

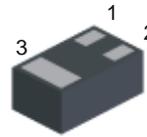
NEW PRODUCT

**Features**

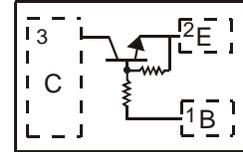
- Epitaxial Planar Die Construction
- Ultra-Small Leadless Surface Mount Package
- Ideally Suited for Automated Assembly Processes
- **Lead Free By Design/RoHS Compliant (Note 1)**
- "Green" Device (Note 2)
- **Qualified to AEC-Q101 Standards for High Reliability**

**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-020D
- Terminal Connections: Collector Dot (See Diagram and Marking Information)
- Terminals: Finish - NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Code N4, Dot denotes Collector Side
- Ordering Information: See Page 3
- Weight: 0.0009 grams (approx.)

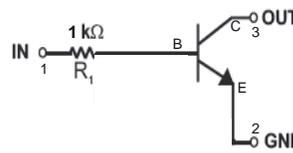


Bottom View

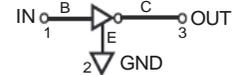


Top View

DFN1006-3



Schematic and Pin Configuration



Equivalent Inverter Circuit

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

| Characteristic                   | Symbol              | Value     | Unit |
|----------------------------------|---------------------|-----------|------|
| Supply Voltage                   | V <sub>CC</sub>     | 50        | V    |
| Input Voltage                    | V <sub>IN</sub>     | -5 to +10 | V    |
| Output Current (I <sub>O</sub> ) | I <sub>C(max)</sub> | 100       | mA   |

**Thermal Characteristics**

| Characteristic   | Symbol                            | Value       | Unit  |
|--|-----------------------------------|-------------|-------|
| Power Dissipation (Note 3) @T <sub>A</sub> = 25  | P <sub>D</sub>                    | 250         | mW    |
| Power Derating above 25°C  | P <sub>der</sub>                  | 2           | mW/°C |
| Thermal Resistance, Junction to Ambient Air (Note 3) @T <sub>A</sub> = 25 (Equivalent to one heated junction of NPN) | R <sub>θJA</sub>                  | 500         | °C/W  |
| Operating and Storage Temperature Range  | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                       | Symbol               | Min | Typ | Max  | Unit | Test Condition  |
|--------------------------------------|----------------------|-----|-----|------|------|---|
| <b>OFF CHARACTERISTICS (Note 4)</b>  |                      |     |     |      |      |   |
| Collector-Base Breakdown Voltage     | V <sub>(BR)CBO</sub> | 50  | —   | —    | V    | I <sub>C</sub> = 10μA, I <sub>E</sub> = 0               |
| Collector-Emitter Breakdown Voltage  | V <sub>(BR)CEO</sub> | 50  | —   | —    | V    | I <sub>C</sub> = 1.0mA, I <sub>B</sub> = 0              |
| Emitter-Base Breakdown Voltage       | V <sub>(BR)EBO</sub> | 5   | —   | —    | V    | I <sub>E</sub> = 50μA, I <sub>C</sub> = 0               |
| Collector-Base Cutoff Current        | I <sub>CBO</sub>     | —   | —   | 0.5  | μA   | V <sub>CB</sub> = 50V, I <sub>E</sub> = 0               |
| Emitter-Base Cutoff Current          | I <sub>EBO</sub>     | —   | —   | 0.5  | μA   | V <sub>EB</sub> = 4V, I <sub>C</sub> = 0                |
| <b>ON CHARACTERISTICS (Note 4)</b>   |                      |     |     |      |      |   |
| DC Current Gain                      | h <sub>FE</sub>      | 100 | 380 | 600  | —    | V <sub>CE</sub> = 5V, I <sub>C</sub> = 1mA              |
| Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub> | —   | —   | 0.25 | V    | I <sub>C</sub> = 50mA, I <sub>B</sub> = 2.5mA           |
| Input Resistance                     | R <sub>1</sub>       | 0.7 | 1   | 1.3  | KΩ   | —   |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |                      |     |     |      |      |   |
| Current Gain-Bandwidth Product       | f <sub>T</sub>       | —   | 250 | —    | MHz  | V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz |

- 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, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on page 3 or Diodes Inc. suggested pad layout document AP02001 on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  4. Short duration pulse test used to minimize self-heating effect.

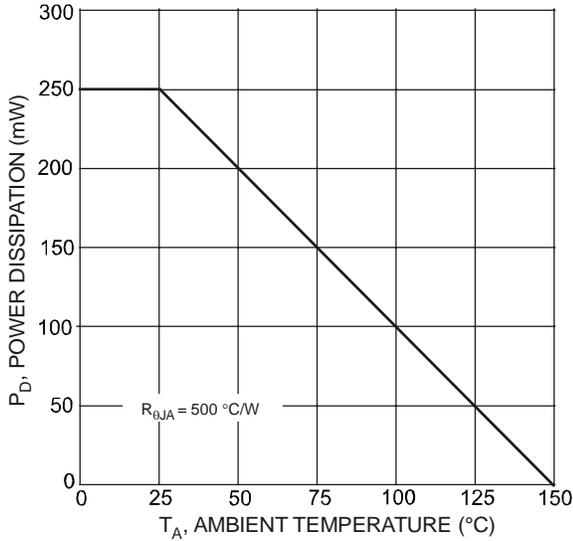


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

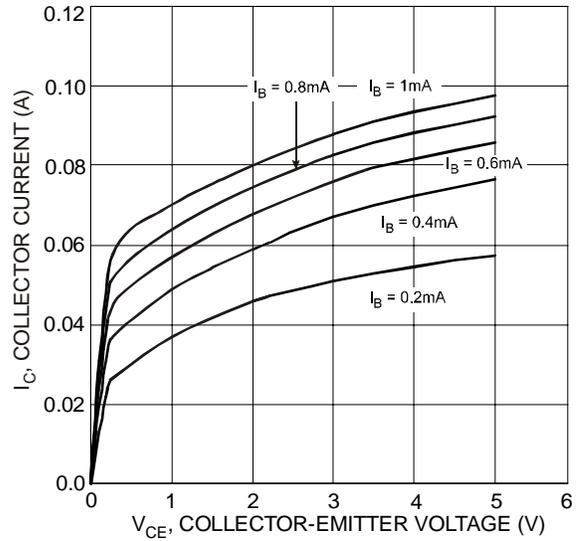


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

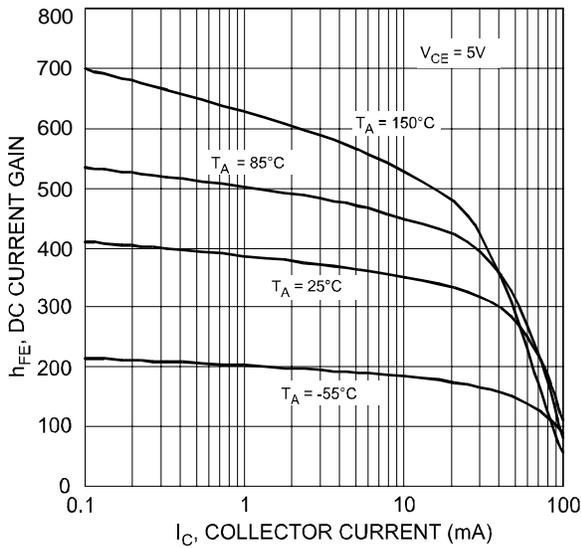


Fig. 3 Typical DC Current Gain vs. Collector Current

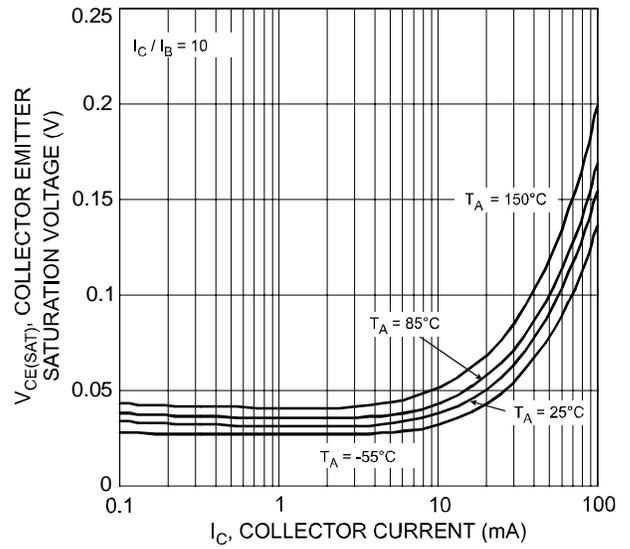


Fig. 4 Typical Collector Emitter Saturation Voltage vs. Collector Current

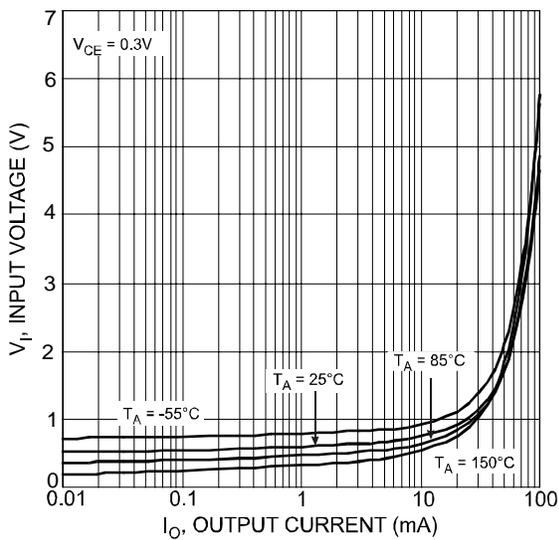


Fig. 5 Typical Input Voltage vs. Output Current (On Characteristics)

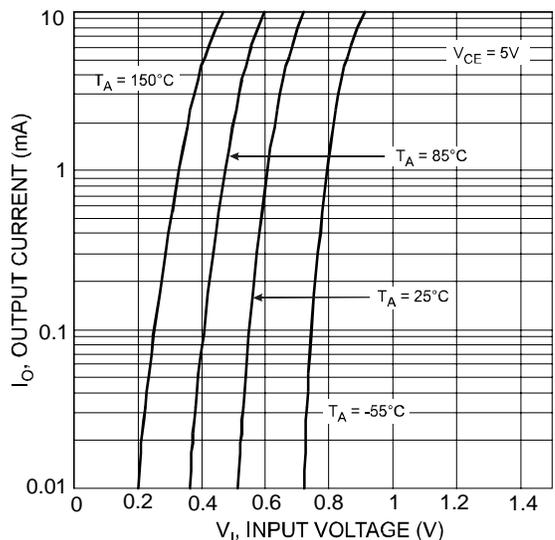


Fig. 6 Typical Output Current vs. Input Voltage (Off Characteristics)

## Ordering Information (Note 5)

| Device       | Packaging | Shipping         |
|--------------|-----------|------------------|
| DDTC113TLP-7 | DFN1006-3 | 3000/Tape & Reel |

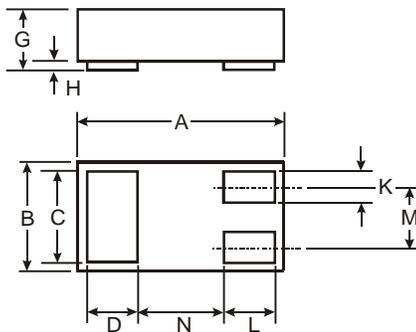
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



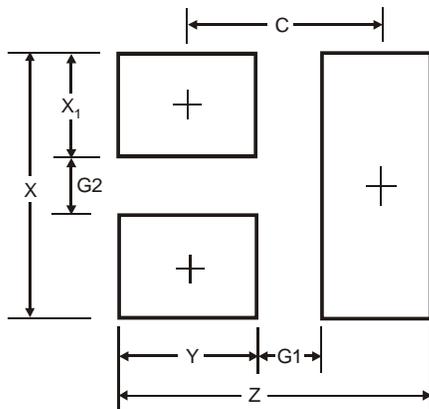
N4 = Product Type Marking Code  
Dot Denotes Collector, Pin 3

## Mechanical Details



| DFN1006-3            |      |       |      |
|----------------------|------|-------|------|
| Dim                  | Min  | Max   | Typ  |
| A                    | 0.95 | 1.075 | 1.00 |
| B                    | 0.55 | 0.675 | 0.60 |
| C                    | 0.45 | 0.55  | 0.50 |
| D                    | 0.20 | 0.30  | 0.25 |
| G                    | 0.47 | 0.53  | 0.50 |
| H                    | 0    | 0.05  | 0.15 |
| K                    | 0.10 | 0.20  | 0.15 |
| L                    | 0.20 | 0.30  | 0.25 |
| M                    | —    | —     | 0.35 |
| N                    | —    | —     | 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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