

PRE-BIASED SMALL SIGNAL SURFACE MOUNT NPN 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

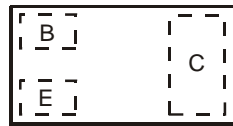
Mechanical Data

- 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)

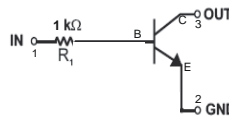
DFN1006-3



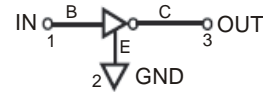
Bottom View



Top View
Pin-Out



Device Symbol



Equivalent Inverter
Circuit

Ordering Information (Note 3)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DDTC113TLP-7 | N4 | 7 | 8 | 3,000 |
| DDTC113TLP-7B | N4 | 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>.

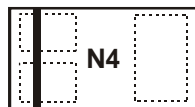
Marking Information

DDTC113TLP-7



Top View
Dot Denotes
Collector Side

DDTC113TLP-7B



Top View
Bar Denotes Base
and Emitter Side

N4 = 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} | -5 to +10 | V |
| Output Current (I_O) | $I_{C(MAX)}$ | 100 | 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 Derating above 25°C | P_{der} | 2 | mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction to Ambient Air (Note 4) (Equivalent to one heated junction of NPN) | $R_{\theta JA}$ | 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 |
|--------------------------------------|---------------|-----|-----|------|------------------|--|
| OFF CHARACTERISTICS (Note 5) | | | | | | |
| 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} | 5 | — | — | V | $I_E = 50\mu\text{A}, I_C = 0$ |
| Collector-Base Cutoff Current | I_{CBO} | — | — | 0.5 | μA | $V_{CB} = 50\text{V}, I_E = 0$ |
| Emitter-Base Cutoff Current | I_{EBO} | — | — | 0.5 | μA | $V_{EB} = 4\text{V}, I_C = 0$ |
| ON CHARACTERISTICS (Note 5) | | | | | | |
| DC Current Gain | h_{FE} | 100 | 380 | 600 | — | $V_{CE} = 5\text{V}, I_C = 1\text{mA}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | — | 0.25 | V | $I_C = 50\text{mA}, I_B = 2.5\text{mA}$ |
| Input Resistance | R1 | 0.7 | 1 | 1.3 | $\text{K}\Omega$ | — |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Current Gain-Bandwidth Product | f_T | — | 250 | — | MHz | $V_{CE} = 10\text{V}, I_E = 5\text{mA}, f = 100\text{MHz}$ |

- Notes: 4. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch
5. Short duration pulse test used to minimize self-heating effect.

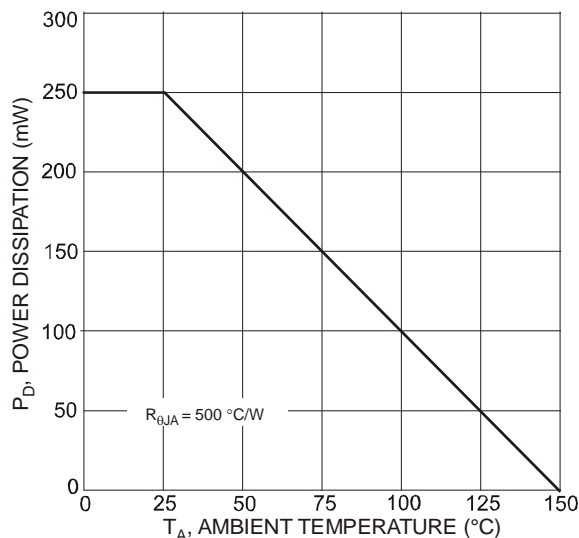


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 4)

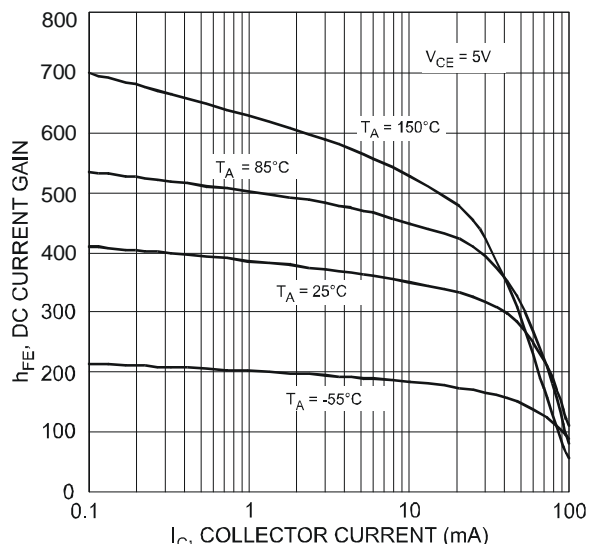


Fig. 2 Typical DC Current Gain vs. Collector Current

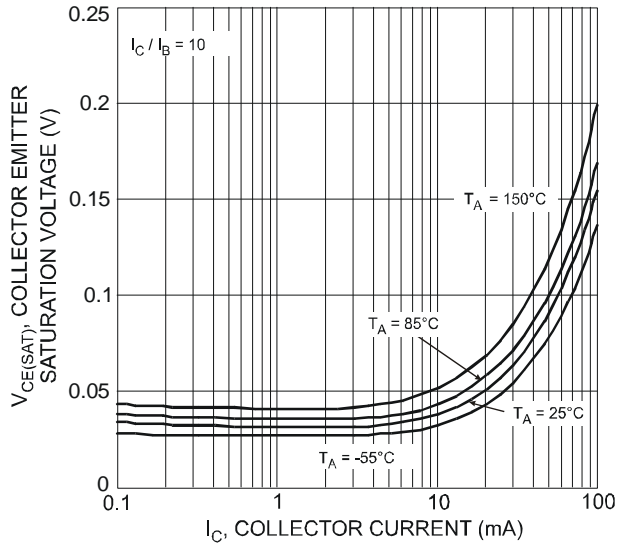


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

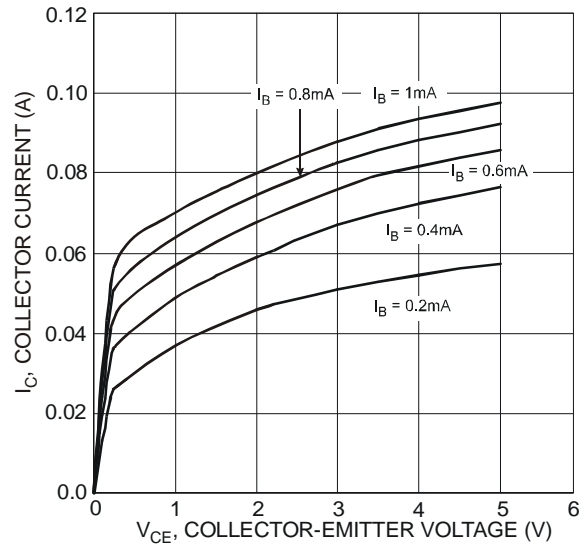


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

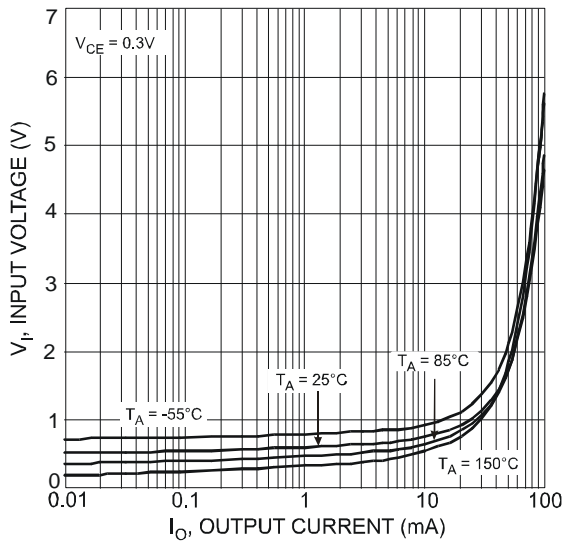


Fig. 5 Typical Input Voltage vs. Output Current (On Characteristics)

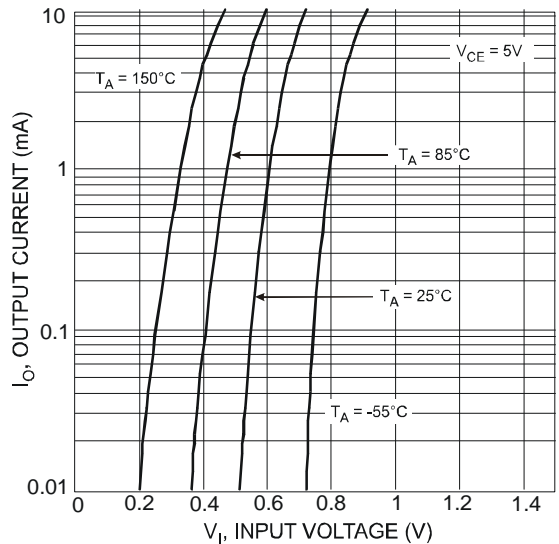
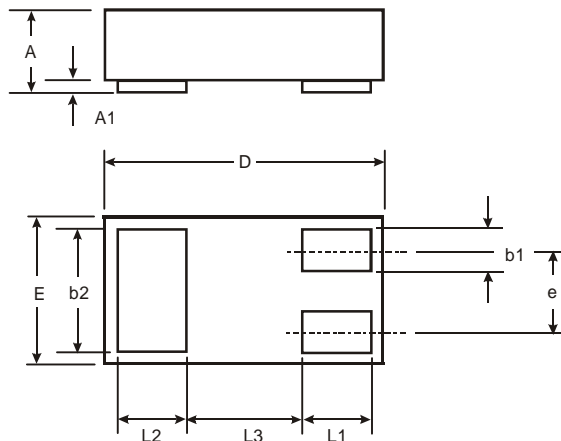


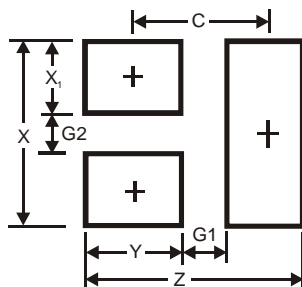
Fig. 6 Typical Output Current vs. Input Voltage (Off Characteristics)

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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