

Main product characteristics

| | |
|-------------|--------|
| $I_{F(AV)}$ | 3 A |
| V_{RRM} | 40 V |
| T_j (max) | 150° C |
| V_F (max) | 0.57 V |

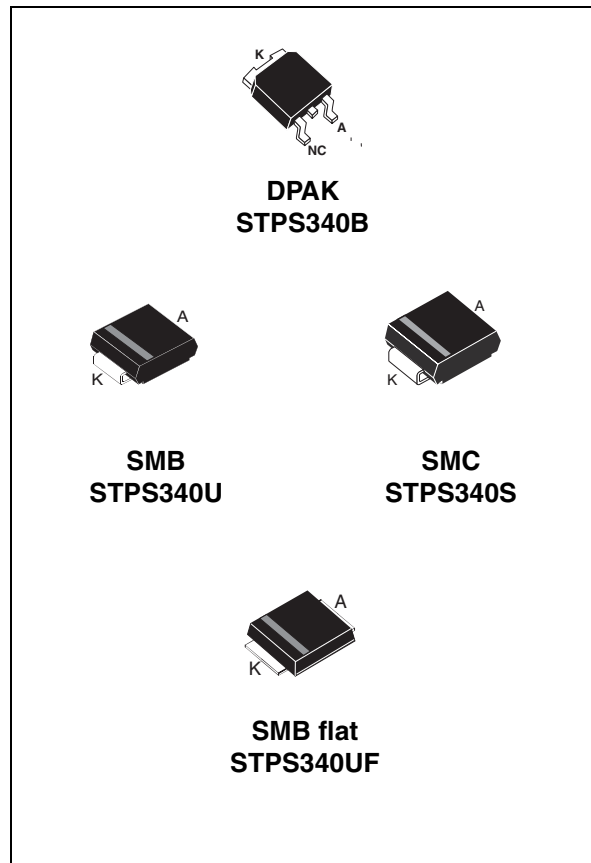
Features and Benefits

- Very small conduction losses
- Negligible switching losses
- Low forward voltage drop
- Low thermal resistance
- Extremely fast switching
- Surface mounted device
- Avalanche capability specified

Description

Single chip Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in DPAK, SMC, SMB, and low profile SMB, this device is intended for use in low and medium voltage operation, high frequency inverters, free wheeling and polarity protection applications where low switching losses are required.



Order codes

| Part Number | Marking |
|-------------|---------|
| STPS340U | U34 |
| STPS340S | S34 |
| STPS340B | S340 |
| STPS340B-TR | S340 |
| STPS340UF | FU34 |

1 Characteristics

Table 1. Absolute Ratings (limiting values)

| Symbol | Parameter | | Value | Unit | |
|---------------------|---|--|--------------|------|---|
| V _{RRM} | Repetitive peak reverse voltage | | 40 | V | |
| I _{F(RMS)} | RMS forward current | | 6 | A | |
| I _{F(AV)} | Average forward current | T _c = 135° C δ = 0.5 | DPAK | 3 | A |
| | | T _L = 105° C δ = 0.5 | SMB/SMC | | |
| | | T _L = 115° C δ = 0.5 | SMB flat | | |
| I _{FSM} | Surge non repetitive forward current | t _p = 10 ms sinusoidal | 75 | A | |
| P _{ARM} | Repetitive peak avalanche power | t _p = 1 μs T _j = 25° C | 1300 | W | |
| T _{stg} | Storage temperature range | | -65 to + 150 | °C | |
| T _j | Operating junction temperature ⁽¹⁾ | | 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 2. Thermal resistance

| Symbol | Parameter | | Value | Unit |
|----------------------|------------------|----------|-------|------|
| R _{th(j-l)} | Junction to lead | SMB | 25 | °C/W |
| | | SMB flat | 15 | |
| | | SMC | 20 | |
| R _{th(j-c)} | Junction to case | DPAK | 5.5 | °C/W |

Table 3. Static electrical characteristics

| Symbol | Parameter | Test Conditions | | Min. | Typ. | Max. | Unit |
|-------------------------------|-------------------------|-------------------------|-----------------------------------|------|------|------|------|
| I _R ⁽¹⁾ | Reverse leakage current | T _j = 25° C | V _R = V _{RRM} | | | 20 | μA |
| | | T _j = 125° C | | | 2 | 10 | mA |
| V _F ⁽¹⁾ | Forward voltage drop | T _j = 25° C | I _F = 3 A | | | 0.63 | V |
| | | T _j = 125° C | | | 0.52 | 0.57 | |
| | | T _j = 25° C | I _F = 6 A | | | 0.84 | |
| | | T _j = 125° C | | | 0.63 | 0.72 | |

1. Pulse test: t_p = 380 μs, δ < 2%

To evaluate the conduction losses use the following equation:

$$P = 0.42 \times I_{F(AV)} + 0.050 I_{F(RMS)}^2$$

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

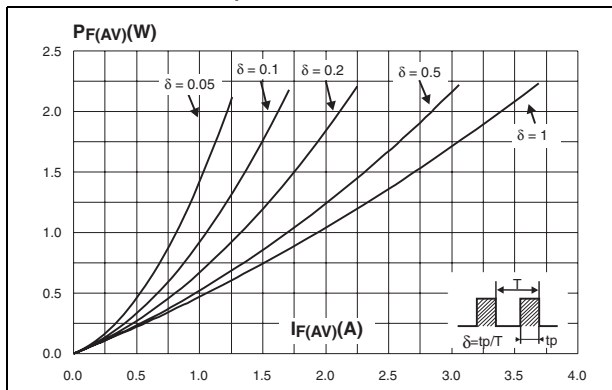


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$, per diode) (DPAK / SMB / SMC)

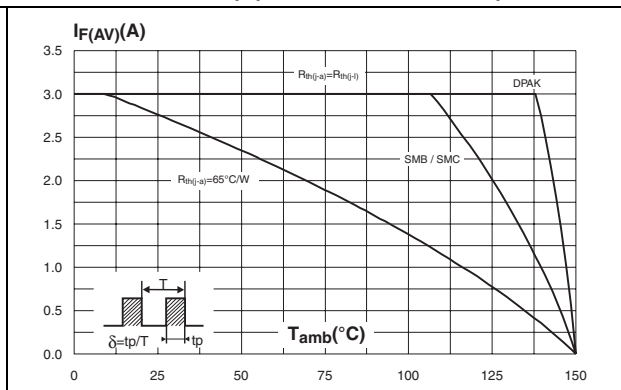


Figure 3. Average forward current versus ambient temperature ($\delta = 0.5$, per diode) (SMB flat)

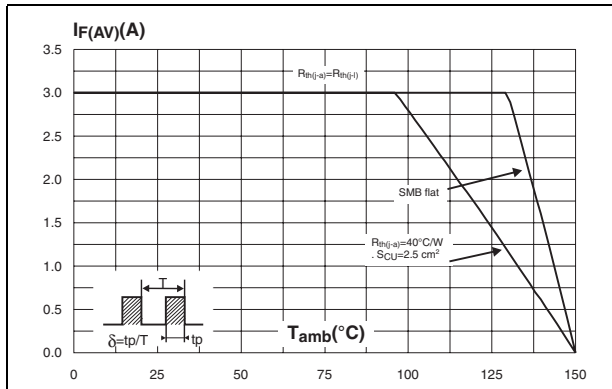


Figure 4. Non repetitive surge peak forward current versus overload duration (maximum values) (DPAK)

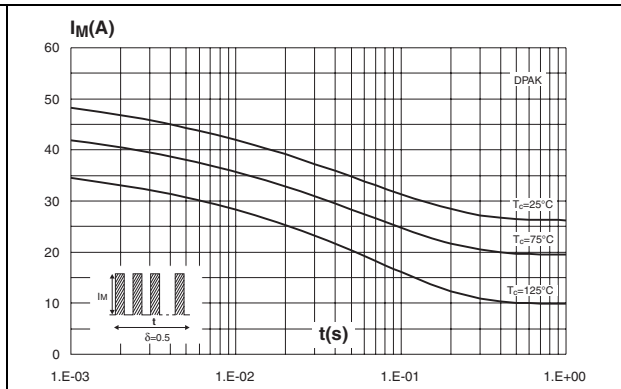


Figure 5. Non repetitive surge peak forward current versus overload duration (maximum values) (SMB)

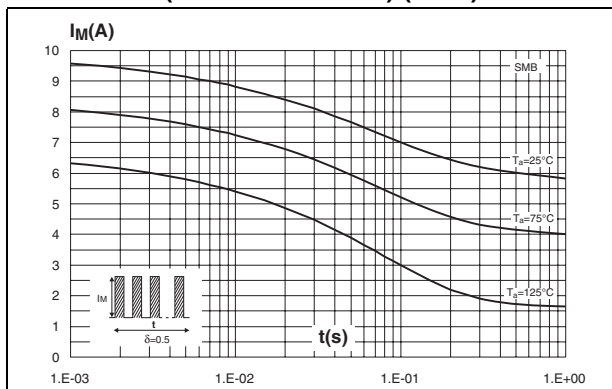


Figure 6. Non repetitive surge peak forward current versus overload duration (maximum values) (SMC)

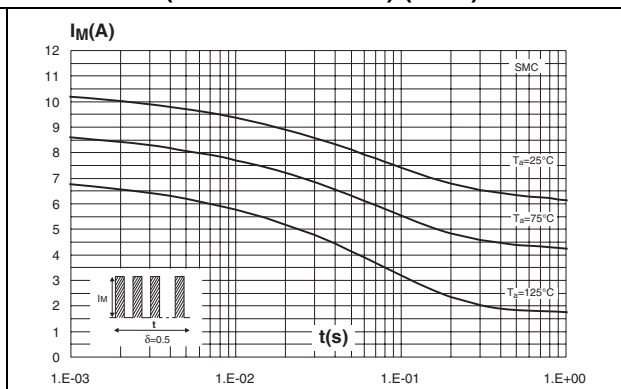


Figure 7. Non repetitive surge peak forward current versus overload duration (maximum values) SMB flat

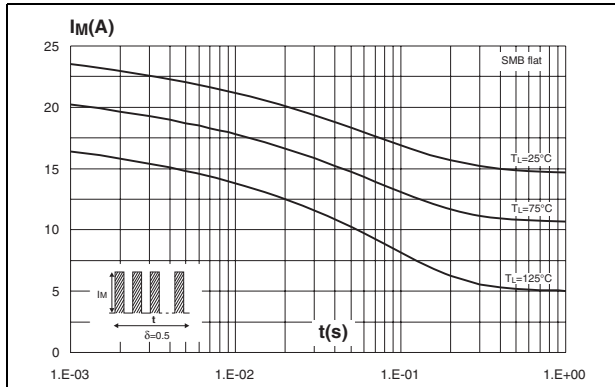


Figure 8. Normalized avalanche power derating versus pulse duration

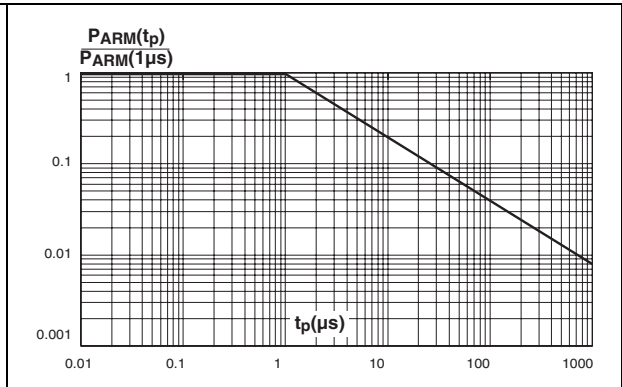


Figure 9. Normalized avalanche power derating versus junction temperature

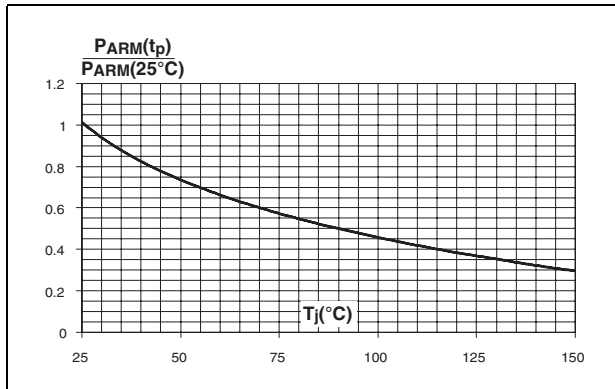


Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration (DPAK)

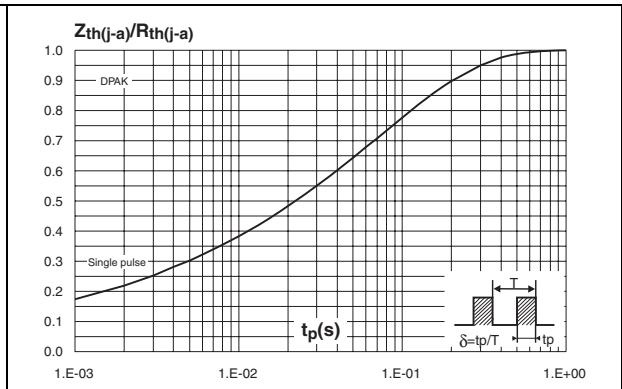


Figure 11. Relative variation of thermal impedance junction to ambient versus pulse duration (SMB)

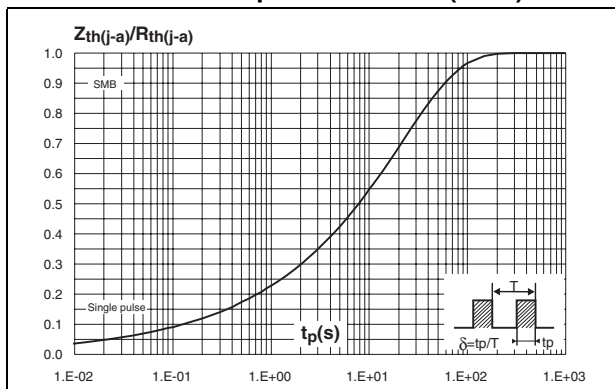


Figure 12. Relative variation of thermal impedance junction to ambient versus pulse duration (SMC)

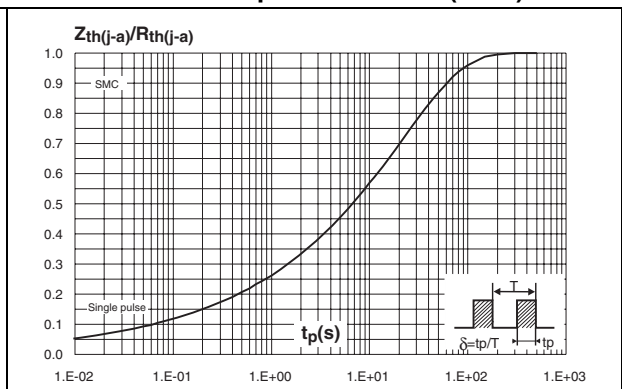


Figure 13. Relative variation of thermal impedance junction to lead versus pulse duration - SMB flat

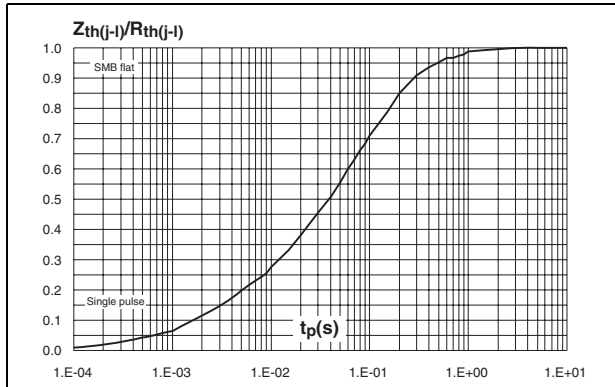


Figure 14. Reverse leakage current versus reverse voltage applied (typical values)

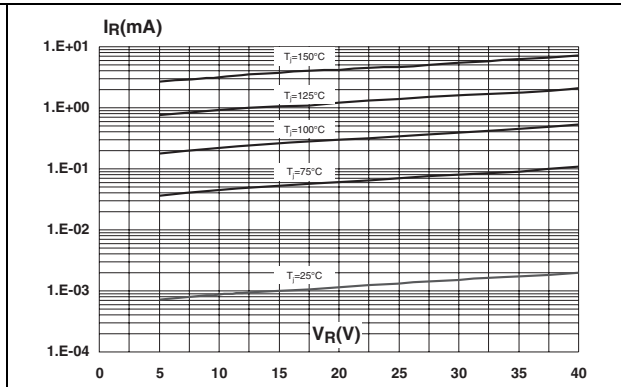


Figure 15. Junction capacitance versus reverse voltage applied (typical values)

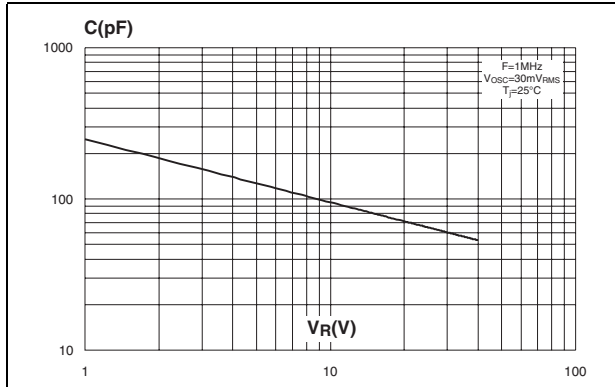


Figure 16. Forward voltage drop versus forward current

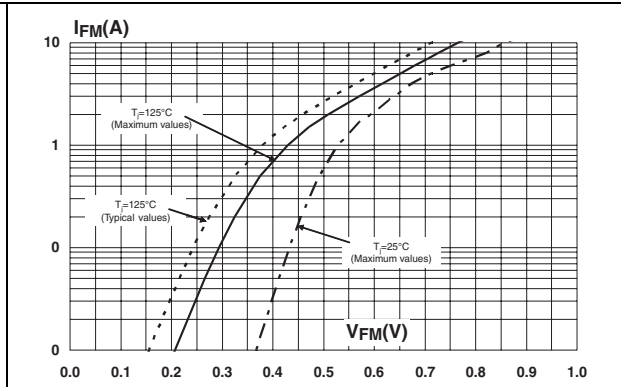


Figure 17. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, $e_{CU} = 35 \mu m$) (DPAK)

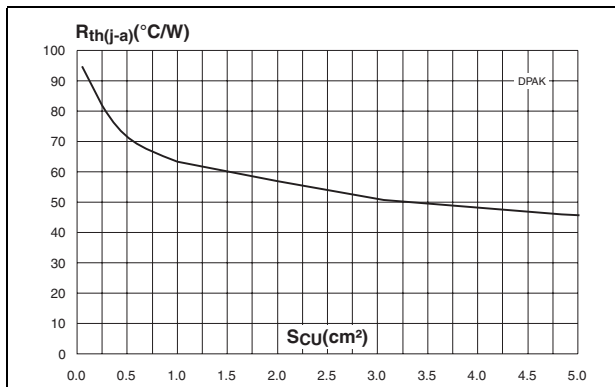


Figure 18. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, $e_{CU} = 35 \mu m$) (SMB / SMC)

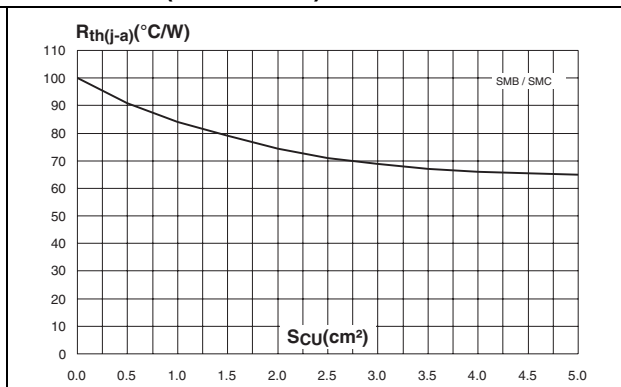
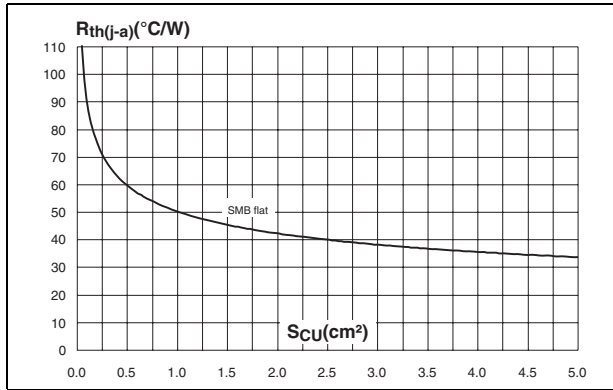


Figure 19. Thermal resistance junction to ambient versus copper surface under each lead (epoxy printed board FR4, $\epsilon_{CU} = 35 \mu\text{m}$) (SMB flat)



2 Package Information

- Band indicates cathode on SMB and SMC
- Epoxy meets UL94, V0

Table 4. DPAK dimensions

| Ref | Dimensions | | | |
|-----|-------------|-------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 2.20 | 2.40 | 0.086 | 0.094 |
| A1 | 0.90 | 1.10 | 0.035 | 0.043 |
| A2 | 0.03 | 0.23 | 0.001 | 0.009 |
| B | 0.64 | 0.90 | 0.025 | 0.035 |
| B2 | 5.20 | 5.40 | 0.204 | 0.212 |
| C | 0.45 | 0.60 | 0.017 | 0.023 |
| C2 | 0.48 | 0.60 | 0.018 | 0.023 |
| D | 6.00 | 6.20 | 0.236 | 0.244 |
| E | 6.40 | 6.60 | 0.251 | 0.259 |
| G | 4.40 | 4.60 | 0.173 | 0.181 |
| H | 9.35 | 10.10 | 0.368 | 0.397 |
| L2 | 0.80 typ. | | 0.031 typ. | |
| L4 | 0.60 | 1.00 | 0.023 | 0.039 |
| V2 | 0° | 8° | 0° | 8° |

Figure 20. DPAK footprint dimensions (in millimeters)

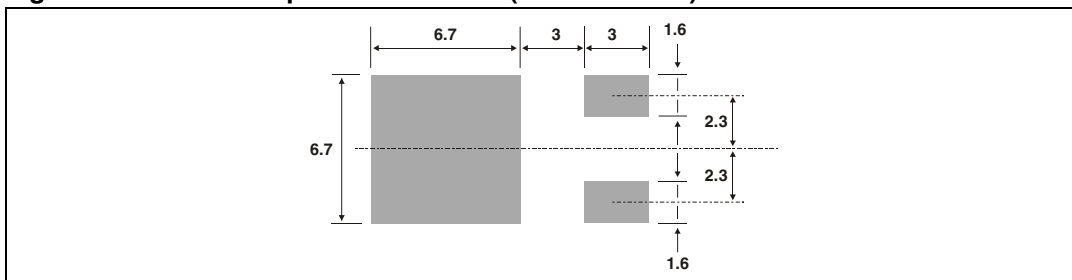


Table 5. SMB dimensions

| 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 | 1.95 | 2.20 | 0.077 | 0.087 |
| c | 0.15 | 0.40 | 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 | 1.50 | 0.030 | 0.059 |

Figure 21. SMB footprint (dimensions in mm)

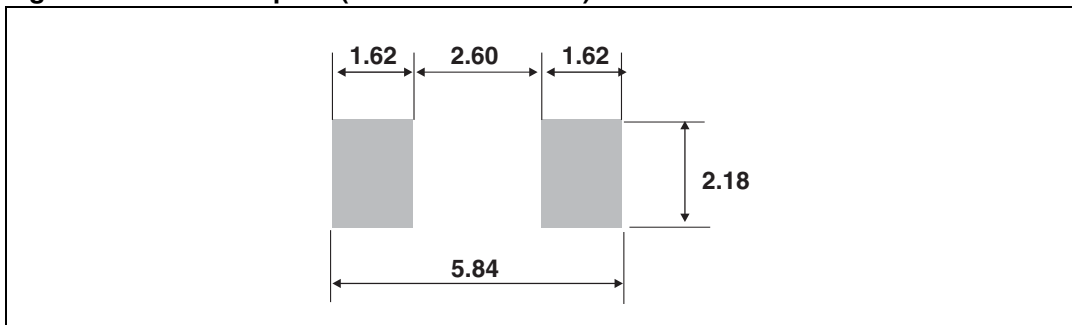


Table 6. SMB Flat dimensions

| Ref. | Dimensions | | | | | |
|------------------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.035 | | 0.043 |
| b ⁽¹⁾ | 1.95 | | 2.20 | 0.077 | | 0.087 |
| c ⁽¹⁾ | 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 22. SMB Flat footprint (dimensions in mm)

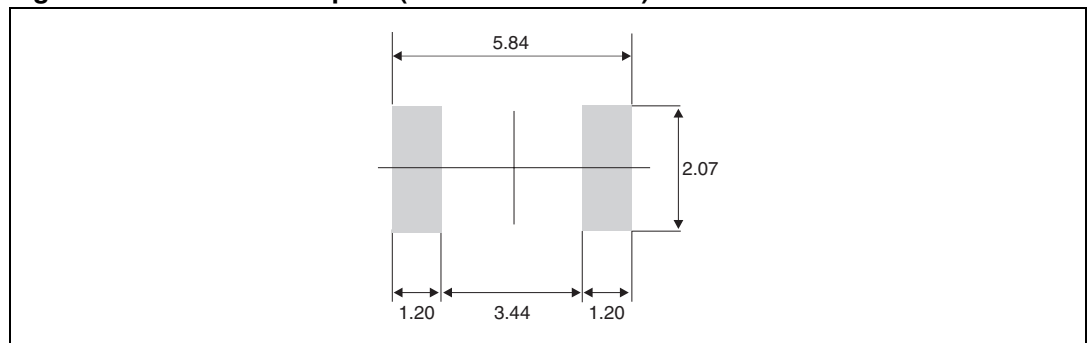
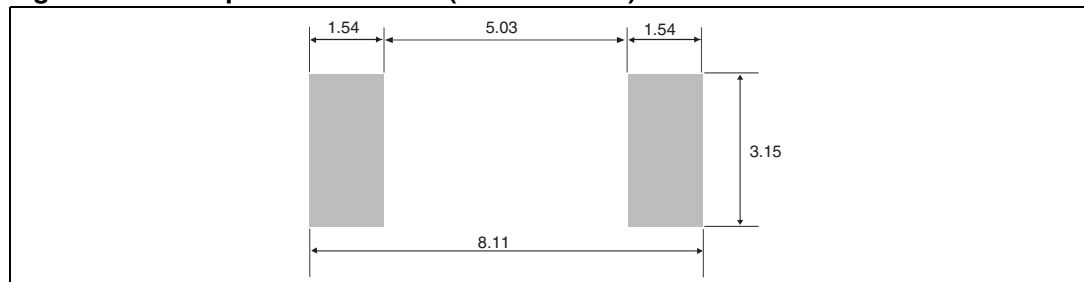


Table 7. SMC package mechanical data

| 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 | 0.41 | 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 23. Foot print dimensions (in millimeters)



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.

3 Ordering information

| Ordering type | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|----------|---------|----------|---------------|
| STPS340U | U34 | SMB | 0.107 g | 2500 | Tape and reel |
| STPS340S | S34 | SMC | 0.243 g | 2500 | |
| STPS340B | S340 | DPAK | 0.30 g | 75 | Tube |
| STPS340B-TR | | | | 2500 | Tape and reel |
| STPS340UF | FU34 | SMB flat | 0.50 g | 5000 | Tape and reel |

4 Revision history

| Date | Revision | Description of Changes |
|-------------|----------|---|
| Jul-2003 | 7B | Last update. |
| Feb-2005 | 8 | Layout update. No content change. |
| 08-Feb-2007 | 9 | Reformatted to current standard. Added ECOPACK statement. Added SMB flat package. |

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