



NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

Product Summary

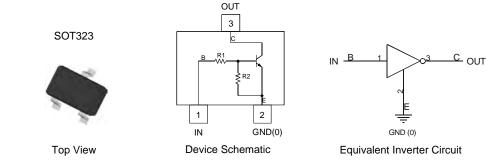
| Part Number | R1, R2 (NOM) |
|-------------|--------------|
| DDTC123EUA | 2.2ΚΩ |
| DDTC143EUA | 4.7ΚΩ |
| DDTC114EUA | 10KΩ |
| DDTC124EUA | 22ΚΩ |
| DDTC144EUA | 47ΚΩ |
| DDTC115EUA | 100ΚΩ |

Features and Benefits

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.008 grams (approximate)



Ordering Information (Notes 3 & 4)

| Product | Grade | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------------|------------|---------|--------------------|-----------------|-------------------|
| DDTC123EUA-7-F | Commercial | N04 | 7 | 8 | 3,000 |
| DDTC143EUA-7-F | Commercial | N08 | 7 | 8 | 3,000 |
| DDTC114EUA-7-F | Commercial | N13 | 7 | 8 | 3,000 |
| DDTC124EUA-7-F | Commercial | 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 | Commercial | 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 | Commercial | N24 | 7 | 8 | 3,000 |

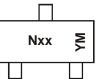
Notes: 1. No purposefully added lead.

2. Diodes Inc's "Green" policy can be found on our website at http://www.diodes.com.

3. For packaging details, go to our website at http://www.diodes.com.

4. Products with Q-suffix are automotive grade. Automotive products are electrical and thermal the same as the commercial, except where specified.

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 | 2002 | 2003 | 2004 | 2005 | 20 |
| Code | N | Р | R | Ś | |

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-------|------|------|------|---------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | Ν | Р | R | S | Т | U | V | W | Х | Y | Z | Α | В | С | D | E |
| Month | Jan | F | eb | Mar | Apr | M | lav | Jun | Jul | A | | Sep | Oct | N | ov | Dec |
| | Uan | | 0.0 | Initial | | | - | oun | | | ug | | 001 | | | Dec |
| Code | 1 | | 2 | 3 | 4 | | 5 | 6 | 7 | 1 8 | 3 | 9 | | | N | D |



Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|--|--|---------------------|--|------|
| Supply Voltage <pine: (2)="" (3)="" to=""></pine:> | | Vcc | 50 | V |
| Input Voltage <pin: (1)="" (2)="" to=""></pin:> | DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC124EUA DDTC144EUA DDTC115EUA | V _{IN} | -10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40 | V |
| Output Current | DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC124EUA DDTC144EUA DDTC115EUA | lo | 100 100 50 30 100 20 | mA |
| Output Current | All | I _{C(MAX)} | 100 | mA |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|----------------------|-------------|------|
| Power Dissipation (Notes 5 & 6) | PD | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 5) | $R_{	ext{	heta}JA}$ | 625 | °C/W |
| Operating and Storage Temperature Range | TJ, T _{STG} | -55 to +150 | °C |

Electrical Characteristics @T_A = 25°C unless otherwise specified

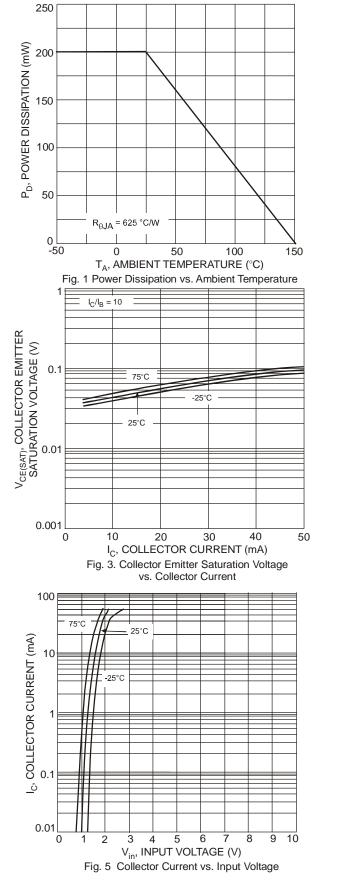
| Characteristic | Symbol | Min | Тур | Max | Unit | Test Condition | |
|--|--|--------------------------------|--|-----|--|----------------|--|
| | | VI(OFF) | 0.5 | 1.1 | _ | V | $V_{CC} = 5V, I_{O} = 100 \mu A$ |
| Input Voltage | | V _{I(ON)} | | 1.9 | 3 | V | $ \begin{array}{l} V_{O}=0.3V,\ I_{O}=20mA,\ 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\\ \end{array} $ |
| Output Voltage | | V _{O(ON)} | _ | 0.1 | 0.3 | > | $\begin{split} & _O/I_{ } = 10 \text{mA}/0.5 \text{mA}, \text{DDTC123EUA} \\ & _O/I_{ } = 10 \text{mA}/0.5 \text{mA}, \text{DDTC143EUA} \\ & _O/I_{ } = 10 \text{mA}/0.5 \text{mA}, \text{DDTC114EUA} \\ & _O/I_{ } = 10 \text{mA}/0.5 \text{mA}, \text{DDTC124EUA} \\ & _O/I_{ } = 10 \text{mA}/0.5 \text{mA}, \text{DDTC144EUA} \\ & _O/I_{ } = 5 \text{mA}/0.25 \text{mA}, \text{DDTC115EUA} \end{split}$ |
| Input Current | DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC124EUA DDTC144EUA DDTC115EUA | h | | _ | 3.8 1.8 0.88 0.36 0.18 0.15 | mA | V ₁ = 5V |
| Output Current | | I _{O(OFF)} | _ | _ | 0.5 | μA | $V_{CC} = 50V, V_{I} = 0V$ |
| DC Current Gain | DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC124EUA DDTC144EUAQ DDTC114EUAQ | Gı | 20 20 30 56 68 80 82 | | | | $ \begin{array}{l} V_{O}=5V, \ I_{O}=20mA \\ V_{O}=5V, \ I_{O}=10mA \\ V_{O}=5V, \ I_{O}=5mA \end{array} $ |
| 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 |

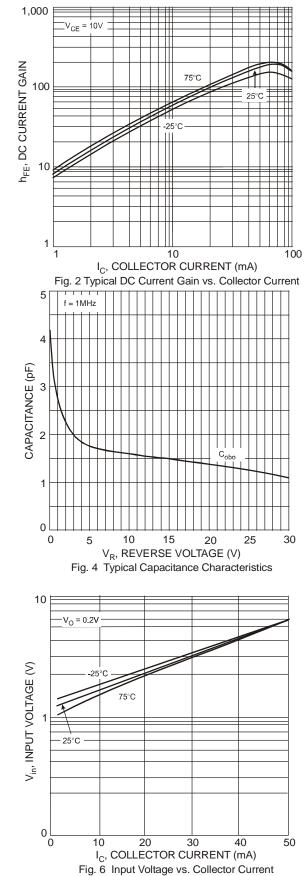
* Transistor - For Reference Only

5. Mounted on FR4 PC Board with recommended pad layout as shown on Diodes Inc., suggested pad layout document AP02001, which can be found on Notes: our website at http://www.diodes.com.6. 150mW per element must not be exceeded.



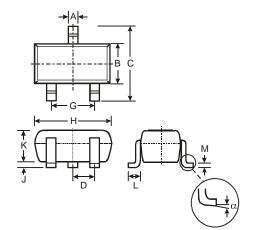
Typical Curves – DDTC143EUA @T_A = 25°C unless otherwise specified





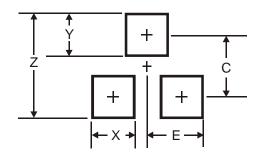


Package Outline Dimensions



| SOT323 | | | | | | | | | |
|--------|------|------|------|--|--|--|--|--|--|
| Dim | Min | Max | Тур | | | | | | |
| Α | 0.25 | 0.40 | 0.30 | | | | | | |
| В | 1.15 | 1.35 | 1.30 | | | | | | |
| С | 2.00 | 2.20 | 2.10 | | | | | | |
| D | - | - | 0.65 | | | | | | |
| G | 1.20 | 1.40 | 1.30 | | | | | | |
| Н | 1.80 | 2.20 | 2.15 | | | | | | |
| J | 0.0 | 0.10 | 0.05 | | | | | | |
| Κ | 0.90 | 1.00 | 1.00 | | | | | | |
| L | 0.25 | 0.40 | 0.30 | | | | | | |
| М | 0.10 | 0.18 | 0.11 | | | | | | |
| α | 0° | 8° | - | | | | | | |
| All | | | | | | | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.8 |
| Х | 0.7 |
| Y | 0.9 |
| С | 1.9 |
| E | 1.0 |



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