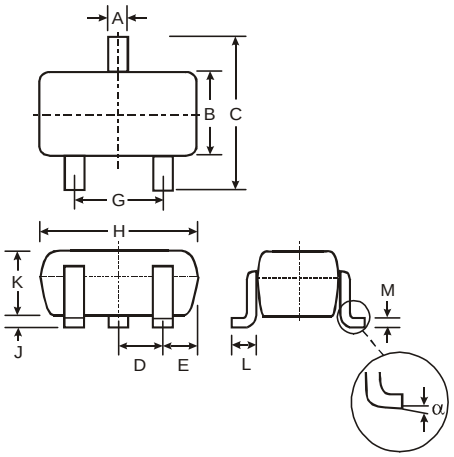
# DDTC (R1≠R2 SERIES) UA

**NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR**

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1≠R2
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2 & 3)**

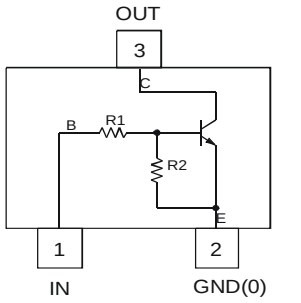



| SOT-323 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 0.25 | 0.40 |
| **B** | 1.15 | 1.35 |
| **C** | 2.00 | 2.20 |
| **D** | 0.65 Nominal | |
| **E** | 0.30 | 0.40 |
| **G** | 1.20 | 1.40 |
| **H** | 1.80 | 2.20 |
| **J** | 0.0 | 0.10 |
| **K** | 0.90 | 1.00 |
| **L** | 0.25 | 0.40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

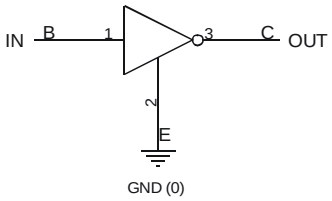
## Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 3. 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 Information: See Page 4
- Type Code: See Table Below
- Ordering Information: See Page 4
- Weight: 0.006 grams (approximate)

| P/N | R1 (NOM) | R2 (NOM) | Type Code |
|---|---|---|---|
| DDTC113ZUA | 1KΩ | 10KΩ | N02 |
| DDTC123YUA | 2.2KΩ | 10KΩ | N05 |
| DDTC123JUA | 2.2KΩ | 47KΩ | N06 |
| DDTC143XUA | 4.7KΩ | 10KΩ | N09 |
| DDTC143FUA | 4.7KΩ | 22KΩ | N10 |
| DDTC143ZUA | 4.7KΩ | 47KΩ | N11 |
| DDTC114YUA | 10KΩ | 47KΩ | N14 |
| DDTC114WUA | 10KΩ | 4.7KΩ | N15 |
| DDTC124XUA | 22KΩ | 47KΩ | N18 |
| DDTC144VUA | 47KΩ | 10KΩ | N21 |
| DDTC144WUA | 47KΩ | 22KΩ | N22 |




Schematic and Pin Configuration




## 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) | DDTC113ZUA | $V_{IN}$ | -5 to +10 | V |
| | DDTC123YUA | | -5 to +12 | |
| | DDTC123JUA | | -5 to +12 | |
| | DDTC143XUA | | -7 to +20 | |
| | DDTC143FUA | | -6 to +30 | |
| | DDTC143ZUA | | -5 to +30 | |
| | DDTC114YUA | | -6 to +40 | |
| | DDTC114WUA | | -10 to +30 | |
| | DDTC124XUA | | -10 to +40 | |
| | DDTC144VUA | | -15 to +40 | |
| | DDTC144WUA | | -10 to +40 | Equivalent Inverter Circuit |
| Output Current | DDTC113ZUA | $I_O$ | 100 | mA |
| | DDTC123YUA | | 100 | |
| | DDTC123JUA | | 100 | |
| | DDTC143XUA | | 100 | |
| | DDTC143FUA | | 100 | |
| | DDTC143ZUA | | 100 | |
| | DDTC114YUA | | 70 | |
| | DDTC114WUA | | 100 | |
| | DDTC124XUA | | 50 | |
| | DDTC144VUA | | 30 | |
| | DDTC144WUA | | 30 | |
| Output Current | All | $I_C$ (Max) | 100 | mA |

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. Product manufactured with Date Code 0627 (week 27, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0627 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

## Maximum Ratings (continued) @$T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Output Current All | $I_C$ (Max) | 100 | mA |
| Power Dissipation | $P_d$ | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 4) | $R_{\theta JA}$ | 625 | °C/W |
| Operating and Storage Temperature Range | $T_j$, $T_{STG}$ | -55 to +150 | °C |

Notes: 4. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com/datasheets/ap02001.pdf.

## Electrical Characteristics @$T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Input Voltage | DDTC113ZUA | $V_{I(off)}$ | 0.3 | — | — | V | $V_{CC}$ = 5V, $I_O$ = 100μA |
| | DDTC123YUA | | 0.3 | | | | |
| | DDTC123JUA | | 0.5 | | | | |
| | DDTC143XUA | | 0.3 | | | | |
| | DDTC143FUA | | 0.3 | | | | |
| | DDTC143ZUA | | 0.5 | | | | |
| | DDTC114YUA | | 0.3 | | | | |
| | DDTC114WUA | | 0.8 | | | | |
| | DDTC124XUA | | 0.4 | | | | |
| | DDTC144VUA | | 1.0 | | | | |
| | DDTC144WUA | | 0.8 | | | | |
| Input Voltage | DDTC113ZUA | $V_{I(on)}$ | — | — | 3.0 | | $V_O$ = 0.3V, $I_O$ = 20mA |
| | DDTC123YUA | | | | 3.0 | | $V_O$ = 0.3V, $I_O$ = 20mA |
| | DDTC123JUA | | | | 1.1 | | $V_O$ = 0.3V, $I_O$ = 5mA |
| | DDTC143XUA | | | | 2.5 | | $V_O$ = 0.3V, $I_O$ = 20mA |
| | DDTC143FUA | | | | 1.3 | | $V_O$ = 0.3V, $I_O$ = 3mA |
| | DDTC143ZUA | | | | 1.3 | | $V_O$ = 0.3V, $I_O$ = 5mA |
| | DDTC114YUA | | | | 1.4 | | $V_O$ = 0.3V, $I_O$ = 1mA |
| | DDTC114WUA | | | | 3.0 | | $V_O$ = 0.3V, $I_O$ = 2mA |
| | DDTC124XUA | | | | 2.5 | | $V_O$ = 0.3V, $I_O$ = 2mA |
| | DDTC144VUA | | | | 5.0 | | $V_O$ = 0.3V, $I_O$ = 2mA |
| | DDTC144WUA | | | | 4.0 | | $V_O$ = 0.3V, $I_O$ = 2mA |
| Output Voltage | | $V_{O(on)}$ | — | 0.1 | 0.3 | V | $I_O/I_I$ = 5mA/0.25mA DDTC123JUA |
| | | | | | | | $I_O/I_I$ = 5mA/0.25mA DDTC143ZUA |
| | | | | | | | $I_O/I_I$ = 5mA/0.25mA DDTC114YUA |
| | | | | | | | $I_O/I_I$ = 10mA/0.5mA All Others |
| Input Current | DDTC113ZUA | $I_I$ | — | — | 7.2 | mA | $V_I$ = 5V |
| | DDTC123YUA | | | | 3.8 | | |
| | DDTC123JUA | | | | 3.6 | | |
| | DDTC143XUA | | | | 1.8 | | |
| | DDTC143FUA | | | | 1.8 | | |
| | DDTC143ZUA | | | | 1.8 | | |
| | DDTC114YUA | | | | 0.88 | | |
| | DDTC114WUA | | | | 0.88 | | |
| | DDTC124XUA | | | | 0.36 | | |
| | DDTC144VUA | | | | 0.16 | | |
| | DDTC144WUA | | | | 0.16 | | |
| Output Current | | $I_{O(off)}$ | — | — | 0.5 | μA | $V_{CC}$ = 50V, $V_I$ = 0V |
| DC Current Gain | DDTC113ZUA | $G_I$ | 33 | — | — | — | $V_O$ = 5V, $I_O$ = 5mA |
| | DDTC123YUA | | 33 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDTC123JUA | | 80 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDTC143XUA | | 30 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDTC143FUA | | 68 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDTC143ZUA | | 80 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDTC114YUA | | 68 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| | DDTC114WUA | | 24 | | | | $V_O$ = 5V, $I_O$ = 10mA |
| | DDTC124XUA | | 68 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| | DDTC144VUA | | 33 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| | DDTC144WUA | | 56 | | | | $V_O$ = 5V, $I_O$ = 5mA |
| Input Resistor Tolerance | | $\Delta R_1$ | -30 | — | +30 | % | — |
| Resistance Ratio Tolerance | | $\Delta R_2/R_1$ | -20 | — | +20 | % | — |
| Gain-Bandwidth Product* | | $f_T$ | — | 250 | — | MHz | $V_{CE}$ = 10V, $I_E$ = 5mA, f = 100MHz |

* Transistor - For Reference Only

## Typical Curves – DDTC123JUA

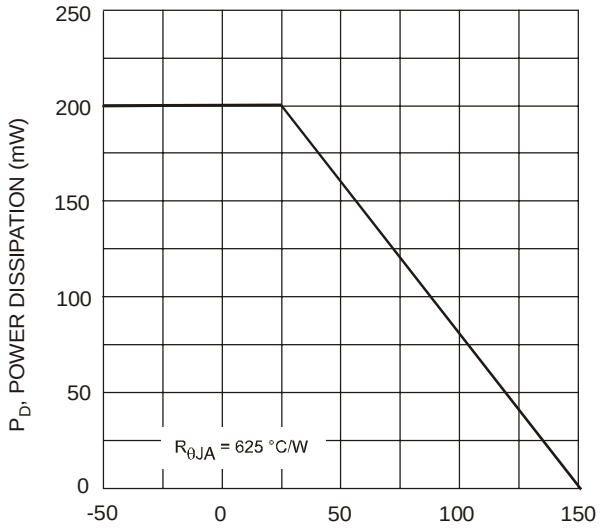



Fig. 1 Derating Curve

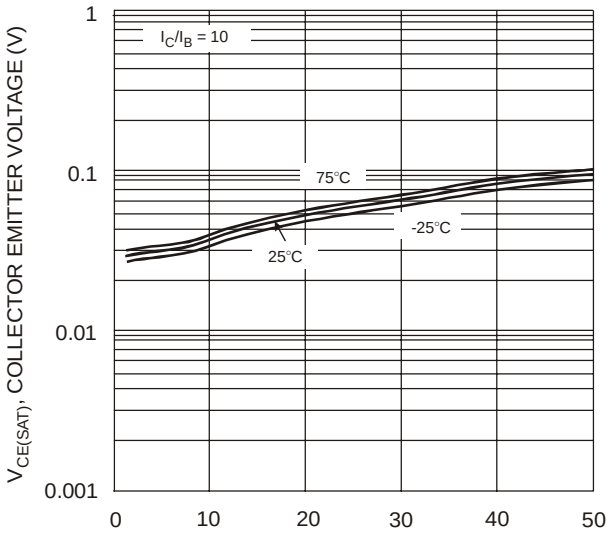



Fig. 2 $V_{CE(SAT)}$ vs. $I_C$

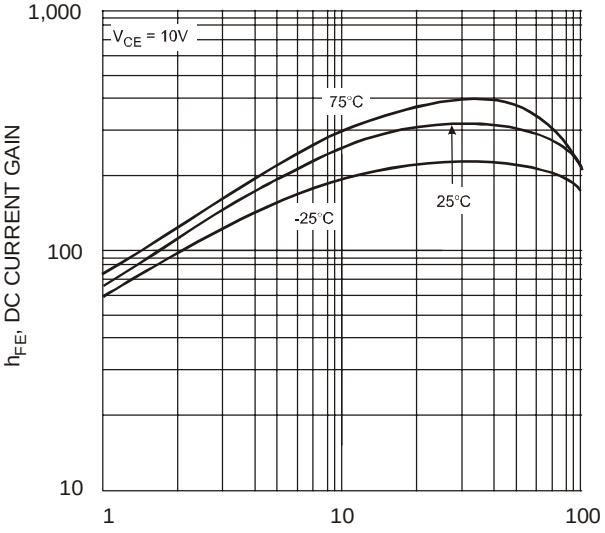



Fig. 3 DC Current Gain

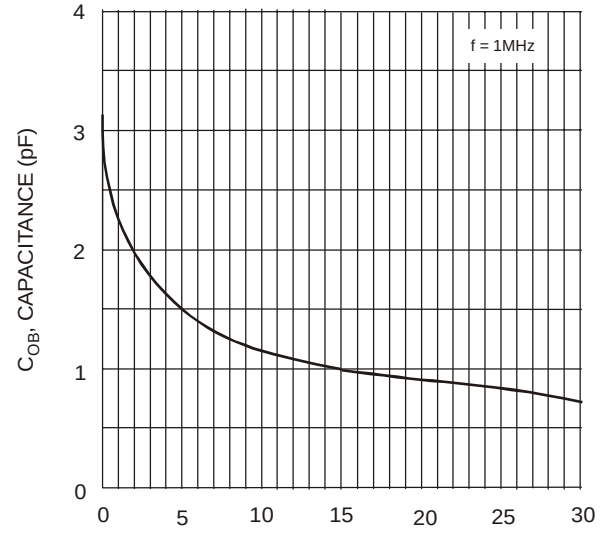



Fig. 4 Output Capacitance

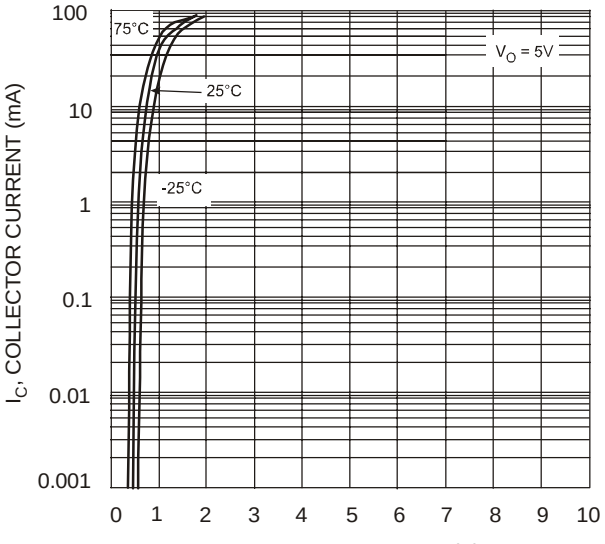



Fig. 5 Collector Current vs. Input Voltage

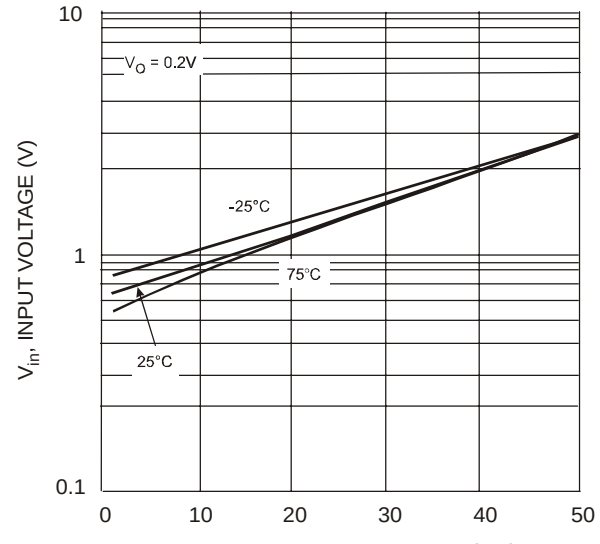


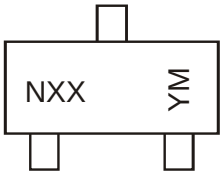

Fig. 6 Input Voltage vs. Collector Current

## Ordering Information (Note 3 & 5)

| Device | Packaging | Shipping |
|---|---|---|
| DDTC113ZUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC123YUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC123JUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC143XUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC143FUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC143ZUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC114YUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC114WUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC124XUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC144VUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC144WUA-7-F | SOT-323 | 3000/Tape & Reel |

Notes: 5. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information




NXX = Product Type Marking Code
See Page 1 Diagrams
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 |

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- Консультации по применению компонента;
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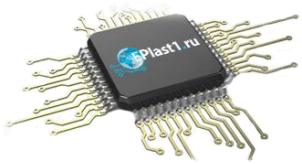
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

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