

STPS1045B-Y

Automotive power Schottky rectifier

Features

- Negligible switching losses
- Low forward voltage drop
- Low capacitance
- High reverse avalanche surge capability
- Avalanche specification
- AEC-Q101 qualified

Description

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

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

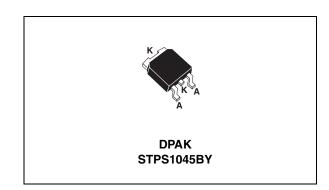


Table 1. Device summary

| I _{F(AV)} | 10 A |
|----------------------|--------|
| V_{RRM} | 45 V |
| T _j | 175 °C |
| V _F (max) | 0.57 V |

Characteristics STPS1045B-Y

1 Characteristics

Table 2. Absolute maximum ratings

| Symbol | Parameter | Value | Unit | |
|--------------------------|---|-------------|-------------|----|
| V _{RRM} | Repetitive peak reverse voltage | 45 | V | |
| I _{F(RMS)} /pin | Forward rms current | | 7 | Α |
| I _{F(AV)} | Average forward current $T_c = 150 ^{\circ}\text{C} \delta = 0.5$ | | 10 | Α |
| I _{FSM} | Surge non repetitive forward current $t_p = 10 \text{ ms sinusoidal}$ | | 75 | Α |
| I _{RRM} | Repetitive peak reverse current $t_p = 2 \mu s$, F= 1 kHz | | 1 | Α |
| P _{ARM} | Repetitive peak avalanche power $t_p = 1 \mu s$, $T_{j=25 °C}$ | | 4000 | W |
| T _{stg} | Storage temperature range | -65 to +175 | °C | |
| T _j | Operating junction temperature range ⁽¹⁾ | | -40 to +175 | °C |
| dV/dt | Critical rate of rise of reverse voltage | 10000 | V/µs | |

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

Table 3. Thermal parameters

| Symbol | Parameter | Value | Unit |
|----------------------|------------------|-------|------|
| R _{th(j-c)} | Junction to case | 3 | °C/W |

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | | Min. | Тур. | Max. | Unit |
|-------------------------------|--|-------------------------|-----------------------|------|------|------|------|
| I _R ⁽¹⁾ | Reverse leakage | T _j = 25 °C | V- - V | - | - | 100 | μΑ |
| 'R' | current | T _j = 125 °C | $V_R = V_{RRM}$ | - | 7 | 15 | mA |
| | V _F ⁽²⁾ Forward voltage drop | T _j = 25 °C | I _F = 10 A | - | - | 0.63 | |
| V (2) | | T _j = 125 °C | IF = 10 A | - | 0.50 | 0.57 | V |
| VF` | | T _j = 25 °C | I _F = 20 A | - | - | 0.84 | V |
| | | T _j = 125 °C | 1F = 20 A | - | 0.65 | 0.72 | |

^{1.} Pulse test: t_p = 5 ms, δ < 2%

To evaluate the conduction losses use the following equation:

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

Doc ID 17265 Rev 1

^{2.} Pulse test: t_p = 380 μ s, δ < 2%

STPS1045B-Y Characteristics

Figure 1. Average forward power dissipation Figure 2. Average forward current versus awbient temperature (δ = 0.5)

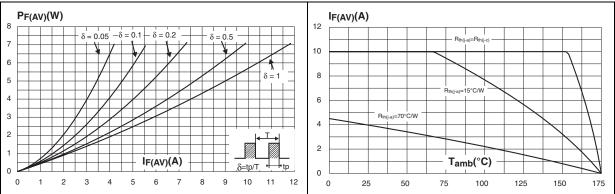


Figure 3. Normalized avalanche power derating versus pulse duration

Figure 4. Normalized avalanche power derating versus junction temperature

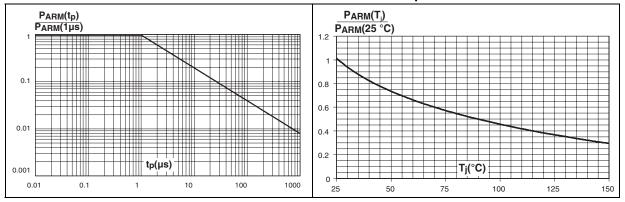
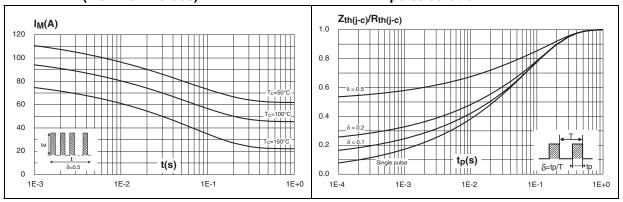


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)

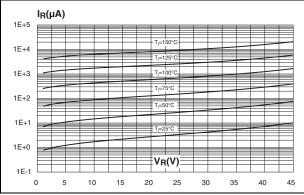
Figure 6. Relative variation of thermal impedance junction to case versus pulse duration



Characteristics STPS1045B-Y

Figure 7. Reverse leakage current versus reverse voltage applied (typical values)

Figure 8. Junction capacitance versus reverse voltage applied (typical values)



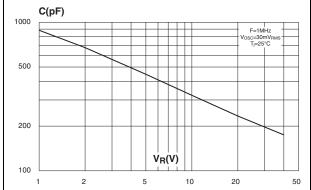
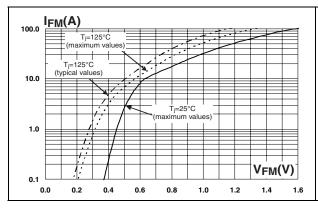
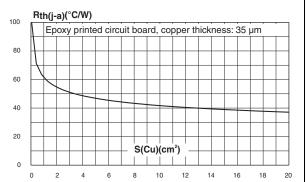


Figure 9. Forward voltage drop versus forward current

Figure 10. Thermal resistance junction to ambient versus copper surface under tab





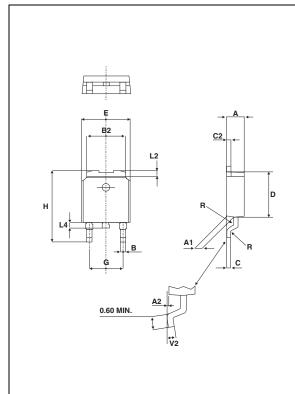
4/7 Doc ID 17265 Rev 1

2 Package information

- Epoxy meets UL94, V0
- Lead-free package

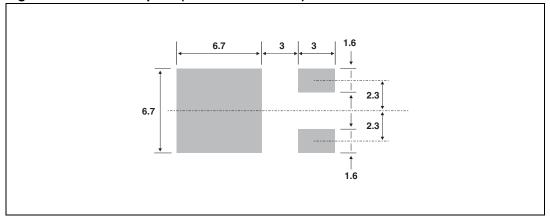
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

Table 5. DPAK dimensions



| | Dimensions | | | |
|------|-------------|-------|------------|-------|
| Ref. | Millimeters | | Inc | hes |
| | Min. | Max | Min. | Max. |
| Α | 2.20 | 2.40 | 0.086 | 0.094 |
| A1 | 0.90 | 1.10 | 0.035 | 0.043 |
| A2 | 0.03 | 0.23 | 0.001 | 0.009 |
| В | 0.64 | 0.90 | 0.025 | 0.035 |
| B2 | 5.20 | 5.40 | 0.204 | 0.212 |
| С | 0.45 | 0.60 | 0.017 | 0.023 |
| C2 | 0.48 | 0.60 | 0.018 | 0.023 |
| D | 6.00 | 6.20 | 0.236 | 0.244 |
| Е | 6.40 | 6.60 | 0.251 | 0.259 |
| G | 4.40 | 4.60 | 0.173 | 0.181 |
| Н | 9.35 | 10.10 | 0.368 | 0.397 |
| L2 | 0.80 typ. | | 0.031 typ. | |
| L4 | 0.60 | 1.00 | 0.023 | 0.039 |
| V2 | 0° | 8° | 0° | 8° |

Figure 11. DPAK footprint (dimensions in mm)



Ordering information STPS1045B-Y

3 Ordering information

Table 6. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|--------|----------|---------------|
| STPS1045BY-TR | S1045Y | DPAK | 0.30 g | 2500 | Tape and reel |

4 Revision history

Table 7. Document revision history

| Date | Revision | Changes |
|-------------|----------|------------------|
| 23-May-2011 | 1 | Initial release. |

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time. without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED ST REPRESENTATIVE, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2011 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

STMicroelectronics: STPS1045BY-TR