

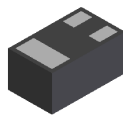
PRE-BIASED SMALL SIGNAL SURFACE MOUNT 100mA NPN TRANSISTOR
Features

- 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**

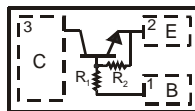
| Part Number | R1 (NOM) | R2 (NOM) |
|-------------|----------|----------|
| DDTC123JLP | 2.2K | 47K |
| DDTC143ZLP | 4.7K | 47K |
| DDTC114YLP | 10K | 47K |

Mechanical Data

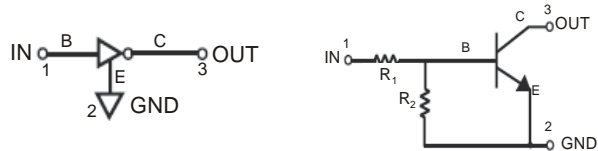
- Case: DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: Collector Dot (See Diagram and Marking Information)
- Terminals: Finish — NiPdAu over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 6
- Ordering Information: See Page 6
- Weight: 0.0009 grams (approximate)



Bottom View



Package Pin Out Configuration



Device Schematics

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

| Characteristic | P/N | Symbol | Value | Unit |
|---------------------------|------------|--------------|-----------|------|
| Supply Voltage | | V_{CC} | 50 | V |
| Input Voltage | DDTC123JLP | V_{IN} | -5 to +12 | V |
| | DDTC143ZLP | | -5 to +30 | |
| | DDTC114YLP | | -5 to +40 | |
| Output Voltage | DDTC123JLP | I_O | 100 | mA |
| | DDTC143ZLP | | 100 | |
| | DDTC114YLP | | 70 | |
| Maximum Collector Current | | $I_{C(MAX)}$ | 100 | mA |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|-------|
| Power Dissipation (Note 3) | P_D | 250 | mW |
| Power Deration above 25 °C | P_{der} | 2 | mW/°C |
| Thermal Resistance, Junction to Ambient Air (Note 3) (Equivalent to one heated junction of NPN) | $R_{\theta JA}$ | 500 | °C/W |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | °C |

- 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.
 3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on page 6 or our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

Electrical Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | P/N | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|------------|----------------------|-----|-----|-------|------|--|
| Off Characteristics (Note 4) | | | | | | | |
| Collector-Base Breakdown Voltage | | V _{(BR)CBO} | 50 | — | — | V | I _C = 10μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage * | | V _{(BR)CEO} | 50 | — | — | V | I _C = 2mA, I _B = 0 |
| Emitter-Base Breakdown Voltage * | | V _{(BR)EBO} | 4.5 | — | — | V | I _E = 50μA, I _C = 0 |
| Collector Cutoff Current * | | I _{CEX} | — | — | 0.5 | μA | V _{CE} = 50V, V _{EB(OFF)} = 3.0V |
| Base Cutoff Current (I _{BEX}) | | I _{BL} | — | — | 0.5 | μA | V _{CE} = 50V, V _{EB(OFF)} = 3.0V |
| Collector-Base Cut Off Current | | I _{CBO} | — | — | 0.5 | μA | V _{CB} = 50V, I _E = 0 |
| Collector-Emitter Cut Off Current, I _{O(OFF)} | | I _{CEO} | — | — | 0.5 | μA | V _{CE} = 50V, I _B = 0 |
| Emitter-Base Cut Off Current | | I _{EBO} | — | — | 0.5 | mA | V _{EB} = 5V, I _C = 0 |
| Input-Off Voltage | | V _{I(OFF)} | — | — | 0.5 | V | V _{CE} = 5V, I _C = 100μA |
| On Characteristics (Note 4) | | | | | | | |
| Base-Emitter Turn-On Voltage* | DDTC123JLP | V _{BE(ON)} | — | — | 0.85 | V | V _{CE} = 5V, I _C = 2mA |
| | DDTC143ZLP | | — | — | 0.85 | | |
| | DDTC114YLP | | — | — | 0.95 | | |
| Base-Emitter Saturation Voltage* | DDTC123JLP | V _{BE(SAT)} | — | — | 0.98 | V | I _C = 10mA, I _B = 1mA, V _{CE} =5V |
| | DDTC143ZLP | | — | — | 0.998 | | |
| | DDTC114YLP | | — | — | 0.98 | | |
| Input-On Voltage | | V _{I(ON)} | 1.1 | — | — | V | V _O = 0.3V, I _C = 5mA |
| Input Current | DDTC123JLP | I _I | — | — | 7.2 | mA | V _I = 5V |
| | DDTC143ZLP | | — | — | 1.5 | | |
| | DDTC114YLP | | — | — | 7.2 | | |
| DC Current Gain | | h _{FE} | 50 | — | — | — | V _{CE} = 5V, I _C = 1mA |
| | | | 70 | — | — | — | V _{CE} = 5V, I _C = 2mA |
| | | | 125 | — | — | — | V _{CE} = 5V, I _C = 5mA |
| | | | 150 | — | — | — | V _{CE} = 5V, I _C = 10mA |
| | | | 180 | — | — | — | V _{CE} = 5V, I _C = 50mA |
| 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 |
| Output On Voltage (Same as V _{CE(SAT)}) | | V _{O(ON)} | — | — | 0.3 | | I _J = 2.5mA, I _O = 50mA |
| Input Resistor +/-30% | | ΔR1 | -30 | — | 30 | % | — |
| Resistor Ratio | | Δ (R2/R1) | -20 | — | -20 | % | — |
| Small Signal Characteristics | | | | | | | |
| Transition Frequency (gain bandwidth product) | | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = 5mA, f = 100MHz |

*Guaranteed by design

Notes: 4. Short duration pulse test used to minimize self-heating effect.
Pulse Test: Pulse width, tp<300 uS, Duty Cycle, d<=0.02

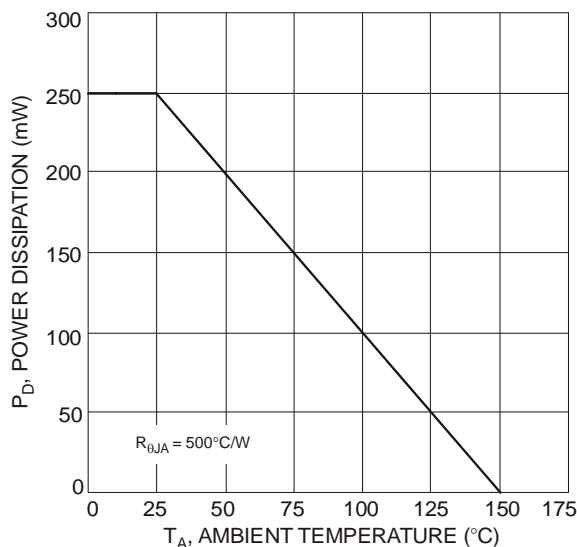
Typical Characteristics Curves @T_A = 25°C unless otherwise specified


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

Characteristics Curves of DDTC123JLP

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

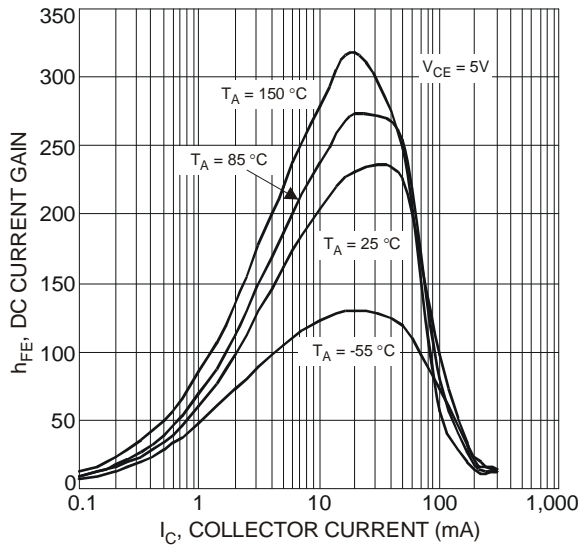


Fig. 2 Typical DC Current Gain vs. Collector Current

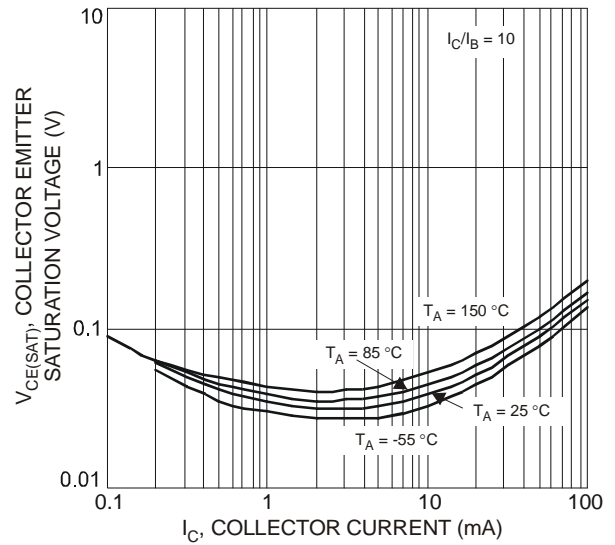


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

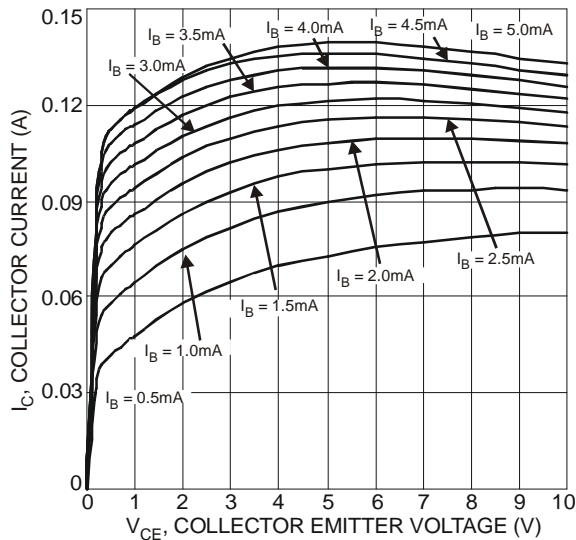


Fig. 4 Typical Collector Current vs. Collector Emitter Voltage

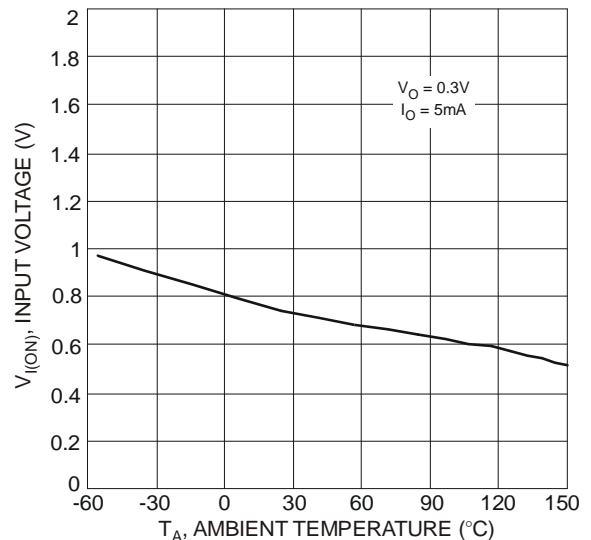


Fig. 5 Typical Input Voltage vs. Ambient Temperature

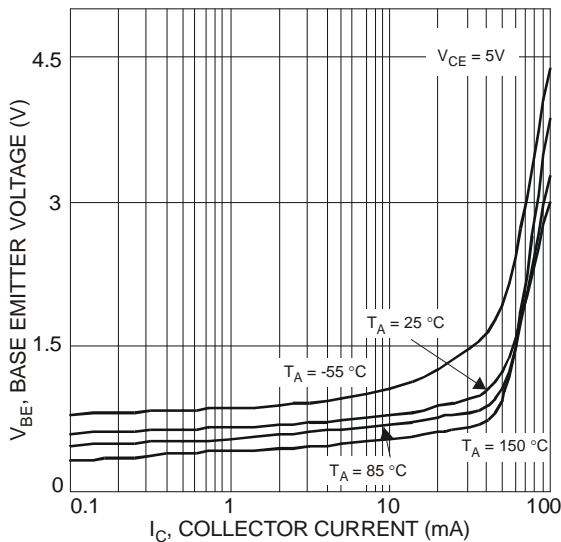


Fig. 6 Typical Base Emitter Voltage vs. Collector Current

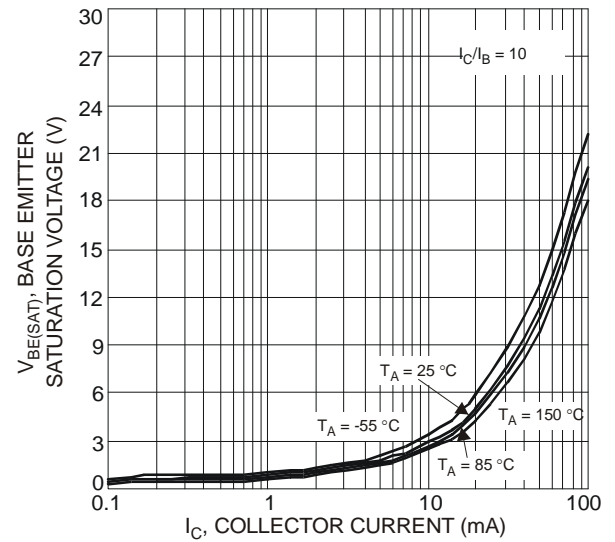


Fig. 7 Typical Base Emitter Saturation Voltage vs. Collector Current

Characteristics Curves of DDTC143ZLP @ $T_A = 25^\circ\text{C}$ unless otherwise specified

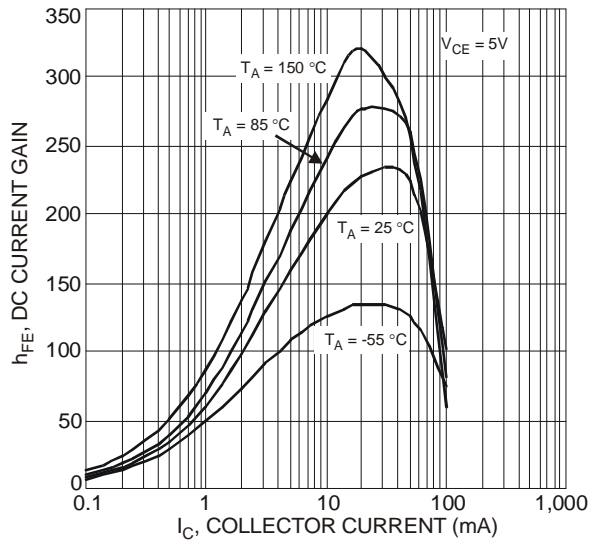


Fig. 8 Typical DC Current Gain vs. Collector Current

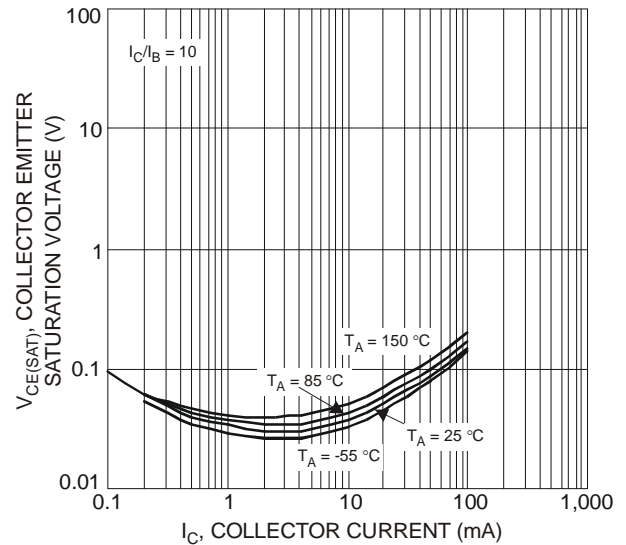


Fig. 9 Typical Collector Emitter Saturation Voltage vs. Collector Current

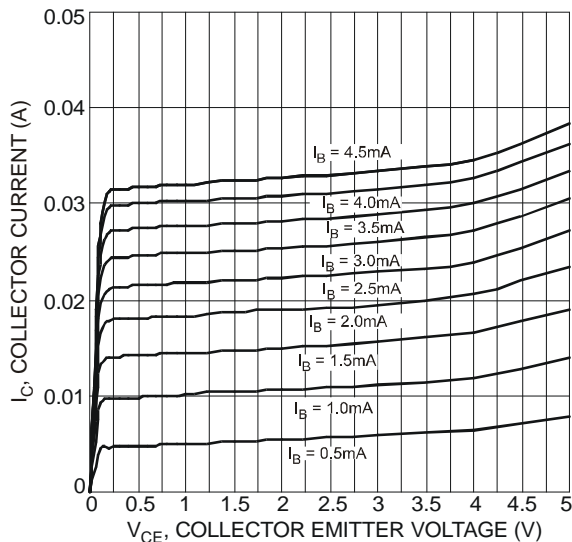


Fig. 10 Typical Collector Current vs. Collector Emitter Voltage

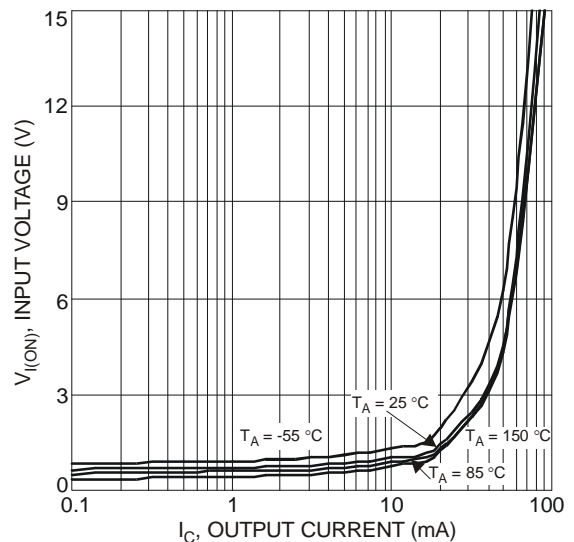


Fig. 11 Typical Input Voltage vs. Output Current

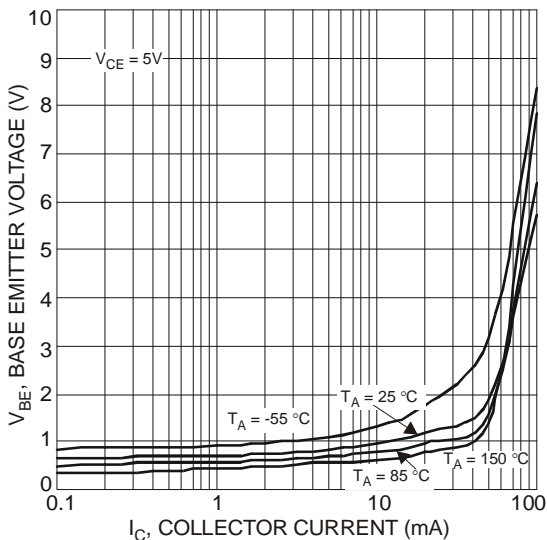


Fig. 12 Typical Base Emitter Voltage vs. Collector Current

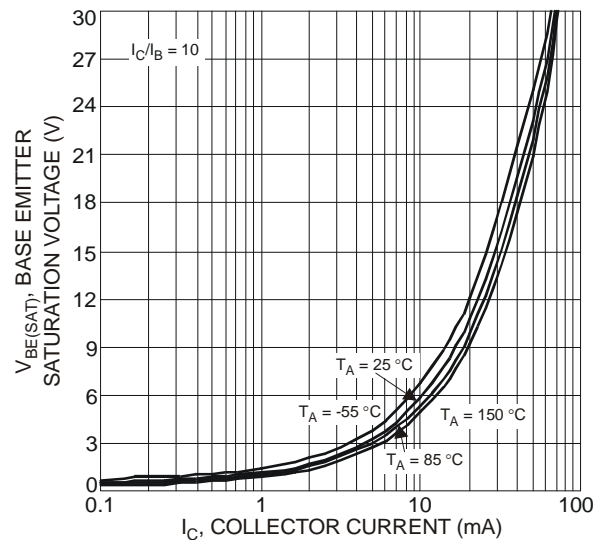


Fig. 13 Typical Base Emitter Saturation Voltage vs. Collector Current

Characteristics Curves of DDTC114YLP @ $T_A = 25^\circ\text{C}$ unless otherwise specified

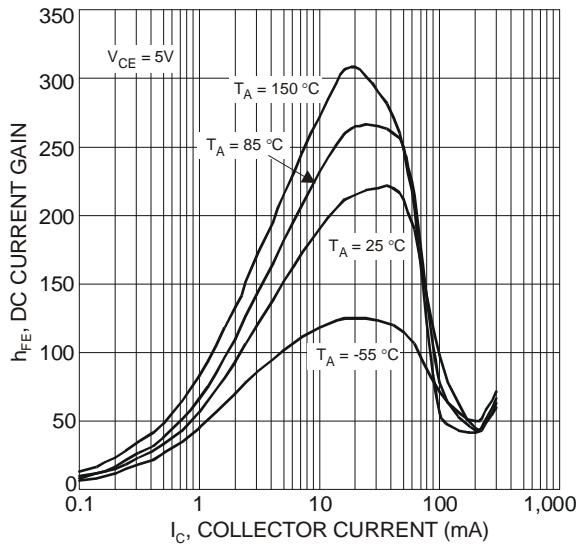


Fig. 14 Typical DC Current Gain vs. Collector Current

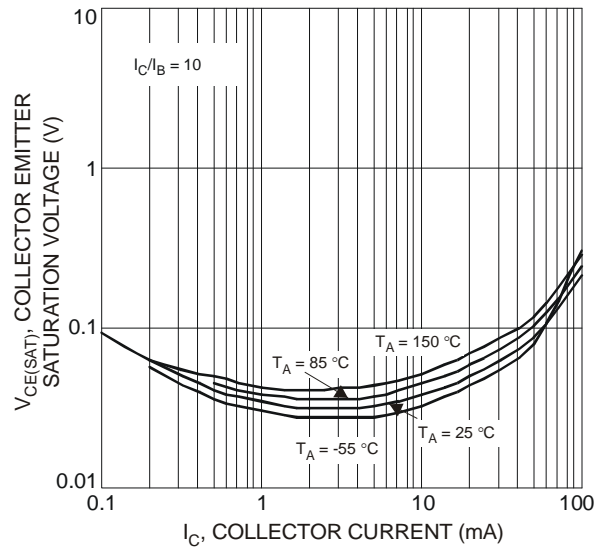


Fig. 15 Typical Collector Emitter Saturation Voltage vs. Collector Current

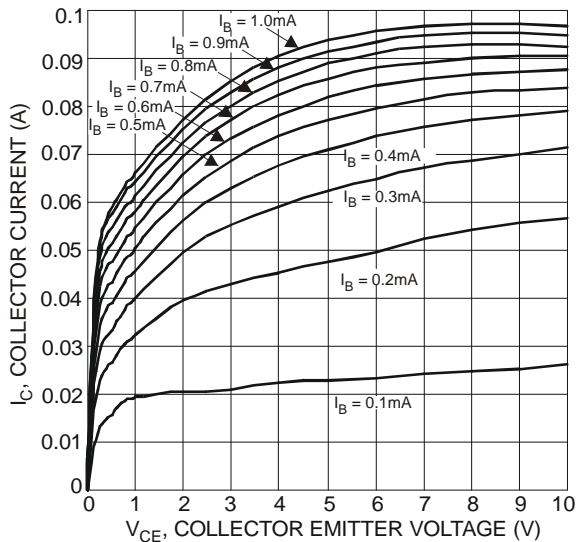


Fig. 16 Typical Collector Current vs. Collector Emitter Voltage

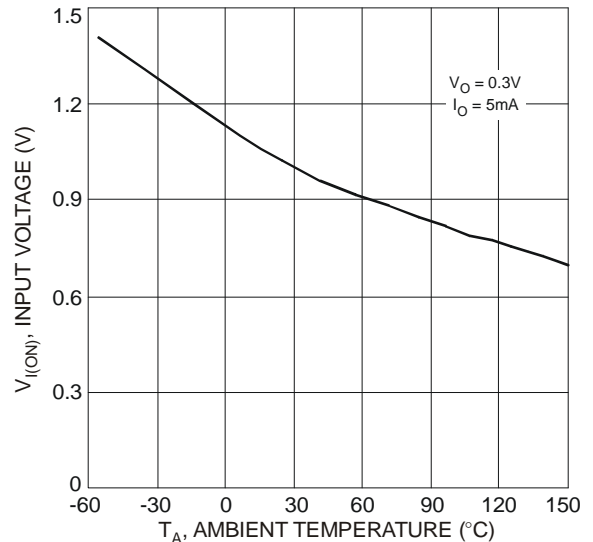


Fig. 17 Typical Input Voltage vs. Ambient Temperature

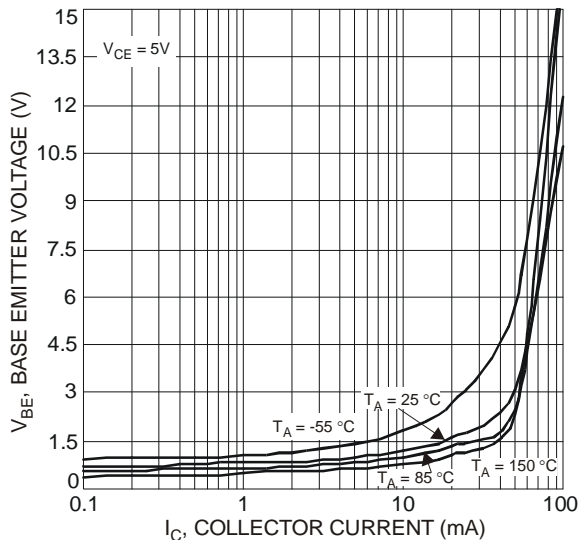


Fig. 18 Typical Base Emitter Voltage vs. Collector Current

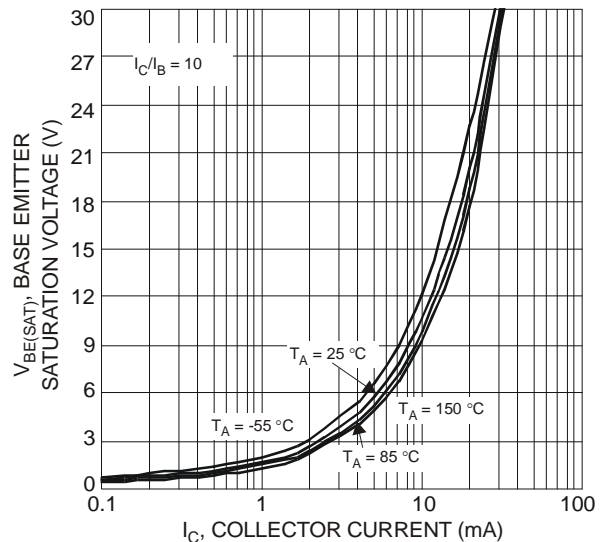
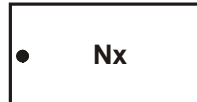


Fig. 19 Typical Base Emitter Saturation Voltage vs. Collector Current

Ordering Information (Note 5)

| Part Number | Case | Packaging |
|--------------|-----------|------------------|
| DDTC123JLP-7 | DFN1006-3 | 3000/Tape & Reel |
| DDTC143ZLP-7 | DFN1006-3 | 3000/Tape & Reel |
| DDTC114YLP-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


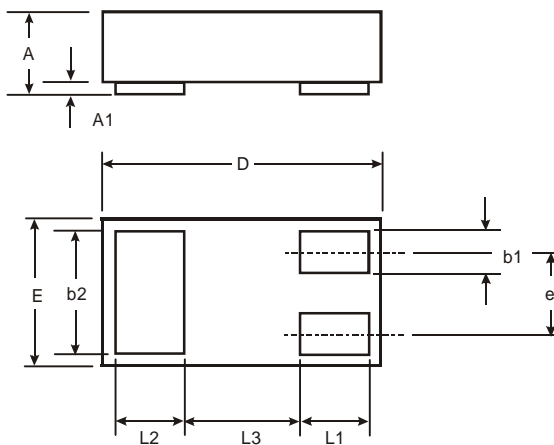
Nx = Product Type Marking Code:

DDTC123JLP = N0

DDTC143ZLP = N1

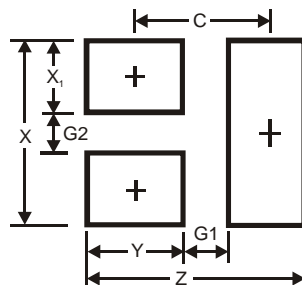
DDTC114YLP = N2

Dot Denotes Collector, Pin 3

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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- Техническая поддержка проекта;
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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.