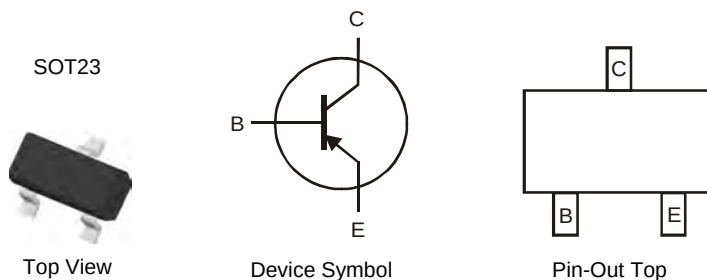


**60V LOW  $V_{CE(sat)}$  PNP SURFACE MOUNT TRANSISTOR**
**Features**

- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free. "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

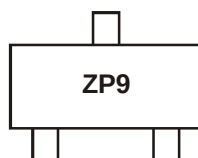
**Mechanical Data**

- 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 annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)


**Ordering Information** (Note 3)

| Product    | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------|---------|--------------------|-----------------|-------------------|
| DSS5160T-7 | ZP9     | 7                  | 8mm             | 3,000             |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
  3. For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**


ZP9 = Product Type Marking Code

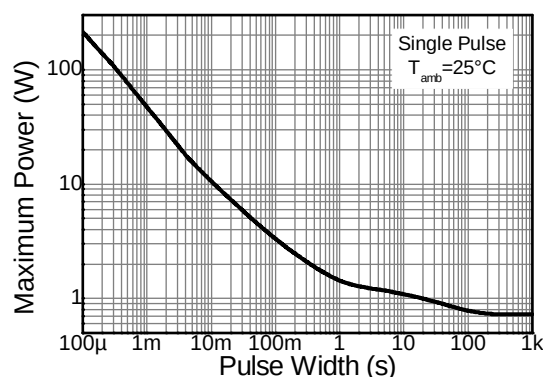
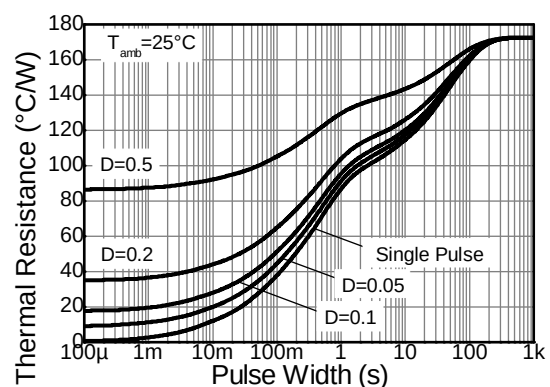
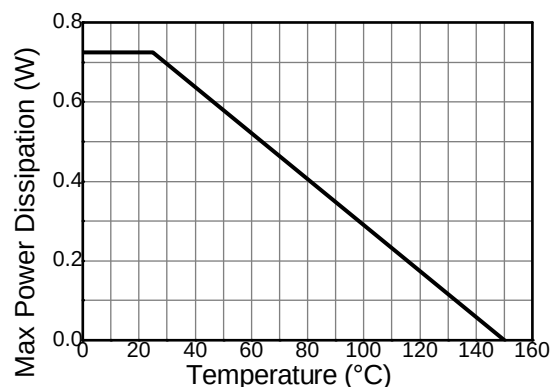
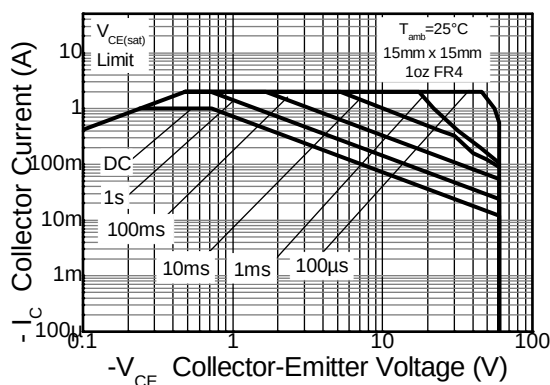
**Maximum Ratings** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CBO}$ | -80   | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | -60   | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | -5    | V    |
| Continuous Collector Current | $I_C$     | -1    | A    |
| Peak Pulse Collector Current | $I_{CM}$  | -2    | A    |
| Base Current (DC)            | $I_B$     | -300  | mA   |
| Peak Base Current            | $I_{BM}$  | -1    | A    |

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

| Characteristic                                       | Symbol          | Value       | Unit               |
|------------------------------------------------------|-----------------|-------------|--------------------|
| Power Dissipation (Note 5)                           | $P_D$           | 725         | mW                 |
| Thermal Resistance, Junction to Ambient (Note 5)     | $R_{\theta JA}$ | 172         | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Ambient Air (Note 4) | $R_{\theta JA}$ | 79          | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range              | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

Notes: 4. Operated under pulsed conditions: pulse width  $\leq 100\text{ms}$ , duty cycle  $\leq 0.25$ .  
 5. Device mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

**Thermal Characteristics**


# Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                | Symbol               | Min | Typ | Max  | Unit | Test Conditions                                                                           |
|-----------------------------------------------|----------------------|-----|-----|------|------|-------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage              | BV <sub>CBO</sub>    | -80 | —   | —    | V    | I <sub>C</sub> = -100μA                                                                   |
| Collector-Emitter Breakdown Voltage (Note 6)  | BV <sub>CEO</sub>    | -60 | —   | —    | V    | I <sub>C</sub> = -10mA                                                                    |
| Emitter-Base Breakdown Voltage                | BV <sub>EBO</sub>    | -5  | —   | —    | V    | I <sub>E</sub> = -100μA                                                                   |
| Collector-Base Cutoff Current                 | I <sub>CBO</sub>     | —   | —   | -100 | nA   | V <sub>CB</sub> = -20V, I <sub>E</sub> = 0                                                |
|                                               |                      | —   | —   | -50  | μA   | V <sub>CB</sub> = -20V, I <sub>E</sub> = 0, T <sub>A</sub> = 150°C                        |
| Emitter-Base Cutoff Current                   | I <sub>EBO</sub>     | —   | —   | -100 | nA   | V <sub>EB</sub> = -5V, I <sub>C</sub> = 0                                                 |
| DC Current Gain (Note 6)                      | h <sub>FE</sub>      | 200 | —   | —    | —    | V <sub>CE</sub> = -5V, I <sub>C</sub> = -1mA                                              |
|                                               |                      | 150 | —   | —    | —    | V <sub>CE</sub> = -5V, I <sub>C</sub> = -500mA                                            |
|                                               |                      | 100 | —   | —    | —    | V <sub>CE</sub> = -5V, I <sub>C</sub> = -1A                                               |
| Collector-Emitter Saturation Voltage (Note 6) | V <sub>CE(sat)</sub> | —   | —   | -175 | mV   | I <sub>C</sub> = -100mA, I <sub>B</sub> = -1mA                                            |
|                                               |                      | —   | —   | -180 |      | I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA                                           |
|                                               |                      | —   | —   | -340 |      | I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA                                             |
| Equivalent On-Resistance                      | R <sub>CE(sat)</sub> | —   | —   | 340  | mΩ   | I <sub>E</sub> = -1A, I <sub>B</sub> = -100mA                                             |
| Base-Emitter Saturation Voltage               | V <sub>BE(sat)</sub> | —   | —   | -1.1 | V    | I <sub>C</sub> = -1A, I <sub>B</sub> = -50mA                                              |
| Base-Emitter Turn-on Voltage                  | V <sub>BE(on)</sub>  | —   | —   | -0.9 | V    | V <sub>CE</sub> = -5V, I <sub>C</sub> = -1A                                               |
| Transition Frequency                          | f <sub>T</sub>       | 150 | —   | —    | MHz  | V <sub>CE</sub> = -10V, I <sub>C</sub> = -50mA, f = 100MHz                                |
| Output Capacitance                            | C <sub>ob</sub>      | —   | —   | 15   | pF   | V <sub>CB</sub> = -10V, f = 1MHz                                                          |
| Turn-On Time                                  | t <sub>on</sub>      | —   | 75  | —    | ns   | V <sub>CC</sub> = -10V, I <sub>C</sub> = -0.5A, I <sub>B1</sub> = I <sub>B2</sub> = -25mA |
| Delay Time                                    | t <sub>d</sub>       | —   | 35  | —    | ns   |                                                                                           |
| Rise Time                                     | t <sub>r</sub>       | —   | 40  | —    | ns   |                                                                                           |
| Turn-Off Time                                 | t <sub>off</sub>     | —   | 265 | —    | ns   |                                                                                           |
| Storage Time                                  | t <sub>s</sub>       | —   | 230 | —    | ns   |                                                                                           |
| Fall Time                                     | t <sub>f</sub>       | —   | 35  | —    | ns   |                                                                                           |

Notes: 6. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

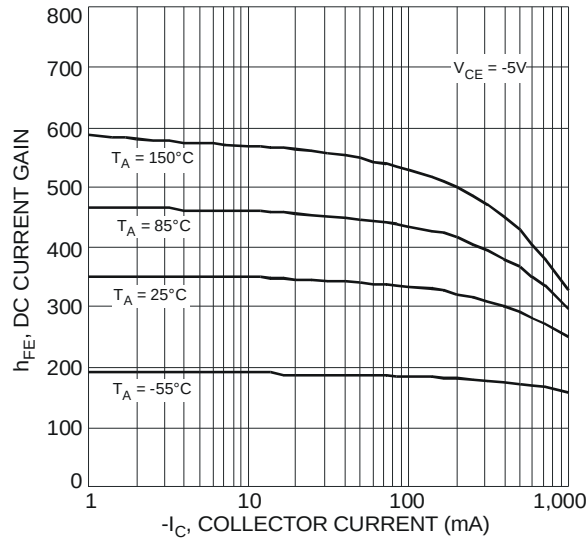


Fig. 5 Typical DC Current Gain vs. Collector Current

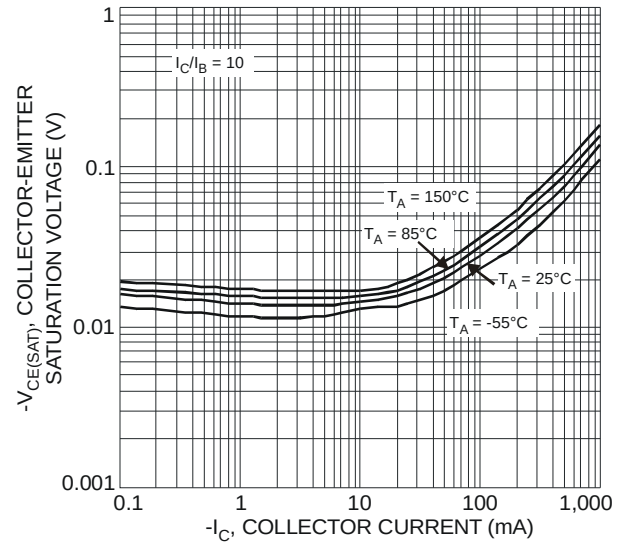


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

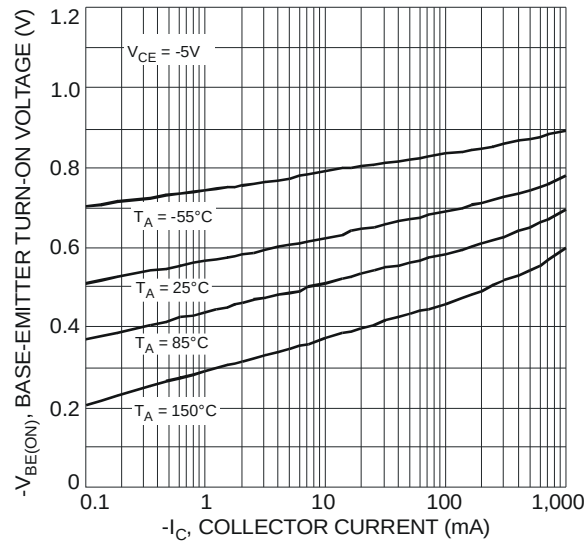


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

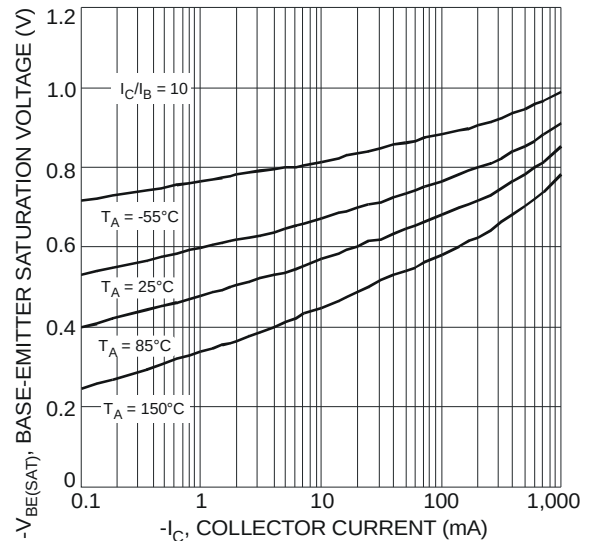


Fig. 8 Typical Base-Emitter Saturation Voltage vs. Collector Current

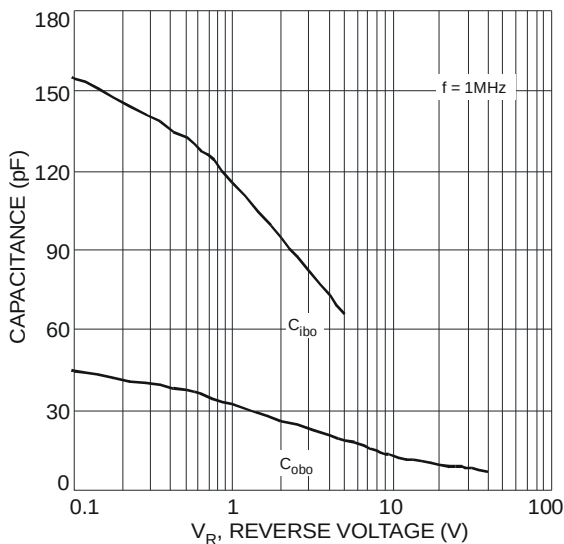
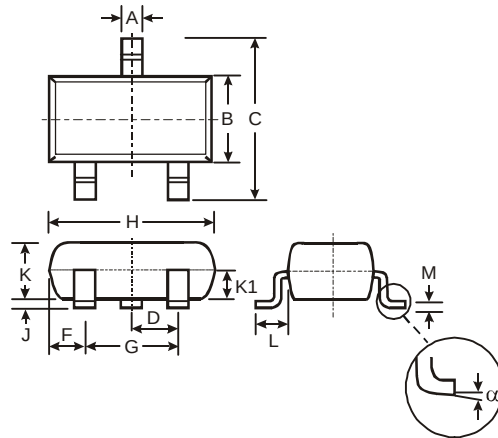


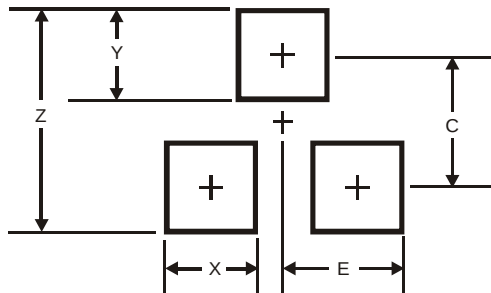
Fig. 9 Typical Capacitance Characteristics

## Package Outline Dimensions



| 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                    | 0.903 | 1.10 | 1.00  |
| K1                   | -     | -    | 0.400 |
| L                    | 0.45  | 0.61 | 0.55  |
| M                    | 0.085 | 0.18 | 0.11  |
| α                    | 0°    | 8°   | -     |
| All Dimensions in mm |       |      |       |

## Suggested Pad Layout



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

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