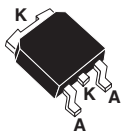
# STPS1045B-Y

## Automotive power Schottky rectifier

## Features

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




**DPAK**
**STPS1045BY**

## 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 |

# 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 | A |
| $I_{F(AV)}$ | Average forward current | $T_c$ = 150 °C $\delta$ = 0.5 | 10 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | 75 | A |
| $I_{RRM}$ | Repetitive peak reverse current | $t_p$ = 2 µs, F= 1 kHz | 1 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | $t_p$ = 1 µs, $T_j$ = 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. $\frac{dPtot}{dTj} < \frac{1}{Rth(j-a)}$ 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. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | - | - | 100 | µA |
| | | $T_j$ = 125 °C | | - | 7 | 15 | mA |
| $V_F$(2) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 10 A | - | - | 0.63 | V |
| | | $T_j$ = 125 °C | | - | 0.50 | 0.57 | |
| | | $T_j$ = 25 °C | $I_F$ = 20 A | - | - | 0.84 | |
| | | $T_j$ = 125 °C | | - | 0.65 | 0.72 | |

1. Pulse test: $t_p$ = 5 ms, $\delta$ < 2%
2. Pulse test: $t_p$ = 380 µs, $\delta$ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.42 \times I_{F(AV)} + 0.015\ I_F{}^2{}_{(RMS)}$

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

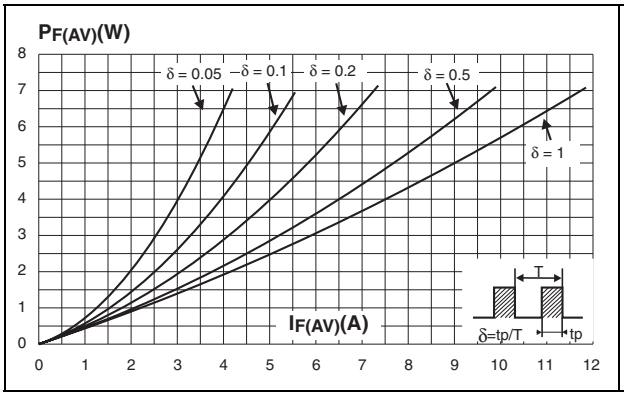



**Figure 2. Average forward current versus ambient temperature ( δ = 0.5)**

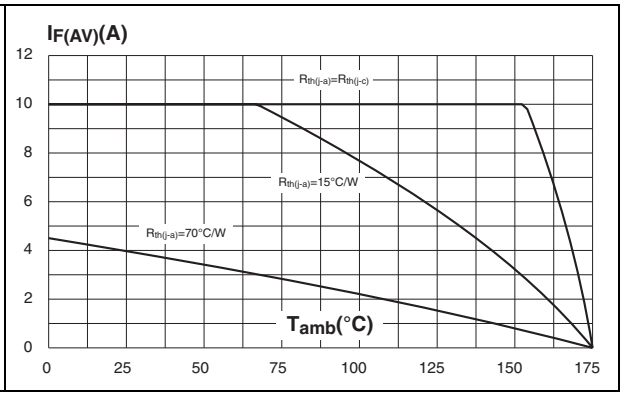



**Figure 3. Normalized avalanche power derating versus pulse duration**

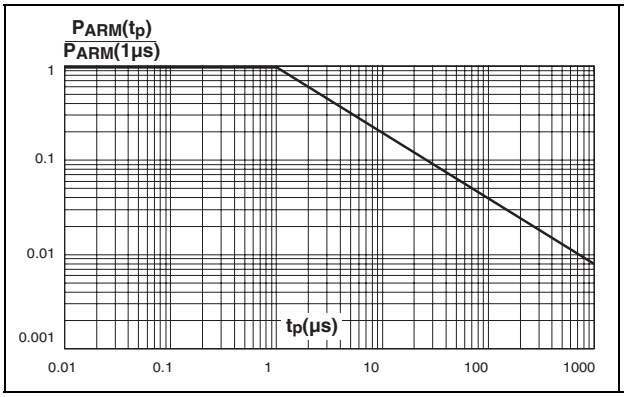



**Figure 4. Normalized avalanche power derating versus junction temperature**

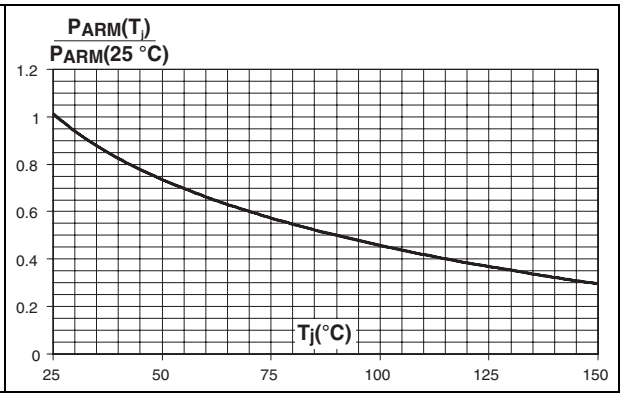



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values)**

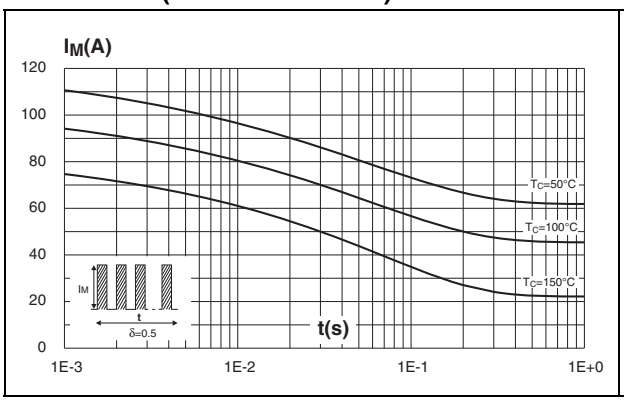



**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**

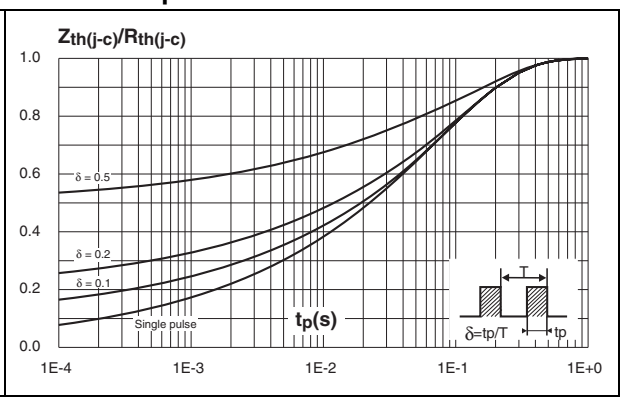


**Figure 7. Reverse leakage current versus reverse voltage applied (typical values)**

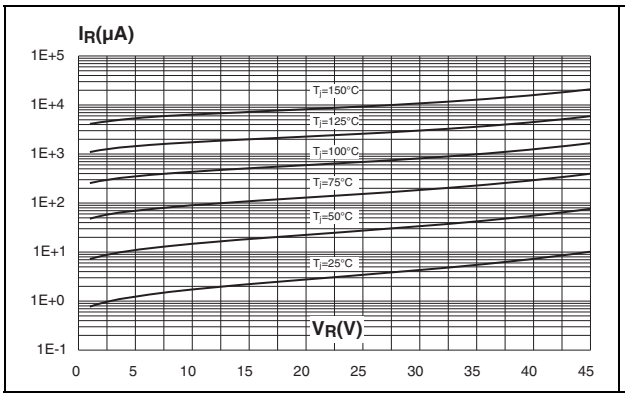



**Figure 8. Junction capacitance versus reverse voltage applied (typical values)**

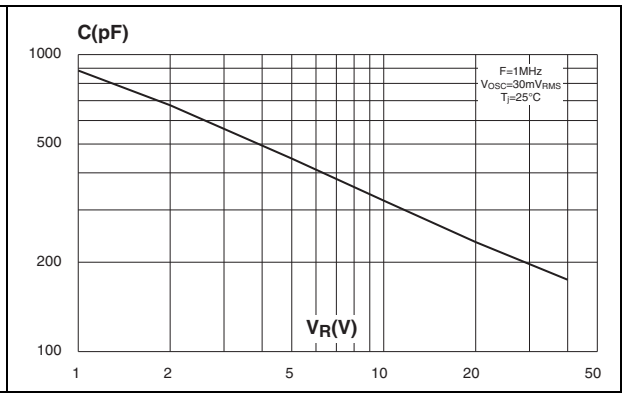



**Figure 9. Forward voltage drop versus forward current**

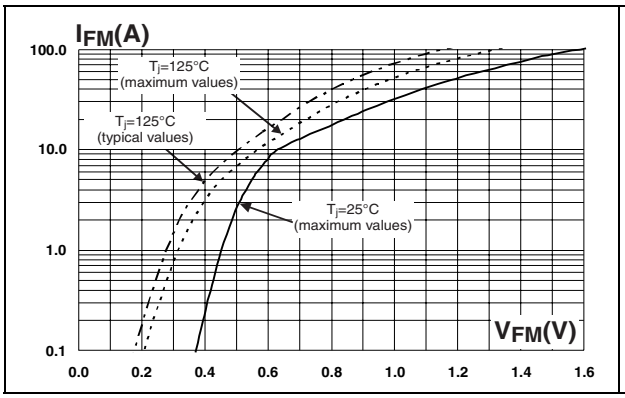
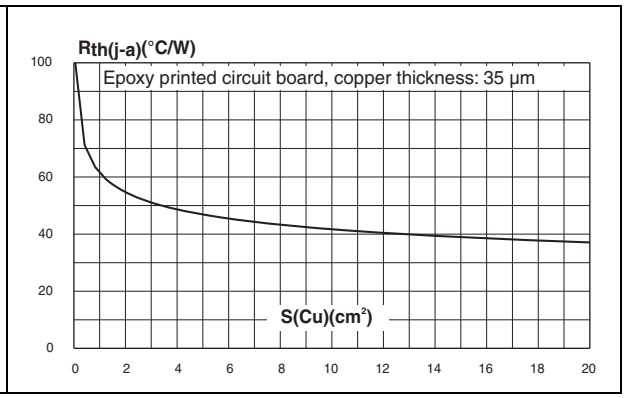



**Figure 10. Thermal resistance junction to ambient versus copper surface under tab**

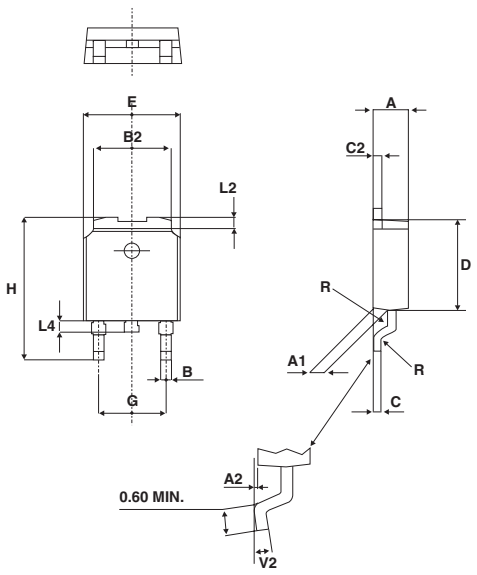


# 2 Package information

- Epoxy meets UL94, V0
- Lead-free package

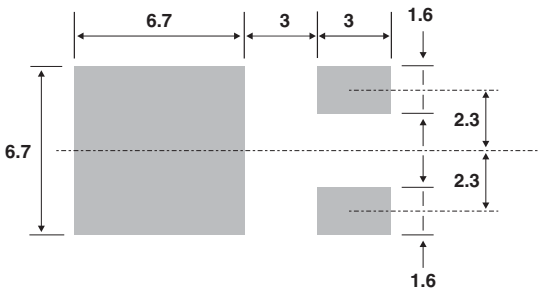
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

**Table 5. DPAK dimensions**




| Ref. | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max | Min. | Max. |
| A | 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 |
| B | 0.64 | 0.90 | 0.025 | 0.035 |
| B2 | 5.20 | 5.40 | 0.204 | 0.212 |
| C | 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 |
| E | 6.40 | 6.60 | 0.251 | 0.259 |
| G | 4.40 | 4.60 | 0.173 | 0.181 |
| H | 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)**



# 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. |