

Low capacitance small signal Schottky diodes

Features

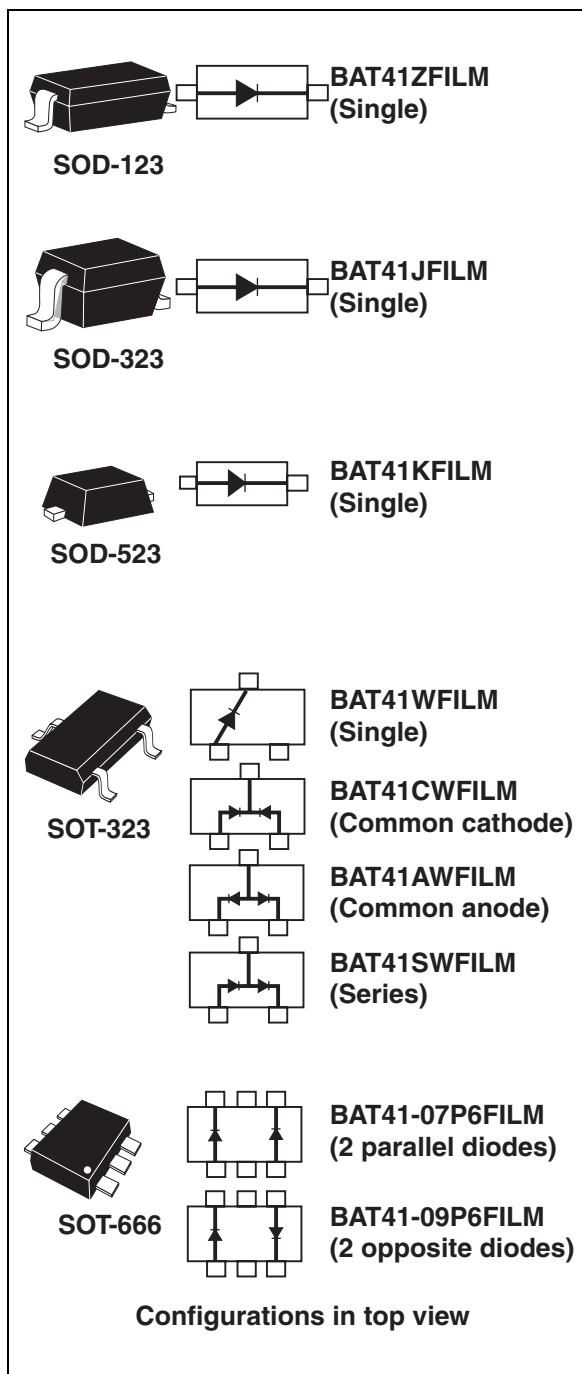
- Low leakage current losses
- Negligible switching losses
- Low forward and reverse recovery times
- Extremely fast switching
- Surface mount device
- Low capacitance diode

Description

The BAT41 series uses 100 V Schottky barrier diodes packaged in SOD-123, SOD-323, SOD-523, SOT-323, or SOT-666. This series is specially suited for switching mode with low I_F losses

Table 1. Device summary

| Symbol | Value |
|-------------|--------|
| I_F | 200 mA |
| V_{RRM} | 100 V |
| C(typ) | 3 pF |
| T_j (max) | 150 °C |



1 Characteristics

Table 2. Absolute ratings (limiting values at $T_j = 25\text{ °C}$, unless otherwise specified)

| Symbol | Parameter | Value | Unit | |
|-----------|--|---------------------------------|------|---|
| V_{RRM} | Repetitive peak reverse voltage | 100 | V | |
| I_F | Continuous forward current | 200 | mA | |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms}$ Sinusoidal | 1 | A |
| T_{stg} | Storage temperature range | -65 to +150 | °C | |
| T_j | Maximum operating junction temperature | 150 | °C | |

Table 3. Thermal parameters

| Symbol | Parameter | Value | Unit | |
|---------------|------------------------------------|------------------|------|------|
| $R_{th(j-a)}$ | Junction to ambient ⁽¹⁾ | SOD-123 | 500 | °C/W |
| | | SOT-323, SOD-323 | 550 | |
| | | SOD-523, SOT-666 | 600 | |

1. Epoxy printed circuit board with recommended pad layout

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit | |
|-------------|-------------------------|-----------------------|-----------------------|------|------|---------------|----|
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ °C}$ | $V_R = 50\text{ V}$ | | 0.1 | μA | |
| | | $T_j = 100\text{ °C}$ | | | 20 | | |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ °C}$ | $I_F = 1\text{ mA}$ | | 400 | 450 | mV |
| | | | $I_F = 200\text{ mA}$ | | | 1000 | |

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

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

Table 5. Dynamic characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------|-------------------|---|------|------|------|------|
| C | Diode capacitance | $V_R = 1\text{ V}$, $F = 1\text{ MHz}$ | | 3 | 10 | pF |

Figure 1. Average forward power dissipation versus average forward current

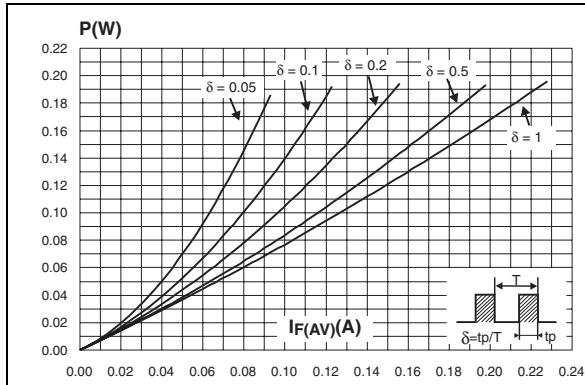


Figure 2. Average forward current versus ambient temperature ($\delta = 1$)

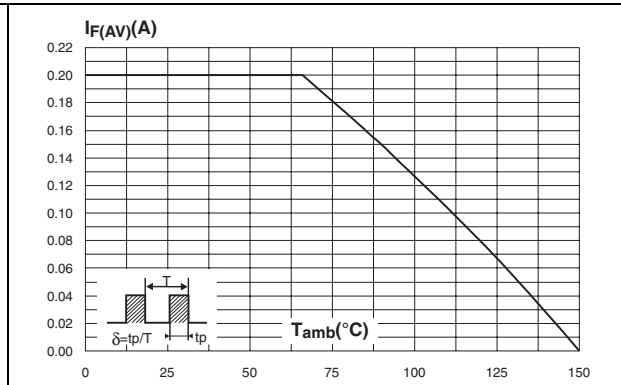


Figure 3. Reverse leakage current versus reverse applied voltage (typical values)

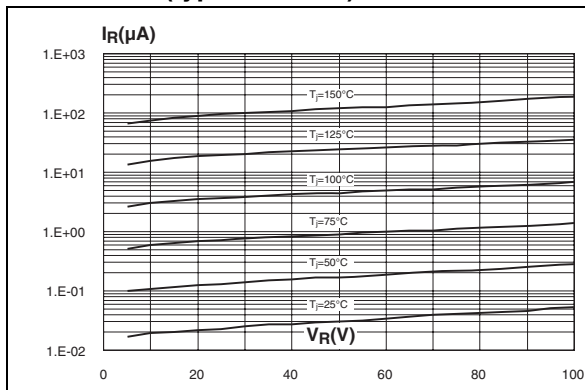


Figure 4. Reverse leakage current versus junction temperature (typical values)

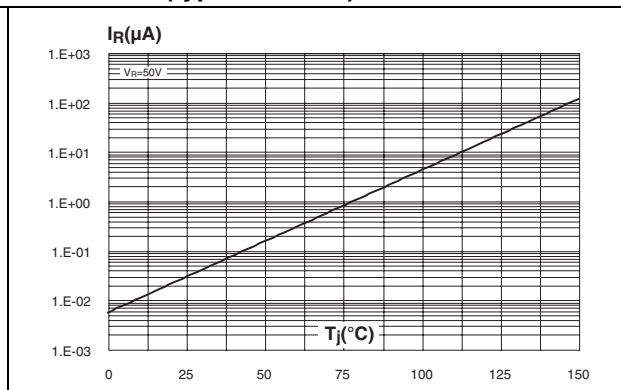


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

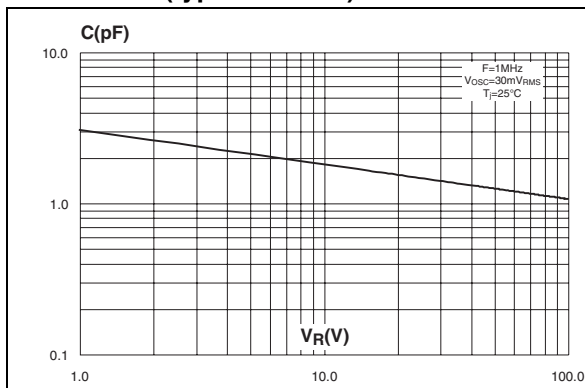


Figure 6. Forward voltage drop versus forward current (typical values)

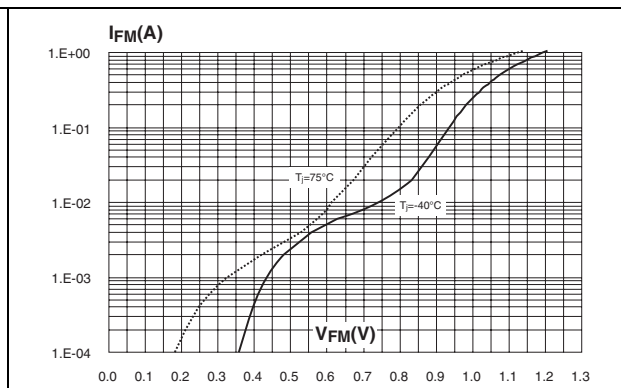


Figure 7. Forward voltage drop versus forward current (typical values)

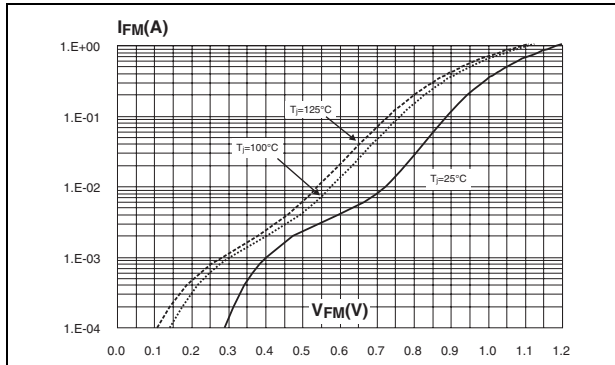


Figure 8. Variation of thermal impedance junction to ambient versus pulse duration

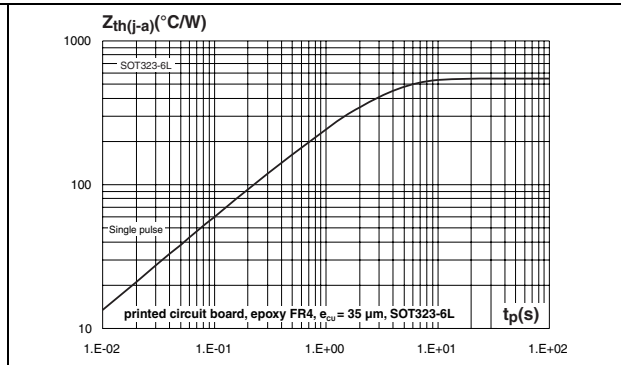


Figure 9. Relative variation of thermal impedance junction to ambient versus pulse duration

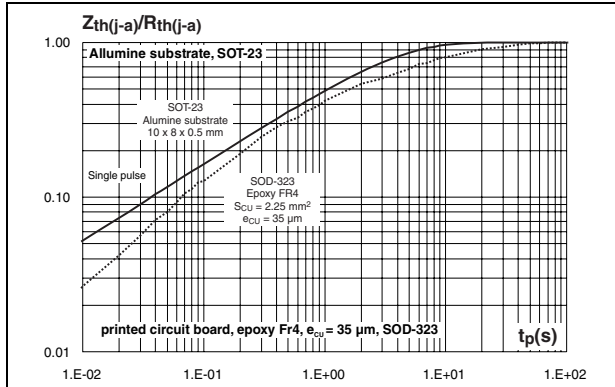


Figure 10. Relative variation of thermal impedance junction to ambient versus pulse duration

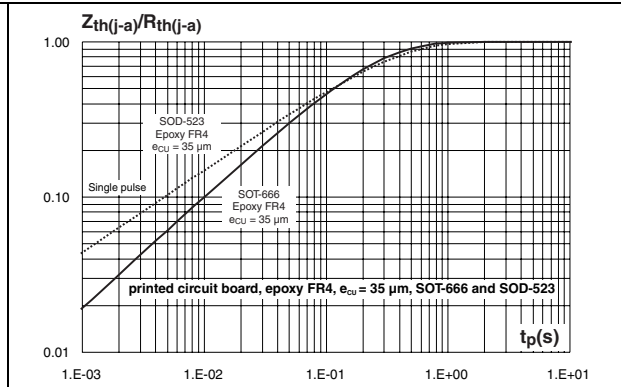
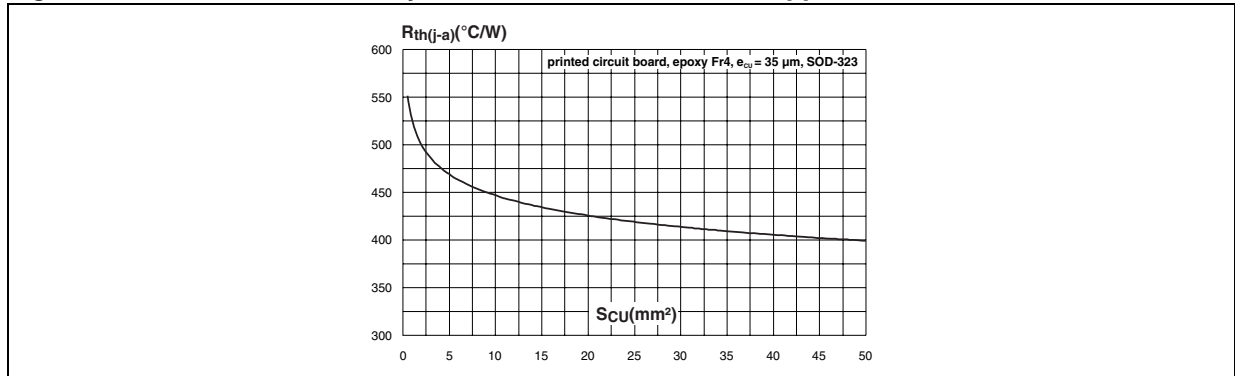
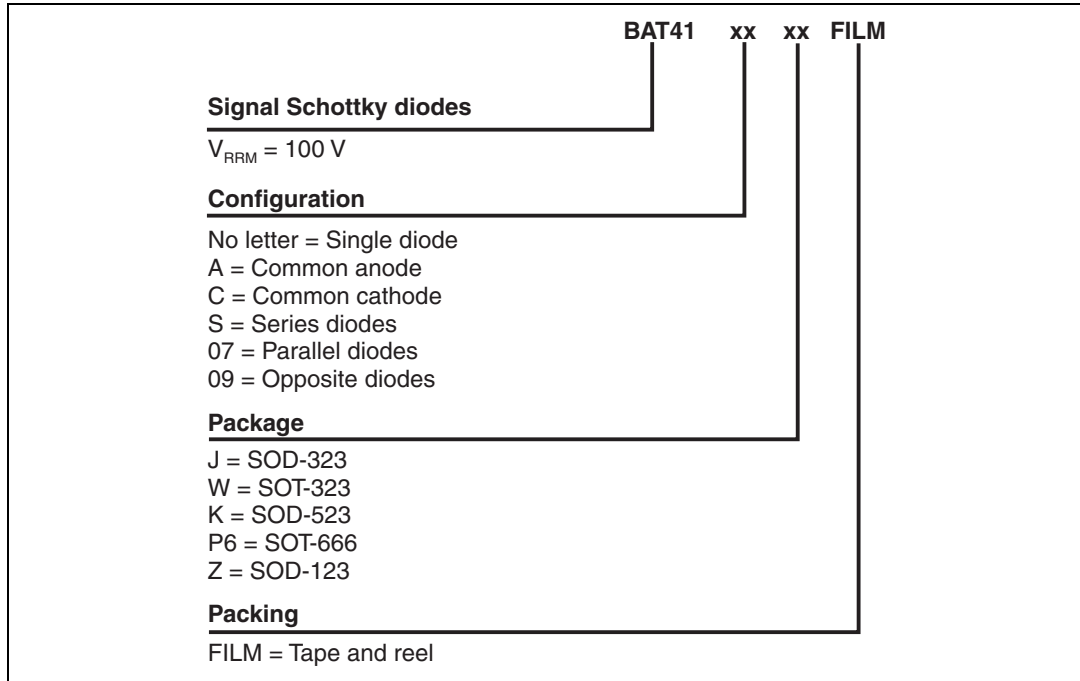


Figure 11. Thermal resistance junction to ambient versus copper surface under each lead



2 Ordering information scheme

Figure 12. Ordering information scheme



3 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. ECOPACK® is an ST trademark.

Table 6. SOD-123 dimensions

| Ref. | Dimensions | | | |
|------|-------------|------|------------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | | 1.45 | | 0.057 |
| A1 | 0 | 0.1 | 0 | 0.004 |
| A2 | 0.85 | 1.35 | 0.033 | 0.053 |
| b | 0.55 Typ. | | 0.022 Typ. | |
| c | 0.15 Typ. | | 0.039 Typ. | |
| D | 2.55 | 2.85 | 0.1 | 0.112 |
| E | 1.4 | 1.7 | 0.055 | 0.067 |
| G | 0.25 | | 0.01 | |
| H | 3.55 | 3.95 | 0.14 | 0.156 |

Figure 13. SOD-123 footprint (dimensions in mm)



Table 7. SOD-323 dimensions

| Ref. | Dimensions | | | |
|------|-------------|------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | | 1.17 | | 0.046 |
| A1 | 0 | 0.1 | 0 | 0.004 |
| b | 0.25 | 0.44 | 0.01 | 0.017 |
| c | 0.1 | 0.25 | 0.004 | 0.01 |
| D | 1.52 | 1.8 | 0.06 | 0.071 |
| E | 1.11 | 1.45 | 0.044 | 0.057 |
| H | 2.3 | 2.7 | 0.09 | 0.106 |
| L | 0.1 | 0.46 | 0.004 | 0.02 |
| Q1 | 0.1 | 0.41 | 0.004 | 0.016 |

Figure 14. SOD-323 footprint (dimensions in mm)

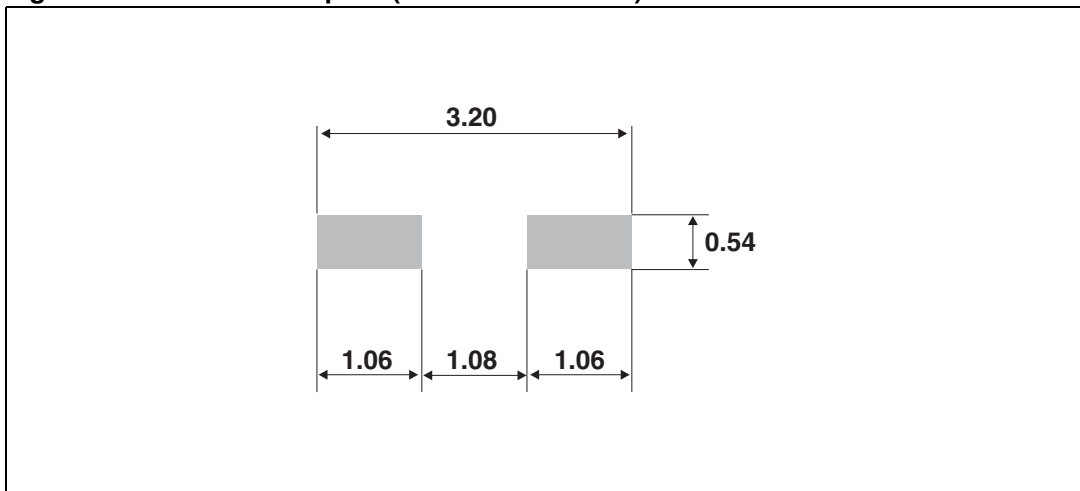


Table 8. SOD-523 dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.50 | 0.60 | 0.70 | 0.020 | 0.024 | 0.028 |
| E | 1.50 | 1.60 | 1.70 | 0.059 | 0.063 | 0.067 |
| E1 | 1.10 | 1.20 | 1.30 | 0.043 | 0.047 | 0.051 |
| D | 0.70 | 0.80 | 0.90 | 0.028 | 0.031 | 0.035 |
| b | 0.25 | | 0.35 | 0.010 | | 0.014 |
| c | 0.07 | | 0.20 | 0.003 | | 0.008 |
| L | 0.15 | 0.20 | 0.25 | 0.006 | 0.008 | 0.010 |
| L1 | 0.05 | | 0.20 | 0.002 | | 0.008 |

Figure 15. SOD-523 footprint (dimensions in mm)

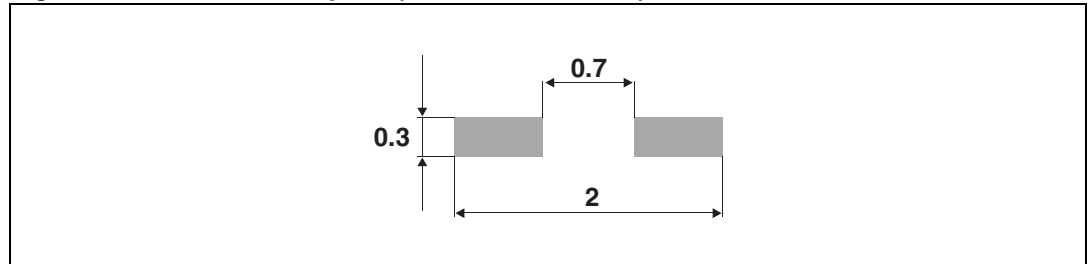


Table 9. SOT-323 dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.8 | | 1.1 | 0.031 | | 0.043 |
| A1 | 0.0 | | 0.1 | 0.0 | | 0.004 |
| b | 0.25 | | 0.4 | 0.010 | | 0.016 |
| c | 0.1 | | 0.26 | 0.004 | | 0.010 |
| D | 1.8 | 2.0 | 2.2 | 0.071 | 0.079 | 0.086 |
| E | 1.15 | 1.25 | 1.35 | 0.045 | 0.049 | 0.053 |
| e | | 0.65 | | | 0.026 | |
| H | 1.8 | 2.1 | 2.4 | 0.071 | 0.083 | 0.094 |
| L | 0.1 | 0.2 | 0.3 | 0.004 | 0.008 | 0.012 |
| q | 0 | | 30° | 0 | | 30° |

Figure 16. SOT-323 footprint (dimensions in mm)

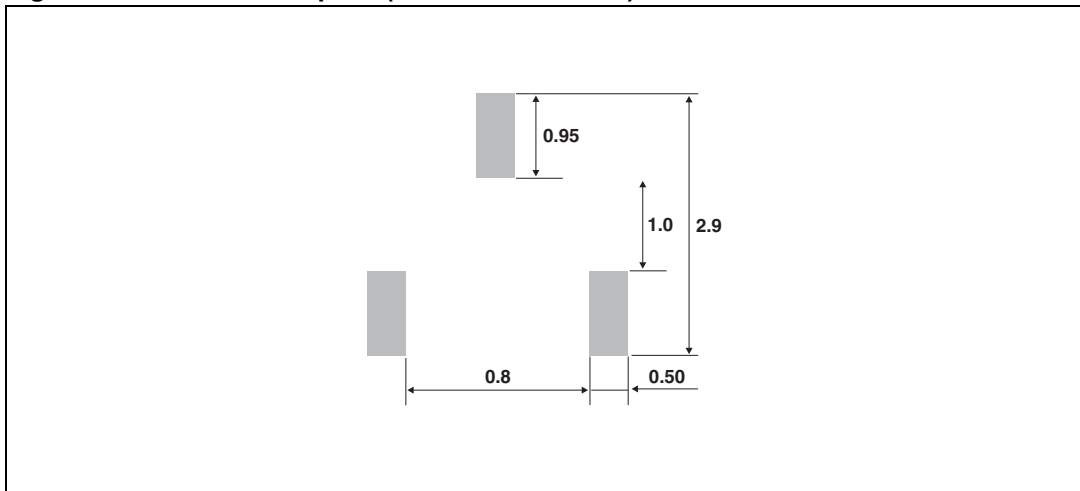
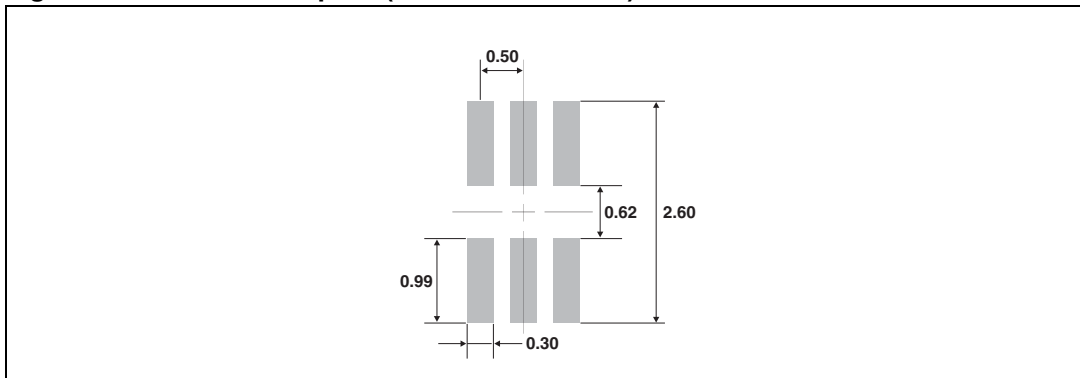


Table 10. SOT-666 dimensions

| Ref. | Dimensions | | | | | |
|------|-------------|------|------|--------|-------|-------|
| | Millimeters | | | Inches | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 0.45 | | 0.60 | 0.018 | | 0.024 |
| A3 | 0.08 | | 0.18 | 0.003 | | 0.007 |
| b | 0.17 | | 0.34 | 0.007 | | 0.013 |
| b1 | 0.19 | 0.27 | 0.34 | 0.007 | 0.011 | 0.013 |
| D | 1.50 | | 1.70 | 0.059 | | 0.067 |
| E | 1.50 | | 1.70 | 0.059 | | 0.067 |
| E1 | 1.10 | | 1.30 | 0.043 | | 0.051 |
| e | | 0.50 | | | 0.020 | |
| L1 | | 0.19 | | | 0.007 | |
| L2 | 0.10 | | 0.30 | 0.004 | | 0.012 |
| L3 | | 0.10 | | | 0.004 | |

Figure 17. SOT-666 footprint (dimensions in mm)



4 Ordering information

Table 11. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|----------------|---------|---------------------------|--------|----------|---------------|
| BAT41ZFILM | Z41 | SOD-123 Single | 10 mg | 3000 | Tape and reel |
| BAT41WFILM | B41 | SOT-323 Single | 6 mg | 3000 | Tape and reel |
| BAT41SWFILM | S41 | SOT-323 Series | 6 mg | 3000 | Tape and reel |
| BAT41CWFILM | C41 | SOT-323 Common cathode | 6 mg | 3000 | Tape and reel |
| BAT41AWFILM | A41 | SOT-323 Common anode | 6 mg | 3000 | Tape and reel |
| BAT41JFILM | 41 | SOD-323 Single | 5 mg | 3000 | Tape and reel |
| BAT41KFILM | 41 | SOD-523 Single | 1.4 mg | 3000 | Tape and reel |
| BAT41-09P6FILM | Q1 | SOT-666 Opposite | 2.9 mg | 3000 | Tape and reel |
| BAT41-07P6FILM | P1 | SOT-666 Parallel | 2.9 mg | 3000 | Tape and reel |

5 Revision history

Table 12. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 08-Aug-2006 | 1 | Initial release. |
| 12-Oct-2009 | 2 | Updated Table 8 quote "L1" from 0.10 to 0.05. |

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