

## Features

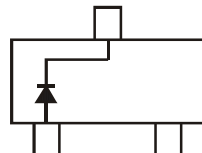
- Ultra-Small Surface Mount Package
- Low Forward Voltage Drop
- Fast Switching
- PN Junction Guard Ring for Transient and ESD Protection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

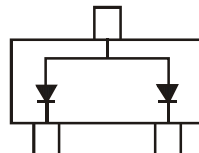
- Case: SOT523
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 
- Lead-Free Plating
- Polarity: See Diagrams Below
- Weight: 0.002 grams (Approximate)



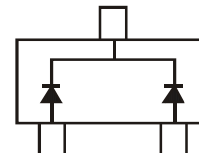
Top View



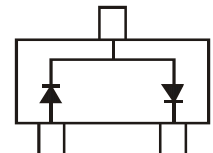
BAT54T



BAT54AT



BAT54CT



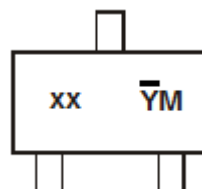
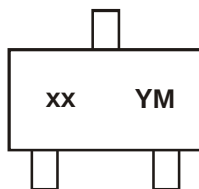
BAT54ST

## Ordering Information (Note 4)

| Part Number | Case   | Packaging         |
|-------------|--------|-------------------|
| BAT54T-7-F  | SOT523 | 3,000/Tape & Reel |
| BAT54AT-7-F | SOT523 | 3,000/Tape & Reel |
| BAT54CT-7-F | SOT523 | 3,000/Tape & Reel |
| BAT54ST-7-F | SOT523 | 3,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



xx = Product Type Marking Code

L1 = BAT54T

L2 = BAT54AT

L3 = BAT54CT

L4 = BAT54ST

 YM or  $\bar{Y}M$  = Date Code Marking

 Y or  $\bar{Y}$  = Year (ex: F = 2018)

M = Month (ex: 9 = September)

### Date Code Key

| Year | 2002 | ... | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | N    | ... | B    | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    | M    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                                                                      | Symbol           | Value | Unit |
|-----------------------------------------------------------------------------------------------------|------------------|-------|------|
| Peak Repetitive Reverse Voltage                                                                     | V <sub>RRM</sub> | 30    | V    |
| Working Peak Reverse Voltage                                                                        | V <sub>RWM</sub> |       |      |
| DC Blocking Voltage                                                                                 | V <sub>R</sub>   |       |      |
| Forward Continuous Current (Note 5)                                                                 | I <sub>FM</sub>  | 200   | mA   |
| Repetitive Peak Forward Current                                                                     | I <sub>FRM</sub> | 300   | mA   |
| Non-Repetitive Peak Forward Surge Current<br>8.3ms Single Half Sine-Wave Superimposed on Rated Load | I <sub>FSM</sub> | 600   | mA   |

**Thermal Characteristics**

| Characteristic                                           | Symbol                            | Value       | Unit |
|----------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                               | P <sub>D</sub>                    | 150         | mW   |
| Typical Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 490         | °C/W |
| Operating and Storage Temperature Range                  | T <sub>J</sub> , T <sub>STG</sub> | -65 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                     | Symbol             | Min | Typ | Max                               | Unit | Test Condition                                                                                                             |
|------------------------------------|--------------------|-----|-----|-----------------------------------|------|----------------------------------------------------------------------------------------------------------------------------|
| Reverse Breakdown Voltage (Note 6) | V <sub>(BR)R</sub> | 30  | —   | —                                 | V    | I <sub>R</sub> = 100μA                                                                                                     |
| Forward Voltage                    | V <sub>F</sub>     | —   | —   | 240<br>320<br>400<br>500<br>1,000 | mV   | I <sub>F</sub> = 0.1mA<br>I <sub>F</sub> = 1mA<br>I <sub>F</sub> = 10mA<br>I <sub>F</sub> = 30mA<br>I <sub>F</sub> = 100mA |
| Reverse Leakage Current (Note 6)   | I <sub>R</sub>     | —   | —   | 2.0                               | μA   | V <sub>R</sub> = 25V                                                                                                       |
| Total Capacitance                  | C <sub>T</sub>     | —   | —   | 10                                | pF   | V <sub>R</sub> = 10V, f = 1.0MHz                                                                                           |
| Reverse Recovery Time              | t <sub>RR</sub>    | —   | —   | 5.0                               | ns   | I <sub>F</sub> = I <sub>R</sub> = 10mA,<br>I <sub>RR</sub> = 0.1 x I <sub>R</sub> , R <sub>L</sub> = 100Ω                  |

Notes: 5. Device mounted on FR-4 substrate PC board with recommended pad layout, which can be found on our website at

<http://www.diodes.com/package-outlines.html>.

6. Short duration pulse test used to minimize self-heating effect.

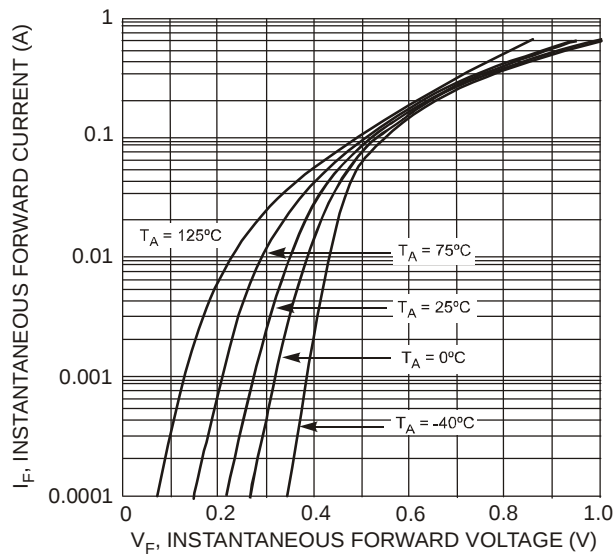


Fig. 1 Typical Forward Characteristics

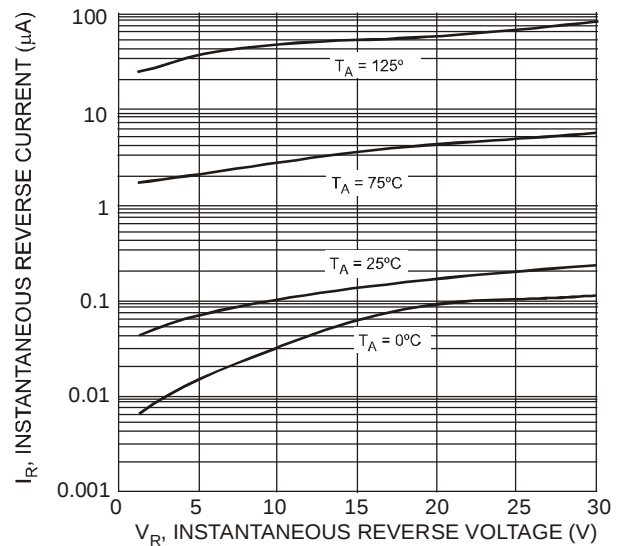


Fig. 2 Typical Reverse Characteristics

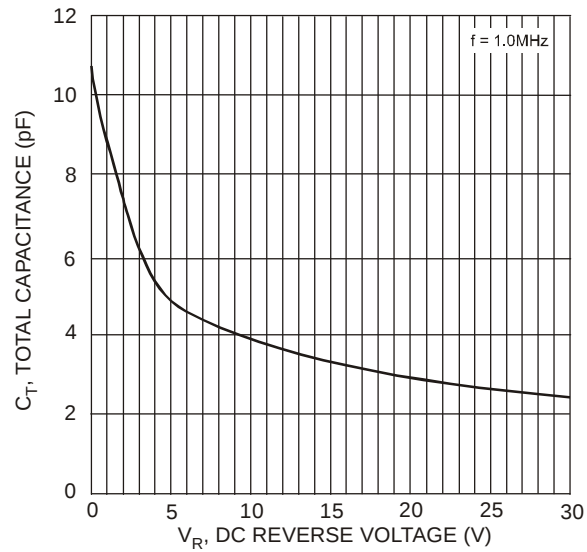


Fig. 3 Total Capacitance vs. Reverse Voltage

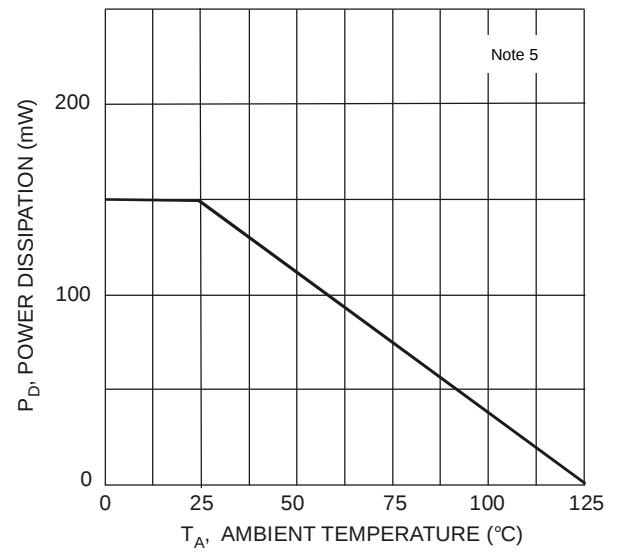
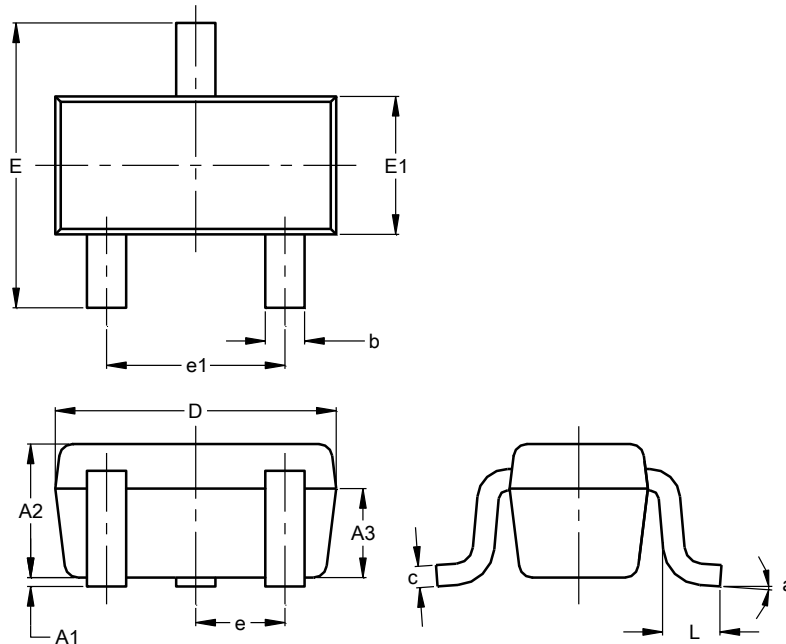


Fig. 4 Power Derating Curve

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT523

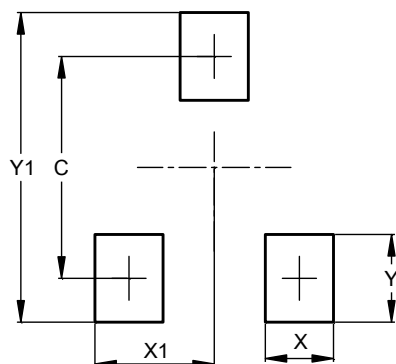


| SOT523               |          |      |      |
|----------------------|----------|------|------|
| Dim                  | Min      | Max  | Typ  |
| A1                   | 0.00     | 0.10 | 0.05 |
| A2                   | 0.60     | 0.80 | 0.75 |
| A3                   | 0.45     | 0.65 | 0.50 |
| b                    | 0.15     | 0.30 | 0.22 |
| c                    | 0.10     | 0.20 | 0.12 |
| D                    | 1.50     | 1.70 | 1.60 |
| E                    | 1.45     | 1.75 | 1.60 |
| E1                   | 0.75     | 0.85 | 0.80 |
| e                    | 0.50 BSC |      |      |
| e1                   | 0.90     | 1.10 | 1.00 |
| L                    | 0.20     | 0.40 | 0.33 |
| a                    | 0°       | --   | 8°   |
| All Dimensions in mm |          |      |      |

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT523



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 1.29          |
| X          | 0.40          |
| X1         | 0.70          |
| Y          | 0.51          |
| Y1         | 1.80          |

**Note:** The suggested land pattern dimensions have been provided for reference only, as actual pad layouts may vary depending on application. These dimensions may be modified based on user equipment capability or fabrication criteria. A more robust pattern may be desired for wave soldering and is calculated by adding 0.2 mm to the 'Z' dimension. For further information, please reference document IPC-7351A, Naming Convention for Standard SMT Land Patterns, and for International grid details, please see document IEC, Publication 97.

**Note:** For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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