# 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**

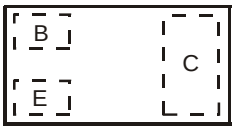
| Part Number | R1 (NOM) | R2 (NOM) | Marking |
|---|---|---|---|
| DDTA144ELP | 47K | 47K | P2 |

## Mechanical Data

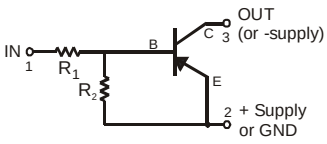
- Case: DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.0009 grams (approximate)

DFN1006-3

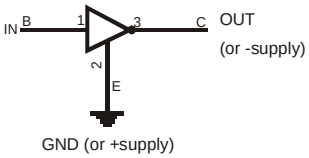
Bottom View




Top View
Pin-Out




Device Symbol




Equivalent Inverter
Circuit

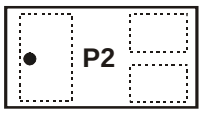
## Ordering Information (Note 3)

| 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.

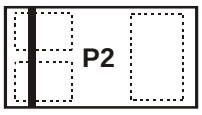
## Marking Information

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°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°C unless otherwise specified

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

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **Off Characteristics (Notes 5 & 6)** | | | | | | |
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | -50 | — | — | V | $I_C$ = -10μA, $I_E$ = 0 |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | -50 | — | — | V | $I_C$ = -1.0mA, $I_B$ = 0 |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | -4.5 | — | — | V | $I_E$ = -100μA, $I_C$ = 0 |
| Collector Cutoff Current | $I_{CEX}$ | — | — | -100 | nA | $V_{CE}$ = -50V, $V_{EB(OFF)}$ = 3.0V |
| Base Cutoff Current ($I_{BEX}$) | $I_{BL}$ | — | — | -60 | μA | $V_{CE}$ = -50V, $V_{EB(OFF)}$ = 3.0V |
| Collector-Base Cut Off Current | $I_{CBO}$ | — | — | -100 | nA | $V_{CB}$ = -50V, $I_E$ = 0 |
| Collector-Emitter Cut Off Current, $I_{O(off)}$ | $I_{CEO}$ | — | — | -100 | nA | $V_{CE}$ = -50V, $I_B$ = 0 |
| Emitter-Base Cut Off Current | $I_{EBO}$ | — | — | -100 | μA | $V_{EB}$ = -4V, $I_C$ = 0 |
| Input Off Voltage | $V_{I(off)}$ | -300 | — | — | mV | $V_{CC}$ = -5V, $I_O$ = -100uA |
| **On Characteristics (Notes 5 & 6)** | | | | | | |
| Input-On Voltage | $V_{I(on)}$ | — | — | -3.0 | V | $V_O$ = -0.3V, $I_O$ = -5mA |
| Input Current | $I_I$ | — | — | -7.2 | mA | $V_I$ = -5V |
| DC Current Gain | $h_{FE}$ | 90 | — | — | — | $V_{CE}$ =-5V, $I_C$ = -2.5mA |
| | | 120 | — | — | — | $V_{CE}$ = -5V, $I_C$ = -5mA |
| | | 150 | — | — | — | $V_{CE}$ = -5V, $I_C$ = -10mA |
| | | 100 | — | — | — | $V_{CE}$ = -5V, $I_C$ = -100mA |
| | | 180 | — | — | — | $V_{CE}$ = -5V, $I_C$ = -200mA |
| | | 250 | — | — | — | $V_{CE}$ = -5V, $I_C$ = -300mA |
| Output On Voltage<br>(Collector-Emitter Saturation Voltage) | $V_{O(on)}$ | — | — | -150 | mV | $I_I$ = -1mA, $I_O$ = -10mA |
| | | — | — | -800~~750~~ | mV | $I_I$ = -1mA, $I_O$ = -4~~5~~0mA |
| Input Resistance | R1 | 33 | 47 | 61 | KΩ | — |
| Resistance Ratio | (R2/R1) | 0.8 | 1.0 | 1.2 | — | — |
| **Small Signal Characteristics** | | | | | | |
| Current Gain-Bandwidth Product | $f_T$ | — | 250 | — | MHz | $V_{CE}$ = -10V, $I_E$ = -5mA, f = 100 MHz |

Notes: 4. Device mounted on FR-4 PCB, 1" x 0.85" x 0.062".
5. Short duration pulse test used to minimize self-heating effect. Pulse Test: Pulse width tp<300 uS, Duty Cycle, d<=2%.
6. Guaranteed by design.

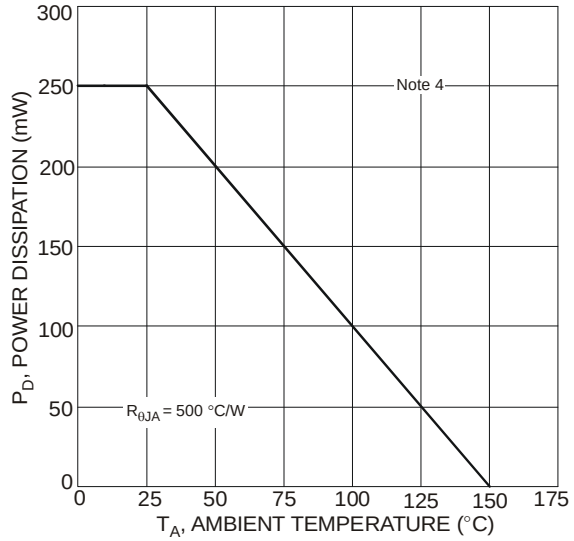



Fig. 1 Power Dissipation vs. Ambient Temperature

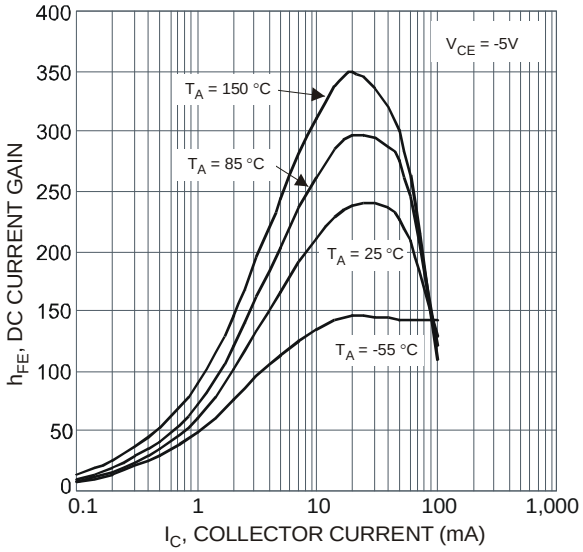



Fig. 2 Typical DC Current Gain vs. Collector Current

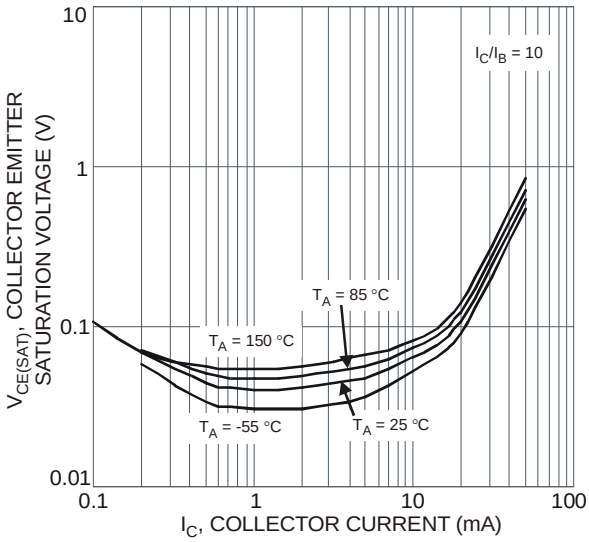



Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

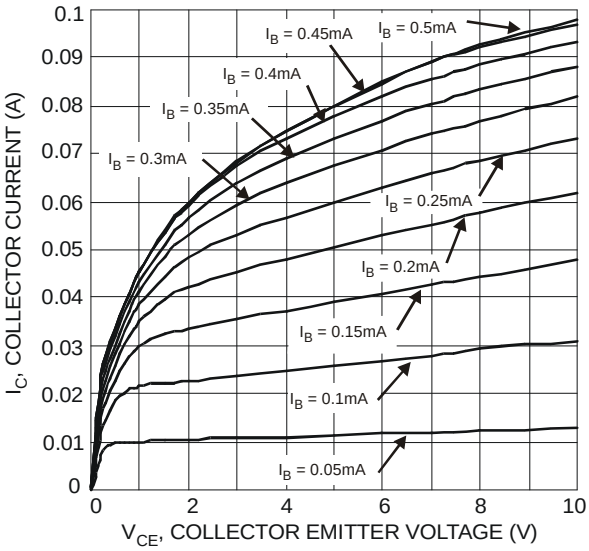



Fig. 4 Typical Collector Emitter Voltage vs. Collector Current

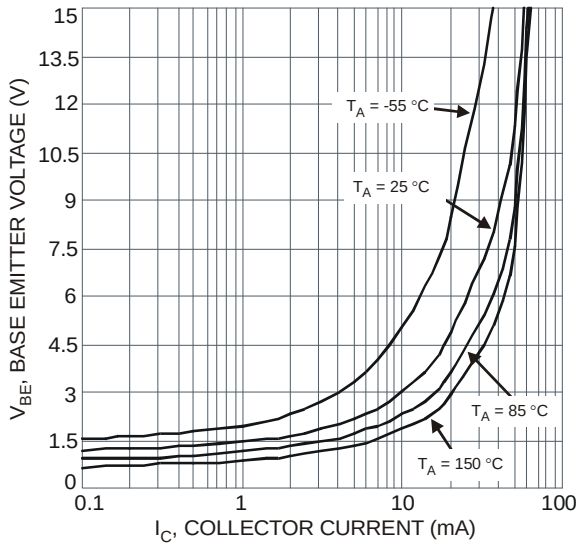



Fig. 5 Typical Base Emitter Voltage vs. Collector Current

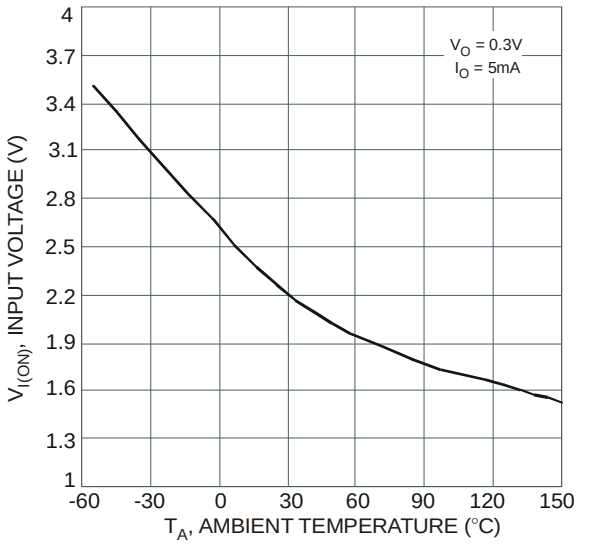



Fig. 6 Typical Input Voltage vs. Ambient Temperature

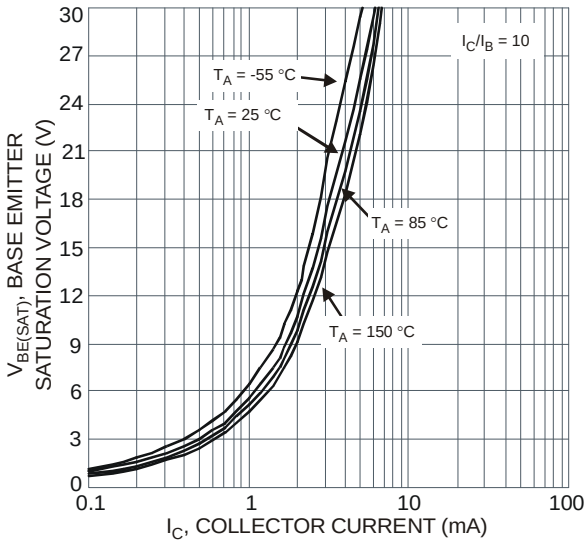
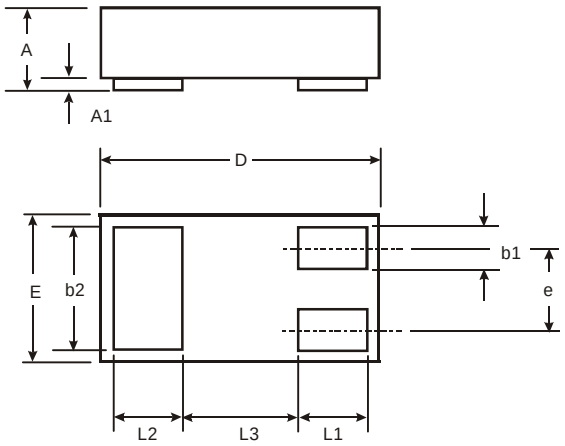


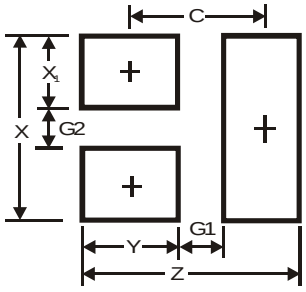

Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

## 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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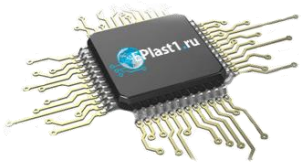


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