

## Features

- Ultra-Small Surface Mount Package
- Fast Switching Speed
- For General Purpose Switching Applications
- High Reverse Breakdown Voltage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

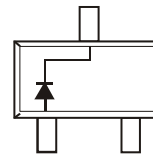
## Mechanical Data

- Case: SOT-523
- Case Material: Molded Plastic, "Green" Molding Compound (Note 5). UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish Annealed over Alloy 42 Leadframe)
- Polarity: See Diagram
- Weight: 0.002 grams (Approximate)



TOP VIEW

SOT-523



TOP VIEW

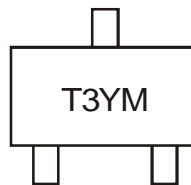
Internal Schematic

## Ordering Information (Notes 4)

| Part Number | Compliance | Case    | Packaging        |
|-------------|------------|---------|------------------|
| BAS21T-7-F  | Commercial | SOT-523 | 3000/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 <http://www.diodes.com/package-outlines.html>.
  5. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.

## Marking Information



T3 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year  | 2001 | 2002 | 2003 | ..... | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|-------|------|------|------|-------|------|------|------|------|------|------|------|------|
| Code  | M    | N    | P    | ..... | E    | F    | G    | H    | I    | J    | K    | L    |
| 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** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                            | Symbol       | Value                  | Unit |   |
|---|--------------|------------------------|------|---|
| Repetitive Peak Reverse Voltage           | $V_{RRM}$    | 250                    | V    |   |
| Working Peak Reverse Voltage              | $V_{RWM}$    | 200                    | V    |   |
| DC Blocking Voltage                       | $V_R$        |                        |      |   |
| RMS Reverse Voltage                       | $V_{R(RMS)}$ | 141                    | V    |   |
| Forward Continuous Current (Note 6)       | $I_{FM}$     | 400                    | mA   |   |
| Average Rectified Output Current (Note 6) | $I_O$        | 200                    | mA   |   |
| Non-Repetitive Peak Forward Surge Current |              | @ $t = 1.0\mu\text{s}$ | 2.5  | A |
|   |              | @ $t = 1.0\text{s}$    | 0.5  |   |
| Repetitive Peak Forward Surge Current     | $I_{FRM}$    | 625                    | mA   |   |

**Thermal Characteristics**

| Characteristic                                  | Symbol          | Value       | Unit               |
|---|-----------------|-------------|--------------------|
| Power Dissipation (Note 6)                      | $P_D$           | 150         | mW                 |
| Thermal Resistance Junction to Ambient (Note 6) | $R_{\theta JA}$ | 833         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range         | $T_J, T_{STG}$  | -65 to +150 | $^\circ\text{C}$   |

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic                                       | Symbol      | Min | Max  | Unit | Test Condition  |
|--|-------------|-----|------|------|---|
| Reverse Breakdown Voltage (Note 7)                   | $V_{(BR)R}$ | 250 | —    | V    | $I_R = 100\mu\text{A}$  |
| Forward Voltage                                      | $V_F$       | —   | 1.0  | V    | $I_F = 100\text{mA}$  |
|  |             |     | 1.25 |      | $I_F = 200\text{mA}$  |
| Reverse Current @ Rated DC Blocking Voltage (Note 7) | $I_R$       | —   | 100  | nA   | $T_J = 25^\circ\text{C}$  |
|  |             |     | 15   |      | $T_J = 100^\circ\text{C}$   |
| Total Capacitance                                    | $C_T$       | —   | 5.0  | pF   | $V_R = 0, f = 1.0\text{MHz}$  |
| Reverse Recovery Time                                | $t_{rr}$    | —   | 50   | ns   | $I_F = I_R = 30\text{mA}$ ,<br>$I_{rr} = 0.1 \times I_R, R_L = 100\Omega$ |

- Notes:
- Device mounted on FR-4 PCB with recommended pad layout, which can be found on our website at <http://www.diodes.com/package-outlines.html>.  
 $I_{FM}, I_O$  are valid provided that terminals are kept at ambient temperature.
  - Short duration pulse test used to minimize self-heating effect.

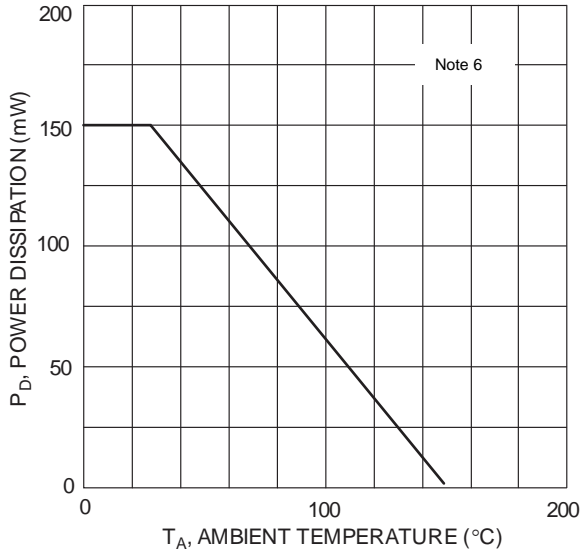


Fig. 1 Power Derating Curve

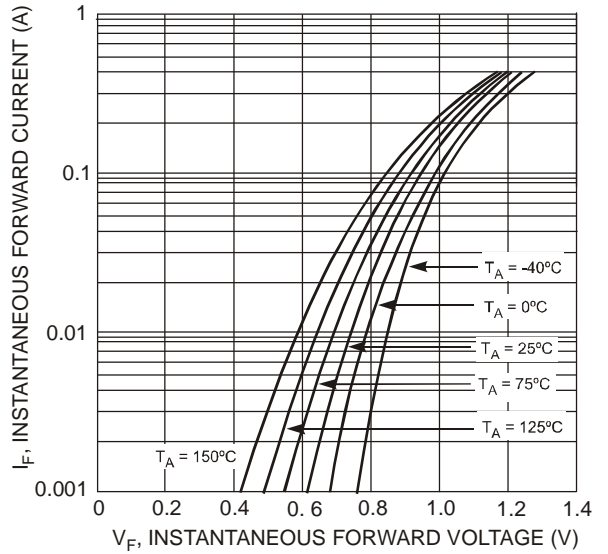


Fig. 2 Typical Forward Characteristics

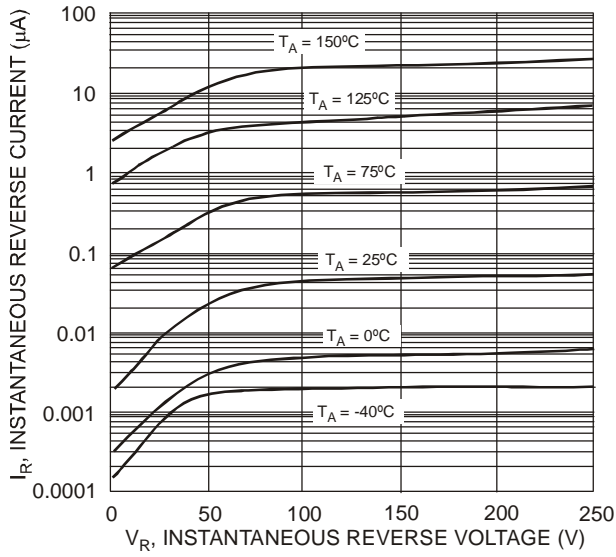


Fig. 3 Typical Reverse Characteristics

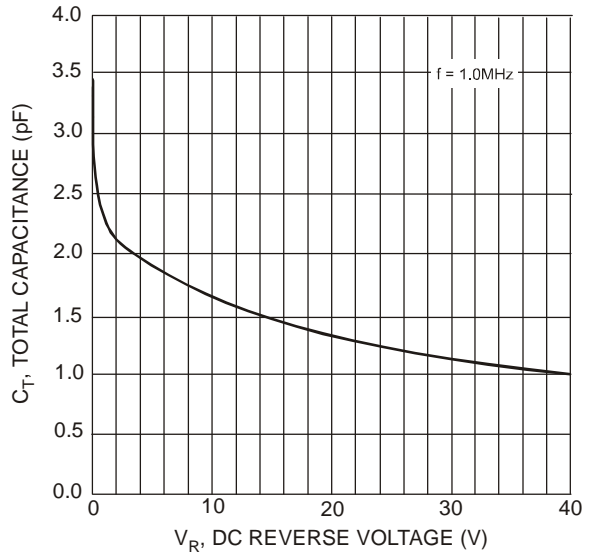
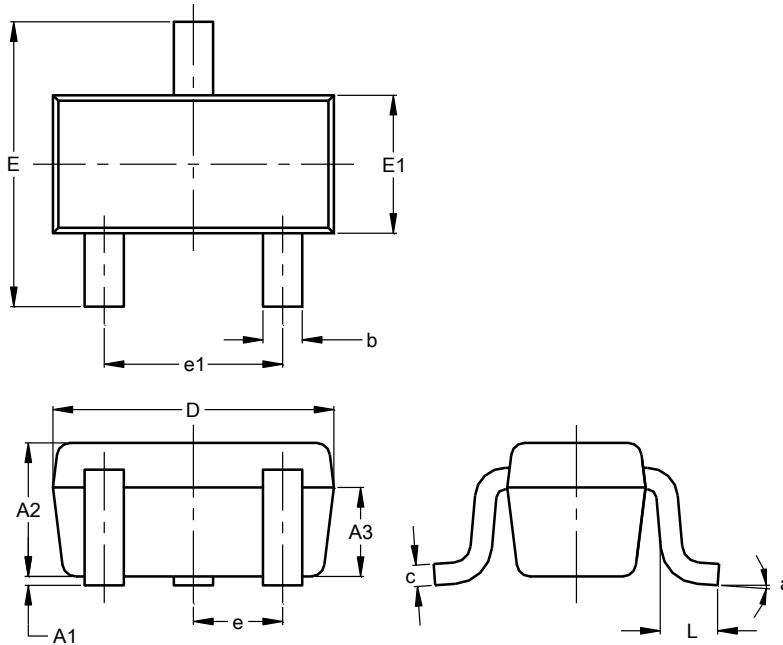


Fig. 4 Total Capacitance vs. Reverse Voltage

**Package Outline Dimensions**

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

**SOT523**

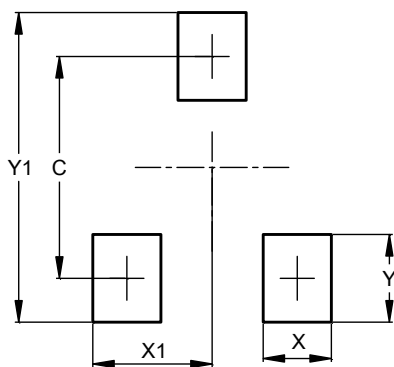


| SOT523               |          |      |      |
|----------------------|----------|------|------|
| Dim                  | Min      | Max  | Typ  |
| A1                   | 0.00     | 0.10 | 0.05 |
| A2                   | 0.60     | 0.80 | 0.75 |
| A3                   | 0.45     | 0.65 | 0.50 |
| 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          |

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