

## Features

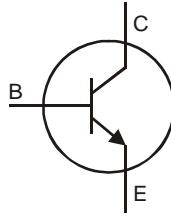
- Ideal for Medium Power Amplification and Switching
- Ultra Low Collector-Emitter Saturation Voltage
- **Lead, Halogen and Antimony Free, RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**
- **ESD rating: 400V-MM, 8KV-HBM**

## Mechanical Data

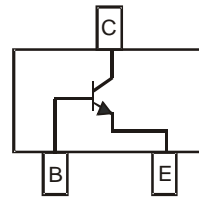
- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)



Top View



Device Symbol



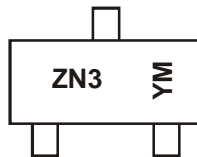
Pin Configuration

## Ordering Information

| Part Number | Case   | Packaging        |
|-------------|--------|------------------|
| DSS30101L-7 | SOT-23 | 3000/Tape & Reel |

Notes: 1. No purposefully added lead. Halogen and Antimony Free.  
 2. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>

## Marking Information



ZN3 = 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   |

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

| Characteristic               | Symbol    | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage       | $V_{CBO}$ | 50    | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | 30    | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | 5     | V    |
| Peak Pulse Current           | $I_{CM}$  | 2     | A    |
| Continuous Collector Current | $I_C$     | 1     | A    |

**Thermal Characteristics**

| Characteristic  | Symbol          | Value       | Unit                      |
|---|-----------------|-------------|---------------------------|
| Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$                           | $P_D$           | 600         | mW                        |
| Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 209         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range   | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

Notes: 3. Device mounted on FR-4 PCB MRP

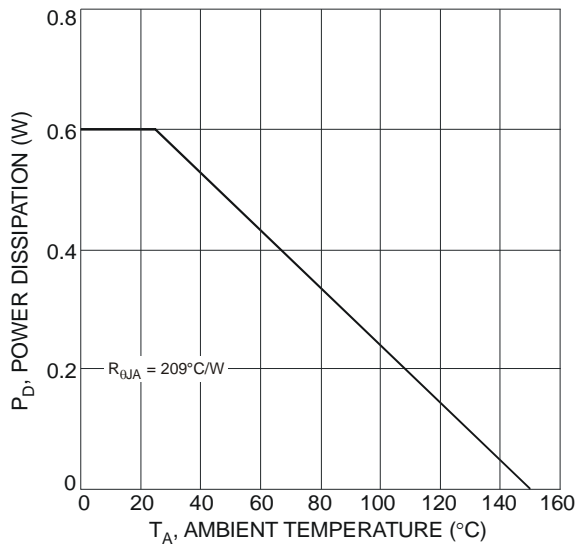


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

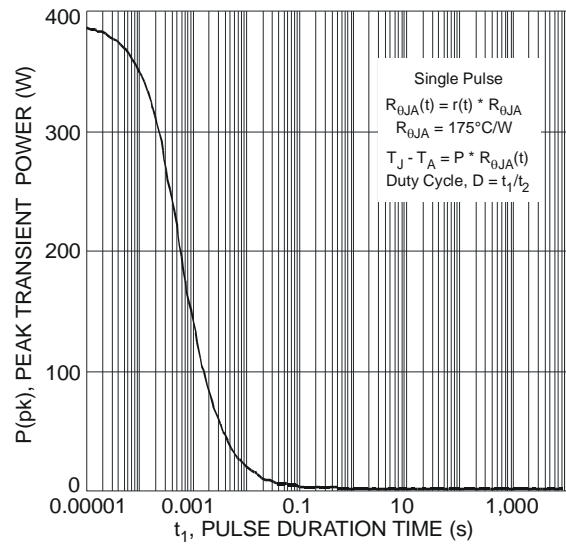


Fig. 2 Single Pulse Maximum Power Dissipation

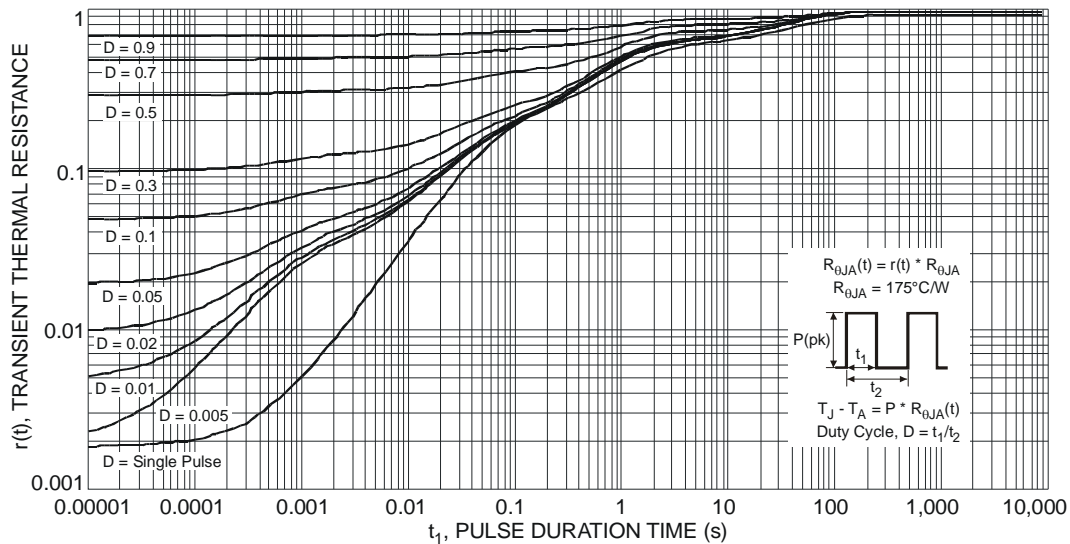


Fig. 3 Transient Thermal Response

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

| Characteristic                                | Symbol        | Min | Typ  | Max | Unit          | Test Conditions  |
|---|---------------|-----|------|-----|---------------|--|
| Collector-Base Breakdown Voltage              | $V_{(BR)CBO}$ | 50  | —    | —   | V             | $I_C = 100\mu\text{A}$   |
| Collector-Emitter Breakdown Voltage (Note 4)  | $V_{(BR)CEO}$ | 30  | —    | —   | V             | $I_C = 10\text{mA}$  |
| Emitter-Base Breakdown Voltage                | $V_{(BR)EBO}$ | 5   | —    | —   | V             | $I_E = 100\mu\text{A}$   |
| Collector-Base Cutoff Current                 | $I_{CBO}$     | —   | —    | 100 | nA            | $V_{CB} = 30\text{V}, I_E = 0$   |
|   |               | —   | —    | 50  | $\mu\text{A}$ | $V_{CB} = 30\text{V}, I_E = 0, T_A = 150^\circ\text{C}$                  |
| Emitter-Base Cutoff Current                   | $I_{EBO}$     | —   | —    | 100 | nA            | $V_{EB} = 4\text{V}, I_C = 0$  |
| DC Current Gain (Note 4)                      | $h_{FE}$      | 300 | —    | —   | —             | $V_{CE} = 5\text{V}, I_C = 50\text{mA}$                                  |
|   |               | 300 | 450  | 900 |               | $V_{CE} = 5\text{V}, I_C = 0.5\text{A}$                                  |
|   |               | 200 | —    | —   |               | $V_{CE} = 5\text{V}, I_C = 1\text{A}$                                    |
| Collector-Emitter Saturation Voltage (Note 4) | $V_{CE(sat)}$ | —   | —    | 75  | mV            | $I_C = 0.1\text{A}, I_B = 1\text{mA}$                                    |
|   |               | —   | —    | 125 |               | $I_C = 0.5\text{A}, I_B = 50\text{mA}$                                   |
|   |               | —   | —    | 200 |               | $I_C = 1.0\text{A}, I_B = 100\text{mA}$                                  |
| Equivalent On-Resistance (Note 4)             | $R_{CE(sat)}$ | —   | —    | 200 | m $\Omega$    | $I_E = 1\text{A}, I_B = 100\text{mA}$                                    |
| Base-Emitter Saturation Voltage (Note 4)      | $V_{BE(sat)}$ | —   | 0.93 | 1.1 | V             | $I_C = 1\text{A}, I_B = 100\text{mA}$                                    |
| Base-Emitter Turn-on Voltage (Note 4)         | $V_{BE(on)}$  | —   | 0.80 | 1.1 | V             | $V_{CE} = 2\text{V}, I_C = 1\text{A}$                                    |
| Transition Frequency                          | $f_T$         | 100 | 250  | —   | MHz           | $V_{CE} = 5\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$              |
| Output Capacitance                            | $C_{obo}$     | —   | 9    | 15  | pF            | $V_{CB} = 10\text{V}, f = 1\text{MHz}$                                   |
| Input Capacitance                             | $C_{ibo}$     | —   | 65   | —   | pF            | $V_{EB} = 5\text{V}, f = 1\text{MHz}$                                    |
| Turn-On Time                                  | $t_{on}$      | —   | 57   | —   | ns            | $V_{CC} = 5\text{V}, I_C = 500\text{mA}, I_{B1} = -I_{B2} = 50\text{mA}$ |
| Delay Time                                    | $t_d$         | —   | 19   | —   | ns            |  |
| Rise Time                                     | $t_r$         | —   | 38   | —   | ns            |  |
| Turn-Off Time                                 | $t_{off}$     | —   | 340  | —   | ns            |  |
| Storage Time                                  | $t_s$         | —   | 315  | —   | ns            |  |
| Fall Time                                     | $t_f$         | —   | 25   | —   | ns            |  |

Notes: 4. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

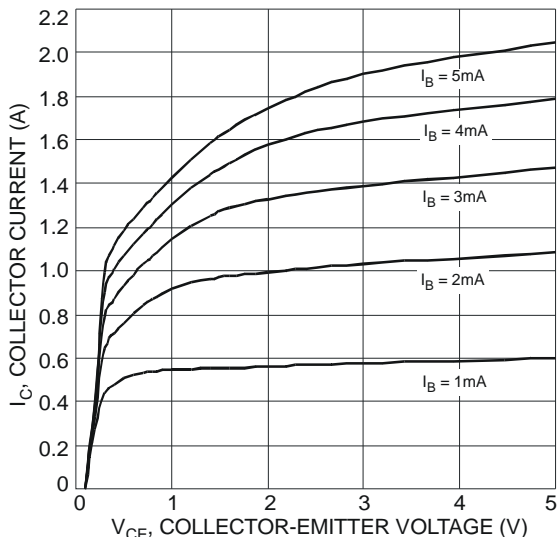


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

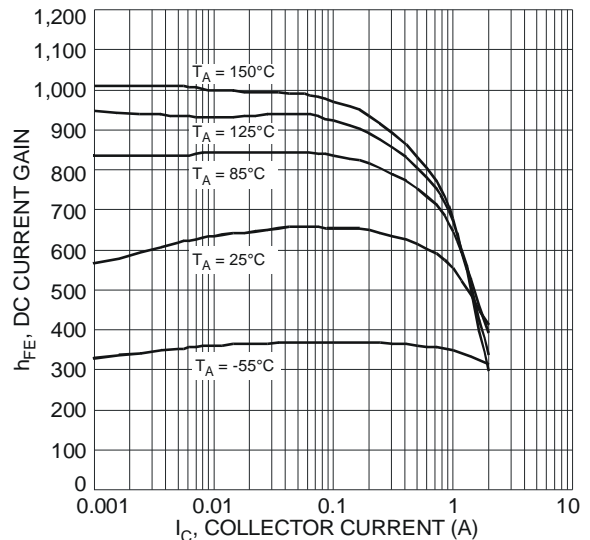


Fig. 5 Typical DC Current Gain vs. Collector Current

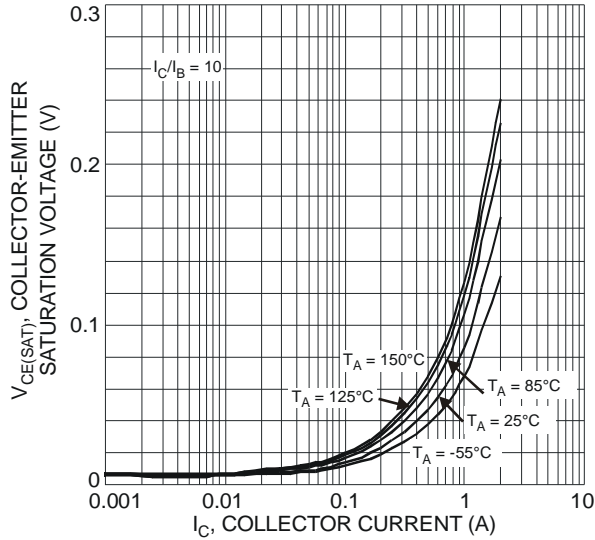


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

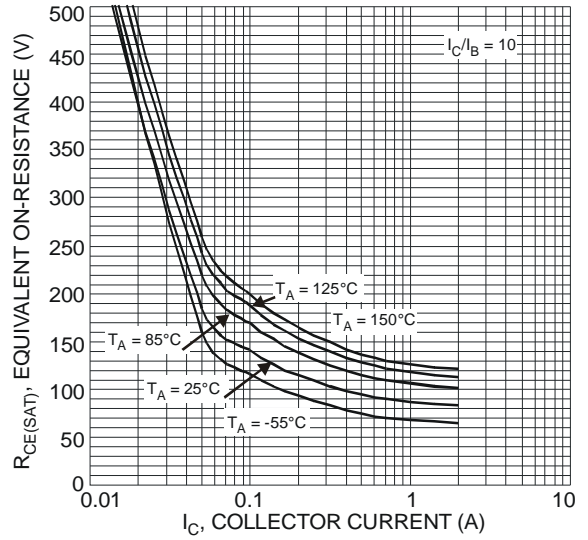


Fig. 7 Typical Equivalent On-Resistance vs. Collector Current

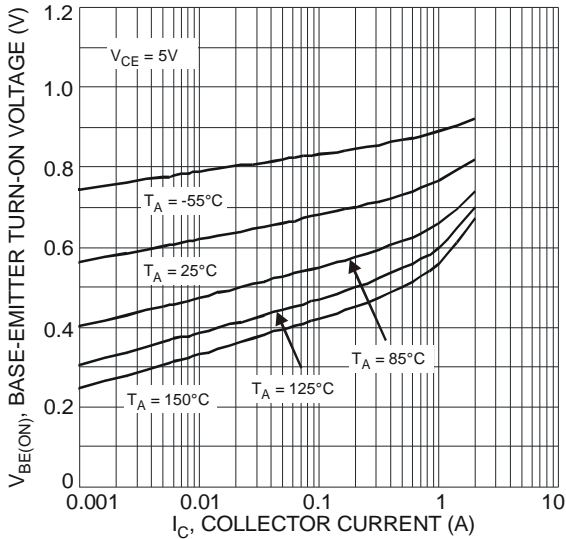


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

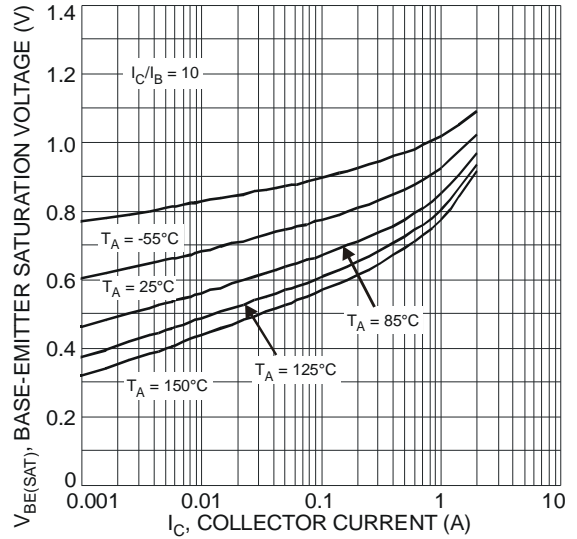


Fig. 9 Typical Base-Emitter Saturation Voltage vs. Collector Current

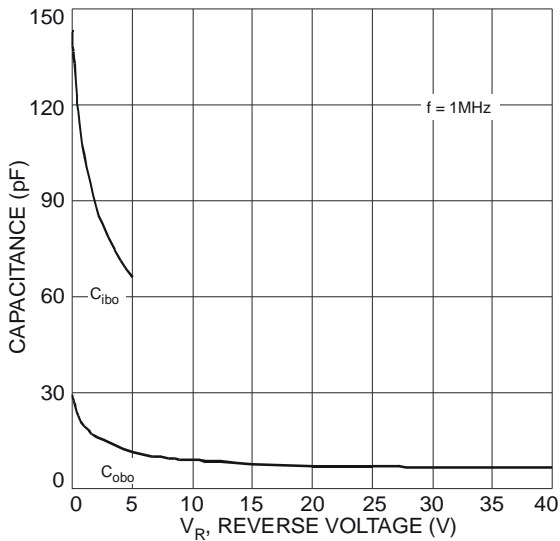
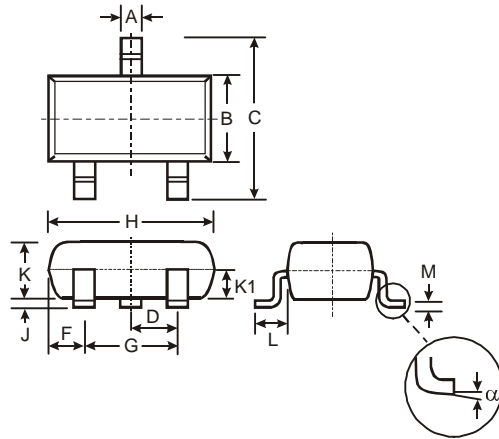


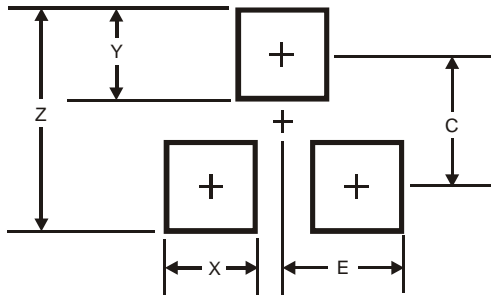
Fig. 10 Typical Capacitance Characteristics

**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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