1 | 4.95 | | 5.60 | 0.194 | | 0.220 |
| E | 6.35 | | 6.73 | 0.250 | | 0.264 |
| E1 | 4.32 | | 5.50 | 0.170 | | 0.216 |
| e | | 2.28 | | | 0.090 | |
| e1 | 4.40 | | 4.70 | 0.173 | | 0.185 |
| H | 9.35 | | 10.40 | 0.368 | | 0.409 |
| L | 1.00 | | 1.78 | 0.039 | | 0.070 |
| L2 | | | 1.27 | | | 0.050 |
| L4 | 0.60 | | 1.02 | 0.023 | | 0.040 |
| V2 | -8° | | +8° | -8° | | 8° |

Figure 10. DPAK footprint dimensions (in mm)



3 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|--------------|---------|---------|--------|----------|---------------|
| STPS1045B | S10 45 | DPAK | 0.30 g | 75 | Tube |
| STPS1045B-TR | S10 45 | | | 2500 | Tape and reel |

4 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| Jul-2003 | 3B | Last issue |
| 21-Apr-2005 | 4 | IPAK package removed |
| 03-Nov-2005 | 5 | DPAK foot print dimensions updated. |
| 01-Jul-2010 | 6 | Updated Figure 10 Updated ECOPACK statement. |
| 04-Nov-2014 | 7 | Updated DPAK package information, Table 2 and Figure 5. Removed P_{ARM} ($T_j = 25\text{ °C}$). |
| 07-Apr-2015 | 8 | Updated Table 2. Format update to current standard. |
| 05-Oct-2016 | 9 | Updated DPAK package information. |

IMPORTANT NOTICE – PLEASE READ CAREFULLY

STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, enhancements, modifications, and improvements to ST products and/or to this document at any time without notice. Purchasers should obtain the latest relevant information on ST products before placing orders. ST products are sold pursuant to ST's terms and conditions of sale in place at the time of order acknowledgement.

Purchasers are solely responsible for the choice, selection, and use of ST products and ST assumes no liability for application assistance or the design of Purchasers' products.

No license, express or implied, to any intellectual property right is granted by ST herein.

Resale of ST products with provisions different from the information set forth herein shall void any warranty granted by ST for such product.

ST and the ST logo are trademarks of ST. All other product or service names are the property of their respective owners.

Information in this document supersedes and replaces information previously supplied in any prior versions of this document.

© 2016 STMicroelectronics – All rights reserved