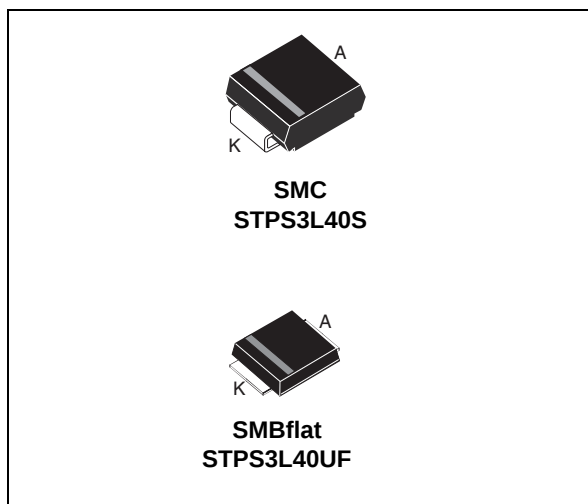




### Description

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

**Table 1. Device summary**

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

### Features

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

# 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                       | SMC     | $T_L = 120\text{ °C } \delta = 0.5$              | 3            | A    |
|             |                                               | SMBflat | $T_L = 130\text{ °C } \delta = 0.5$              |              |      |
| $I_{FSM}$   | Surge non repetitive forward current          |         | $t_p = 10\text{ ms sinusoidal}$                  | 75           | A    |
| $P_{ARM}$   | Repetitive peak avalanche power               |         | $t_p = 1\text{ }\mu\text{s } T_J = 25\text{ °C}$ | 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

**Table 3. Thermal resistance**

| Symbol        | Parameter        |         | Value | Unit |
|---------------|------------------|---------|-------|------|
| $R_{th(j-l)}$ | Junction to lead | SMC     | 18    | °C/W |
|               |                  | SMBflat | 10    |      |

**Table 4. Static electrical characteristics**

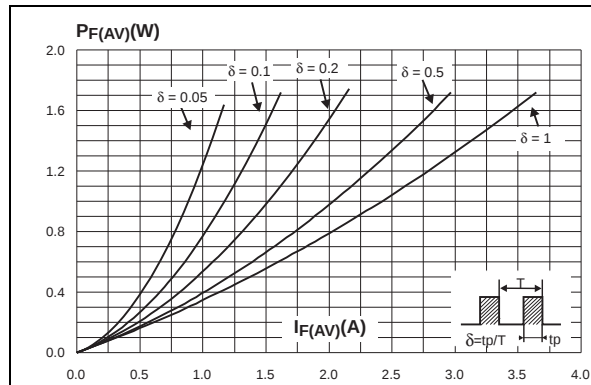
| Symbol      | Parameter               | Test conditions       |                    | Typ. | Max. | Unit          |
|-------------|-------------------------|-----------------------|--------------------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_J = 25\text{ °C}$  | $V_R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

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

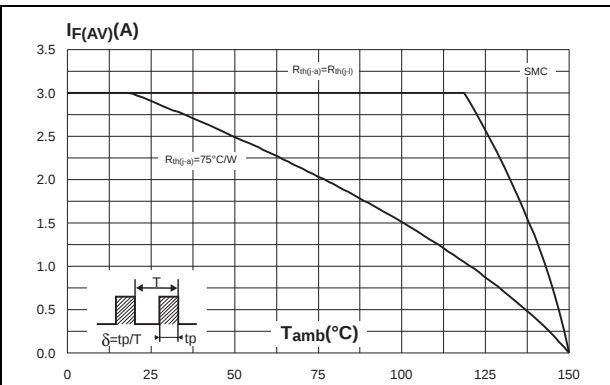
To evaluate the conduction losses use the following equation:

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

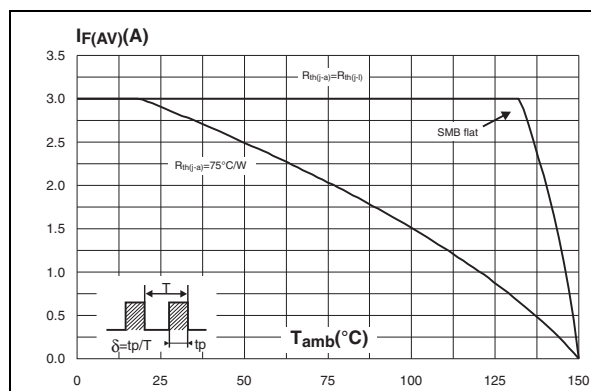
**Figure 1. Average forward power dissipation versus average forward current**



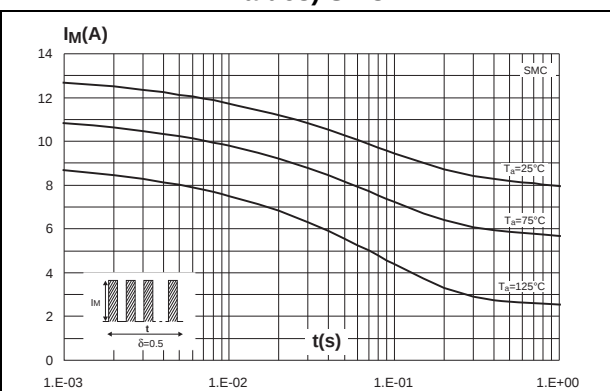
**Figure 2. Average forward current versus ambient temperature ( $\delta = 0.5$ ) - SMC**



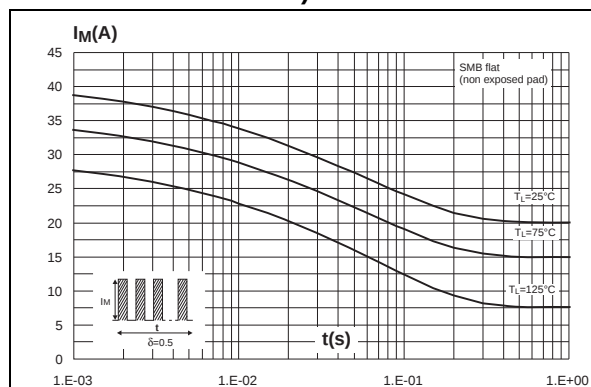
**Figure 3. Average forward current versus ambient temperature ( $\delta = 0.5$ ) SMBflat**



**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) SMBflat**



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

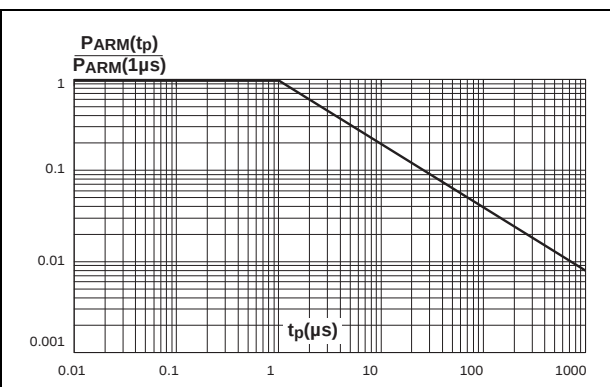


Figure 7. Normalized avalanche power derating versus junction temperature

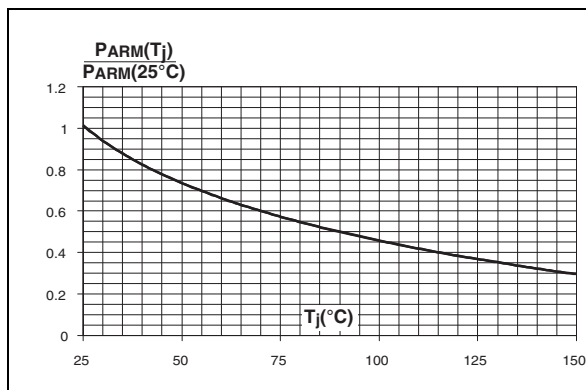


Figure 8. Relative variation of thermal impedance junction to ambient versus pulse duration - SMC

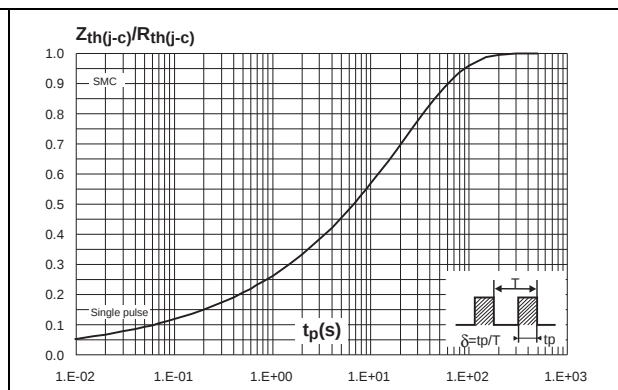


Figure 9. Relative variation of thermal impedance junction to lead versus pulse duration - SMBflat

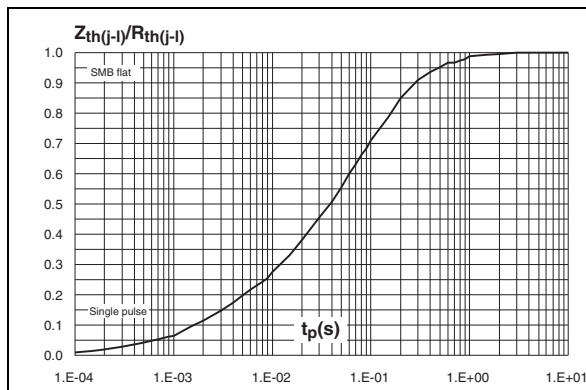


Figure 10. Reverse leakage current versus reverse voltage applied (typical values)

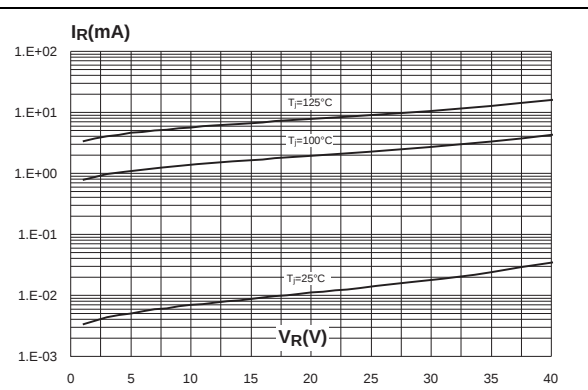


Figure 11. Junction capacitance versus reverse voltage applied (typical values)

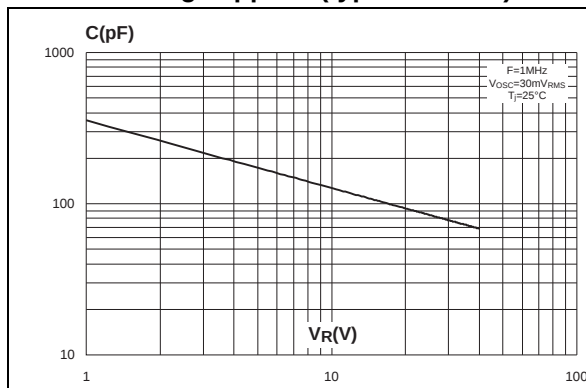


Figure 12. Forward voltage drop versus forward current

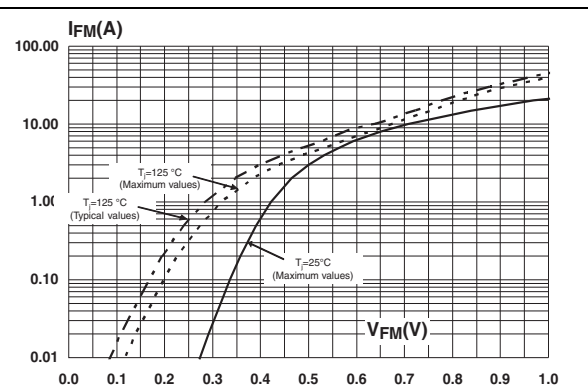
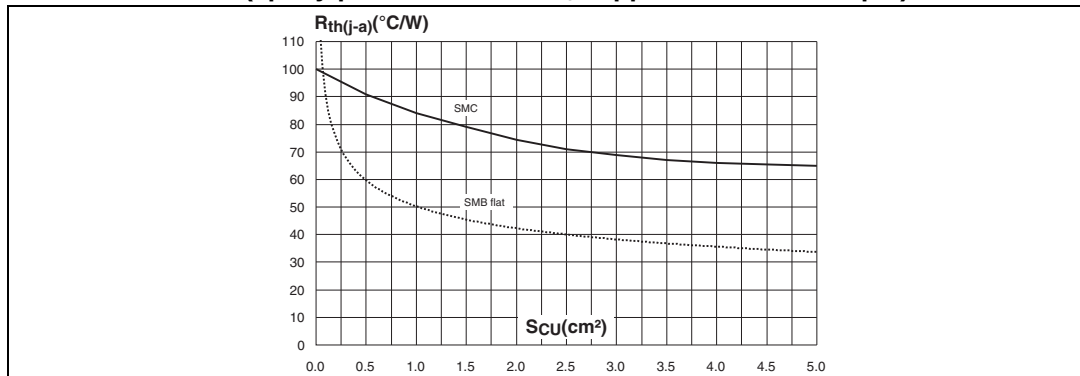


Figure 13. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, copper thickness = 35 $\mu$ m)



# 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](http://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 14. SMC footprint dimensions in mm (inches)

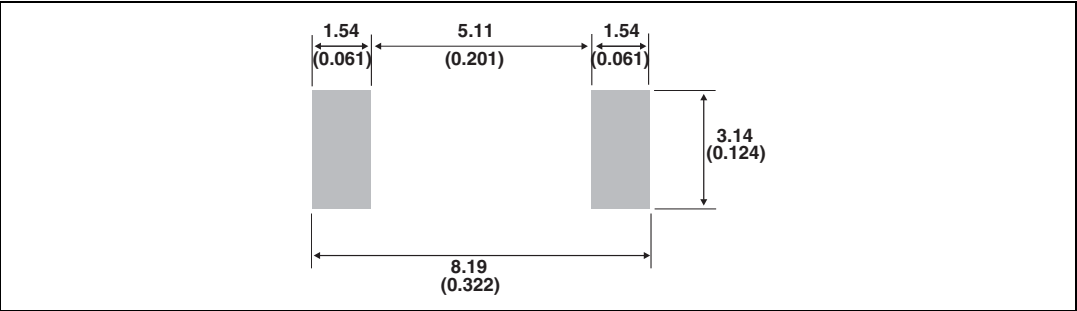
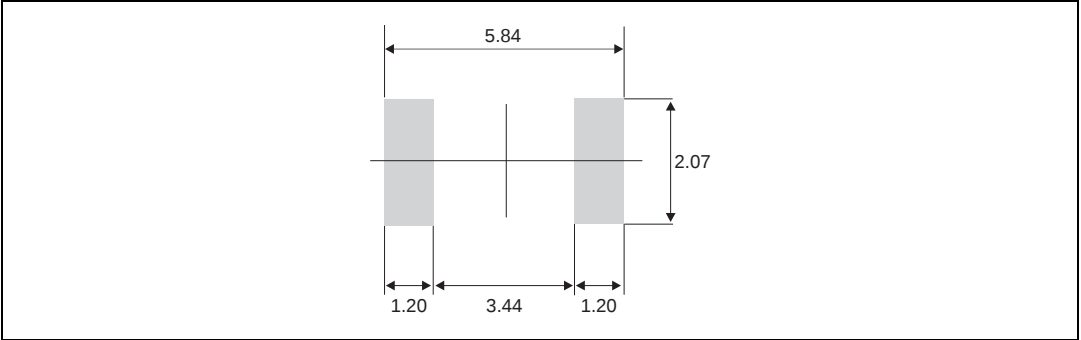


Table 6. SMBflat dimensions

| 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. SMBflat footprint (dimensions in mm)



### 3 Ordering information

Table 7. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|---------|--------|----------|---------------|
| STPS3L40S  | S3L4    | SMC     | 0.24 g | 2500     | Tape and reel |
| STPS3L40UF | FS3L4   | SMBflat | 0.05 g | 5000     | Tape and reel |

### 4 Revision history

Table 8. Document revision history

| Date        | Revision | Description of changes                                                                                             |
|-------------|----------|--------------------------------------------------------------------------------------------------------------------|
| Jul-2003    | 2A       | Last update.                                                                                                       |
| 08-Feb-2007 | 3        | Reformatted to current standard. Added ECOPACK statement. Added SMBflat package.                                   |
| 20-May-2013 | 4        | Updated SMC package information. Updated ECOPACK statement. Corrected Y axis labels of <a href="#">Figure 12</a> . |

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