

**PNP PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR**
**Features**

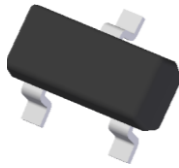
- Epitaxial Planar Die Construction
- Built-In Biasing Resistors, R1 = R2
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

**Mechanical Data**

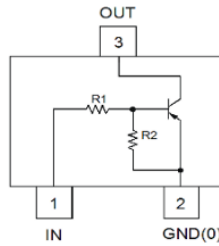
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

|                     |
|---------------------|
| <b>R1, R2 (NOM)</b> |
| 4.7kΩ               |

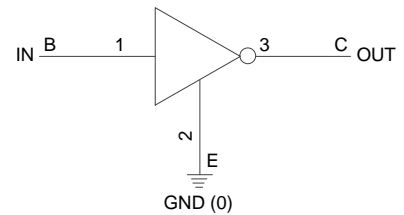
SOT23



Top View



Device Schematic



Equivalent Inverter Circuit

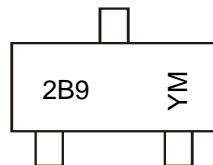
**Ordering Information (Note 5)**

| Part Number    | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|----------------|------------|---------|--------------------|-----------------|-------------------|
| ADTA143ECAQ-7  | Automotive | 2B9     | 7                  | 8               | 3,000             |
| ADTA143ECAQ-13 | Automotive | 2B9     | 13                 | 8               | 10,000            |

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**

SOT23



2B9 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: G = 2019)  
 M = Month (ex: 9 = September)

Date Code Key

| Year  | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code  | G    | H    | I    | J    | K    | L    | M    | N    | O    | P    | Q    | R    | S    | T    | U    | V    |
| 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    |      |      |      |      |

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

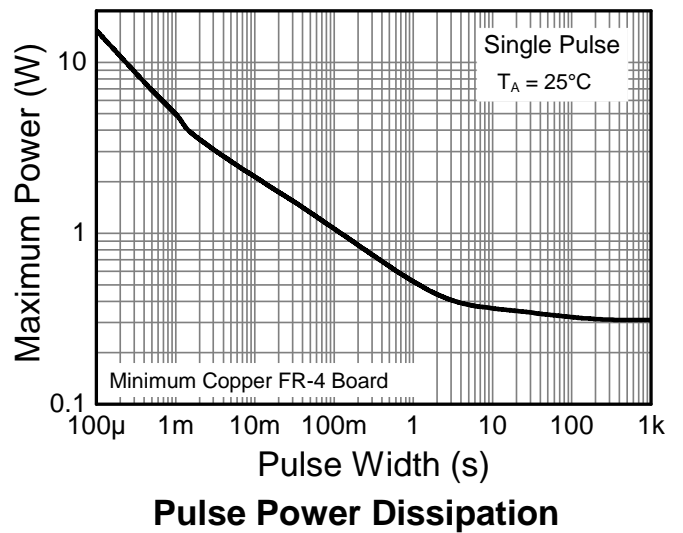
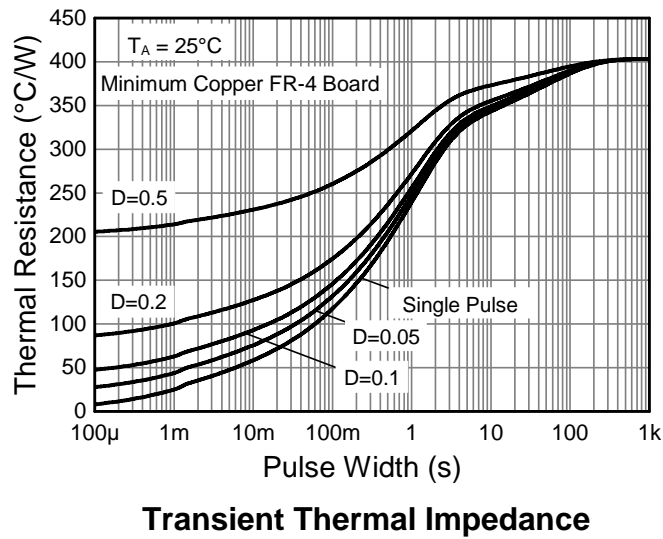
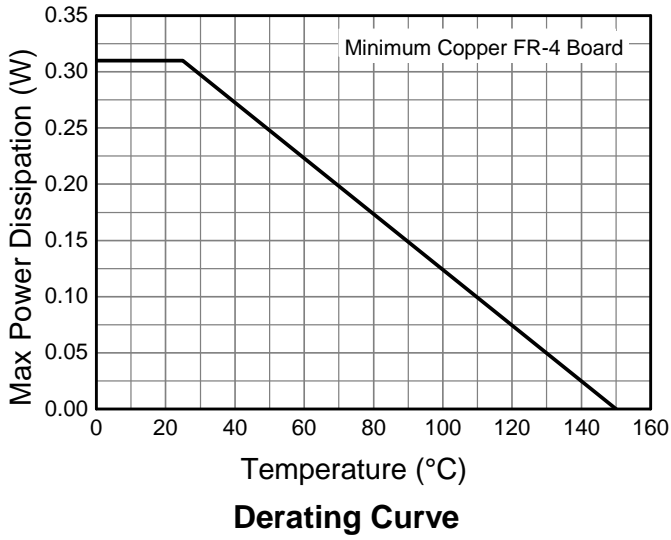
| Characteristic                   | Symbol               | Value      | Unit |
|----------------------------------|----------------------|------------|------|
| Supply Voltage <Pin: (3) to (2)> | V <sub>CC</sub>      | -50        | V    |
| Input Voltage <Pin: (1) to (2)>  | V <sub>IN</sub>      | +10 to -30 | V    |
| Output Current                   | I <sub>C</sub> (Max) | -100       | mA   |

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

| Characteristic                                       | Symbol                            | Value       | Unit |
|------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 6)                           | P <sub>D</sub>                    | 310         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R <sub>θJA</sub>                  | 403         | °C/W |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

Note: 6. Mounted on FR-4 PC Board with minimum recommended pad layout.

**Thermal Characteristics and Derating Information**

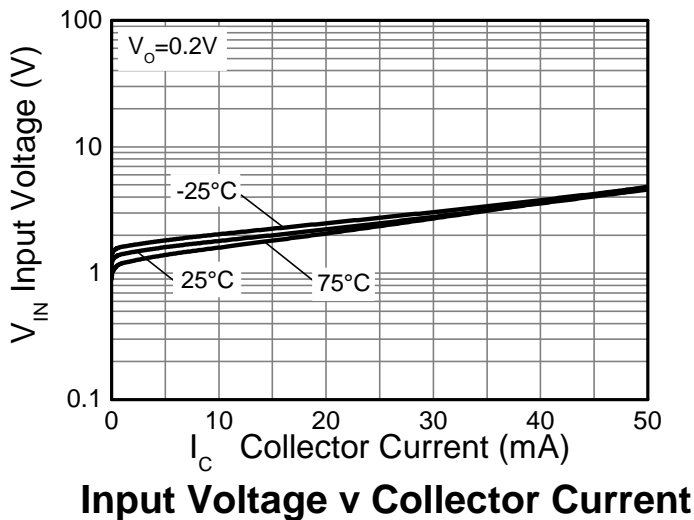
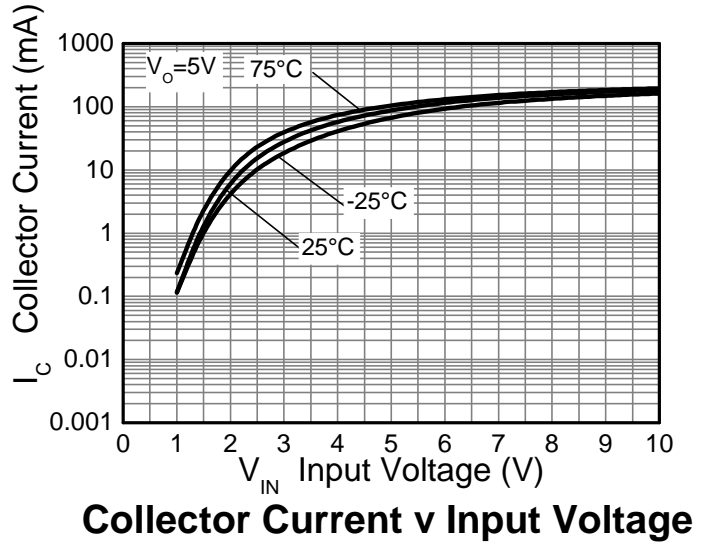
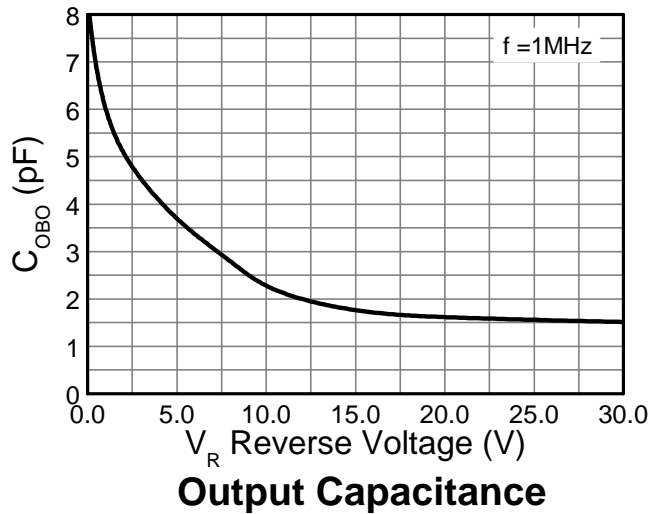
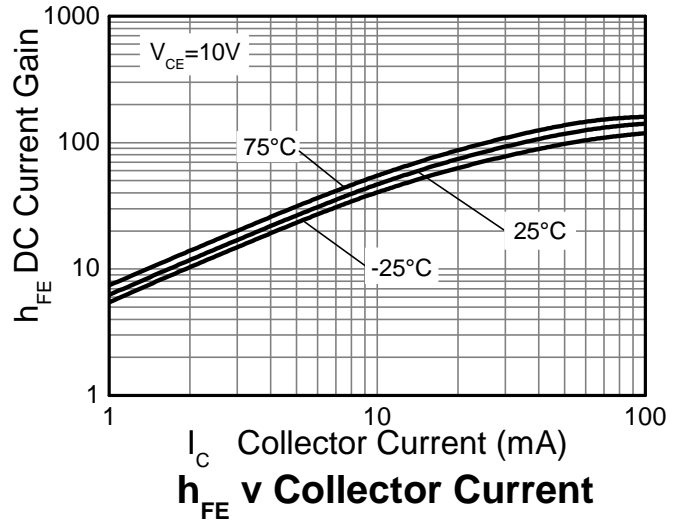
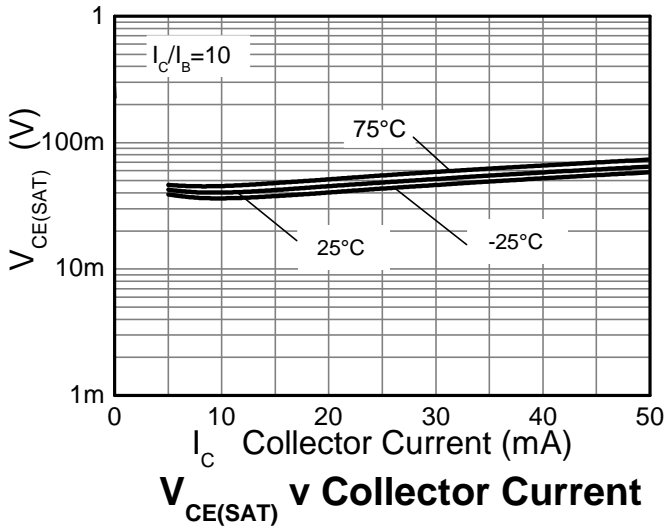


**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                  | Symbol                          | Min  | Typ  | Max  | Unit | Test Condition                                               |
|---------------------------------|---------------------------------|------|------|------|------|--------------------------------------------------------------|
| Input Voltage                   | V <sub>I(OFF)</sub> (Note 7)    | -0.5 | -1.1 | —    | V    | V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA               |
|                                 | V <sub>I(ON)</sub> (Note 8)     | —    | -1.9 | -3   |      | V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA               |
| Output Voltage                  | V <sub>O(ON)</sub>              | —    | -0.1 | -0.3 | V    | I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA                |
| Input Current                   | I <sub>I</sub>                  | —    | —    | -1.8 | mA   | V <sub>I</sub> = -5V                                         |
| Output Current                  | I <sub>O(OFF)</sub>             | —    | —    | -0.5 | μA   | V <sub>CC</sub> = -50V, V <sub>I</sub> = 0V                  |
| DC Current Gain                 | G <sub>I</sub>                  | 20   | —    | —    | —    | V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA                 |
| Input Resistor Tolerance        | ΔR <sub>1</sub>                 | -30  | —    | +30  | %    | —                                                            |
| Resistance Ratio Tolerance      | ΔR <sub>2</sub> /R <sub>1</sub> | -20  | —    | +20  | %    | —                                                            |
| Gain-Bandwidth Product (Note 9) | f <sub>T</sub>                  | —    | 250  | —    | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA,<br>f = 100MHz |

- Notes:
- 7. Guarantees that the device will be switched OFF if the Input Voltage is less than -0.5V.
  - 8. Guarantees that the device will be switched ON if the Input Voltage is more than -3V.
  - 9. Transistor - For Reference Only.

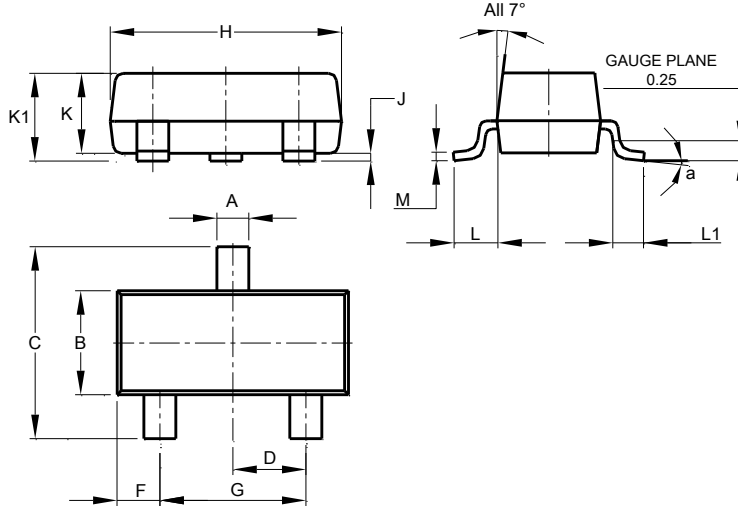
**Typical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT23**

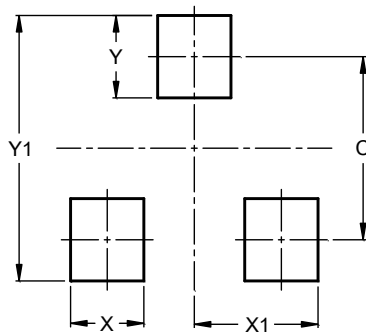


| SOT23                |       |       |       |
|----------------------|-------|-------|-------|
| Dim                  | Min   | Max   | Typ   |
| A                    | 0.37  | 0.51  | 0.40  |
| B                    | 1.20  | 1.40  | 1.30  |
| C                    | 2.30  | 2.50  | 2.40  |
| D                    | 0.89  | 1.03  | 0.915 |
| F                    | 0.45  | 0.60  | 0.535 |
| G                    | 1.78  | 2.05  | 1.83  |
| H                    | 2.80  | 3.00  | 2.90  |
| J                    | 0.013 | 0.10  | 0.05  |
| K                    | 0.890 | 1.00  | 0.975 |
| K1                   | 0.903 | 1.10  | 1.025 |
| L                    | 0.45  | 0.61  | 0.55  |
| L1                   | 0.25  | 0.55  | 0.40  |
| M                    | 0.085 | 0.150 | 0.110 |
| a                    | 0°    | 8°    | --    |
| All Dimensions in mm |       |       |       |

**Suggested Pad Layout**

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

**SOT23**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 2.0           |
| X          | 0.8           |
| X1         | 1.35          |
| Y          | 0.9           |
| Y1         | 2.9           |

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