

## Features

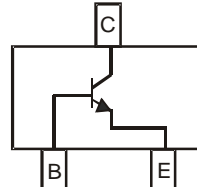
- Epitaxial Planar Die Construction
- Ideal for Medium Power Amplification and Switching
- Complimentary PNP Type Available (DSS5320T)
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **“Green” Device (Note 2)**

## Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)



Top View



Device Schematic

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

| Characteristic                         | Symbol    | Value | Unit |
|----------------------------------------|-----------|-------|------|
| Collector-Base Voltage                 | $V_{CBO}$ | 20    | V    |
| Collector-Emitter Voltage              | $V_{CEO}$ | 20    | V    |
| Emitter-Base Voltage                   | $V_{EBO}$ | 5     | V    |
| Peak Pulse Current                     | $I_{CM}$  | 5     | A    |
| Repetitive Peak Pulse Current (Note 3) | $I_{CRP}$ | 3     | A    |
| Continuous Collector Current           | $I_C$     | 2     | A    |
| Base Current                           | $I_B$     | 0.5   | A    |

## Thermal Characteristics

| Characteristic                                                                  | Symbol          | Value       | Unit               |
|---------------------------------------------------------------------------------|-----------------|-------------|--------------------|
| Power Dissipation (Note 4) @ $T_A = 25^\circ\text{C}$                           | $P_D$           | 600         | mW                 |
| Thermal Resistance, Junction to Ambient Air (Note 4) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 209         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range                                         | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Operated under pulse conditions: Pulse width  $\leq 100\text{ms}$ , duty cycle  $\leq 0.25$ .
  4. Device mounted on FR-4 PCB; with minimum recommended pad layout.

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

| Characteristic                               | Symbol        | Min | Typ | Max | Unit             | Test Conditions                                             |
|----------------------------------------------|---------------|-----|-----|-----|------------------|-------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b>                   |               |     |     |     |                  |                                                             |
| Collector-Base Cutoff Current                | $I_{CBO}$     | —   | —   | 100 | nA               | $V_{CB} = 20\text{V}, I_E = 0$                              |
| Emitter-Base Cutoff Current                  | $I_{EBO}$     | —   | —   | 50  | $\mu\text{A}$    | $V_{CB} = 20\text{V}, I_E = 0, T_A = 150^\circ\text{C}$     |
| Collector-Base Breakdown Voltage             | $V_{(BR)CBO}$ | 20  | —   | —   | V                | $I_C = 100\mu\text{A}$                                      |
| Collector-Emitter Breakdown Voltage (Note 5) | $V_{(BR)CEO}$ | 20  | —   | —   | V                | $I_C = 10\text{mA}$                                         |
| Emitter-Base Breakdown Voltage               | $V_{(BR)EBO}$ | 5   | —   | —   | V                | $I_E = 100\mu\text{A}$                                      |
| <b>ON CHARACTERISTICS (Note 5)</b>           |               |     |     |     |                  |                                                             |
| DC Current Gain                              | $h_{FE}$      | 220 | —   | —   | —                | $V_{CE} = 2\text{V}, I_C = 0.1\text{A}$                     |
|                                              |               | 220 | —   | —   |                  | $V_{CE} = 2\text{V}, I_C = 0.5\text{A}$                     |
|                                              |               | 220 | —   | —   |                  | $V_{CE} = 2\text{V}, I_C = 1\text{A}$                       |
|                                              |               | 200 | —   | —   |                  | $V_{CE} = 2\text{V}, I_C = 2\text{A}$                       |
|                                              |               | 150 | —   | —   |                  | $V_{CE} = 2\text{V}, I_C = 3\text{A}$                       |
| Collector-Emitter Saturation Voltage         | $V_{CE(SAT)}$ | —   | —   | 70  | mV               | $I_C = 0.5\text{A}, I_B = 50\text{mA}$                      |
|                                              |               | —   | —   | 120 |                  | $I_C = 1\text{A}, I_B = 50\text{mA}$                        |
|                                              |               | —   | —   | 230 |                  | $I_C = 2\text{A}, I_B = 40\text{mA}$                        |
|                                              |               | —   | 70  | 210 |                  | $I_C = 2\text{A}, I_B = 200\text{mA}$                       |
|                                              |               | —   | —   | 310 |                  | $I_C = 3\text{A}, I_B = 300\text{mA}$                       |
| Equivalent On-Resistance                     | $R_{CE(SAT)}$ | —   | 35  | 105 | $\text{m}\Omega$ | $I_E = 2\text{A}, I_B = 200\text{mA}$                       |
| Base-Emitter Saturation Voltage              | $V_{BE(SAT)}$ | —   | —   | 1.1 | V                | $I_C = 2\text{A}, I_B = 40\text{mA}$                        |
|                                              |               | —   | —   | 1.2 | V                | $I_C = 3\text{A}, I_B = 300\text{mA}$                       |
| Base-Emitter Turn-on Voltage                 | $V_{BE(ON)}$  | —   | —   | 1.2 | V                | $V_{CE} = 2\text{V}, I_C = 1\text{A}$                       |
| <b>SMALL SIGNAL CHARACTERISTICS</b>          |               |     |     |     |                  |                                                             |
| Transition Frequency                         | $f_T$         | 100 | —   | —   | MHz              | $V_{CE} = 5\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$ |
| Output Capacitance                           | $C_{ob}$      | —   | —   | 35  | pF               | $V_{CB} = 10\text{V}, f = 1\text{MHz}$                      |

Notes: 5. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

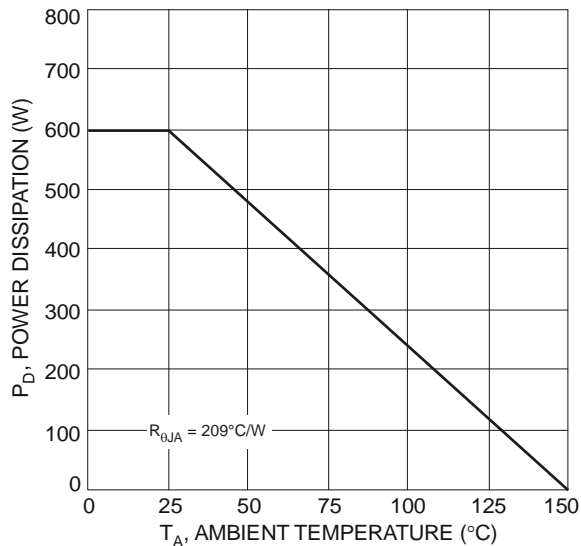


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 4)

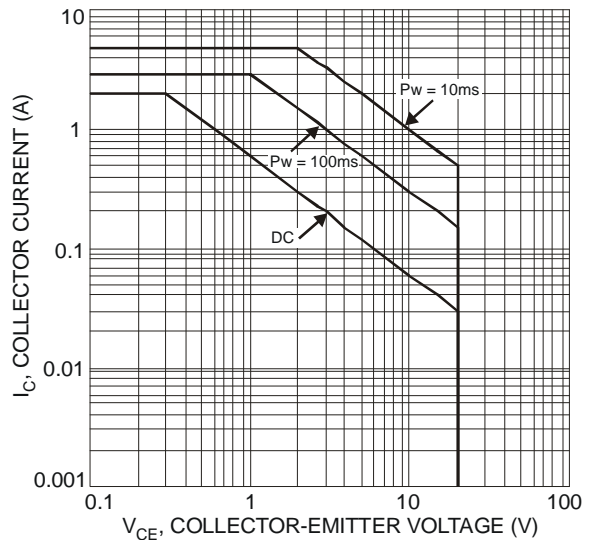


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

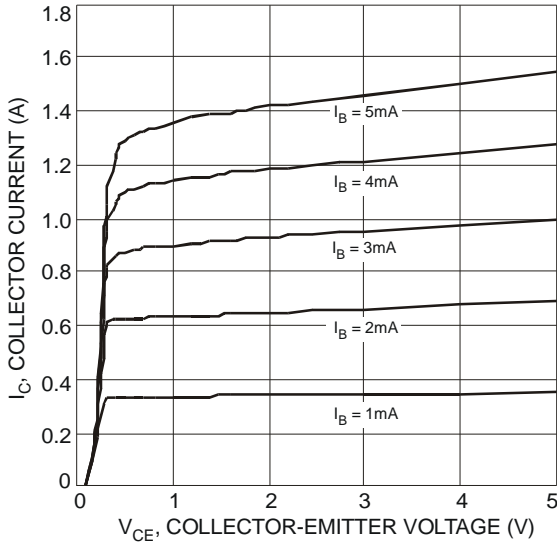


Fig. 3 Typical Collector Current vs. Collector-Emitter Voltage

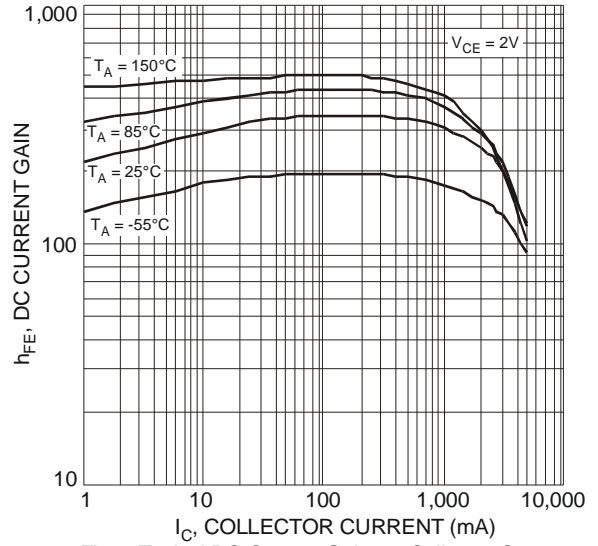


Fig. 4 Typical DC Current Gain vs. Collector Current

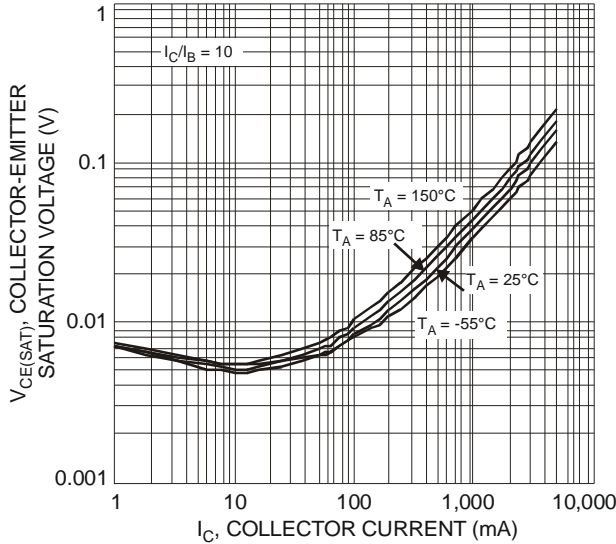


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

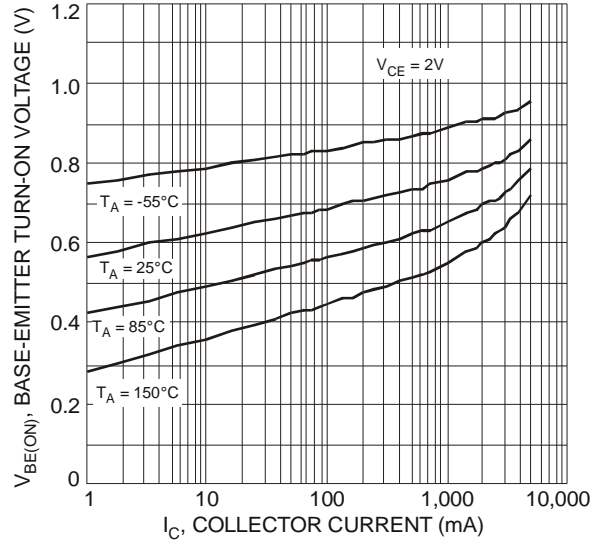


Fig. 6 Typical Base-Emitter Turn-On Voltage vs. Collector Current

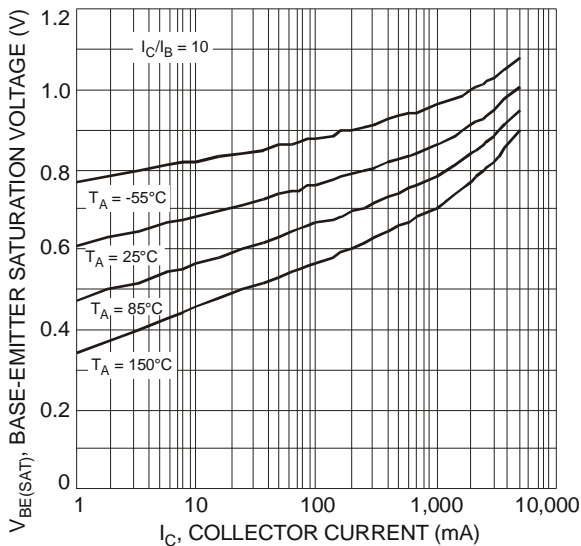


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

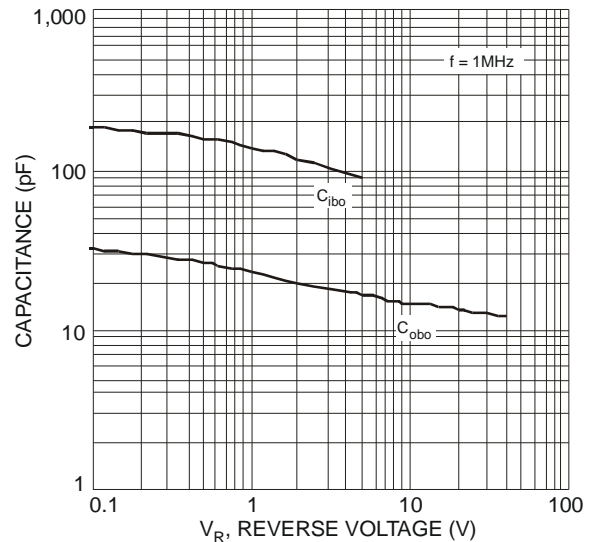


Fig. 8 Typical Capacitance Characteristics

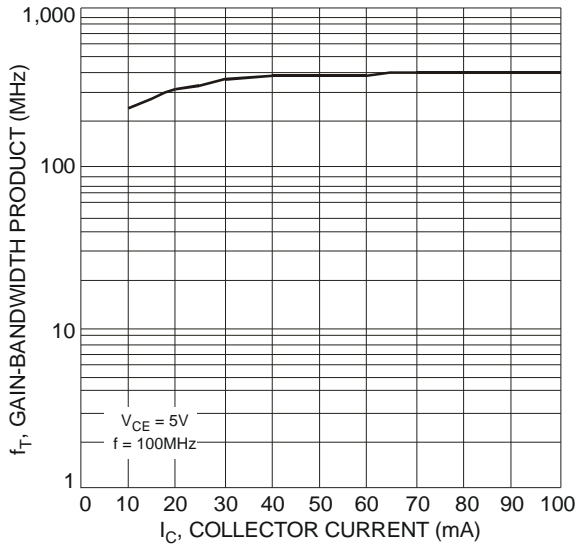


Fig. 9 Typical Gain-Bandwidth Product vs. Collector Current

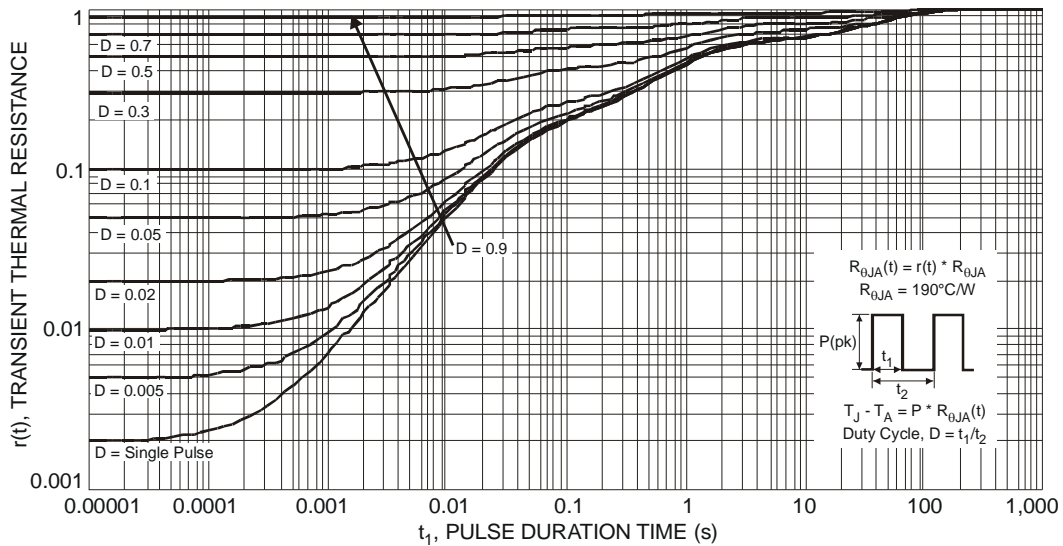


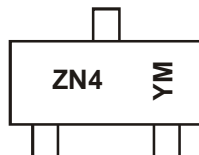
Fig. 10 Transient Thermal Response

**Ordering Information** (Note 6)

| Part Number | Case   | Packaging        |
|-------------|--------|------------------|
| DSS4320T-7  | SOT-23 | 3000/Tape & Reel |

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



ZN4 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: V = 2008)  
 M = Month (ex: 9 = September)

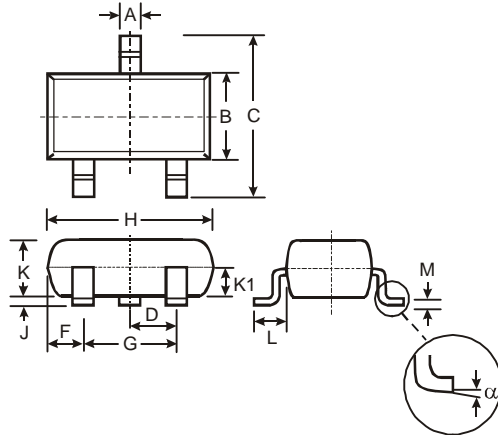
Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|
| Code | V    | W    | X    | Y    | Z    | A    | B    | C    |

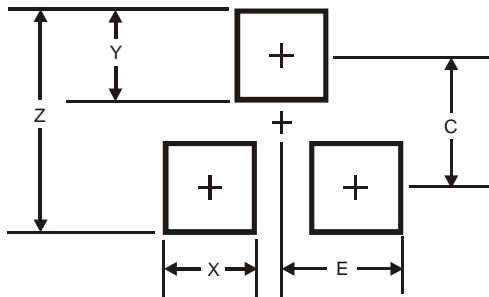
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Package Outline Dimensions**



| SOT-23               |       |      |       |
|----------------------|-------|------|-------|
| 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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