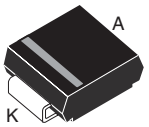
# STPS3L40-Y

## Automotive power Schottky rectifier

## Features

- Negligible switching losses
- Low thermal resistance
- Low forward voltage drop
- Avalanche capability specified
- ECOPACK®2 compliant component
- AEC-Q101 qualified




**SMC**
**STPS3L40SY**

## Description

Schottky rectifier suited for switched mode power supplies and high frequency DC to DC converters. Packaged in SMC, this device is intended for use in DC/DC chargers for automotive application.

**Table 1. Device summary**

| Symbol | Value |
|---|---|
| $I_{F(AV)}$ | 3 A |
| $V_{RRM}$ | 40 V |
| $T_j$ (max) | 150 °C |
| $V_F$(max) | 0.44 V |

# 1 Characteristics

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

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{RRM}$ | Repetitive peak reverse voltage | | 40 | V |
| $I_{F(AV)}$ | Average forward current | $T_L$ = 120 °C $\delta$ = 0.5 | 3 | A |
| $I_{FSM}$ | Surge non repetitive forward current | $t_p$ = 10 ms sinusoidal | 75 | A |
| $P_{ARM}$ | Repetitive peak avalanche power | $t_p$ = 1 µs Tj = 25 °C | 1300 | W |
| $T_{stg}$ | Storage temperature range | | -65 to + 175 | °C |
| $T_j$ | Operating junction temperature range(1) | | -40 to +150 | °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 | 18 | °C/W |

**Table 4. Static electrical characteristics**

| Symbol | Parameter | Test conditions | | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_R$(1) | Reverse leakage current | $T_j$ = 25 °C | $V_R = V_{RRM}$ | | 100 | µA |
| | | $T_j$ = 125 °C | | 16 | 40 | mA |
| $V_F$(1) | Forward voltage drop | $T_j$ = 25 °C | $I_F$ = 3 A | | 0.5 | V |
| | | $T_j$ = 125 °C | | 0.40 | 0.44 | |
| | | $T_j$ = 25 °C | $I_F$ = 6 A | | 0.62 | |
| | | $T_j$ = 125 °C | | 0.52 | 0.58 | |

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

To evaluate the conduction losses use the following equation:
$P = 0.30 \times I_{F(AV)} + 0.047\ I_F{}^2{}_{(RMS)}$

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

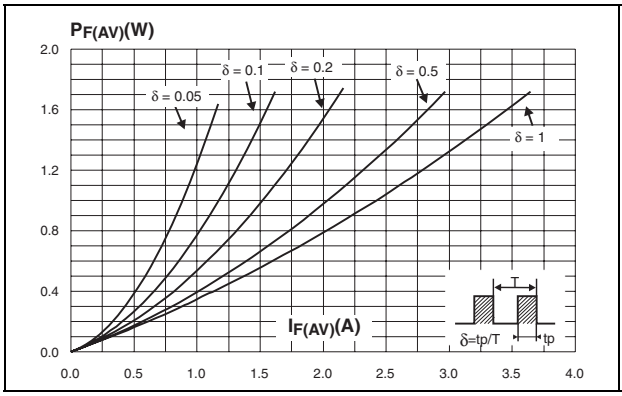



**Figure 2. Average forward current versus ambient temperature (δ = 0.5) - SMC**

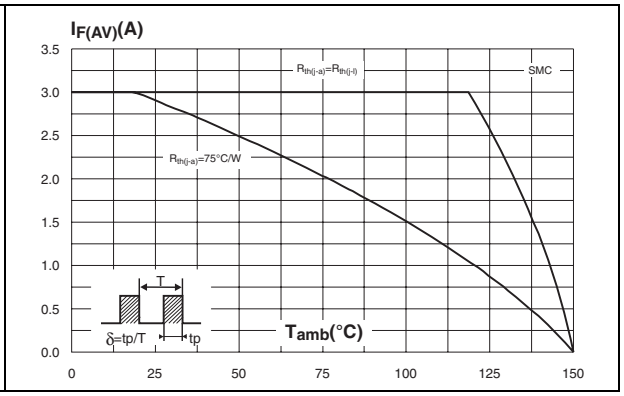



**Figure 3. Non repetitive surge peak forward current versus overload duration (maximum values)**

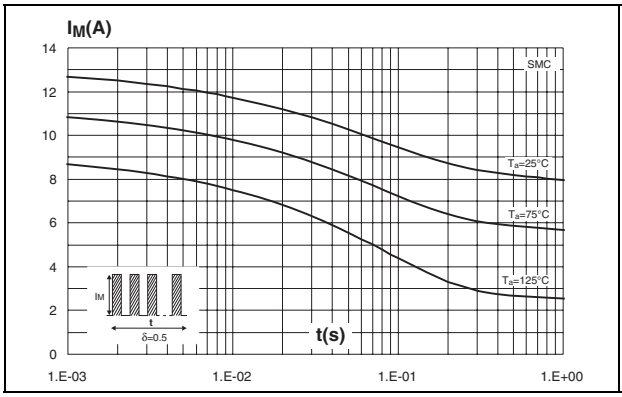



**Figure 4. Normalized avalanche power derating versus pulse duration**

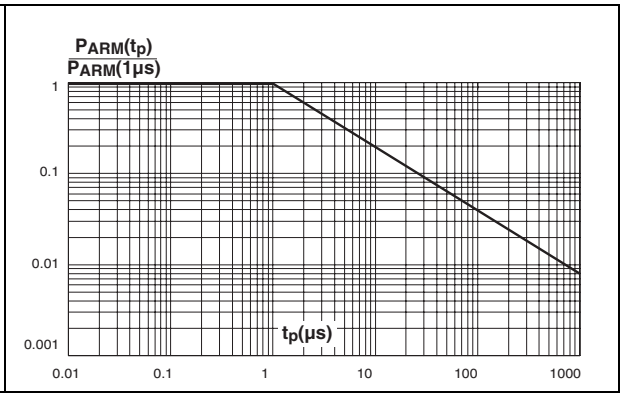



**Figure 5. Normalized avalanche power derating versus junction temperature**

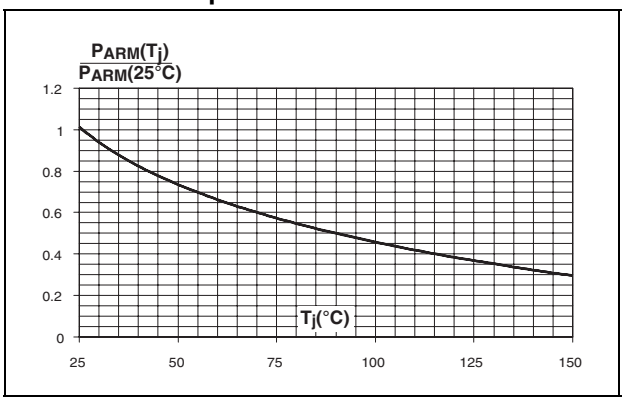



**Figure 6. Relative variation of thermal impedance junction to ambient versus pulse duration**

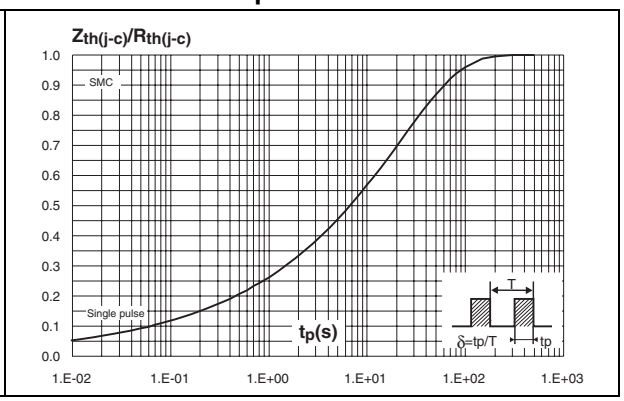


**Figure 7. Reverse leakage current versus reverse voltage applied (typical values)**

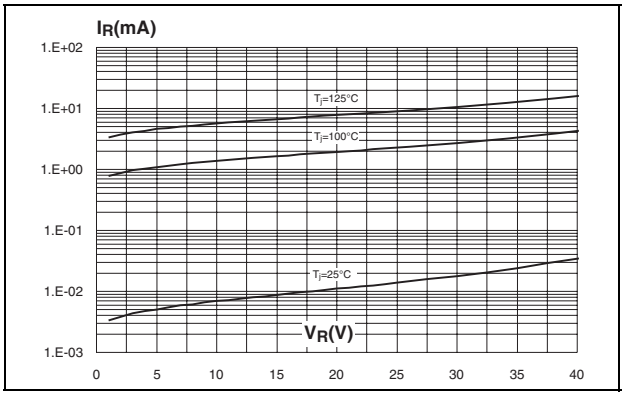



**Figure 8. Junction capacitance versus reverse voltage applied (typical values)**

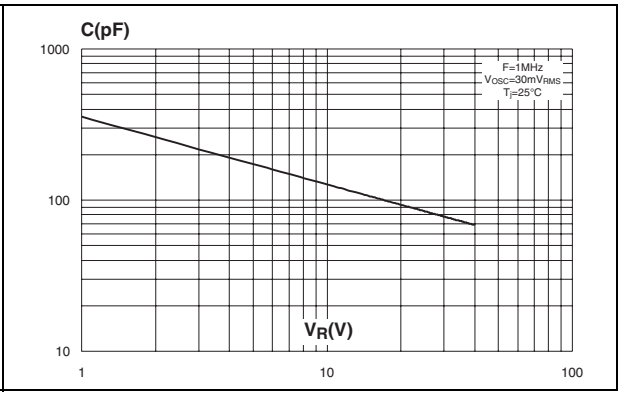



**Figure 9. Forward voltage drop versus forward current**

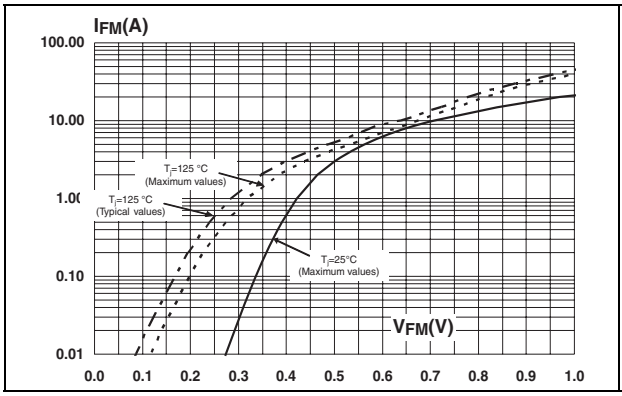
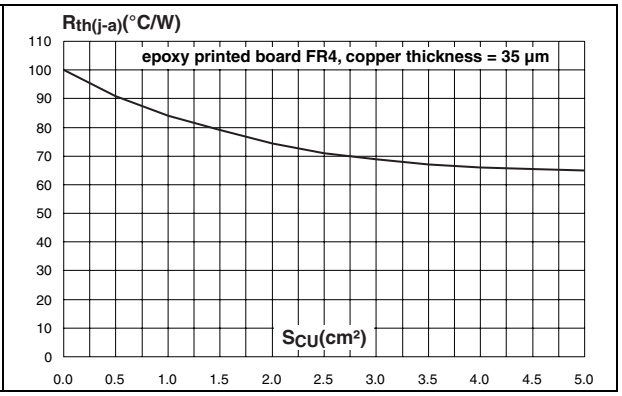



**Figure 10. Thermal resistance junction to ambient versus copper surface under each lead**

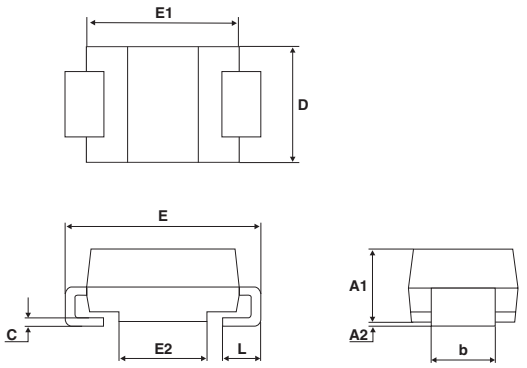


# 2 Package information

- Epoxy meets UL94,V0
- Lead-free packages

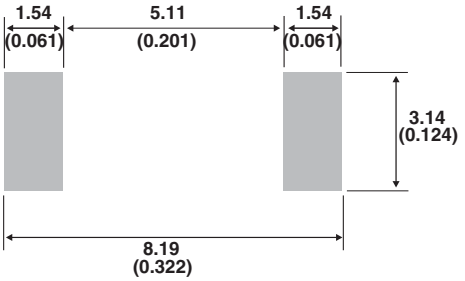
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: www.st.com. ECOPACK® is an ST trademark.

**Table 5. SMC package 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 | 2.90 | 3.2 | 0.114 | 0.126 |
| c | 0.15 | 0.40 | 0.006 | 0.016 |
| D | 5.55 | 6.25 | 0.218 | 0.246 |
| E | 7.75 | 8.15 | 0.305 | 0.321 |
| E1 | 6.60 | 7.15 | 0.260 | 0.281 |
| E2 | 4.40 | 4.70 | 0.173 | 0.185 |
| L | 0.75 | 1.40 | 0.030 | 0.063 |

**Figure 11. SMC footprint dimensions in mm (inches)**



# 3 Ordering information

**Table 6. Ordering information**

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---|---|---|---|---|---|
| STPS3L40SY | S3L4Y | SMC | 0.24 g | 2500 | Tape and reel |

# 4 Revision history

**Table 7. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 10-Mar-2011 | 1 | First issue. |

**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**