

DDTC (R1 = R2 SERIES) UA

NPN PRE-BIASED SMALL SIGNAL SOT-323 SURFACE MOUNT TRANSISTOR

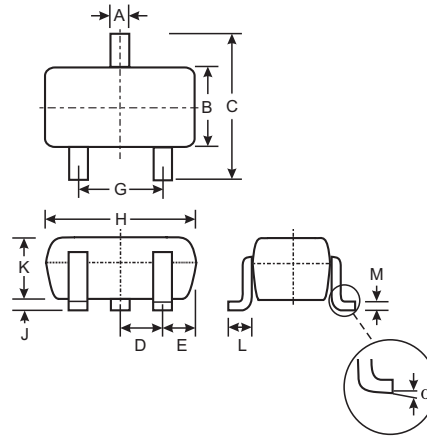
Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **Lead Free/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3 and 4)**

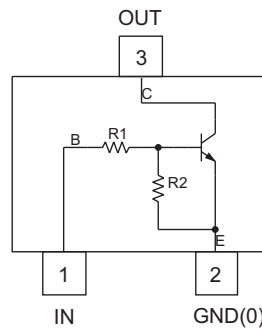
Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking: Date Code and Type Code, See Page 2
- Ordering Information (See Page 2)
- Type Code: See Table Below
- Weight: 0.006 grams (approximate)

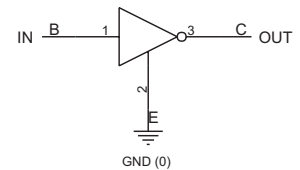
| P/N | R1, R2 (NOM) | Type Code |
|------------|---------------|-----------|
| DDTC123EUA | 2.2K Ω | N04 |
| DDTC143EUA | 4.7K Ω | N08 |
| DDTC114EUA | 10K Ω | N13 |
| DDTC124EUA | 22K Ω | N17 |
| DDTC144EUA | 47K Ω | N20 |
| DDTC115EUA | 100K Ω | N24 |



| SOT-323 | | |
|----------------------|--------------|------|
| Dim | Min | Max |
| A | 0.25 | 0.40 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Nominal | |
| E | 0.30 | 0.40 |
| G | 1.20 | 1.40 |
| H | 1.80 | 2.20 |
| J | 0.0 | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.18 |
| α | 0° | 8° |
| All Dimensions in mm | | |



Schematic and Pin Configuration



Equivalent Inverter Circuit

Maximum Ratings @ T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|--|------|
| Supply Voltage, (3) to (2) | V _{CC} | 50 | V |
| Input Voltage, (1) to (2) | V _{IN} | -10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40 | V |
| Output Current | I _O | 100 100 50 30 100 20 | mA |
| Output Current | I _C (Max) | 100 | mA |
| Power Dissipation | P _d | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 1) | R _{θJA} | 625 | °C/W |
| Operating and Storage and Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

- Note:
1. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.
 2. No purposefully added lead.
 3. Diodes Inc.'s "Green" Policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 4. Product manufactured with date code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to date code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

Electrical Characteristics @ T_A = 25°C unless otherwise specified

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--|--------------------------------|----------------------------------|-----|--|------|---|
| Input Voltage | | V _{I(off)} | 0.5 | 1.1 | — | V | V _{CC} = 5V, I _O = 100μA |
| | | V _{I(on)} | — | 1.9 | 3 | | V _O = 0.3V, I _O = 20mA, DDTC123EUA V _O = 0.3V, I _O = 20mA, DDTC143EUA V _O = 0.3V, I _O = 10mA, DDTC114EUA V _O = 0.3V, I _O = 5mA, DDTC124EUA V _O = 0.3V, I _O = 2mA, DDTC144EUA V _O = 0.3V, I _O = 1mA, DDTC115EUA |
| Output Voltage | | V _{O(on)} | — | 0.1 | 0.3 | V | I _O /I _I = 10mA/0.5mA, DDTC123EUA I _O /I _I = 10mA/0.5mA, DDTC143EUA I _O /I _I = 10mA/0.5mA, DDTC114EUA I _O /I _I = 10mA/0.5mA, DDTC124EUA I _O /I _I = 10mA/0.5mA, DDTC144EUA I _O /I _I = 5mA/0.25mA, DDTC115EUA |
| Input Current | DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC144EUA DDTC115EUA | I _I | — | — | 3.8 1.8 0.88 0.36 0.18 0.15 | mA | V _I = 5V |
| Output Current | | I _{O(off)} | — | — | 0.5 | μA | V _{CC} = 50V, V _I = 0V |
| DC Current Gain | DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC144EUA DDTC115EUA | G _I | 20 20 30 56 68 82 | — | — | — | V _O = 5V, I _O = 20mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA |
| Input Resistor (R ₁) Tolerance | | ΔR ₁ | -30 | — | +30 | % | — |
| Resistance Ratio | | R ₂ /R ₁ | 0.8 | 1 | 1.2 | — | — |
| Gain-Bandwidth Product* | | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = 5mA, f = 100MHz |

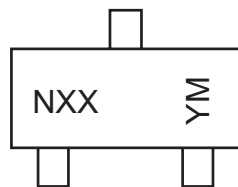
* Transistor - For Reference Only

Ordering Information (Note 4 & 5)

| Device | Packaging | Shipping |
|----------------|-----------|------------------|
| DDTC123EUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC143EUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC114EUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC124EUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC144EUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC115EUA-7-F | SOT-323 | 3000/Tape & Reel |

- Notes: 4. Product manufactured with date code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to date code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.
5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



NXX = Product Type Marking Code, See Table on Page 1
YM = Date Code Marking
Y = Year ex: T = 2006
M = Month ex: 9 = September

Date Code Key

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | N | P | R | S | T | U | V | W | X | Y | Z |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | O | N | D |

TYPICAL CURVES - DDTC143EUA

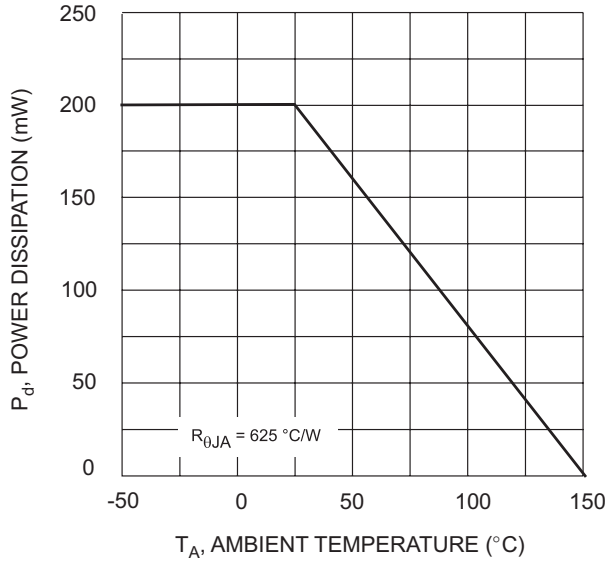


Fig. 1 Derating Curve

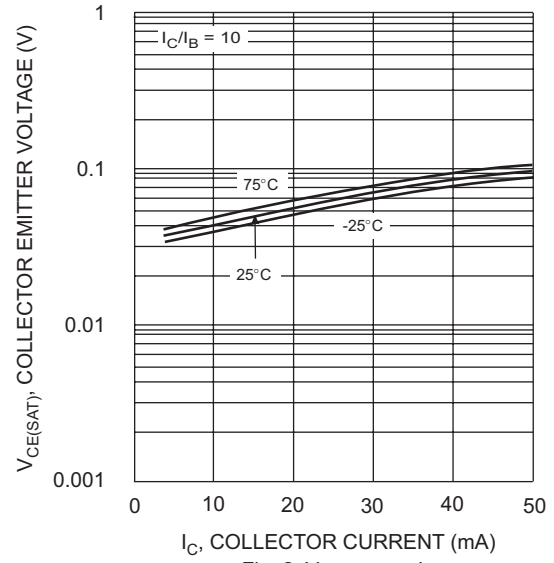


Fig. 2 $V_{CE(SAT)}$ vs. I_C

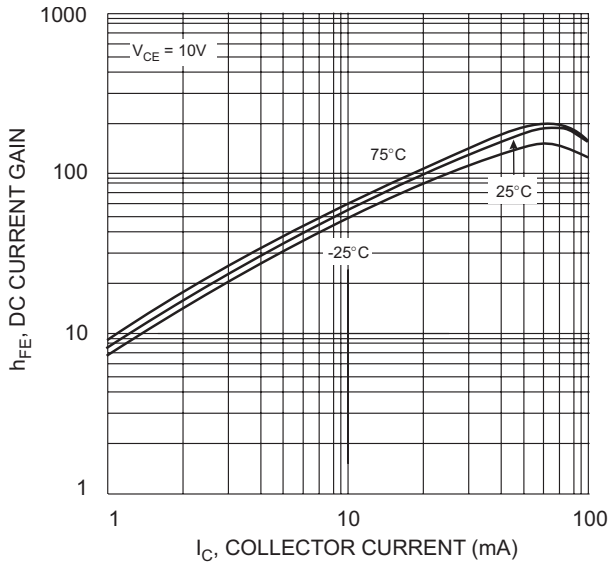


Fig. 3 DC CURRENT GAIN

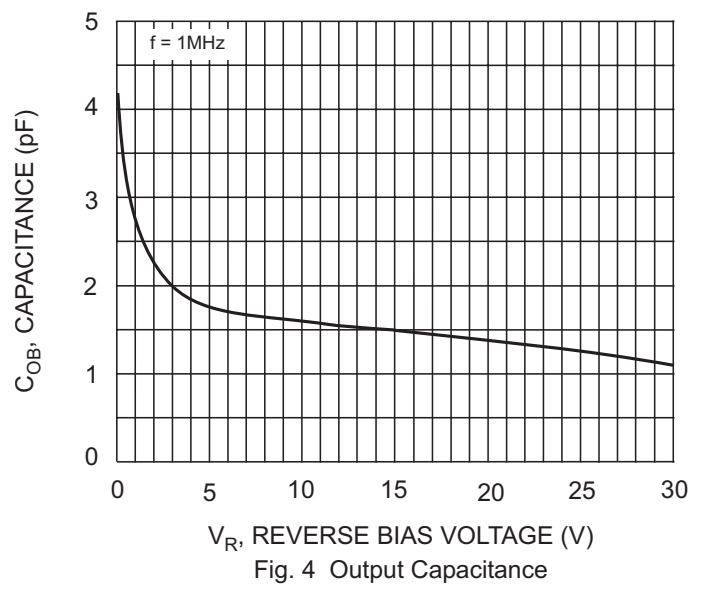


Fig. 4 Output Capacitance

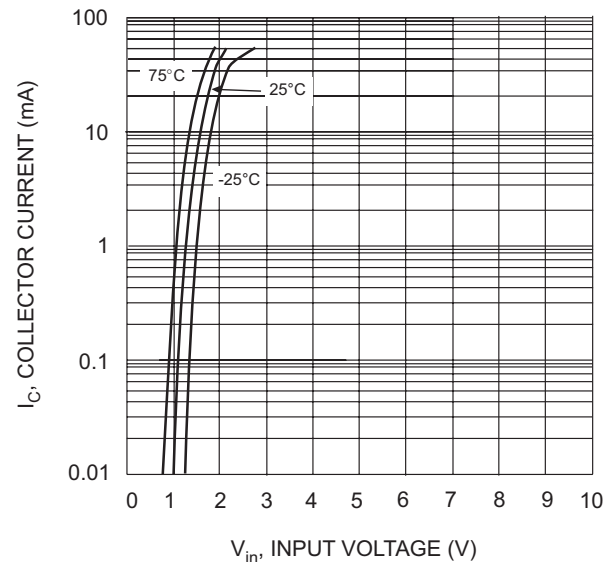


Fig. 5 Collector Current Vs. Input Voltage

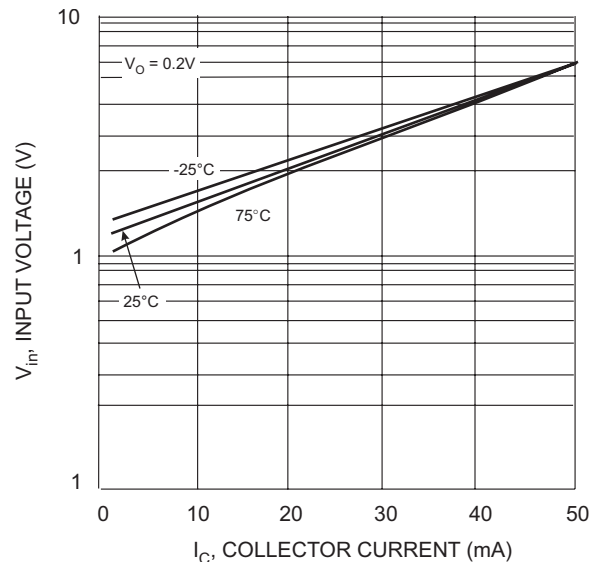


Fig. 6 Input Voltage vs. Collector Current

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