# STPS1545C-Y

## Automotive power Schottky rectifier

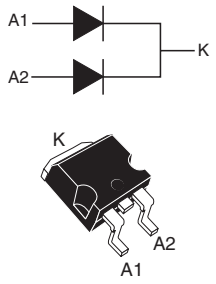
## Features

- Very small conduction losses
- Negligible switching losses
- Extremely fast switching
- Avalanche capability specified
- AEC-Q101 qualified

## Description

Dual center tap Schottky rectifier suited for high frequency DC to DC converters.

Packaged in $D^2PAK$, this device is especially intended for use in low voltage, high frequency inverters, free wheeling and polarity protection applications.




**$D^2PAK$**
**STPS1545CGY**

**Table 1. Device summary**

| | |
|---|---|
| $I_{F(AV)}$ | 2 x 7.5 A |
| $V_{RRM}$ | 45 V |
| $T_{j\ (max)}$ | 175 °C |
| $V_{F(max)}$ | 0.57 V |

# 1 Characteristics

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

| Symbol | Parameter | | | Value | Unit |
|---|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | | 45 | V |
| $I_{F(RMS)}$ | RMS forward voltage | | | 20 | A |
| $I_{F(AV)}$ | Average forward current $\delta = 0.5$ | $T_c$ = 157 °C | Per diode | 7.5 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms Sinusoidal | | 150 | A |
| $I_{RRM}$ | Peak repetitive reverse current | $t_p$ = 2 µs square F = 1 kHz | | 1 | A |
| $I_{RSM}$ | Non repetitive peak reverse current | $t_p$ = 100 µs square | | 2 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | $t_p$ = 1 µs $T_j$ = 25 °C | | 2700 | W |
| $T_{stg}$ | Storage temperature range | | | -65 to +175 | °C |
| $T_j$ | Maximum operating junction temperature (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 resistances**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{th(j-c)}$ | Junction to case | Per diode<br>Total | 3.0<br>1.7 | °C/W |
| $R_{th(c)}$ | Coupling | | 0.35 | |

When the diodes 1 and 2 are used simultaneously :
$\Delta Tj$(diode 1) = P(diode1) x $R_{th(j-c)}$(Per diode) + P(diode 2) x $R_{th(c)}$

**Table 4. Static electrical characteristics (per diode)**

| 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 | | - | 5 | 15 | mA |
| $V_F$ (1) | Forward voltage drop | $T_j$ = 125 °C | $I_F$ = 7.5A | - | 0.5 | 0.57 | V |
| | | $T_j$ = 25 °C | $I_F$ = 15 A | - | - | 0.84 | |
| | | $T_j$ = 125 °C | $I_F$ = 15 A | - | 0.65 | 0.72 | |

1. Pulse test: tp = 380 µs, $\delta$ < 2%

To evaluate the conduction losses use the following equation:
$P = 0.42 \times I_{F(AV)} + 0.020\ I_F{}^2{}_{(RMS)}$

**Figure 1. Average forward power dissipation versus average forward current (per diode)**

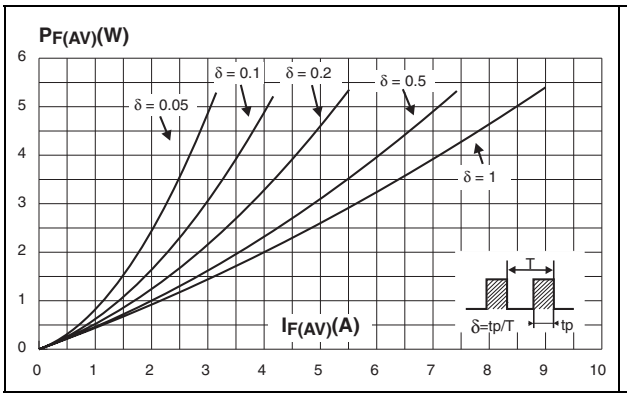



**Figure 2. Average forward current versus ambient temperature (δ = 0.5, per diode)**

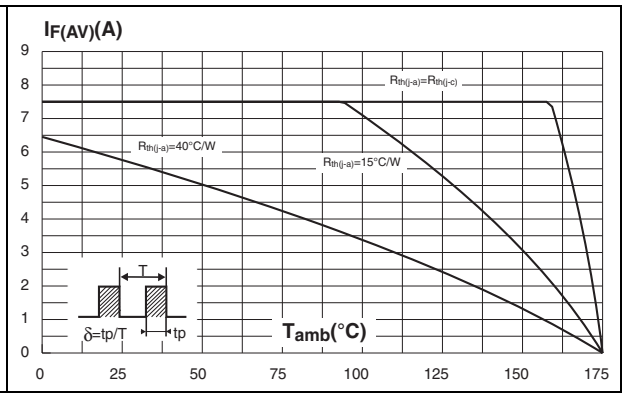



**Figure 3. Normalized avalanche power derating versus pulse duration**

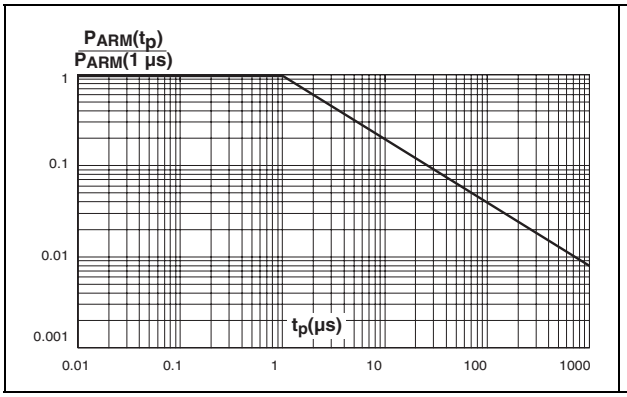



**Figure 4. Normalized avalanche power derating versus junction temperature**

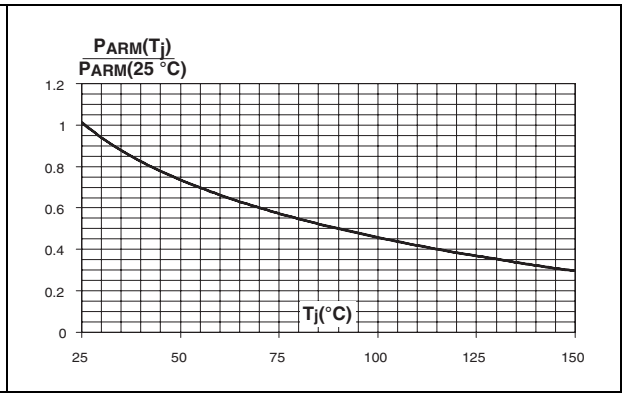



**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values, per diode)**

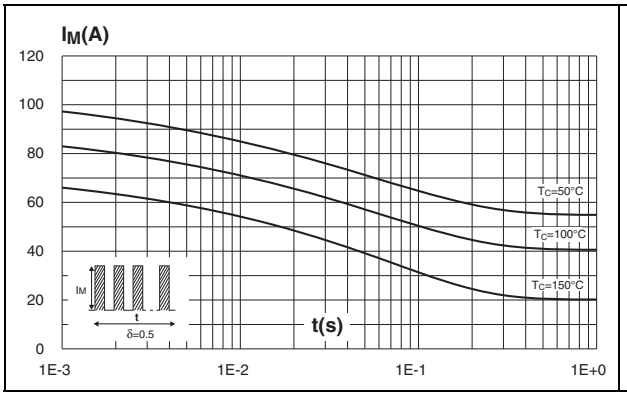



**Figure 6. Relative variation of thermal impedance junction to case versus pulse duration**

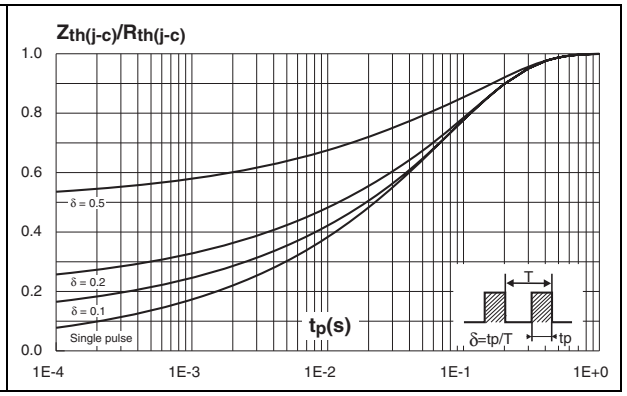


**Figure 7. Reverse leakage current versus reverse voltage applied (typical values, per diode)**

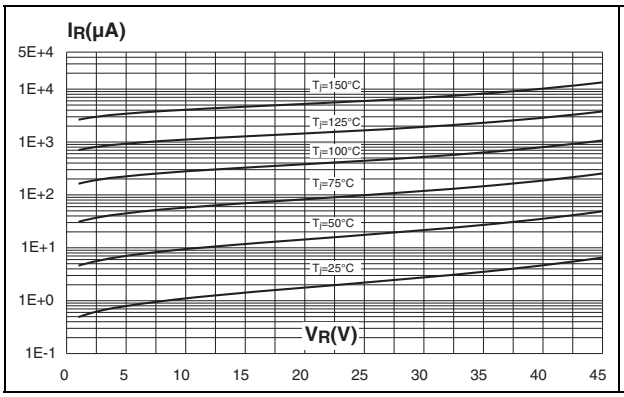



**Figure 8. Junction capacitance versus reverse voltage applied (typical values, per diode)**

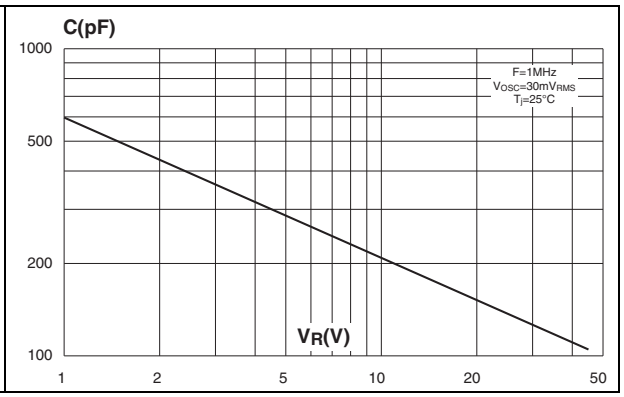



**Figure 9. Forward voltage drop versus forward current (maximum values, per diode)**

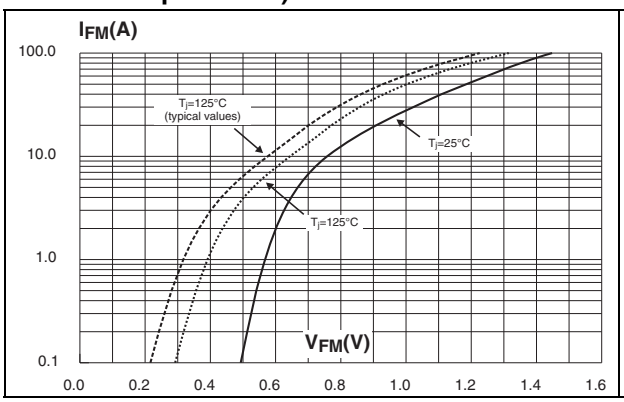
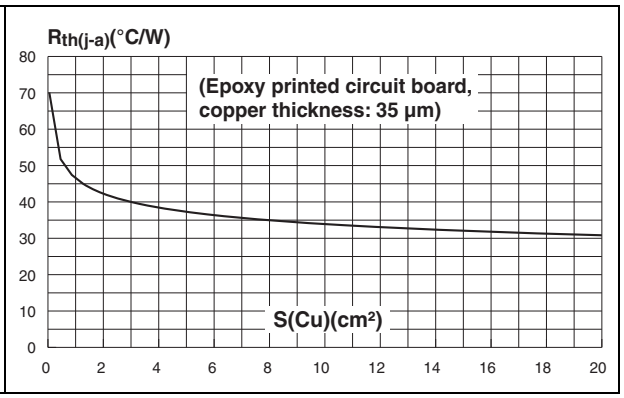



**Figure 10. Thermal resistance junction to ambient versus copper surface under tab**

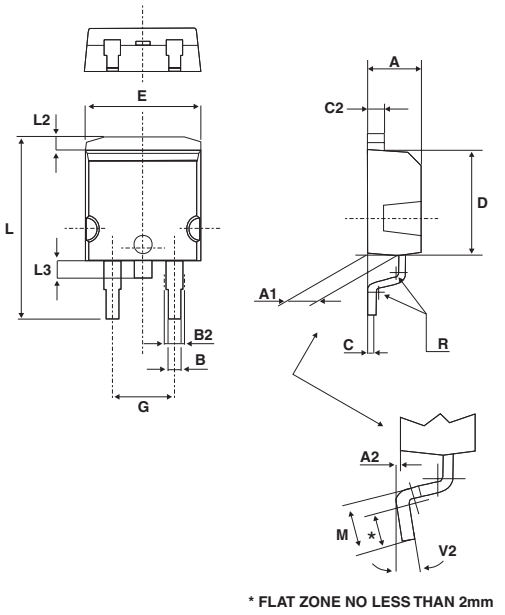


# 2 Package Information

- Epoxy meets UL94, V0
- Lead-free package

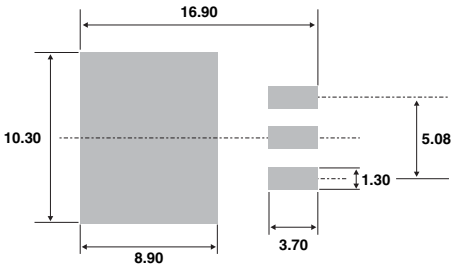
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**Figure 11. D²PAK dimensions**




| Ref | Dimensions | | | |
|---|---|---|---|---|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 4.40 | 4.60 | 0.173 | 0.181 |
| A1 | 2.49 | 2.69 | 0.098 | 0.106 |
| A2 | 0.03 | 0.23 | 0.001 | 0.009 |
| B | 0.70 | 0.93 | 0.027 | 0.037 |
| B2 | 1.14 | 1.70 | 0.045 | 0.067 |
| C | 0.45 | 0.60 | 0.017 | 0.024 |
| C2 | 1.23 | 1.36 | 0.048 | 0.054 |
| D | 8.95 | 9.35 | 0.352 | 0.368 |
| E | 10.00 | 10.40 | 0.393 | 0.409 |
| G | 4.88 | 5.28 | 0.192 | 0.208 |
| L | 15.00 | 15.85 | 0.590 | 0.624 |
| L2 | 1.27 | 1.40 | 0.050 | 0.055 |
| L3 | 1.40 | 1.75 | 0.055 | 0.069 |
| M | 2.40 | 3.20 | 0.094 | 0.126 |
| R | 0.40 typ. | | 0.016 typ. | |
| V2 | 0° | 8° | 0° | 8° |

**Figure 12. Footprint (dimensions in millimeters)**



# 3 Ordering information

**Table 5. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS1545CGY-TR | STPS1545CGY | $D^2PAK$ | 1.48 g | 1000 | Tape and reel |

# 4 Revision history

**Table 6. Document revision history**

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

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