

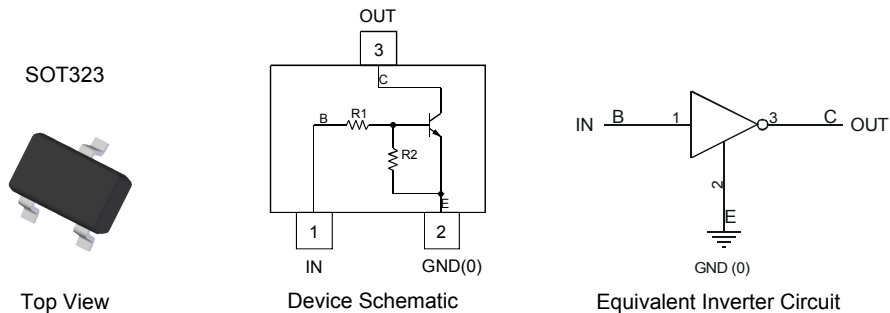
NPN PRE-BIASED GREEN SMALL SIGNAL SURFACE MOUNT TRANSISTOR
Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **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**
- **PPAP Capable (Note 4)**

| Part Number | R1, R2 (NOM) |
|-------------|--------------|
| DDTC123EUA | 2.2KΩ |
| DDTC143EUA | 4.7KΩ |
| DDTC114EUA | 10KΩ |
| DDTC124EUA | 22KΩ |
| DDTC144EUA | 47KΩ |
| DDTC115EUA | 100KΩ |

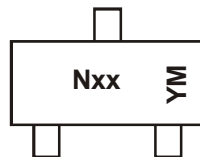
Mechanical Data

- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (approximate)


Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------------|------------|---------|--------------------|-----------------|-------------------|
| DDTC123EUA-7-F | AEC-Q101 | N04 | 7 | 8 | 3,000 |
| DDTC143EUA-7-F | AEC-Q101 | N08 | 7 | 8 | 3,000 |
| DDTC114EUA-7-F | AEC-Q101 | N13 | 7 | 8 | 3,000 |
| DDTC114EUAQ-7-F | Automotive | N13 | 7 | 8 | 3,000 |
| DDTC124EUA-7-F | AEC-Q101 | N17 | 7 | 8 | 3,000 |
| DDTC124EUAQ-7-F | Automotive | N17 | 7 | 8 | 3,000 |
| DDTC124EUAQ-13-F | Automotive | N17 | 13 | 8 | 10,000 |
| DDTC144EUA-7-F | AEC-Q101 | N20 | 7 | 8 | 3,000 |
| DDTC144EUAQ-7-F | Automotive | N20 | 7 | 8 | 3,000 |
| DDTC144EUAQ-13-F | Automotive | N20 | 13 | 8 | 10,000 |
| DDTC115EUA-7-F | AEC-Q101 | N24 | 7 | 8 | 3,000 |
| DDTC115EUAQ-7-F | Automotive | N24 | 7 | 8 | 3,000 |

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


Nxx = Product Type Marking Code (See Table Above)
 YM = Date Code Marking
 Y = Year (ex: X = 2010)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|------|
| Code | X | Y | Z | A | B | C | D | E |

| 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 |

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|----------------------------------|---------------------|--|------|
| Supply Voltage <Pin: (3) to (2)> | V _{CC} | 50 | V |
| Input Voltage <Pin: (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 |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Notes 6) | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R _{θJA} | 625 | °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 |
|--|--------------------------------|--|-----|--|------|---|
| Input Voltage | V _{I(OFF)} | 0.5 | 1.1 | — | V | V _{CC} = 5V, I _O = 100 μA |
| | V _{I(ON)} | — | 1.9 | 3 | V | 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 = 1mA, DDTC115EUA V _O = 0.3V, I _O = 2mA, DDTC144EUA |
| 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 | 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 | G _I | 20 20 30 56 68 80 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 (Note 7) | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = 5mA, f = 100MHz |

Notes: 6. Mounted on FR4 PC Board with minimum recommended pad layout.
7. Transistor - For Reference Only.

Typical Curves – DDTC143EUA (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

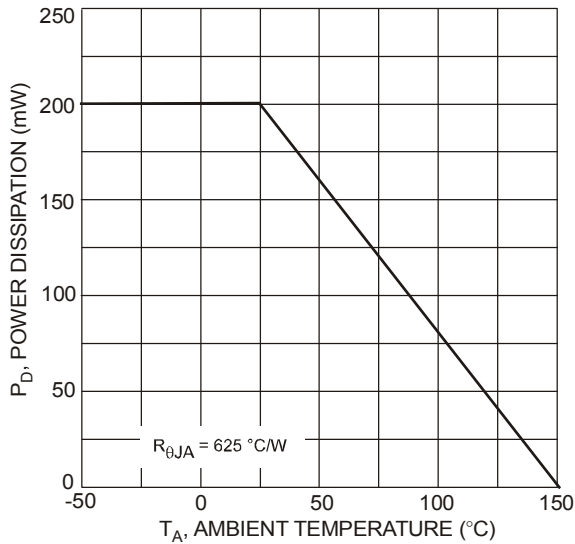


Fig. 1 Power Dissipation vs. Ambient Temperature

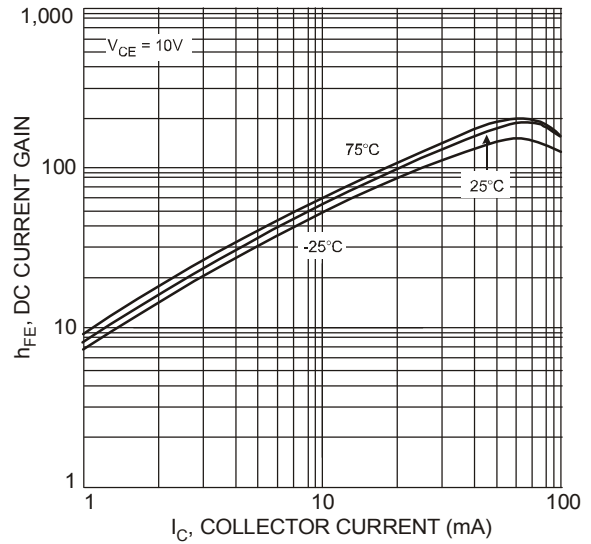


Fig. 2 Typical DC Current Gain vs. Collector Current

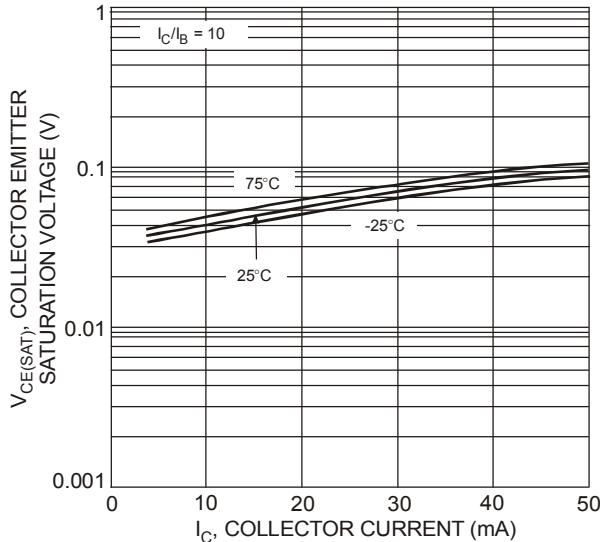


Fig. 3. Collector Emitter Saturation Voltage vs. Collector Current

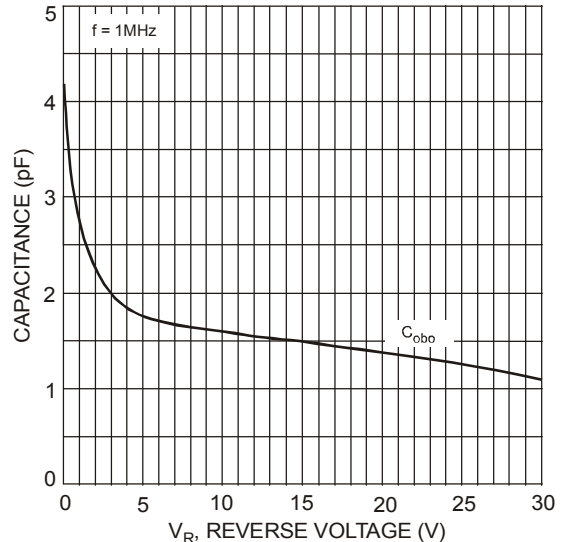


Fig. 4 Typical Capacitance Characteristics

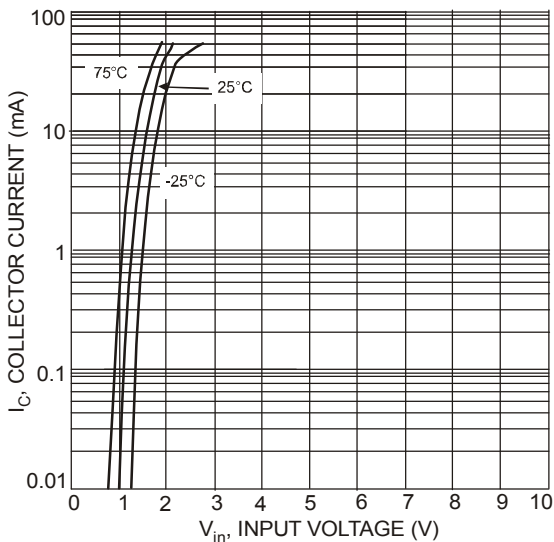


Fig. 5 Collector Current vs. Input Voltage

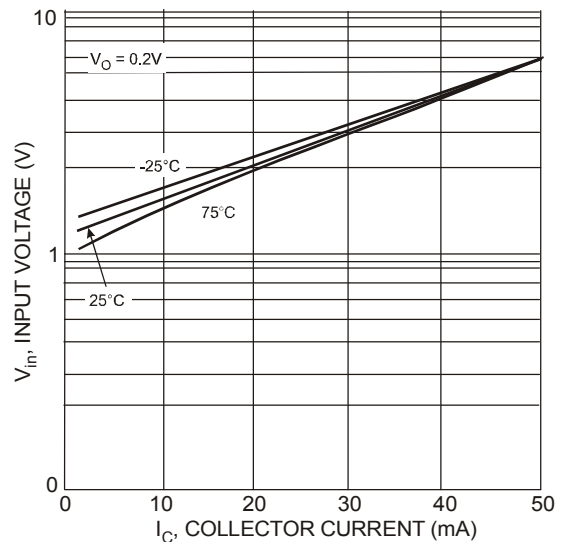
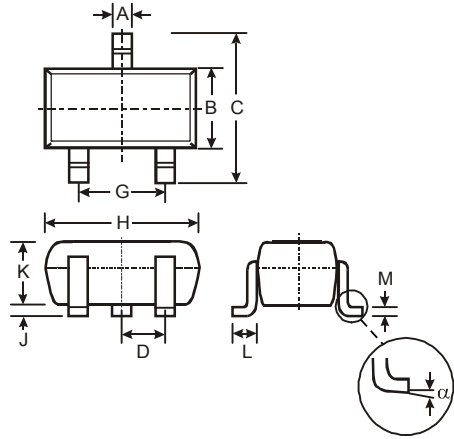


Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions

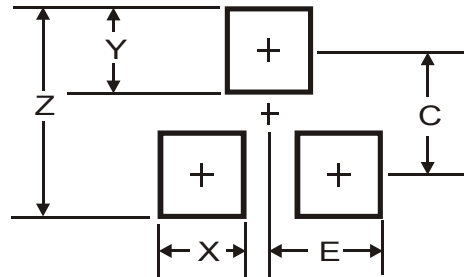
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT323 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.25 | 0.40 | 0.30 |
| B | 1.15 | 1.35 | 1.30 |
| C | 2.00 | 2.20 | 2.10 |
| D | - | - | 0.65 |
| G | 1.20 | 1.40 | 1.30 |
| H | 1.80 | 2.20 | 2.15 |
| J | 0.0 | 0.10 | 0.05 |
| K | 0.90 | 1.00 | 1.00 |
| L | 0.25 | 0.40 | 0.30 |
| M | 0.10 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| 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) |
|------------|---------------|
| Z | 2.8 |
| X | 0.7 |
| Y | 0.9 |
| C | 1.9 |
| E | 1.0 |

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