

50V NPN PRE-BIASED (R1=R2) SMALL SIGNAL TRANSISTOR IN DFN1006
Product Summary

| Part Number | R1 (NOM) | R2 (NOM) | Marking |
|-------------|--------------|--------------|---------|
| DDTC114ELP | 10k Ω | 10k Ω | N5 |

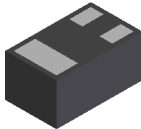
Features

- Epitaxial Planar Die Construction
- Ultra-Small Leadless Surface Mount Package
- Ideally Suited for Automated Assembly Processes
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
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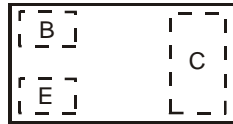
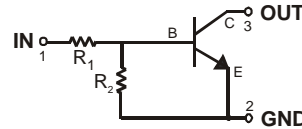
Mechanical Data

- Case: X1-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
- Solderable per MIL-STD-202, Method 208 ^{e4}
- Weight: 0.0009 grams (Approximate)

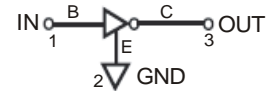
X1-DFN1006-3



Bottom View


 Top View
Pin-Out


Device Symbol


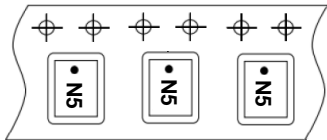

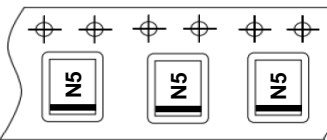

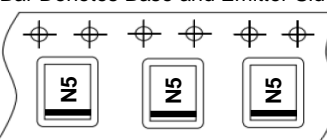

 Equivalent Inverter
Circuit

Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DDTC114ELP-7 | N5 | 7 | 8 | 3,000 |
| DDTC114ELP-7B | N5 | 7 | 8 | 10,000 |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See http://www.diodes.com/quality/lead_free.html for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <http://www.diodes.com>.

Marking Information

| | |
|----------------------|---|
| DDTC114ELP-7 | <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Top View Dot Denotes Collector Side</p>  </div> <div style="text-align: center;"> <p>From date code 1527 (YYWW), this changes to:</p>  <p>Top View Bar Denotes Base and Emitter Side</p>  </div> </div> |
| DDTC114ELP-7B | <div style="text-align: center;">  <p>Top View Bar Denotes Base and Emitter Side</p>  </div> <p style="text-align: right;">N5 = Product Type Marking Code</p> |

Absolute 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 | 50 | mA |
| Collector Current | I _{C(MAX)} | 100 | mA |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|-------|
| Power Dissipation (Note 5) | P _D | 250 | mW |
| Power Derating above +25°C | P _{der} | 2 | mW/°C |
| Thermal Resistance, Junction to Ambient Air (Note 5) (Equivalent to one heated junction of NPN) | R _{θJA} | 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 (Note 6) | | | | | | |
| Collector-Base Breakdown Voltage | BV _{CBO} | 50 | — | — | V | I _C = 50μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | 50 | — | — | V | I _C = 1.0mA, I _B = 0 |
| Collector Cutoff Current | I _{CEX} | — | — | 0.5 | μA | V _{CE} = 50V, V _{EB(OFF)} = 3.0V |
| Collector-Base Cut Off Current | I _{CBO} | — | — | 0.1 | μA | V _{CB} = 50V, I _E = 0 |
| Collector-Emitter Cut Off Current, I _{O(OFF)} | I _{CES} | — | — | 0.1 | μA | V _{CB} = 50V, I _E = 0 |
| Emitter-Base Cut Off Current | I _{EBO} | — | — | 800 | μA | V _{EB} = 10V, I _C = 0 |
| Input Off Voltage | V _{I(off)} | 0.5 | 1.16 | — | V | V _{CC} = 5V, I _O = 100μA |
| Input On Voltage | V _{I(on)} | — | — | 2.5 | V | V _{CC} = 0.3V, I _O = 10mA |
| On Characteristics (Notes 6 & 7) | | | | | | |
| DC Current Gain | h _{FE} | 10 | — | — | — | V _{CE} = 5V, I _C = 1mA |
| | | 15 | — | — | — | V _{CE} = 5V, I _C = 2mA |
| | | 60 | — | — | — | V _{CE} = 5V, I _C = 10mA |
| | | 100 | — | — | — | V _{CE} = 5V, I _C = 50mA |
| | | 90 | — | — | — | V _{CE} = 5V, I _C = 70mA |
| Collector-Emitter Saturation Voltage | V _{CE(sat)} | — | — | 0.15 | V | I _C = 10mA, I _B = 1mA |
| | | — | — | 0.2 | V | I _C = 50mA, I _B = 5mA |
| | | — | — | 0.25 | V | I _C = 50mA, I _B = 10mA |
| | | — | — | 0.3 | V | I _C = 70mA, I _B = 10mA |
| Base-Emitter Turn-On Voltage | V _{BE(on)} | — | — | 0.85 | V | V _{CE} = 5V, I _C = 2mA |
| | | — | — | 0.95 | V | V _{CE} = 5V, I _C = 10mA |
| Base-Emitter Saturation Voltage | V _{BE(sat)} | — | — | 0.98 | V | I _C = 10mA, I _B = 1mA |
| | | — | — | 1.2 | V | I _C = 50mA, I _B = 5mA |
| Input Current | I _I | — | — | 0.88 | mA | V _I = 5V |
| Output On Voltage (Same as V _{CE(sat)}) | V _{O(on)} | — | — | 0.25 | V | I _I = 2.5mA, I _O = 50mA |
| Input Resistance | R1 | 7 | 10 | 13 | kΩ | — |
| Resistance Ratio | (R2/R1) | 0.8 | 1 | 1.2 | — | — |
| Small Signal Characteristics | | | | | | |
| Current Gain-Bandwidth Product | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = 5mA, f = 1MHz |

- Notes:
5. For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
 6. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.
 7. Guaranteed by design.

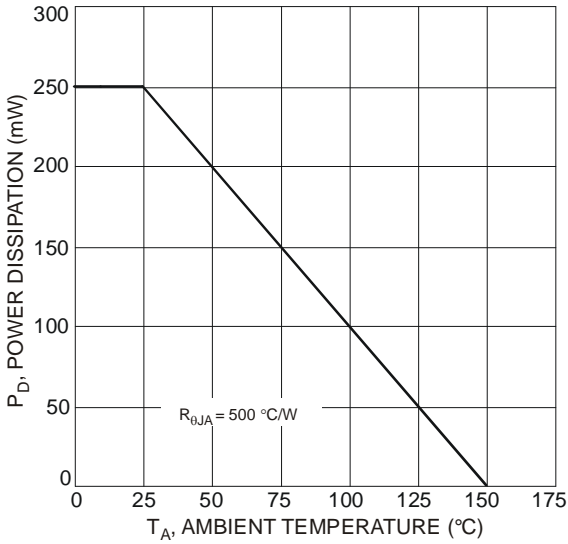


Fig. 1 Power Dissipation vs. Ambient Temperature

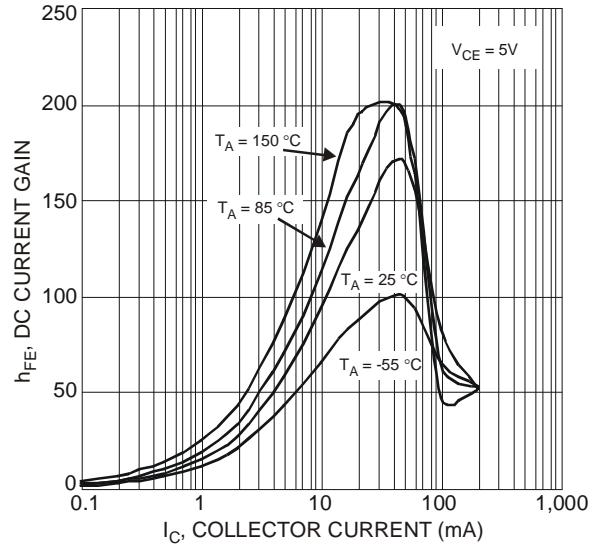


Fig. 2 Typical DC Current Gain vs. Collector Current

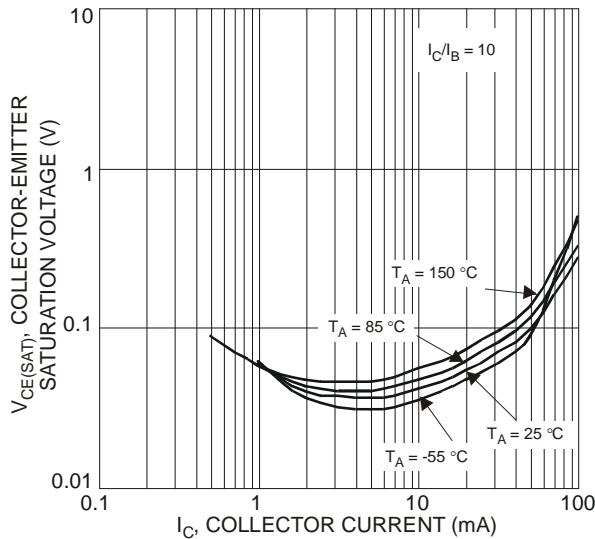


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

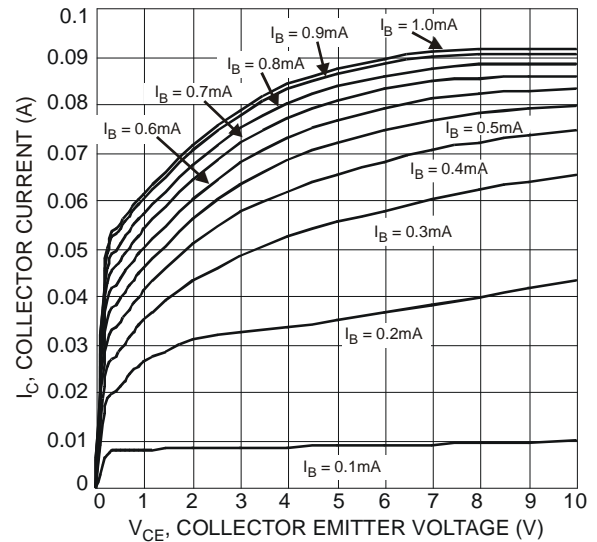


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

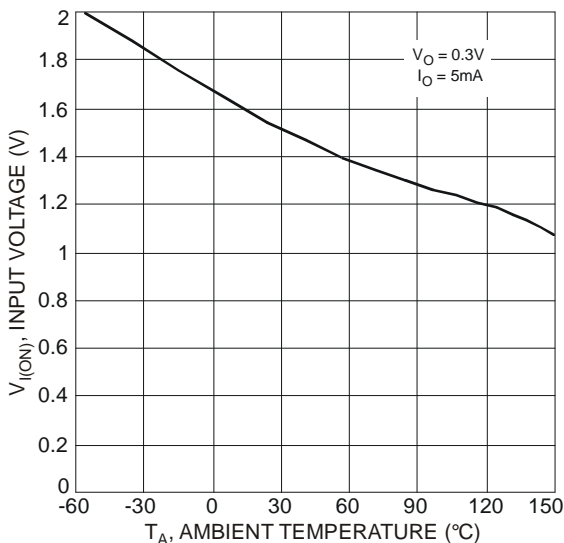


Fig. 5 Typical Input Voltage vs. Ambient Temperature

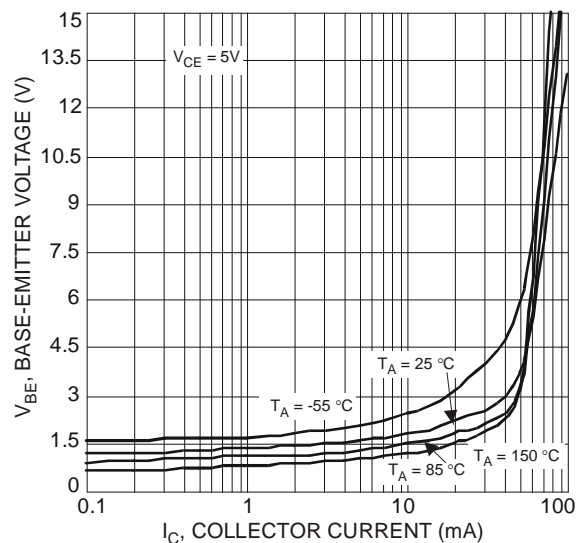


Fig. 6 Typical Base-Emitter Voltage vs. Collector Current

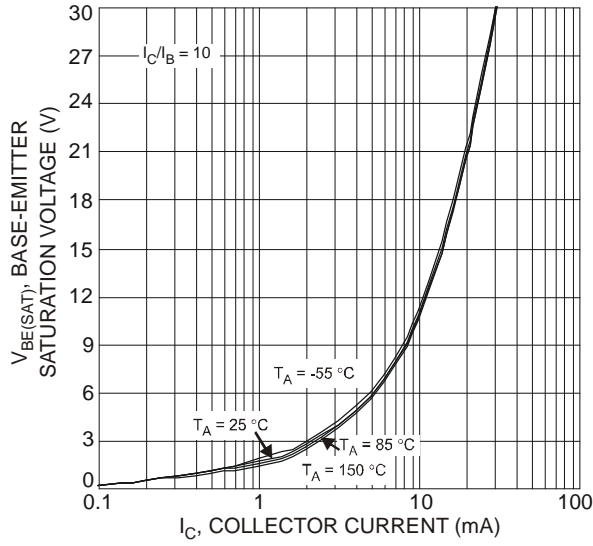
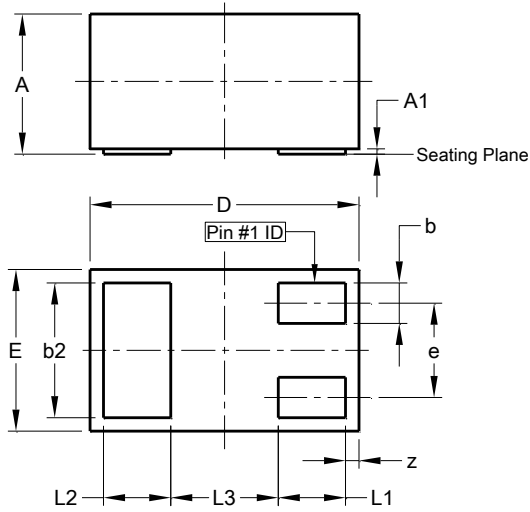


Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions

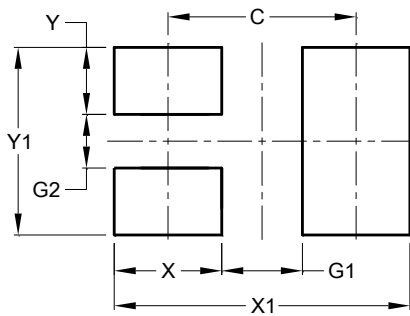
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| X1-DFN1006-3 | | | |
|----------------------|------|-------|------|
| Dim | Min | Max | Typ |
| A | 0.47 | 0.53 | 0.50 |
| A1 | 0.00 | 0.05 | 0.03 |
| b | 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 |
| z | 0.02 | 0.08 | 0.05 |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.70 |
| G1 | 0.30 |
| G2 | 0.20 |
| X | 0.40 |
| X1 | 1.10 |
| Y | 0.25 |
| Y1 | 0.70 |

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