

**PNP PRE-BIASED (R1=R2) SMALL SIGNAL SURFACE MOUNT TRANSISTOR**

**Features**

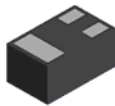
- Epitaxial Planar Die Construction
- Ultra-Small Leadless Surface Mount Package
- Ideally Suited for Automated Assembly Processes
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

| Part Number | R1 (NOM) | R2 (NOM) | Marking |
|-------------|----------|----------|---------|
| DDTA144ELP  | 47K      | 47K      | P2      |

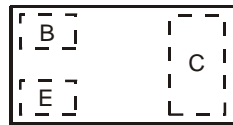
**Mechanical Data**

- Case: DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0009 grams (approximate)

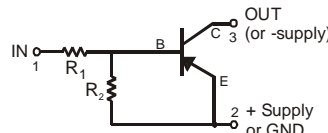
DFN1006-3



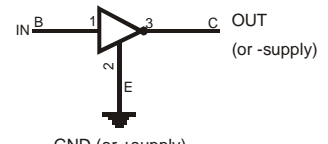
Bottom View



Top View  
Pin-Out



Device Symbol



GND (or +supply)

Equivalent Inverter  
Circuit

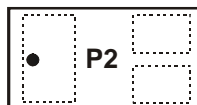
**Ordering Information** (Note 3)

| Product       | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DDTA144ELP-7  | P2      | 7                  | 8               | 3,000             |
| DDTA144ELP-7B | P2      | 7                  | 8               | 10,000            |

- 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>.

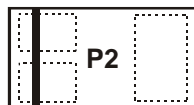
**Marking Information**

DDTA144ELP-7



Top View  
Dot Denotes  
Collector Side

DDTA144ELP-7B



Top View  
Bar Denotes Base  
and Emitter Side

P2 = Product Type Marking Code

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

| Characteristic           | Symbol       | Value      | Unit |
|--------------------------|--------------|------------|------|
| Supply Voltage           | $V_{CC}$     | -50        | V    |
| Input Voltage            | $V_{IN}$     | +10 to -40 | V    |
| Output Current ( $I_o$ ) | $I_{C(MAX)}$ | -200       | mA   |

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

| Characteristic   | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Power Dissipation (Note 4)   | $P_D$           | 250         | mW                        |
| Power Deration above $25^\circ\text{C}$  | $P_{der}$       | 2           | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction to Ambient Air (Note 4)<br>(Equivalent to one heated junction of PNP) | $R_{\theta JA}$ | 500         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range  | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

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

| Characteristic  | Symbol       | Min  | Typ | Max     | Unit             | Test Condition   |
|---|--------------|------|-----|---------|------------------|--|
| <b>Off Characteristics (Notes 5 &amp; 6)</b>                |              |      |     |         |                  |  |
| Collector-Base Breakdown Voltage                            | $BV_{CBO}$   | -50  | —   | —       | V                | $I_C = -10\mu\text{A}, I_E = 0$                              |
| Collector-Emitter Breakdown Voltage                         | $BV_{CEO}$   | -50  | —   | —       | V                | $I_C = -1.0\text{mA}, I_B = 0$                               |
| Emitter-Base Breakdown Voltage                              | $BV_{EBO}$   | -4.5 | —   | —       | V                | $I_E = -100\mu\text{A}, I_C = 0$                             |
| Collector Cutoff Current                                    | $I_{CEX}$    | —    | —   | -100    | nA               | $V_{CE} = -50\text{V}, V_{EB(OFF)} = 3.0\text{V}$            |
| Base Cutoff Current ( $I_{BEX}$ )                           | $I_{BL}$     | —    | —   | -60     | $\mu\text{A}$    | $V_{CE} = -50\text{V}, V_{EB(OFF)} = 3.0\text{V}$            |
| Collector-Base Cut Off Current                              | $I_{CBO}$    | —    | —   | -100    | nA               | $V_{CB} = -50\text{V}, I_E = 0$                              |
| Collector-Emitter Cut Off Current, $I_{O(off)}$             | $I_{CEO}$    | —    | —   | -100    | nA               | $V_{CE} = -50\text{V}, I_B = 0$                              |
| Emitter-Base Cut Off Current                                | $I_{EBO}$    | —    | —   | -100    | $\mu\text{A}$    | $V_{EB} = -4\text{V}, I_C = 0$                               |
| Input Off Voltage   | $V_{I(off)}$ | -300 | —   | —       | mV               | $V_{CC} = -5\text{V}, I_o = -100\mu\text{A}$                 |
| <b>On Characteristics (Notes 5 &amp; 6)</b>                 |              |      |     |         |                  |  |
| Input-On Voltage  | $V_{I(on)}$  | —    | —   | -3.0    | V                | $V_O = -0.3\text{V}, I_o = -5\text{mA}$                      |
| Input Current   | $I_i$        | —    | —   | -7.2    | mA               | $V_i = -5\text{V}$   |
| DC Current Gain   | $h_{FE}$     | 90   | —   | —       | —                | $V_{CE} = -5\text{V}, I_C = -2.5\text{mA}$                   |
|   |              | 120  | —   | —       | —                | $V_{CE} = -5\text{V}, I_C = -5\text{mA}$                     |
|   |              | 150  | —   | —       | —                | $V_{CE} = -5\text{V}, I_C = -10\text{mA}$                    |
|   |              | 100  | —   | —       | —                | $V_{CE} = -5\text{V}, I_C = -100\text{mA}$                   |
|   |              | 180  | —   | —       | —                | $V_{CE} = -5\text{V}, I_C = -200\text{mA}$                   |
| Output On Voltage<br>(Collector-Emitter Saturation Voltage) | $V_{O(on)}$  | —    | —   | -150    | mV               | $I_i = -1\text{mA}, I_o = -10\text{mA}$                      |
|   |              | —    | —   | -800750 | mV               | $I_i = -1\text{mA}, I_o = -450\text{mA}$                     |
| Input Resistance  | R1           | 33   | 47  | 61      | $\text{K}\Omega$ | —  |
| Resistance Ratio  | (R2/R1)      | 0.8  | 1.0 | 1.2     | —                | —  |
| <b>Small Signal Characteristics</b>                         |              |      |     |         |                  |  |
| Current Gain-Bandwidth Product                              | $f_T$        | —    | 250 | —       | MHz              | $V_{CE} = -10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$ |

- Notes:
- Device mounted on FR-4 PCB, 1" x 0.85" x 0.062".
  - Short duration pulse test used to minimize self-heating effect. Pulse Test: Pulse width  $t_p < 300\ \mu\text{s}$ , Duty Cycle,  $d \leq 2\%$ .
  - Guaranteed by design.

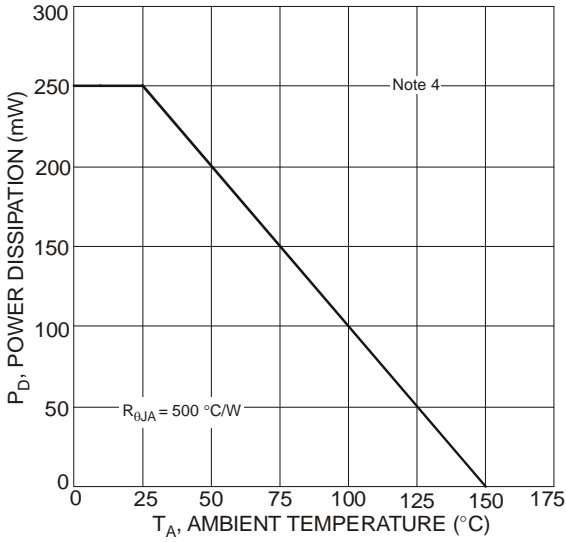


Fig. 1 Power Dissipation vs. Ambient Temperature

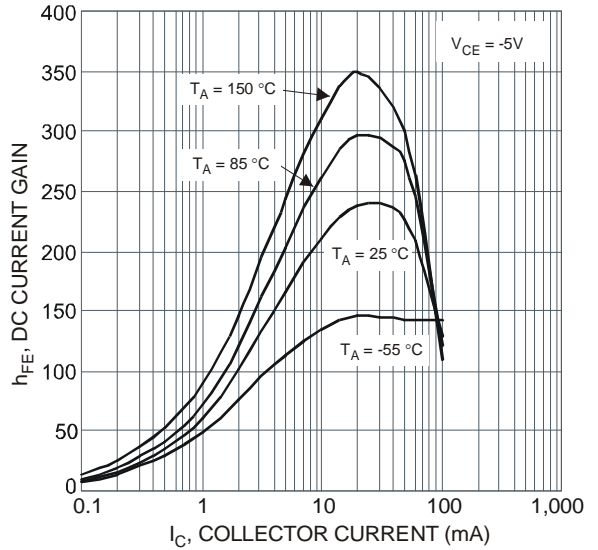


Fig. 2 Typical DC Current Gain vs. Collector Current

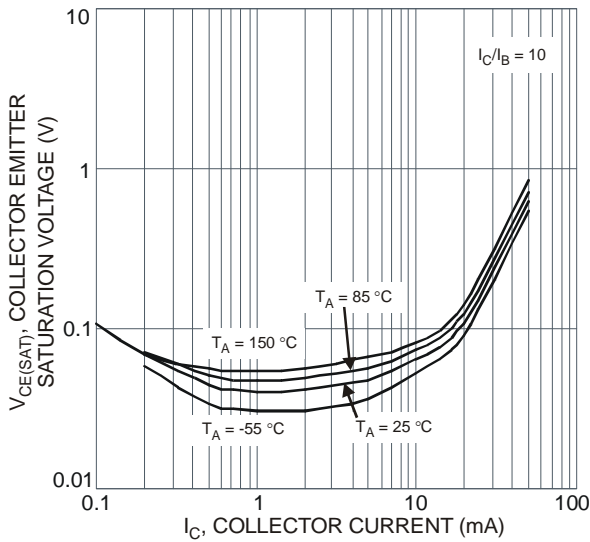


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

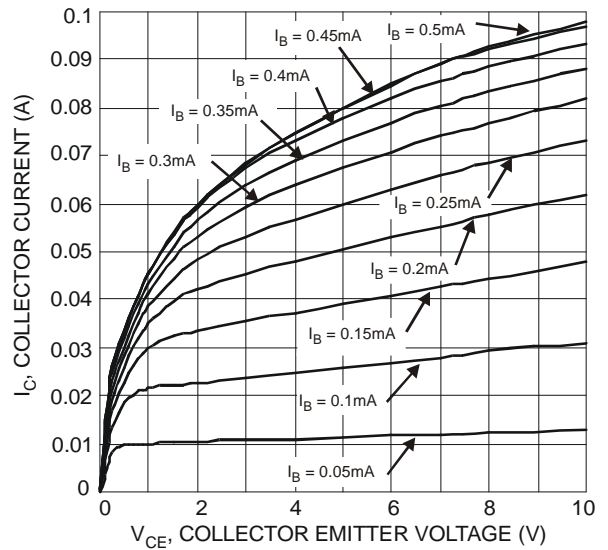


Fig. 4 Typical Collector Emitter Voltage vs. Collector Current

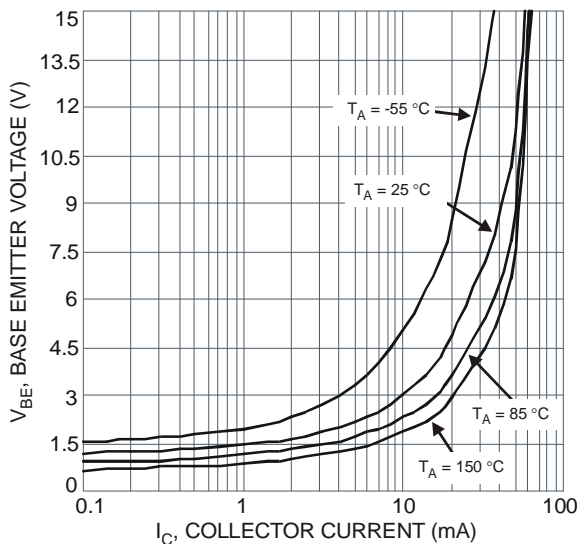


Fig. 5 Typical Base Emitter Voltage vs. Collector Current

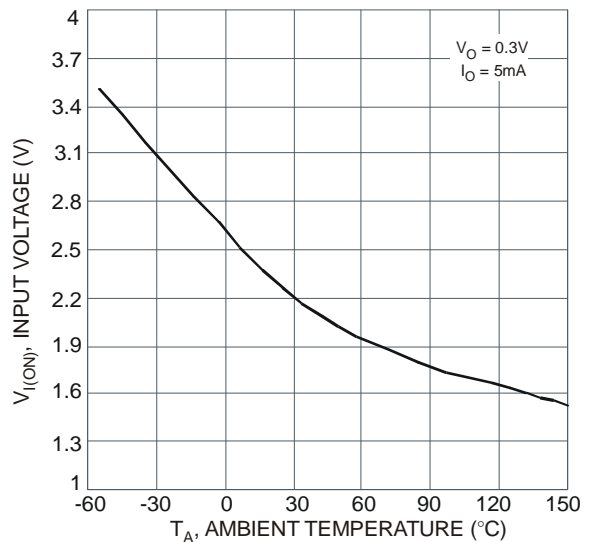


Fig. 6 Typical Input Voltage vs. Ambient Temperature

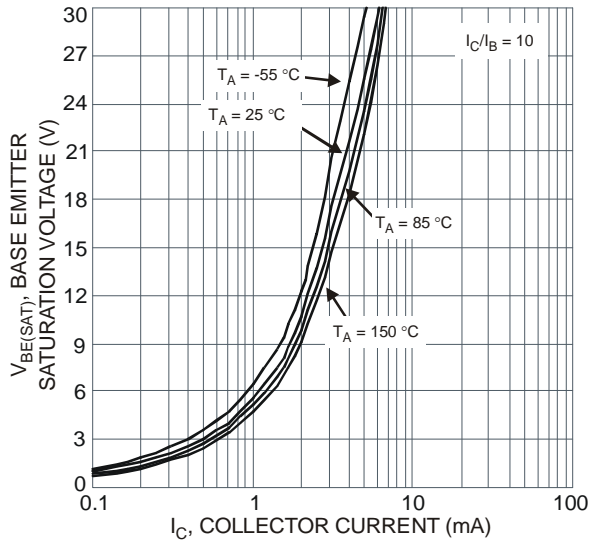
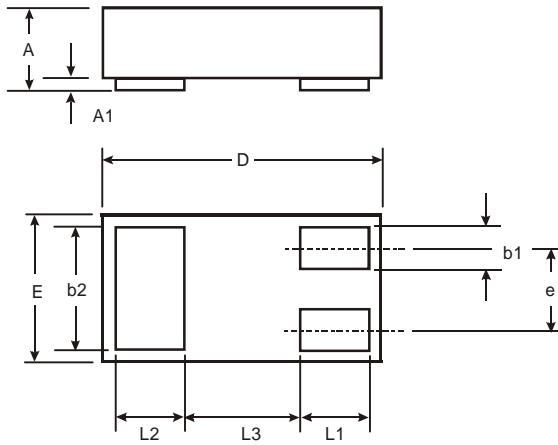


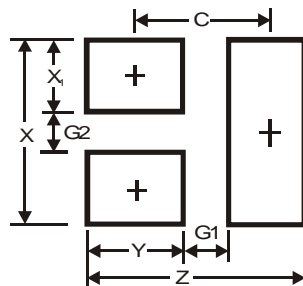
Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

**Package Outline Dimensions**



| DFN1006-3            |      |       |      |
|----------------------|------|-------|------|
| Dim                  | Min  | Max   | Typ  |
| A                    | 0.47 | 0.53  | 0.50 |
| A1                   | 0    | 0.05  | 0.03 |
| b1                   | 0.10 | 0.20  | 0.15 |
| b2                   | 0.45 | 0.55  | 0.50 |
| D                    | 0.95 | 1.075 | 1.00 |
| E                    | 0.55 | 0.675 | 0.60 |
| e                    | —    | —     | 0.35 |
| L1                   | 0.20 | 0.30  | 0.25 |
| L2                   | 0.20 | 0.30  | 0.25 |
| L3                   | —    | —     | 0.40 |
| All Dimensions in mm |      |       |      |

**Suggested Pad Layout**



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 1.1           |
| G1         | 0.3           |
| G2         | 0.2           |
| X          | 0.7           |
| X1         | 0.25          |
| Y          | 0.4           |
| C          | 0.7           |

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