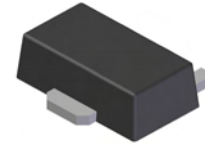


**Features**

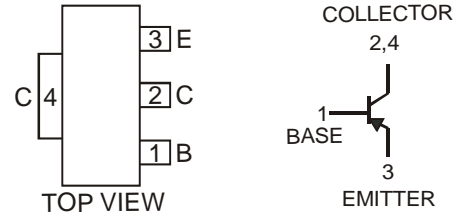
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (DXT3904)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



SOT89-3L

**Mechanical Data**

- Case: SOT89-3L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish — Matte Tin annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking & Type Code Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.072 grams (approximate)



Schematic and Pin Configuration

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                 | Symbol           | Value | Unit |
|--------------------------------|------------------|-------|------|
| Collector-Base Voltage         | V <sub>CBO</sub> | -40   | V    |
| Collector-Emitter Voltage      | V <sub>CEO</sub> | -40   | V    |
| Emitter-Base Voltage           | V <sub>EBO</sub> | -5.0  | V    |
| Collector Current – Continuous | I <sub>C</sub>   | -200  | mA   |

**Thermal Characteristics**

| Characteristic   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3) @ T <sub>A</sub> = 25°C                           | P <sub>D</sub>                    | 1           | W    |
| Thermal Resistance, Junction to Ambient Air (Note 3) @ T <sub>A</sub> = 25°C | R <sub>θJA</sub>                  | 125         | °C/W |
| Operating and Storage Temperature Range                                      | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °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. Device mounted on FR-4 PCB; pad layout as shown on page 4 or in Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

NEW PRODUCT

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

| Characteristic                       | Symbol        | Min        | Max            | Unit             | Test Condition   |
|--------------------------------------|---------------|------------|----------------|------------------|--|
| <b>OFF CHARACTERISTICS (Note 4)</b>  |               |            |                |                  |  |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | -40        | —              | V                | $I_C = -10\mu\text{A}, I_E = 0$  |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | -40        | —              | V                | $I_C = -1.0\text{mA}, I_B = 0$   |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | -5.0       | —              | V                | $I_E = -10\mu\text{A}, I_C = 0$  |
| Collector Cutoff Current             | $I_{CEX}$     | —          | -50            | nA               | $V_{CE} = -30\text{V}, V_{EB(OFF)} = -3.0\text{V}$   |
|                                      | $I_{CBO}$     | —          | -50            | nA               | $V_{CB} = -30\text{V}, I_E = 0$  |
| Base Cutoff Current                  | $I_{BL}$      | —          | -50            | nA               | $V_{CE} = -30\text{V}, V_{EB(OFF)} = -3.0\text{V}$   |
| <b>ON CHARACTERISTICS (Note 4)</b>   |               |            |                |                  |  |
| DC Current Gain                      | $h_{FE}$      | 60         | —              | —                | $I_C = -100\mu\text{A}, V_{CE} = -1.0\text{V}$   |
|                                      |               | 80         | —              | —                | $I_C = -1.0\text{mA}, V_{CE} = -1.0\text{V}$   |
|                                      |               | 100        | 300            | —                | $I_C = -10\text{mA}, V_{CE} = -1.0\text{V}$  |
|                                      |               | 60         | —              | —                | $I_C = -50\text{mA}, V_{CE} = -1.0\text{V}$  |
|                                      |               | 30         | —              | —                | $I_C = -100\text{mA}, V_{CE} = -1.0\text{V}$   |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | —          | -0.25<br>-0.40 | V                | $I_C = -10\text{mA}, I_B = -1.0\text{mA}$<br>$I_C = -50\text{mA}, I_B = -5.0\text{mA}$     |
| Base-Emitter Saturation Voltage      | $V_{BE(SAT)}$ | -0.65<br>— | -0.85<br>-0.95 | V                | $I_C = -10\text{mA}, I_B = -1.0\text{mA}$<br>$I_C = -50\text{mA}, I_B = -5.0\text{mA}$     |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |               |            |                |                  |  |
| Output Capacitance                   | $C_{obo}$     | —          | 4.5            | pF               | $V_{CB} = -5.0\text{V}, f = 1.0\text{MHz}, I_E = 0$  |
| Input Capacitance                    | $C_{ibo}$     | —          | 10             | pF               | $V_{EB} = -0.5\text{V}, f = 1.0\text{MHz}, I_C = 0$  |
| Input Impedance                      | $h_{ie}$      | 2.0        | 12             | $k\Omega$        | $V_{CE} = -10\text{V}, I_C = -1.0\text{mA}, f = 1.0\text{kHz}$                             |
| Voltage Feedback Ratio               | $h_{re}$      | 0.1        | 10             | $\times 10^{-4}$ |  |
| Small Signal Current Gain            | $h_{fe}$      | 100        | 400            | —                |  |
| Output Admittance                    | $h_{oe}$      | 3.0        | 60             | $\mu\text{S}$    |  |
| Current Gain-Bandwidth Product       | $f_T$         | 250        | —              | MHz              |  |
| Noise Figure                         | NF            | —          | 4.0            | dB               | $V_{CE} = -5.0\text{V}, I_C = -100\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$ |
| <b>SWITCHING CHARACTERISTICS</b>     |               |            |                |                  |  |
| Delay Time                           | $t_d$         | —          | 35             | ns               | $V_{CC} = -3.0\text{V}, I_C = -10\text{mA},$   |
| Rise Time                            | $t_r$         | —          | 35             | ns               | $V_{BE(off)} = 0.5\text{V}, I_{B1} = -1.0\text{mA}$  |
| Storage Time                         | $t_s$         | —          | 225            | ns               | $V_{CC} = -3.0\text{V}, I_C = -10\text{mA},$   |
| Fall Time                            | $t_f$         | —          | 75             | ns               | $I_{B1} = I_{B2} = -1.0\text{mA}$  |

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

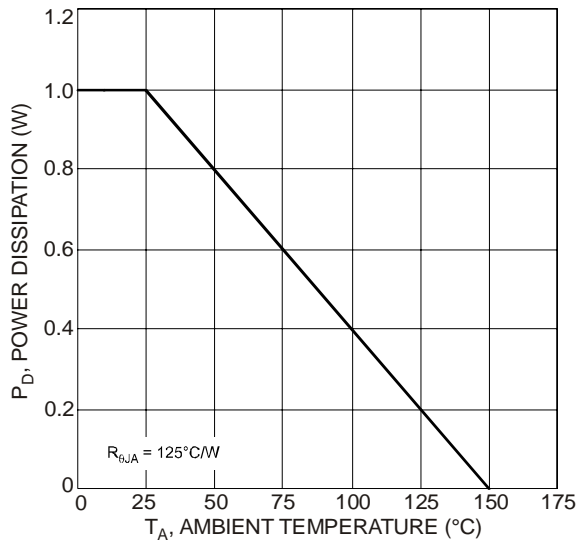


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

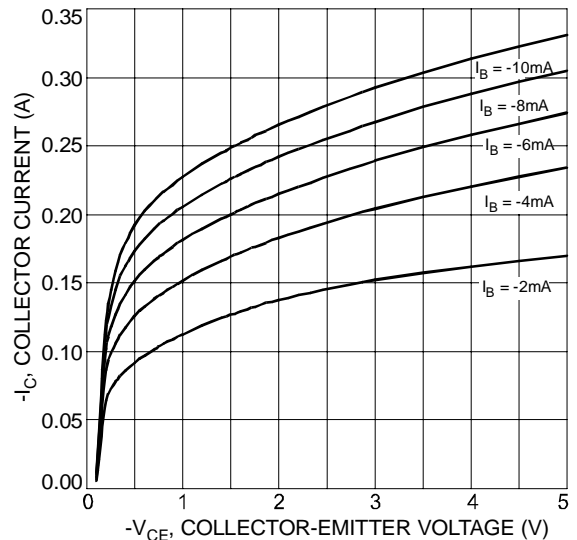


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

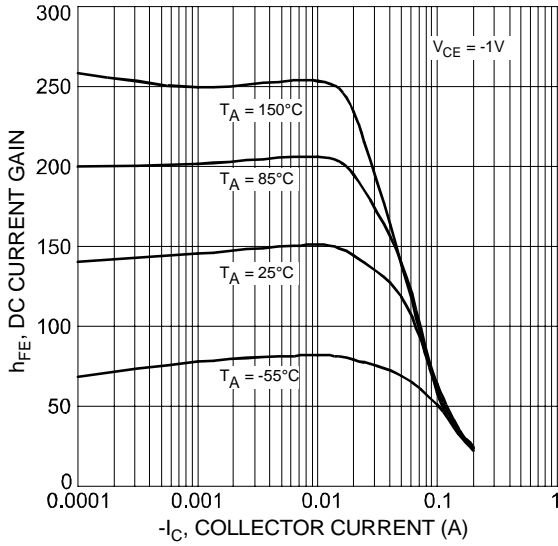


Fig. 3 Typical DC Current Gain vs. Collector Current

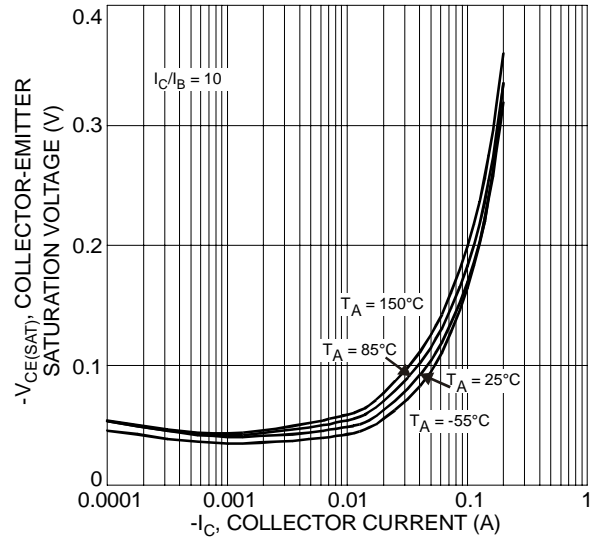


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

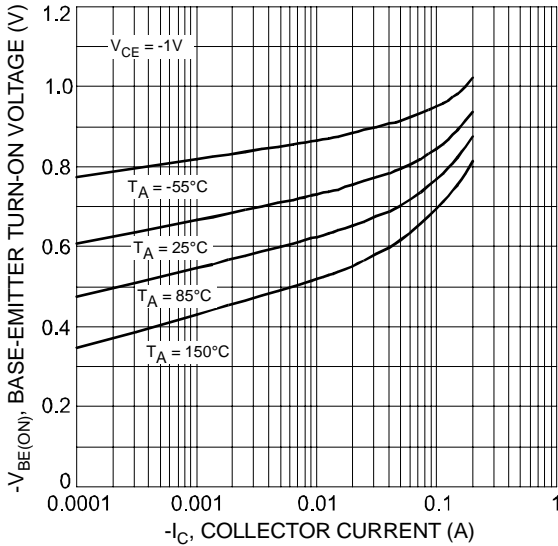


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

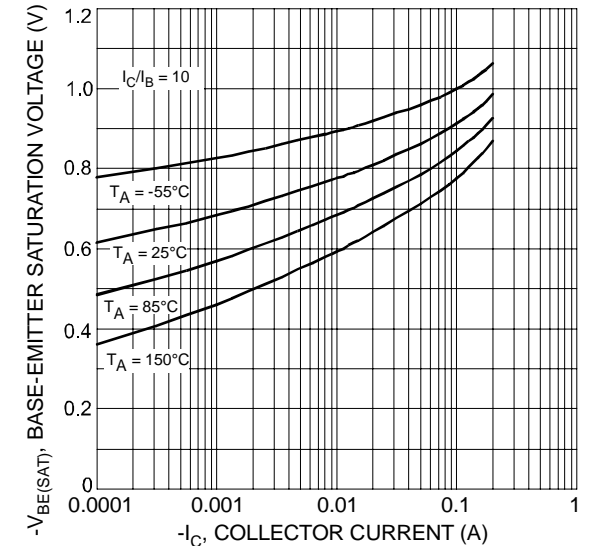


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

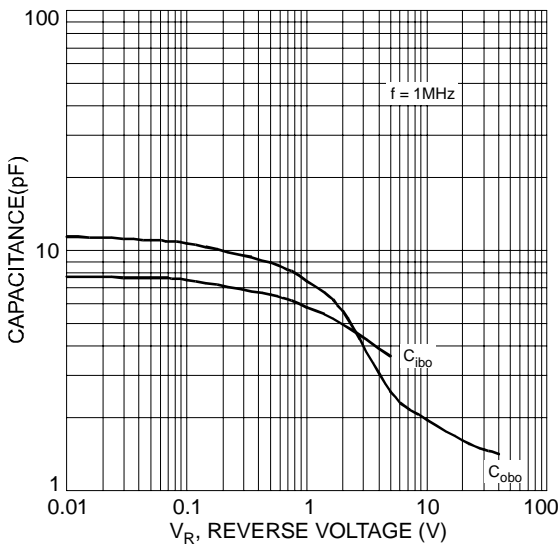


Fig. 7 Typical Capacitance Characteristics

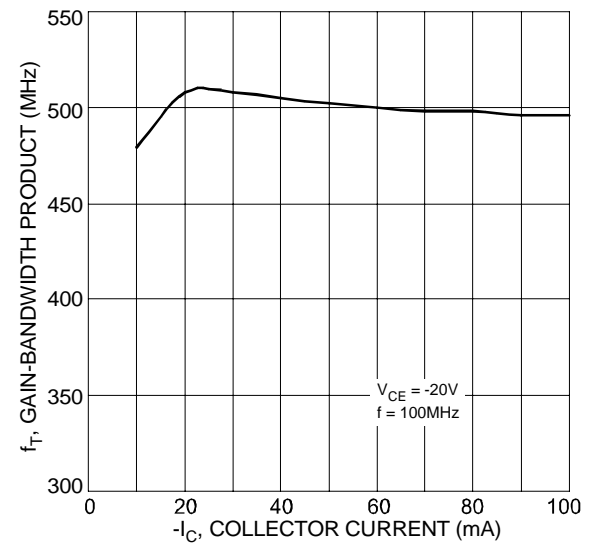


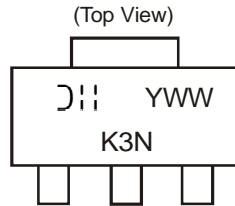
Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

## Ordering Information (Note 5)

| Device     | Packaging | Shipping         |
|------------|-----------|------------------|
| DXT3906-13 | SOT89-3L  | 2500/Tape & Reel |

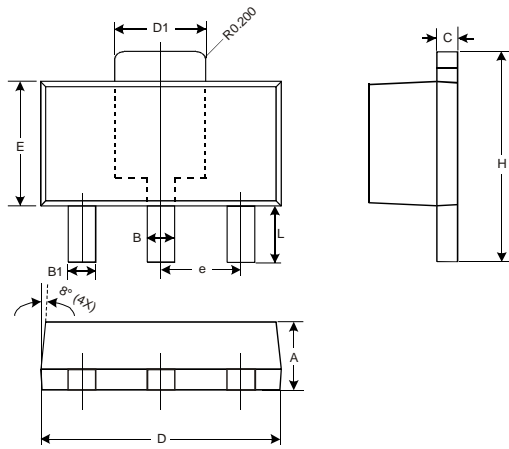
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap02007.pdf>.

## Marking Information



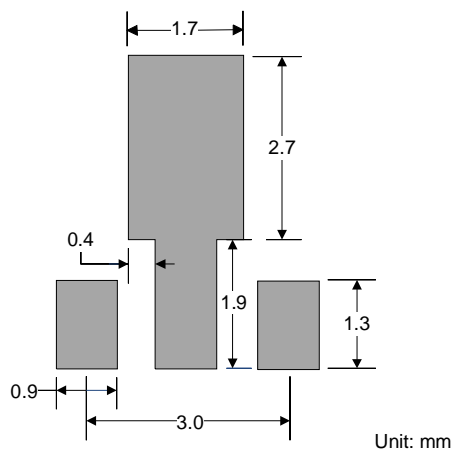
K3N = Product Type Marking Code  
 DII = Manufacturer's Marking Code  
 YWW = Date Code Marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

## Package Outline Dimensions



| SOT89-3L             |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 1.40 | 1.60 | 1.50 |
| B                    | 0.45 | 0.55 | 0.50 |
| B1                   | 0.37 | 0.47 | 0.42 |
| C                    | 0.35 | 0.43 | 0.38 |
| D                    | 4.40 | 4.60 | 4.50 |
| D1                   | 1.50 | 1.70 | 1.60 |
| E                    | 2.40 | 2.60 | 2.50 |
| e                    | —    | —    | 1.50 |
| H                    | 3.95 | 4.25 | 4.10 |
| L                    | 0.90 | 1.20 | 1.05 |
| All Dimensions in mm |      |      |      |

## Suggested Pad Layout



### IMPORTANT NOTICE

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

### LIFE SUPPORT

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.