



STPS1L40A/U

LOW DROP POWER SCHOTTKY RECTIFIER

MAIN PRODUCT CHARACTERISTICS

| | |
|-------------------|--------|
| $I_{F(AV)}$ | 1 A |
| V_{RRM} | 40 V |
| $T_j(\text{max})$ | 150 °C |
| $V_F(\text{max})$ | 0.42 V |

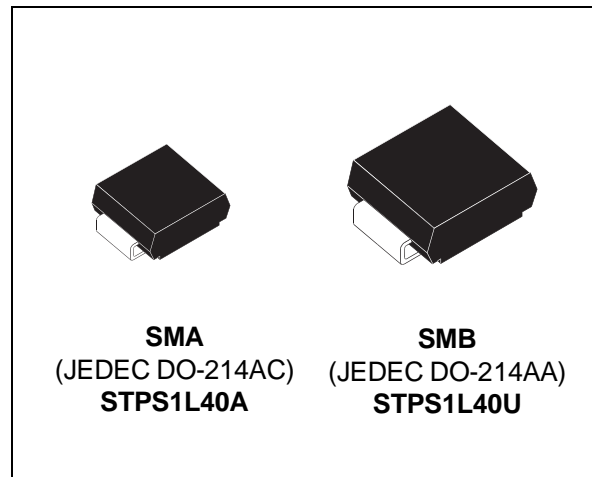
FEATURES AND BENEFITS

- VERY SMALL CONDUCTION LOSSES
- NEGLIGIBLE SWITCHING LOSSES
- LOW FORWARD VOLTAGE DROP
- SURFACE MOUNT MINIATURE PACKAGE

DESCRIPTION

Single chip Schottky rectifiers suited to Switched Mode Power Supplies and high frequency DC to DC converters.

Packaged in SMA and SMB, this device is especially intended for surface mounting and used in low voltage, high frequency inverters, free wheeling and polarity protection applications.



ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | Value | Unit |
|--------------|--|--|------------------|
| V_{RRM} | Repetitive peak reverse voltage | 40 | V |
| $I_{F(RMS)}$ | RMS forward current | 8 | A |
| $I_{F(AV)}$ | Average forward current | $T_L = 130^\circ\text{C} \delta = 0.5$ 1 | A |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10 \text{ ms}$ Sinusoidal | 60 A |
| I_{RRM} | Repetitive peak reverse current | $t_p = 2 \mu\text{s}$ square $F=1\text{kHz}$ | 1 A |
| I_{RSM} | Non repetitive peak reverse current | $t_p = 100 \mu\text{s}$ square | 1 A |
| T_{stg} | Storage temperature range | - 65 to + 150 | °C |
| T_j | Maximum operating junction temperature * | 150 | °C |
| dV/dt | Critical rate of rise of reverse voltage | 10000 | V/ μs |

* : $\frac{dP_{tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$ thermal runaway condition for a diode on its own heatsink

STPS1L40A/U

THERMAL RESISTANCES

| Symbol | Parameter | | Value | Unit |
|---------------|------------------|-----|-------|-----------------------------|
| $R_{th(j-l)}$ | Junction to lead | SMA | 30 | $^{\circ}\text{C}/\text{W}$ |
| | | SMB | 25 | |

STATIC ELECTRICAL CHARACTERISTICS

| Symbol | Tests Conditions | Tests Conditions | Min. | Typ. | Max. | Unit |
|---------|-------------------------|-----------------------------|---------------------|------|------|---------------|
| I_R^* | Reverse leakage current | $T_j = 25^{\circ}\text{C}$ | $V_R = 40\text{ V}$ | | 35 | μA |
| | | $T_j = 125^{\circ}\text{C}$ | | 6 | 10 | mA |
| V_F^* | Forward voltage drop | $T_j = 25^{\circ}\text{C}$ | $I_F = 1\text{ A}$ | | 0.5 | V |
| | | $T_j = 125^{\circ}\text{C}$ | | 0.37 | 0.42 | |
| | | $T_j = 25^{\circ}\text{C}$ | $I_F = 2\text{ A}$ | | 0.63 | |
| | | $T_j = 125^{\circ}\text{C}$ | | 0.5 | 0.61 | |

Pulse test : * $t_p = 380\ \mu\text{s}$, $\delta < 2\%$

To evaluate the maximum conduction losses use the following equation :

$$P = 0.23 \times I_{F(AV)} + 0.19 I_{F(RMS)}^2$$

Fig. 1: Average forward power dissipation versus average forward current.

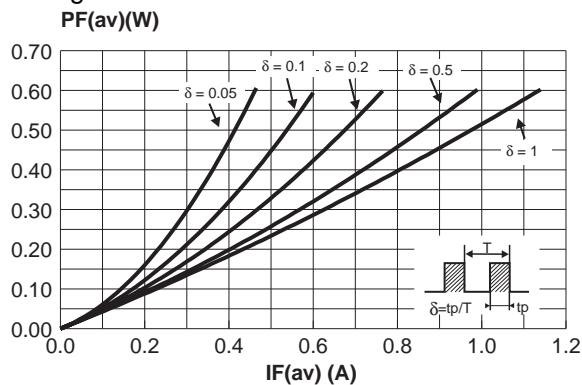


Fig. 3-1: Non repetitive surge peak forward current versus overload duration (maximum values) (SMB).

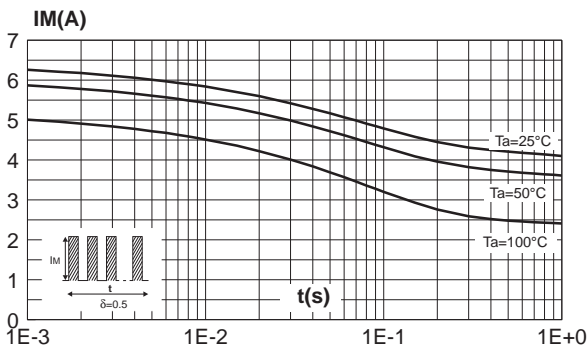


Fig. 2: Average forward current versus ambient temperature ($\delta=0.5$).

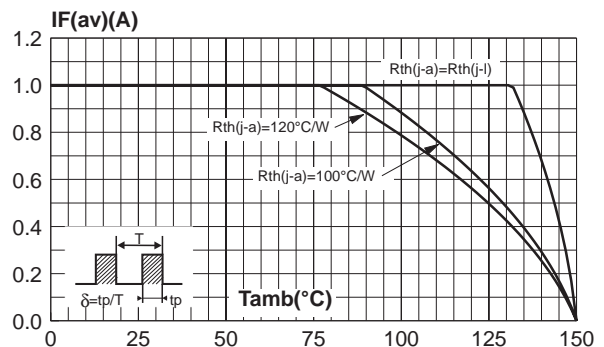


Fig. 3-2: Non repetitive surge peak forward current versus overload duration (maximum values) (SMA).

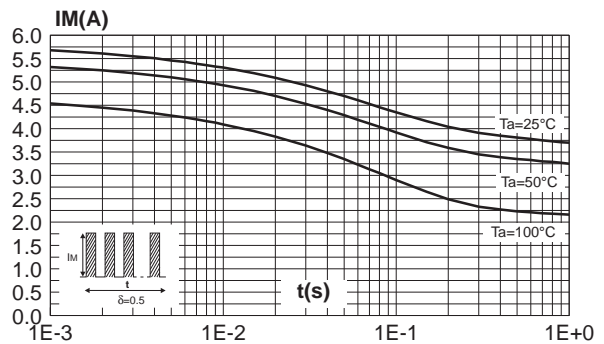


Fig. 4-1: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, $e(\text{Cu})=35\mu\text{m}$, recommended pad layout) (SMB).

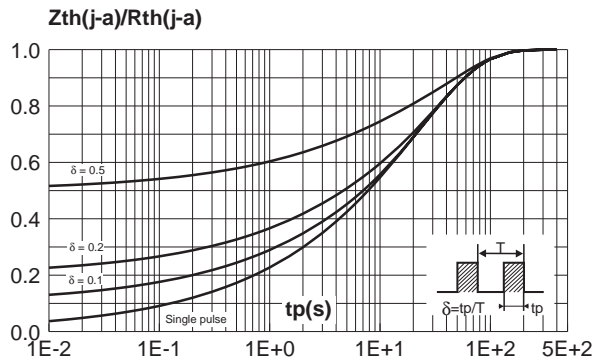


Fig. 4-2: Relative variation of thermal impedance junction to ambient versus pulse duration (epoxy printed circuit board, $e(\text{Cu})=35\mu\text{m}$, recommended pad layout) (SMA).

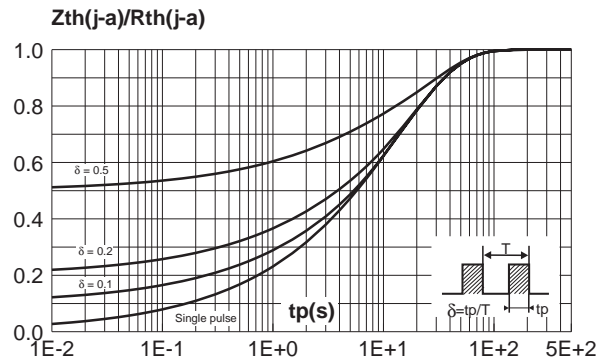


Fig. 5: Reverse leakage current versus reverse voltage applied (typical values).

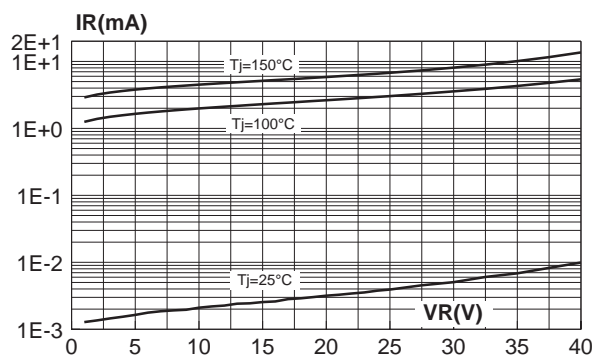


Fig. 6: Junction capacitance versus reverse voltage applied (typical values).

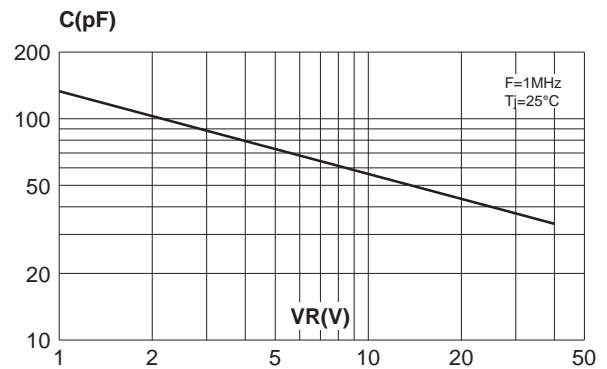


Fig. 7-1: Forward voltage drop versus forward current (typical values, high level).

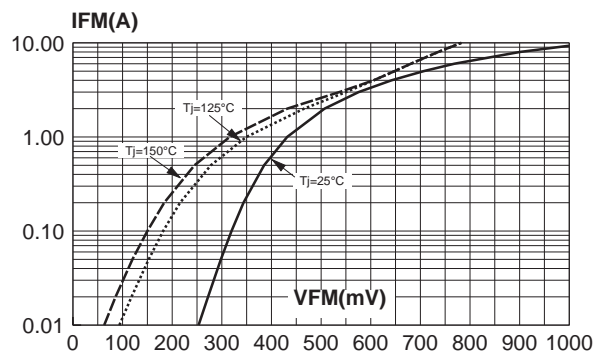
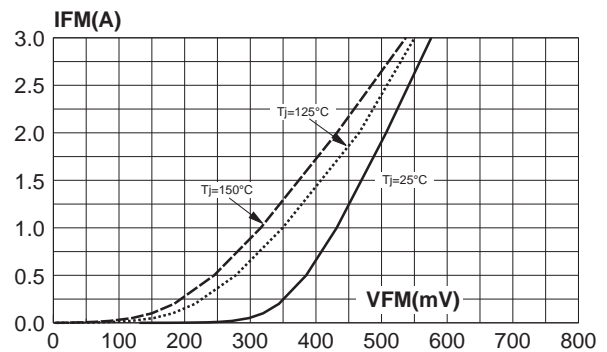


Fig. 7-2: Forward voltage drop versus forward current (typical values, low level).



STPS1L40A/U

Fig. 8-1: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness $e(\text{Cu})=35\mu\text{m}$) (SMB).

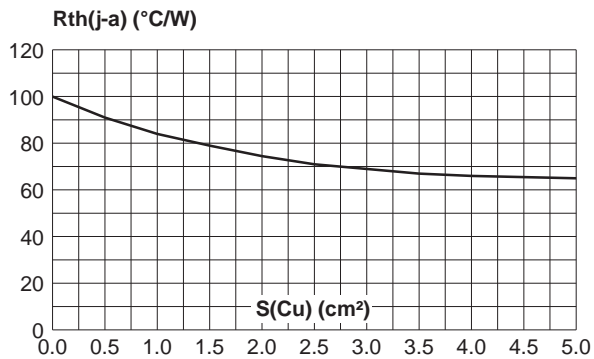
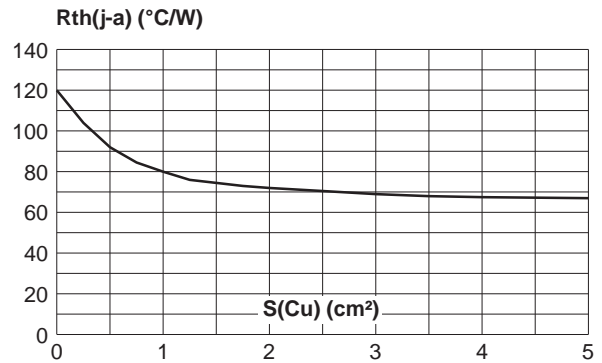
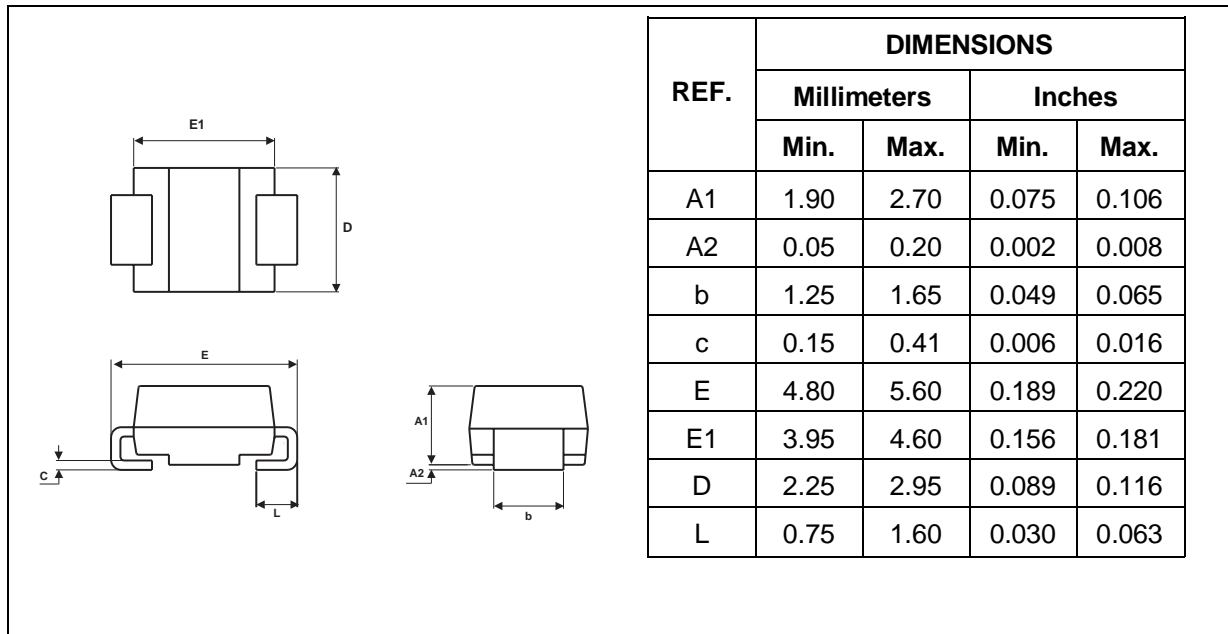


Fig. 8-2: Thermal resistance junction to ambient versus copper surface under each lead (Epoxy printed circuit board FR4, copper thickness $e(\text{Cu})=35\mu\text{m}$) (SMA).

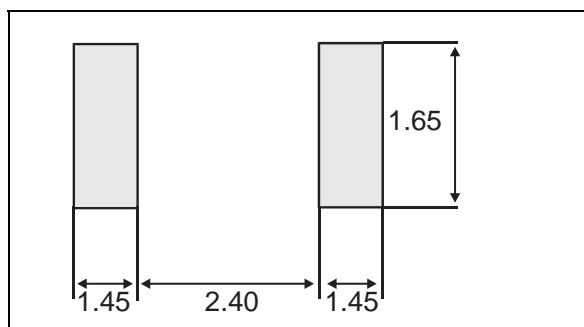


PACKAGE MECHANICAL DATA

SMA

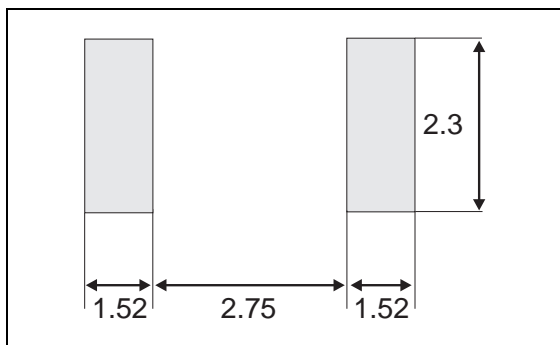


FOOT PRINT DIMENSIONS (in millimeters)



PACKAGE MECHANICAL DATA
SMB

| | DIMENSIONS | | | | |
|----|------------|-------------|-------|--------|-------|
| | REF. | 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 | 1.95 | 2.20 | 0.077 | 0.087 | |
| c | 0.15 | 0.41 | 0.006 | 0.016 | |
| E | 5.10 | 5.60 | 0.201 | 0.220 | |
| E1 | 4.05 | 4.60 | 0.159 | 0.181 | |
| D | 3.30 | 3.95 | 0.130 | 0.156 | |
| L | 0.75 | 1.60 | 0.030 | 0.063 | |

FOOT PRINT DIMENSIONS (in millimeters)


| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|--------|----------|---------------|
| STPS1L40U | GC4 | SMB | 0.107g | 2500 | Tape & reel |
| STPS1L40A | GB4 | SMA | 0.068g | 5000 | Tape & reel |

- Band indicates cathode
- Epoxy meets UL94,V0

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1999 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia
 Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>