

Small signal Schottky diode

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 BAT48 series uses 40 V Schottky barrier diodes packaged in SOD-123, SOD-323 or DO-35. This series is general purpose and features very low turn-on voltage and fast switching.

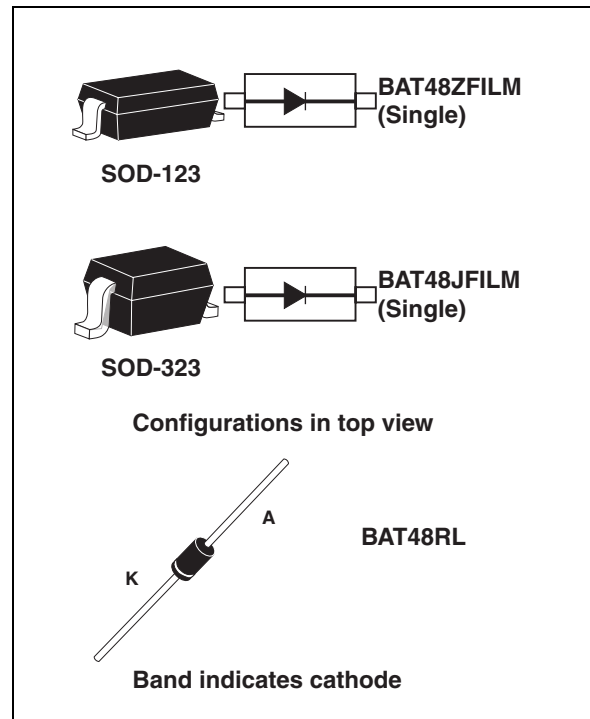


Table 1. Device summary

| Symbol | Value |
|-------------|--------|
| I_F | 350 mA |
| V_{RRM} | 40 V |
| C (typ) | 18 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 | | 40 | V | |
| I_F | Continuous forward current | | 350 | mA | |
| I_{FSM} | Surge non repetitive forward current | $t_p = 10\text{ ms}$ sinusoidal | SOD-123, SOD-323 | 2 | A |
| | | | DO-35 | 7.5 | |
| T_{stg} | Storage temperature range | | -65 to +150 | °C | |
| T_j | Maximum operating junction temperature range | | SOD-123, SOD-323 | -40 to +150 | °C |
| | | | DO-35 | -40 to +125 | |
| T_L | Maximum temperature for soldering during 10 s | | SOD-123, SOD-323 | 260 | °C |
| | | | DO-35 at 4 mm from case | 230 | |

Table 3. Thermal parameters

| Symbol | Parameter | | Value | Unit | |
|---------------|------------------------------------|--|---------|------|------|
| $R_{th(j-a)}$ | Junction to ambient ⁽¹⁾ | | SOD-123 | 500 | °C/W |
| | | | SOD-323 | 550 | |
| $R_{th(j-l)}$ | Junction to lead ⁽²⁾ | | DO-35 | 300 | °C/W |

1. Epoxy printed circuit board with recommended pad layout
2. On infinite heatsink with 4 mm lead length

Table 4. Static electrical characteristics

| Symbol | Parameter | Test conditions | | Min. | Typ. | Max. | Unit |
|-------------|---------------------------|----------------------------------|-------------------------------|------|------|------|---------------|
| V_{BR} | Breakdown reverse voltage | $T_j = 25\text{ }^\circ\text{C}$ | $I_r = 25\text{ }\mu\text{A}$ | 40 | | | V |
| $I_R^{(1)}$ | Reverse leakage current | $T_j = 25\text{ }^\circ\text{C}$ | $V_R = 1.5\text{ V}$ | | | 1 | μA |
| | | | $V_R = 10\text{ V}$ | | | 2 | |
| | | | $V_R = 20\text{ V}$ | | | 5 | |
| | | | $V_R = 40\text{ V}$ | | | 25 | |
| | | $T_j = 60\text{ }^\circ\text{C}$ | $V_R = 1.5\text{ V}$ | | | 10 | |
| | | | $V_R = 10\text{ V}$ | | | 15 | |
| | | | $V_R = 20\text{ V}$ | | | 25 | |
| | | | $V_R = 40\text{ V}$ | | | 50 | |
| $V_F^{(2)}$ | Forward voltage drop | $T_j = 25\text{ }^\circ\text{C}$ | $I_F = 0.1\text{ mA}$ | | | 0.25 | V |
| | | | $I_F = 1\text{ mA}$ | | | 0.3 | |
| | | | $I_F = 10\text{ mA}$ | | | 0.4 | |
| | | | $I_F = 50\text{ mA}$ | | | 0.5 | |
| | | | $I_F = 200\text{ mA}$ | | | 0.75 | |
| | | | $I_F = 500\text{ mA}$ | | | 0.9 | |

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 | $V_R = 0\text{ V}$, $F = 1\text{ MHz}$ | | 30 | | μF |
| | | $V_R = 1\text{ V}$, $F = 1\text{ MHz}$ | | 18 | | |

Figure 1. Average forward power dissipation versus average forward current

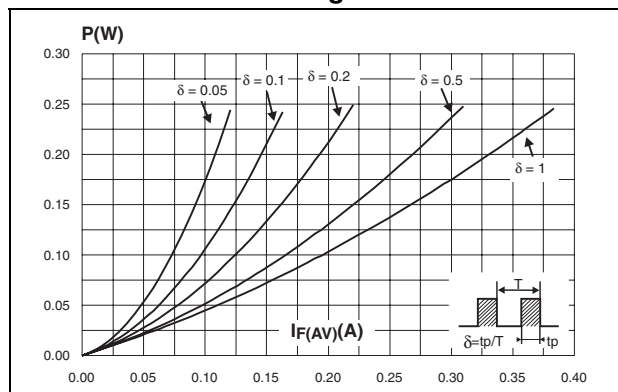


Figure 2. Average forward current versus ambient temperature (delta = 1)

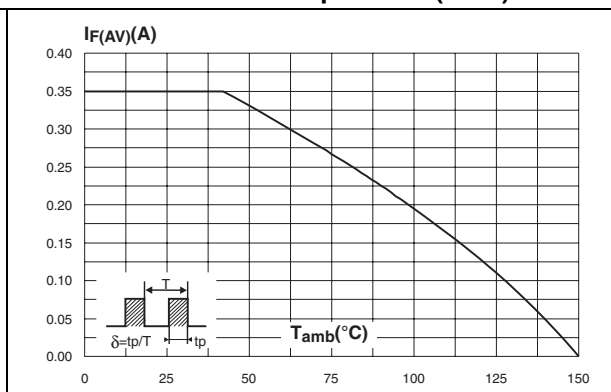


Figure 3. Reverse leakage current versus reverse applied voltage (typical values)

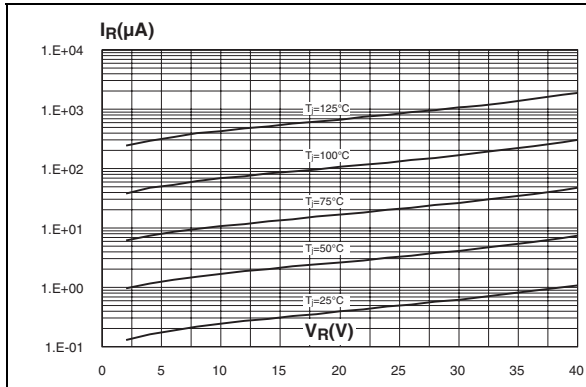


Figure 4. Reverse leakage current versus junction temperature (typical values)

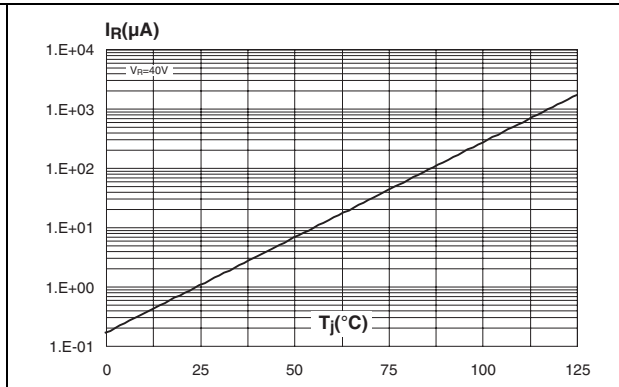


Figure 5. Junction capacitance versus reverse applied voltage (typical values)

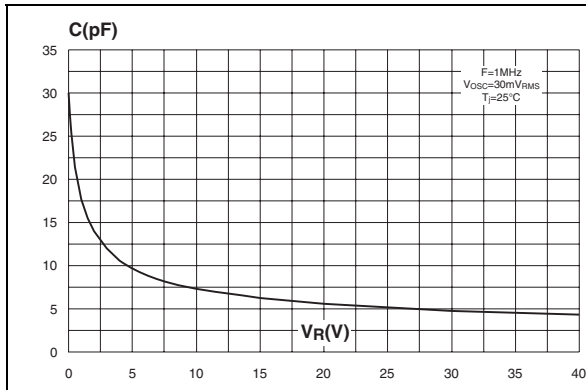


Figure 6. Forward voltage drop versus forward current (typical values)

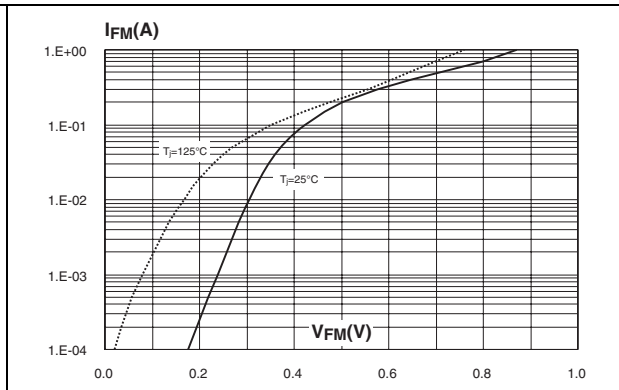


Figure 7. Relative variation of thermal impedance junction to ambient versus pulse duration (SOD-323)

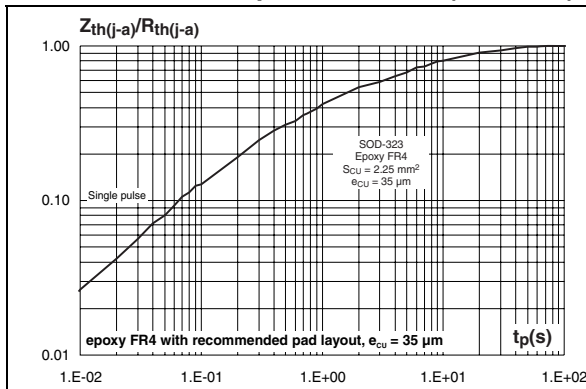
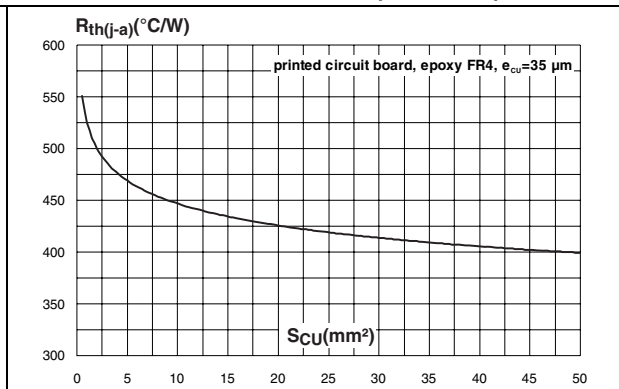


Figure 8. Thermal resistance junction to ambient versus copper surface under each lead (SOD-323)



2 Package information

- Epoxy meets UL94,V0
- Lead-free packages

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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 | 3.75 | 0.14 | 0.148 |

Figure 9. SOD-123 footprint, dimensions in mm (inches)

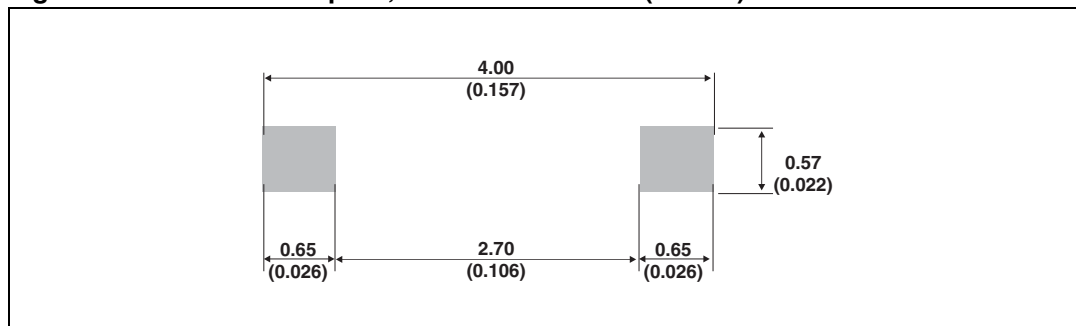
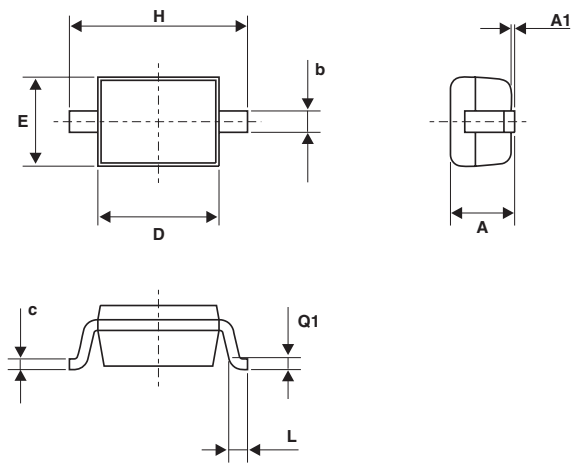


Table 7. SOD-323 dimensions



| 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 10. SOD-323 footprint (dimensions in mm)

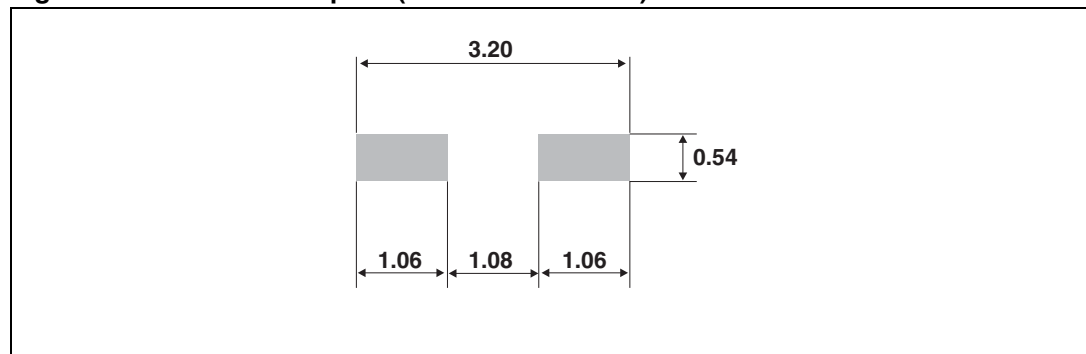
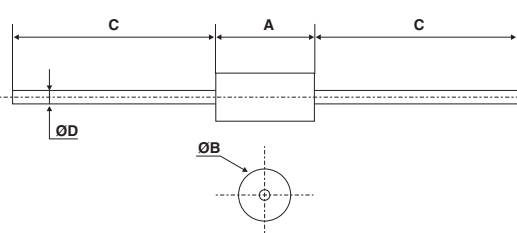


Table 8. DO-35 dimensions



| Ref. | Dimensions | | | |
|------|-------------|-------|--------|-------|
| | Millimeters | | Inches | |
| | Min. | Max. | Min. | Max. |
| A | 3.05 | 4.50 | 0.120 | 0.177 |
| B | 1.53 | 2.00 | 0.060 | 0.079 |
| C | 12.7 | | 0.500 | |
| D | 0.458 | 0.558 | 0.018 | 0.022 |

3 Ordering information

Table 9. Ordering information

| Order code | Marking | Package | Weight | Base qty | Delivery mode |
|------------|---------|----------------|--------|----------|---------------|
| BAT48ZFILM | Z48 | SOD-123 Single | 10 mg | 3000 | Tape and reel |
| BAT48JFILM | 48 | SOD-323 Single | 5 mg | 3000 | Tape and reel |
| BAT48RL | BAT48 | DO-35 | 15 mg | 4000 | Tape and reel |

4 Revision history

Table 10. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 08-Aug-2006 | 1 | Initial release. |
| 07-Jul-2011 | 2 | Updated package information for SOD-123. Added DO-35 package. |

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