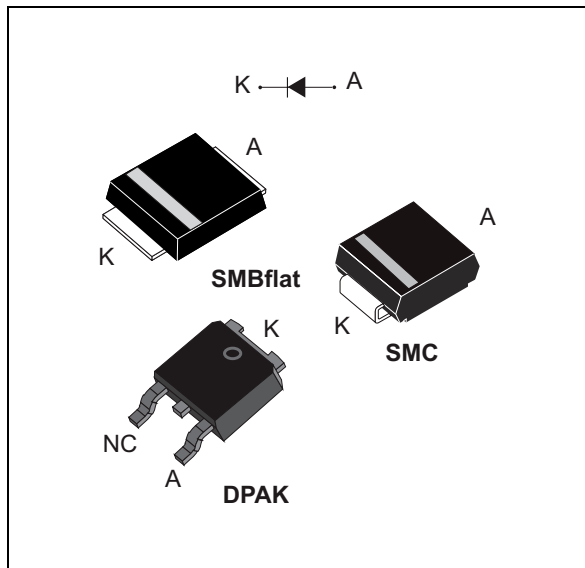


Power Schottky rectifier

Datasheet – production data



Description

This device is a 200 V Schottky rectifier suited for switch mode power supplies and high frequency DC to DC converters.

Packaged in DPAK, SMC and SMBflat, this device is especially intended for use in low voltage, high frequency inverters, freewheeling and polarity protection. Also ideal for all LED lighting applications.

Table 1. Device summary

| Symbol | Value |
|-------------|--------|
| $I_{F(AV)}$ | 4 A |
| V_{RRM} | 200 V |
| V_F (typ) | 0.64 V |
| T_j (max) | 175 °C |

Features

- Negligible switching losses
- High junction temperature capability
- Very small conduction losses
- Low leakage current
- Avalanche rated
- ECOPACK[®] compliant component (SMC and SMBflat)
- $T_j = -40$ °C minimum operating

1 Characteristics

Table 2. Absolute ratings (limiting values at 25 °C, unless otherwise specified)

| Symbol | Parameter | Value | Unit | |
|--------------|---|--|------|---|
| V_{RRM} | Repetitive peak reverse voltage | 200 | V | |
| $I_{F(RMS)}$ | Forward rms current | 10 | A | |
| $I_{F(AV)}$ | Average forward current, $\delta = 0.5$, square wave | DPAK, $T_c = 160\text{ °C}$ | 4 | A |
| | | SMC and SMBflat $T_L = 125\text{ °C}$ | | |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms}$ sinusoidal | 130 | A |
| T_{stg} | Storage temperature range | -65 to +175 | °C | |
| T_j | Operating junction temperature ⁽¹⁾ | -40 to +175 | °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 parameters

| Symbol | Parameter | Value | Unit |
|---------------|-----------------------------------|-------|------|
| $R_{th(j-c)}$ | Junction to case, DPAK | 3.2 | °C/W |
| $R_{th(j-l)}$ | Junction to lead, SMBflat and SMC | 15 | |

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-------------|-------------------------|-----------------------|--------------------|------|------|---------------|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = V_{RRM}$ | | 5 | μA |
| | | $T_j = 125\text{ °C}$ | | 0.7 | 2.5 | mA |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 4\text{ A}$ | | 0.87 | V |
| | | $T_j = 125\text{ °C}$ | | 0.64 | 0.71 | |

1. Pulse test: $t_p = 5\text{ ms}$, $\delta < 2\%$
2. Pulse test: $t_p = 380\text{ }\mu\text{s}$, $\delta < 2\%$

To evaluate the conduction losses use the following equation:

$$P = 0.63 \times I_{F(AV)} + 0.020 I_{F(RMS)}^2$$

Figure 1. Average forward power dissipation versus average forward current

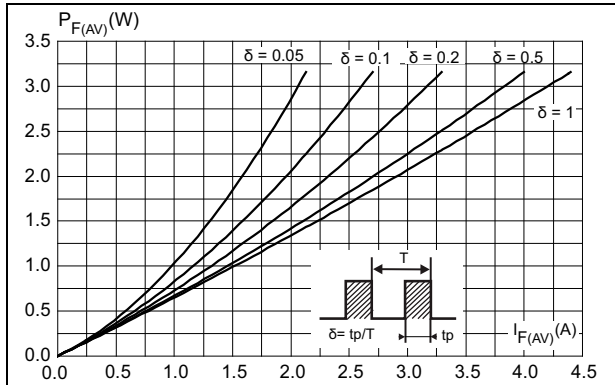


Figure 2. Average forward current versus ambient temperature ($\delta = 0.5$)

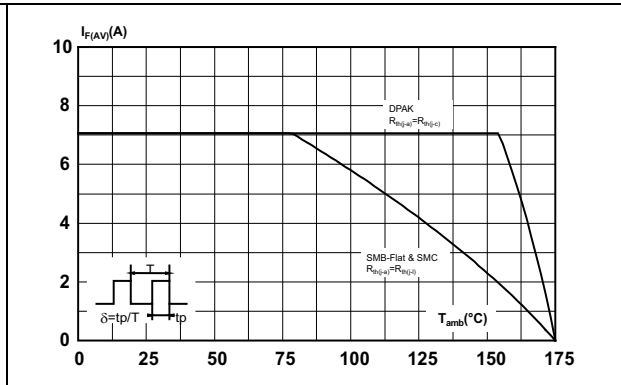


Figure 3. Relative variation of thermal impedance, junction to case, versus pulse duration (DPAK)

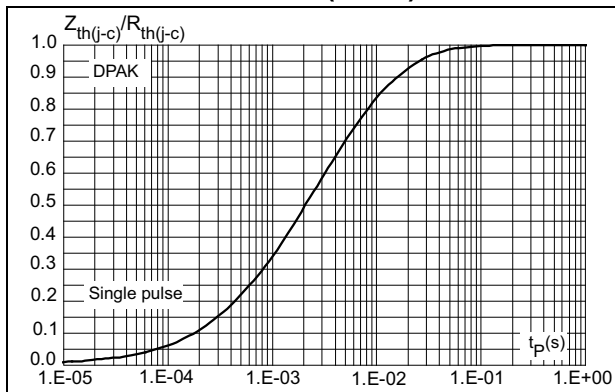


Figure 4. Relative variation of thermal impedance, junction to lead versus pulse duration (SMBflat)

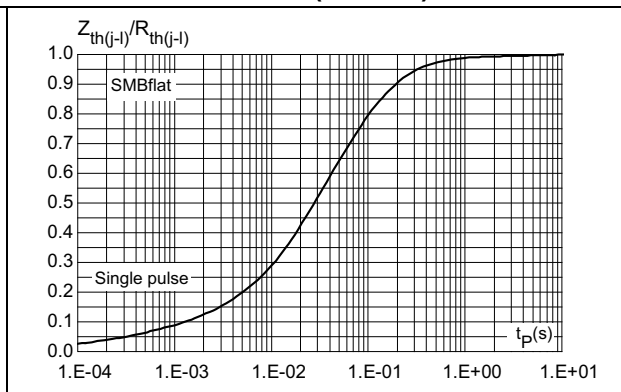


Figure 5. Relative variation of thermal impedance, junction to lead, versus pulse duration (SMC)

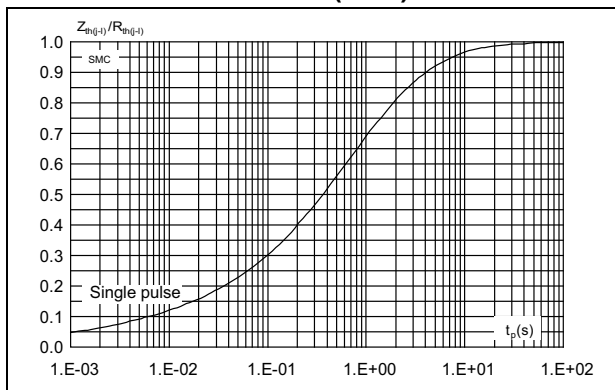


Figure 6. Reverse leakage current versus reverse voltage applied (typical values)

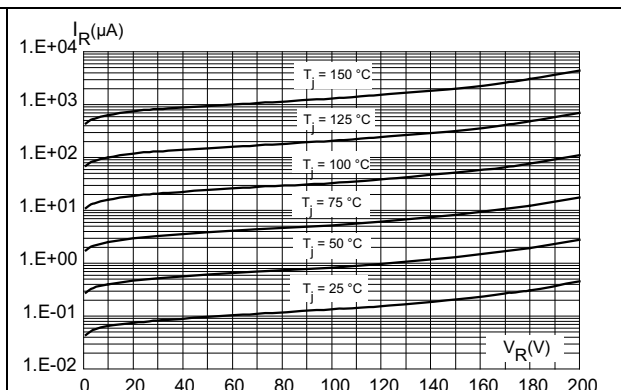


Figure 7. Junction capacitance versus reverse voltage applied (typical values)

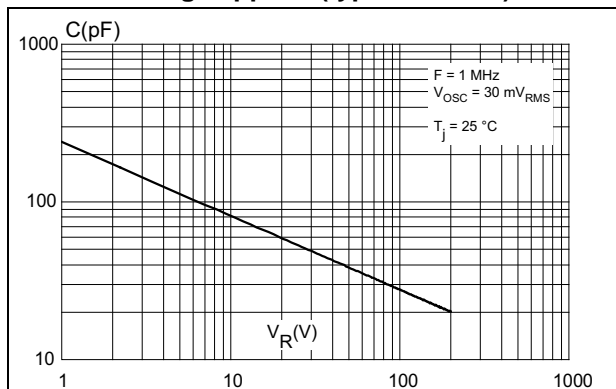


Figure 8. Forward voltage drop versus forward current (typical values)

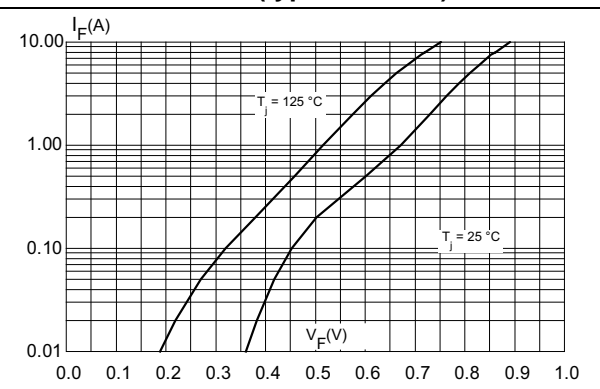


Figure 9. Forward voltage drop versus forward current (maximum values)

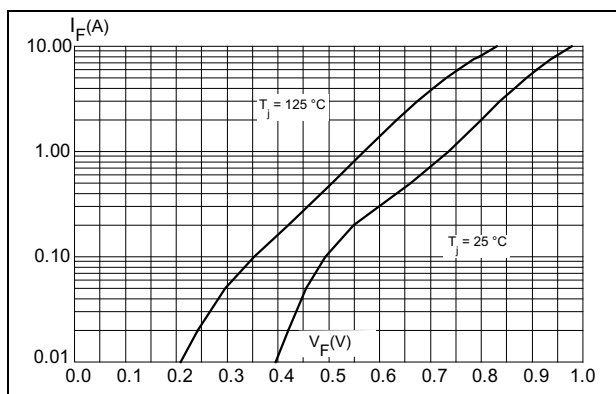


Figure 10. Thermal resistance junction to ambient versus copper surface under tab (typical values)

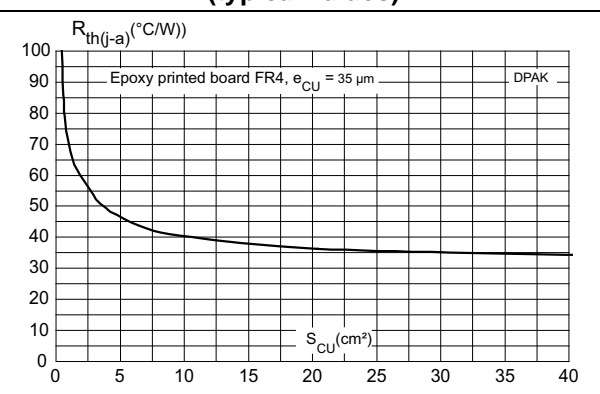


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead (typical values) (SMBflat)

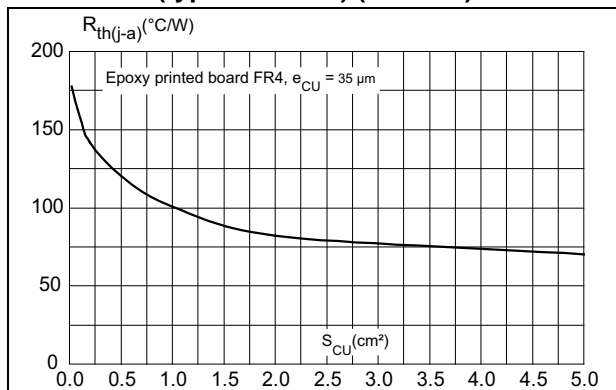
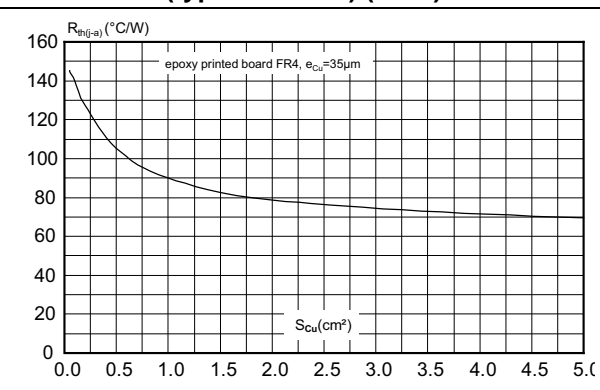


Figure 12. Thermal resistance junction to ambient versus copper surface under each lead (typical values) (SMC)



2 Package information

- Epoxy meets UL94,V0
- Lead-free package
- Band indicates cathode

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.

2.1 DPAK package information

Figure 13. DPAK package outline

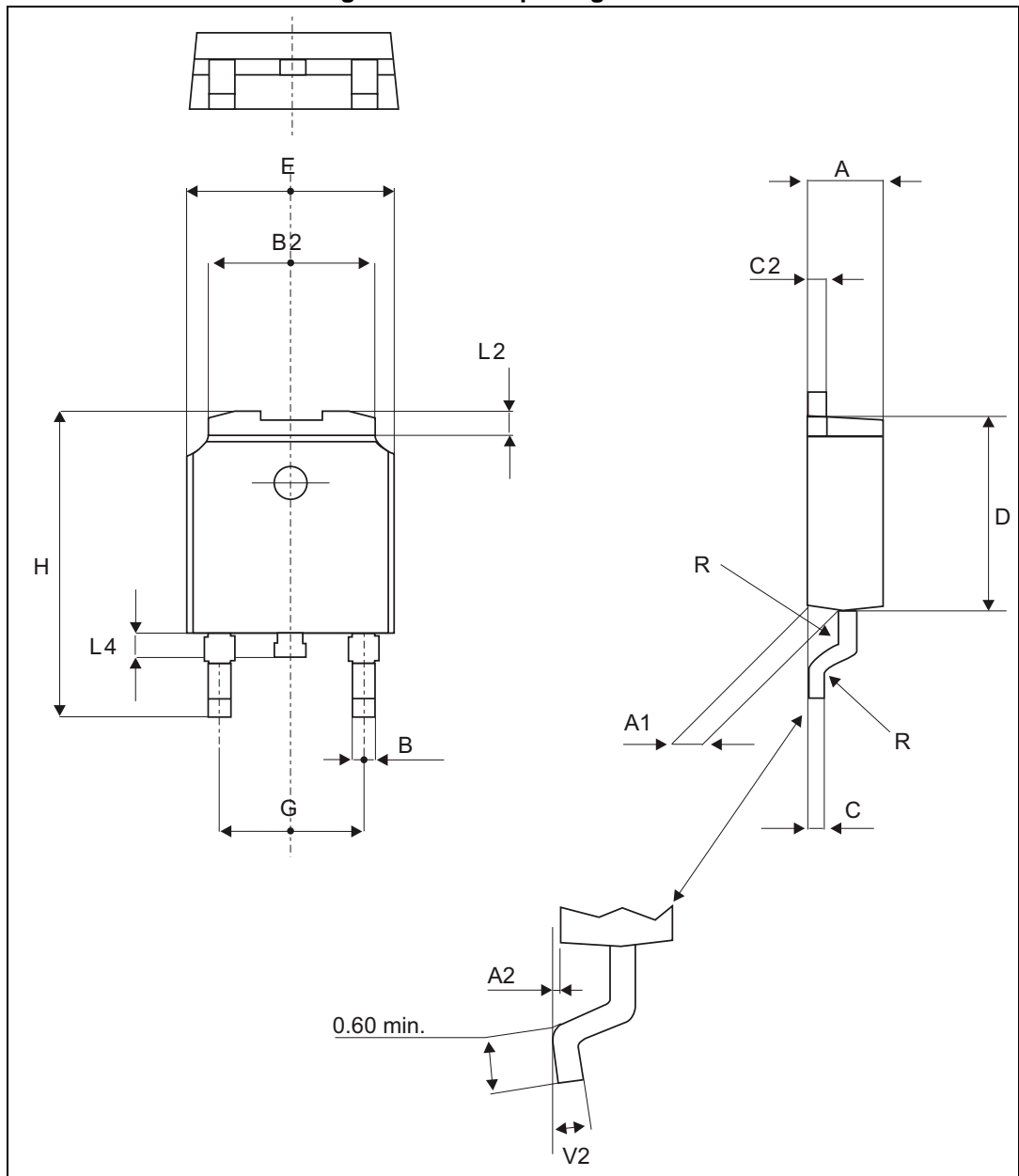
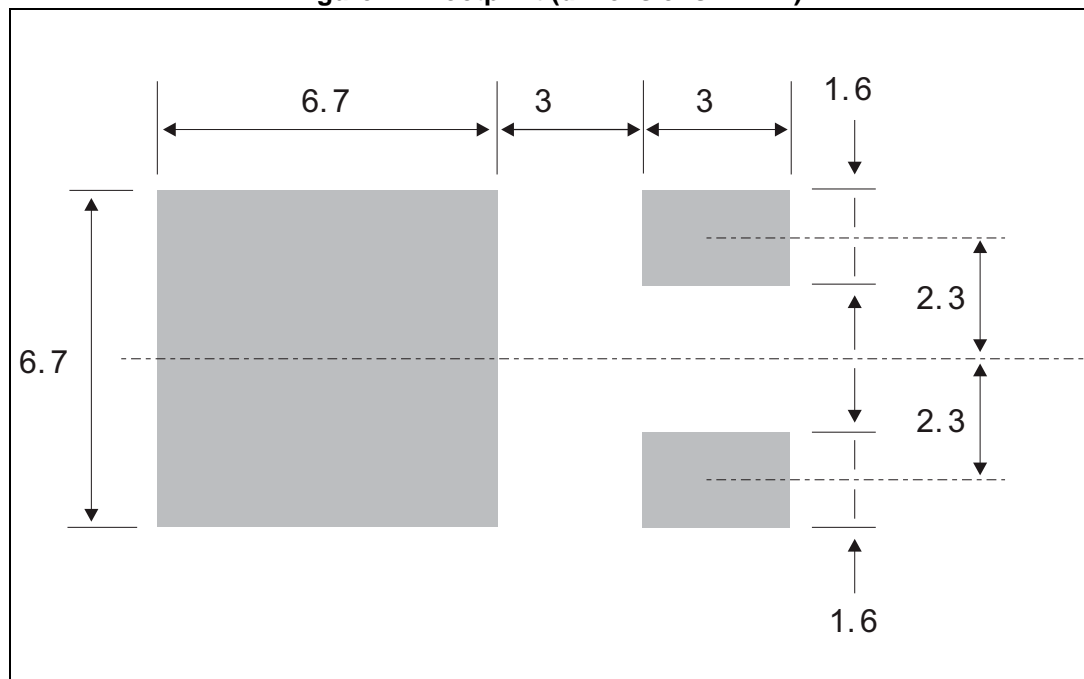


Table 5. DPAK package mechanical data

| Ref. | Dimensions | | | | | |
|------|-------------|-----------|-------|--------|------------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | 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 14. Footprint (dimensions in mm)



2.2 SMBflat package information

Figure 15. SMBflat package outline

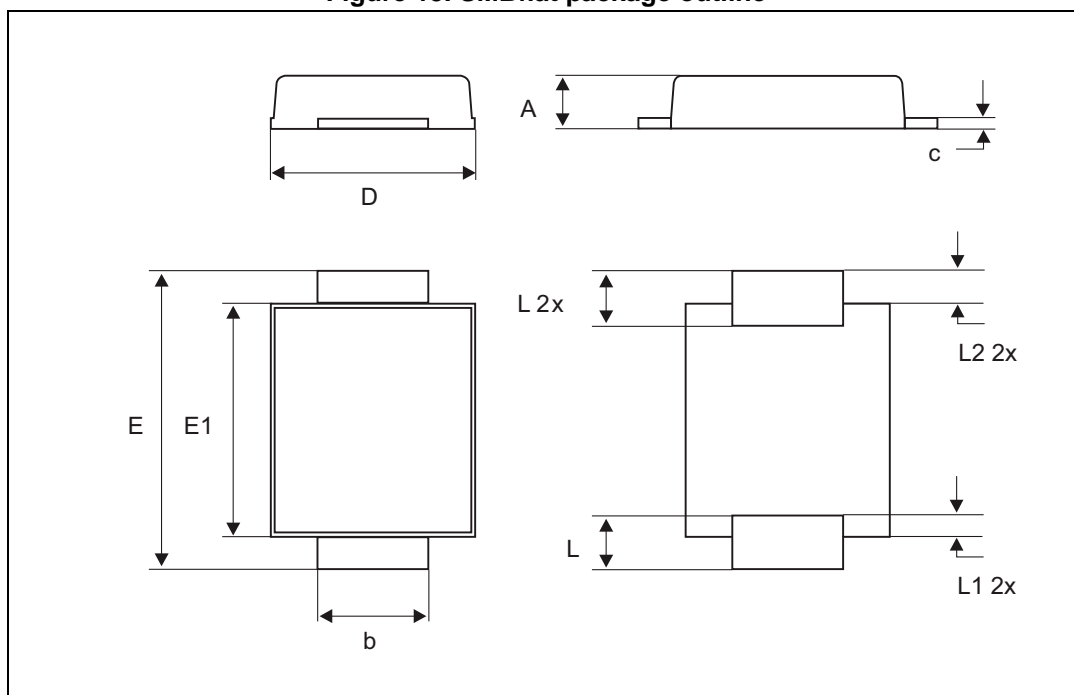
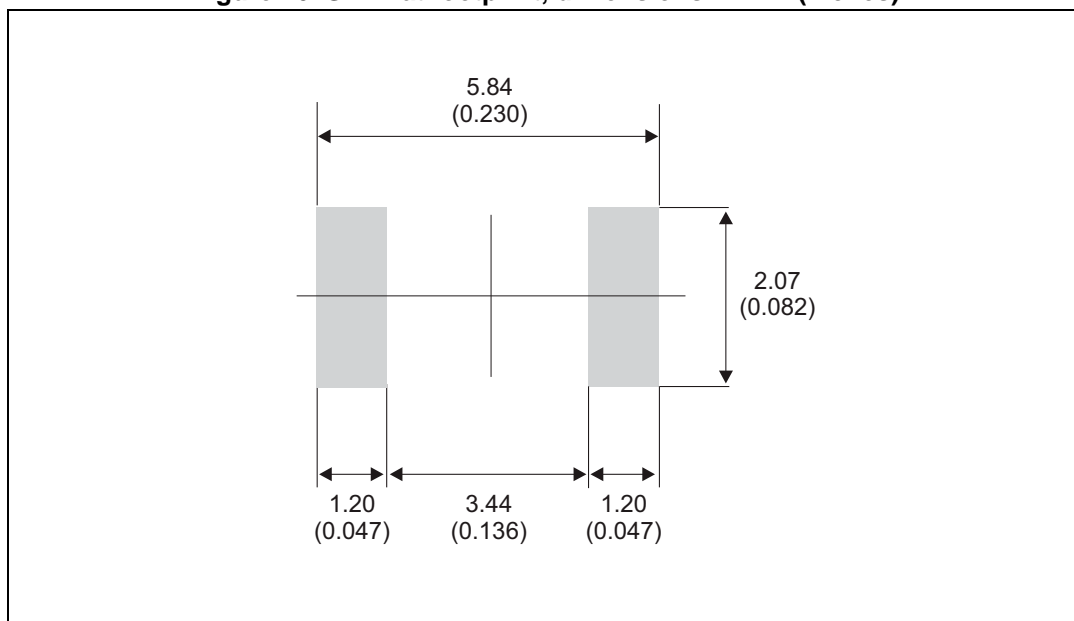


Table 6. SMBflat package mechanical data

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.90 | | 1.10 | 0.035 | | 0.043 |
| b | 1.95 | | 2.20 | 0.077 | | 0.087 |
| c | 0.15 | | 0.40 | 0.006 | | 0.016 |
| D | 3.30 | | 3.95 | 0.130 | | 0.155 |
| E | 5.10 | | 5.60 | 0.200 | | 0.220 |
| E1 | 4.05 | | 4.60 | 0.159 | | 0.181 |
| L | 0.75 | | 1.50 | 0.029 | | 0.059 |
| L1 | | 0.40 | | | 0.016 | |
| L2 | | 0.60 | | | 0.024 | |

Figure 16. SMBflat footprint, dimensions in mm (inches)



2.3 SMC package information

Figure 17. SMC dimensions definitions

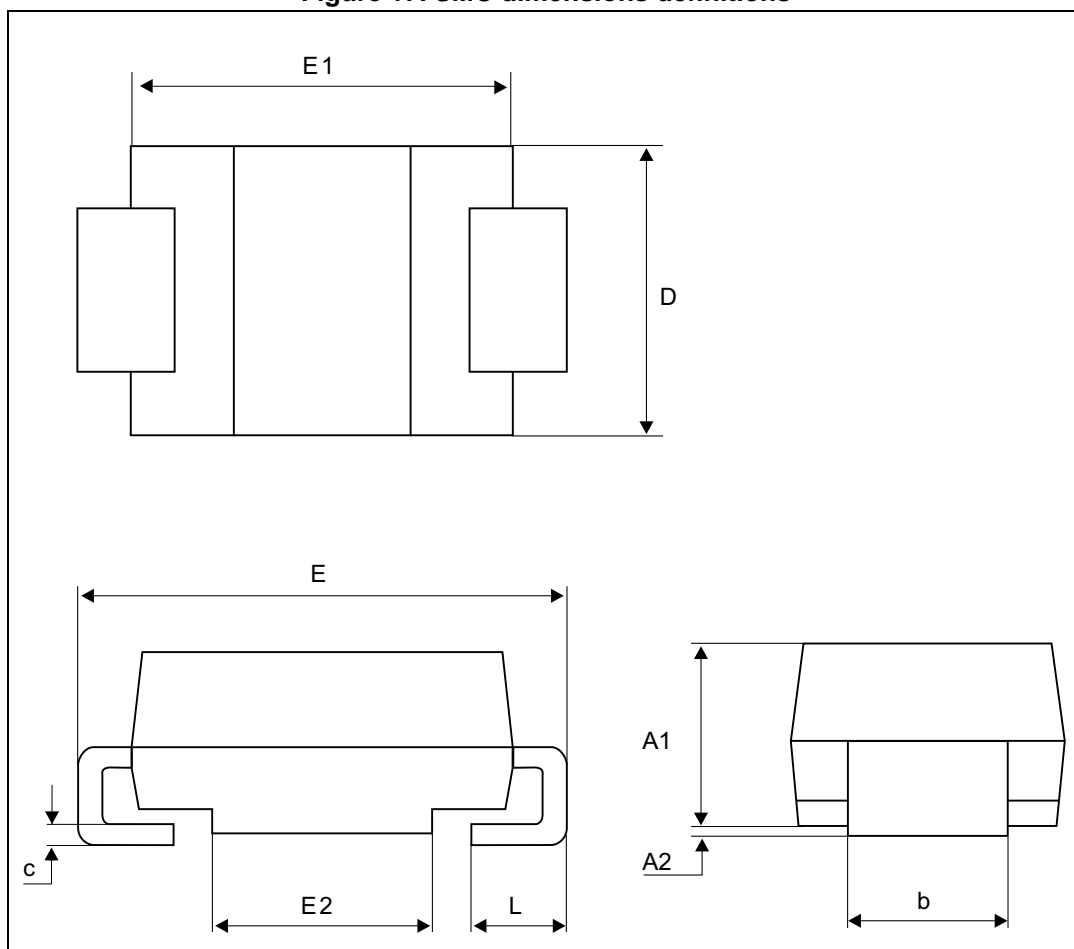
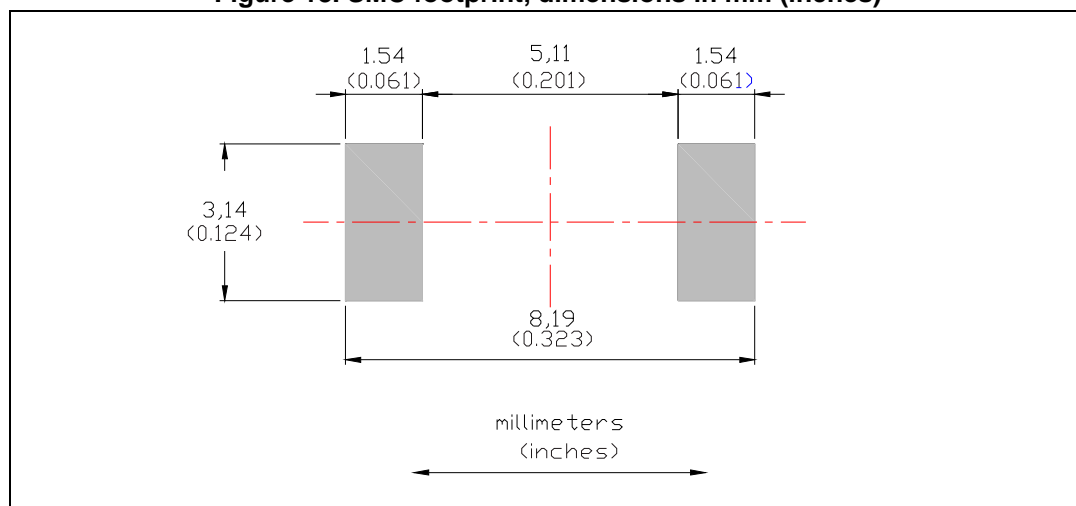


Table 7. SMC dimension values

| 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⁾ | 2.90 | 3.20 | 0.114 | 0.126 |
| c ⁽¹⁾ | 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 | 1.50 | 0.030 | 0.059 |

1. Dimensions b and c apply to plated leads

Figure 18. SMC footprint, dimensions in mm (inches)



3 Ordering information

Table 8. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|---------------|---------|---------|---------|----------|---------------|
| STPS4S200B-TR | S4 200B | DPAK | 0.3 g | 2500 | Tape and reel |
| STPS4S200UF | FG42 | SMBflat | 0.050 g | 5000 | Tape and reel |
| STPS4S200S | S42 | SMC | 0.24 g | 2500 | Tape and reel |

4 Revision history

Table 9. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 17-Oct-2014 | 1 | First release. |
| 26-Aug-2015 | 2 | Added device in SMC package. Updated document accordingly. |

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