

### Main product characteristics

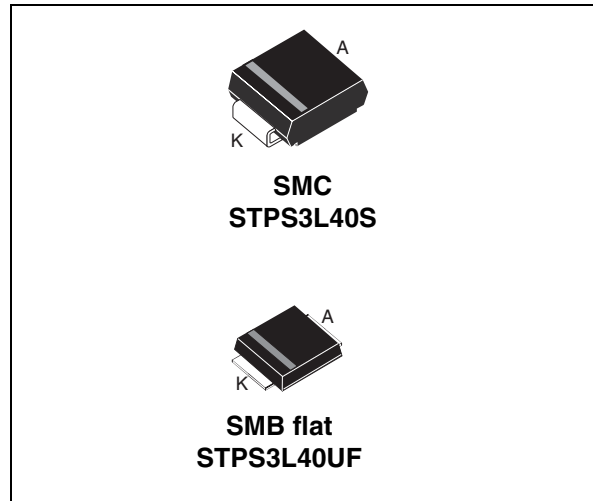
|             |        |
|-------------|--------|
| $I_{F(AV)}$ | 3 A    |
| $V_{RRM}$   | 40 V   |
| $T_j$ (max) | 150° C |
| $V_F$ (max) | 0.44 V |

### Features and Benefits

- Negligible switching losses
- Low thermal resistance
- Low forward voltage drop
- Avalanche capability specified

### Description

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



### Order codes

| Part Number | Marking |
|-------------|---------|
| STPS3L40S   | S3L4    |
| STPS3L40UF  | FS3L4   |

**Table 1. Absolute Ratings (limiting values)**

| Symbol      | Parameter                                     |          |                                                | Value        | Unit |
|-------------|-----------------------------------------------|----------|------------------------------------------------|--------------|------|
| $V_{RRM}$   | Repetitive peak reverse voltage               |          |                                                | 40           | V    |
| $I_{F(AV)}$ | Average forward current                       | SMC      | $T_L = 120^\circ \text{C } \delta = 0.5$       | 3            | A    |
|             |                                               | SMB flat | $T_L = 130^\circ \text{C } \delta = 0.5$       |              |      |
| $I_{FSM}$   | Surge non repetitive forward current          |          | $t_p = 10 \text{ ms sinusoidal}$               | 75           | A    |
| $P_{ARM}$   | Repetitive peak avalanche power               |          | $t_p = 1 \mu\text{s } T_j = 25^\circ \text{C}$ | 1300         | W    |
| $T_{stg}$   | Storage temperature range                     |          |                                                | -65 to + 175 | °C   |
| $T_j$       | Operating junction temperature <sup>(1)</sup> |          |                                                | 150          | °C   |

1.  $\frac{dP_{Tot}}{dT_j} < \frac{1}{R_{th(j-a)}}$  condition to avoid thermal runaway for a diode on its own heatsink

# 1 Characteristics

**Table 2. Thermal resistance**

| Symbol        | Parameter        |          | Value | Unit                 |
|---------------|------------------|----------|-------|----------------------|
| $R_{th(j-l)}$ | Junction to lead | SMC      | 18    | $^{\circ}\text{C/W}$ |
|               |                  | SMB flat | 10    |                      |

**Table 3. Static electrical characteristics**

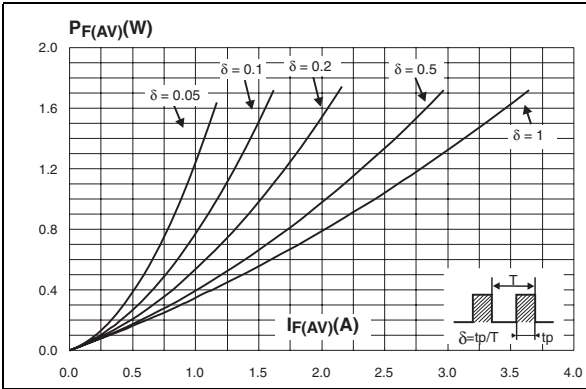
| Symbol      | Parameter               | Test Conditions             |                   | Typ. | Max. | Unit          |
|-------------|-------------------------|-----------------------------|-------------------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_J = 25^{\circ}\text{C}$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

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

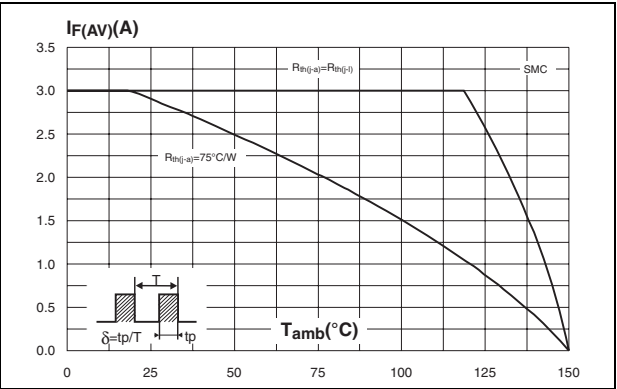
To evaluate the conduction losses use the following equation:

$$P = 0.30 \times I_{F(AV)} + 0.047 I_{F(RMS)}^2$$

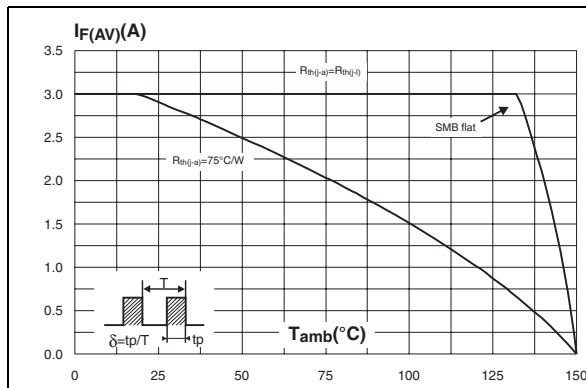
**Figure 1. Average forward power dissipation versus average forward current**



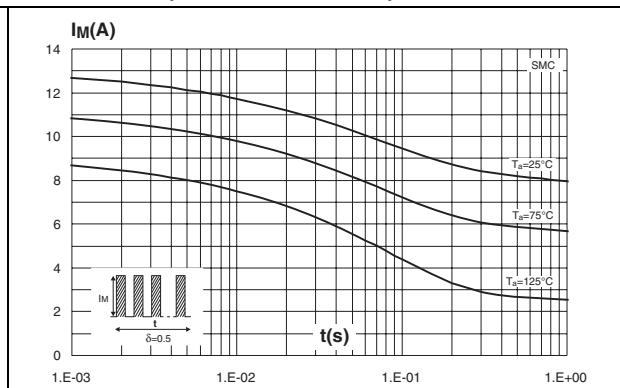
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ ) - SMC**



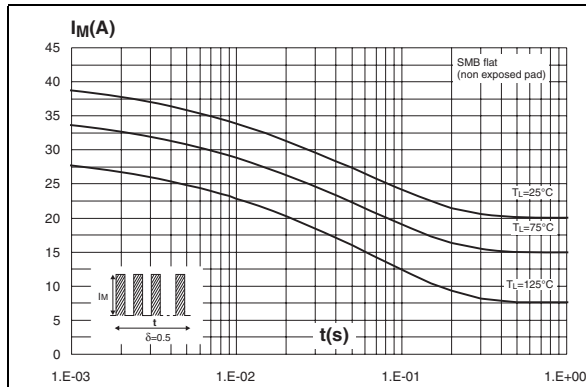
**Figure 3. Average forward current versus ambient temperature ( $\delta = 0.5$ ) SMB flat**



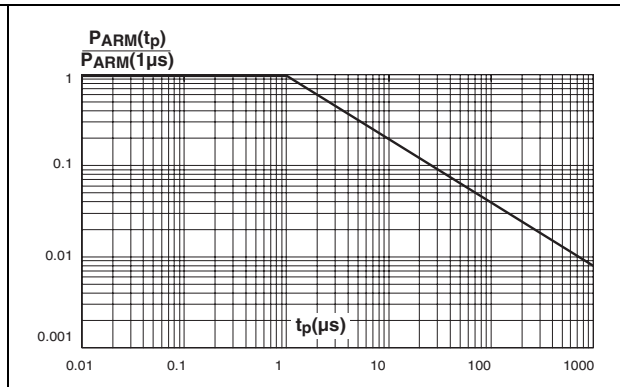
**Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values) SMC**



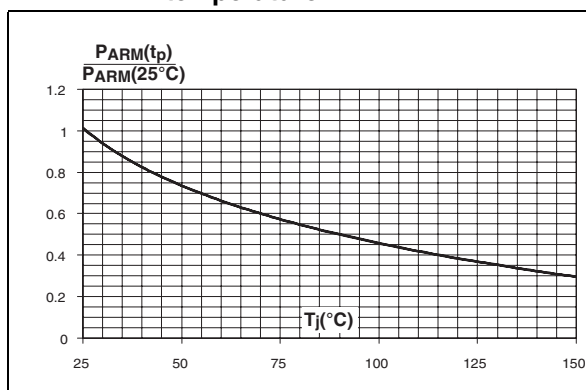
**Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) SMB flat**



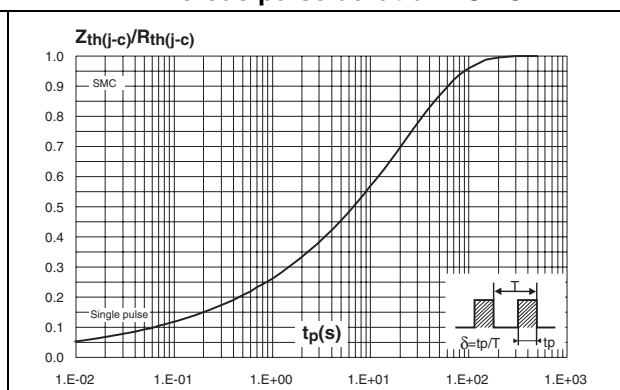
**Figure 6. Normalized avalanche power derating versus pulse duration**



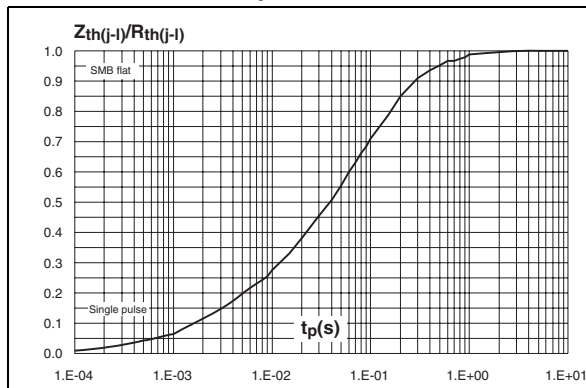
**Figure 7. Normalized avalanche power derating versus junction temperature**



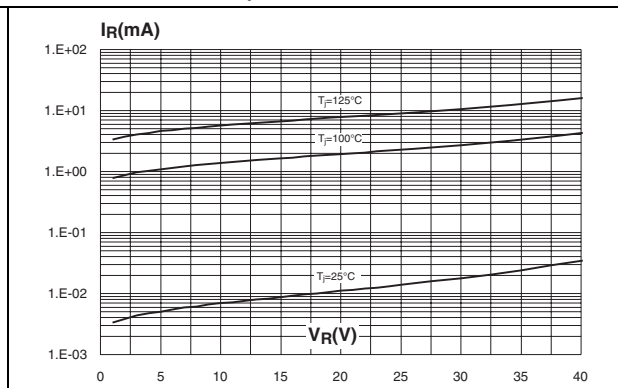
**Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - SMC**



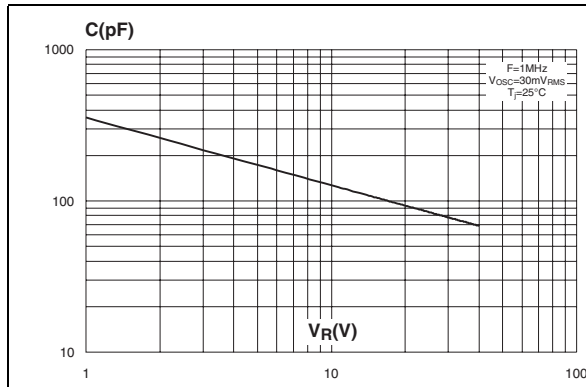
**Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration - SMB flat**



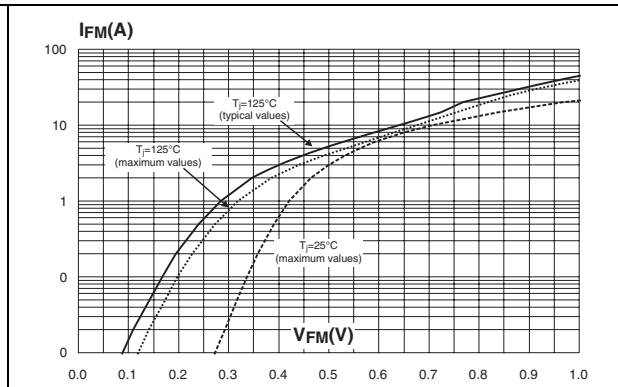
**Figure 10. Reverse leakage current versus reverse voltage applied (typical values)**



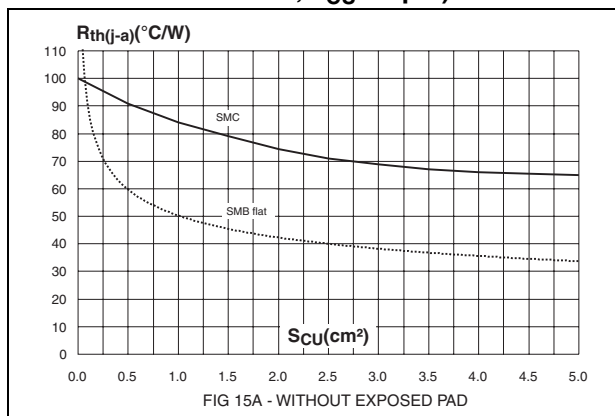
**Figure 11. Junction capacitance versus reverse voltage applied (typical values)**



**Figure 12. Forward voltage drop versus forward current**



**Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, eCU=35μm)**



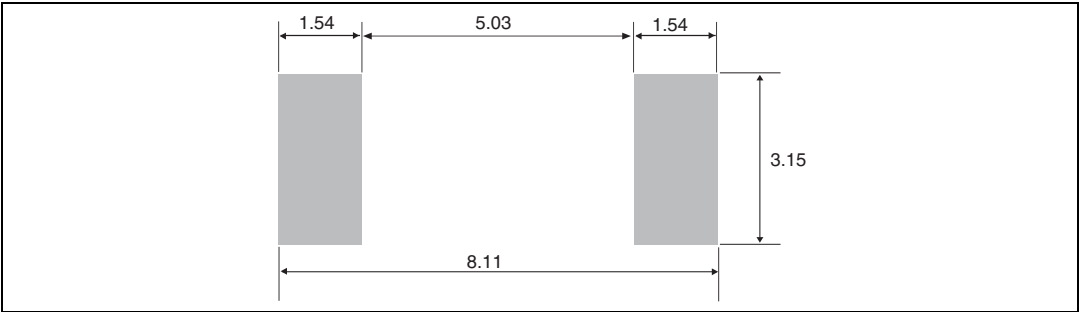
## 2 Package Information

- Epoxy meets UL94,V0

Table 4. SMC package mechanical data

| Ref | Dimensions  |      |        |       |
|-----|-------------|------|--------|-------|
|     | Millimeters |      | Inches |       |
|     | Min.        | Max. | Min.   | Max.  |
| A   | 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        | 0.41 | 0.006  | 0.016 |
| 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 |
| D   | 5.55        | 6.25 | 0.218  | 0.246 |
| L   | 0.75        | 1.40 | 0.030  | 0.063 |

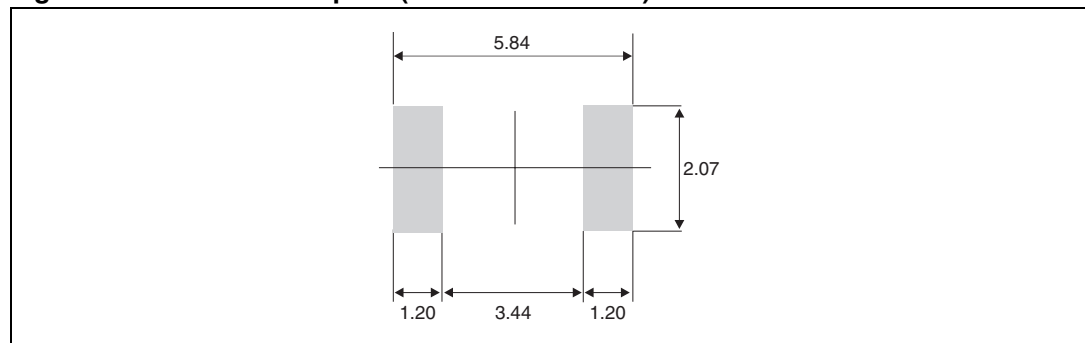
Figure 14. SMC footprint (dimensions in mm)



**Table 5. SMB Flat dimensions**

| Ref.             | Dimensions  |      |      |        |       |       |
|------------------|-------------|------|------|--------|-------|-------|
|                  | Millimeters |      |      | Inches |       |       |
|                  | Min.        | Typ. | Max. | Min.   | Typ.  | Max.  |
| A                | 0.90        |      | 1.10 | 0.035  |       | 0.043 |
| b <sup>(1)</sup> | 1.95        |      | 2.20 | 0.077  |       | 0.087 |
| c <sup>(1)</sup> | 0.15        |      | 0.40 | 0.006  |       | 0.016 |
| D                | 3.30        |      | 3.95 | 0.130  |       | 0.156 |
| E                | 5.10        |      | 5.60 | 0.200  |       | 0.220 |
| E1               | 4.05        |      | 4.60 | 0.189  |       | 0.181 |
| L                | 0.75        |      | 1.50 | 0.029  |       | 0.059 |
| L1               |             | 0.40 |      |        | 0.016 |       |
| L2               |             | 0.60 |      |        | 0.024 |       |

1. Applies to plated leads

**Figure 15. SMB Flat footprint (dimensions in mm)**

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

### 3 Ordering information

| Ordering type | Marking | Package  | Weight | Base qty | Delivery mode |
|---------------|---------|----------|--------|----------|---------------|
| STPS3L40S     | S3L4    | SMC      | 0.24 g | 2500     | Tape and reel |
| STPS3L40UF    | FS3L4   | SMB flat | 0.50 g | 5000     | Tape and reel |

### 4 Revision history

| Date        | Revision | Description of Changes                                                            |
|-------------|----------|-----------------------------------------------------------------------------------|
| Jul-2003    | 2A       | Last update.                                                                      |
| 08-Feb-2007 | 3        | Reformatted to current standard. Added ECOPACK statement. Added SMB flat package. |

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