NEW PRODUCT

# DDTC (R2-ONLY SERIES) UA

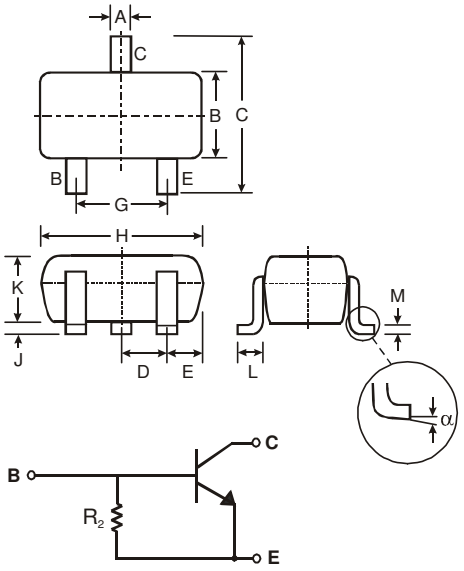
**NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR**

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistor, R2 only
- **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 3
- Ordering Information: See Page 3
- Type Code: See Table Below
- Weight: 0.006 grams (approximate)




SCHEMATIC DIAGRAM

| 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** | | |

| P/N | R2 (NOM) | Type Code |
|---|---|---|
| DDTC114GUA | 10KΩ | N26 |
| DDTC124GUA | 22KΩ | N27 |
| DDTC144GUA | 47KΩ | N28 |
| DDTC115GUA | 100KΩ | N29 |

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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 50 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 50 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | V |
| Collector Current | $I_C$ (Max) | 100 | mA |
| Power Dissipation | $P_d$ | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 1) | $R_{\theta JA}$ | 625 | °C/W |
| Operating and Storage Temperature Range | $T_j$, $T_{STG}$ | -55 to +150 | °C |

Notes:
1. Mounted on FR4 PC Board with recommended pad layout as shown on Diodes Inc., suggested pad layout document AP02001, which can be found on our website 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 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.

NEW PRODUCT

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

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | | $BV_{CBO}$ | 50 | — | — | V | $I_C$ = 50μA |
| Collector-Emitter Breakdown Voltage | | $BV_{CEO}$ | 50 | — | — | V | $I_C$ = 1mA |
| Emitter-Base Breakdown Voltage | | $BV_{EBO}$ | 5 | — | — | V | $I_E$ = 720μA, DDTC114GUA<br>$I_E$ = 330μA, DDTC124GUA<br>$I_E$ = 160μA, DDTC144GUA<br>$I_E$ = 72μA, DDTC115GUA |
| Collector Cutoff Current | | $I_{CBO}$ | — | — | 0.5 | μA | $V_{CB}$ = 50V |
| Emitter Cutoff Current | DDTC114GUA<br>DDTC124GUA<br>DDTC144GUA<br>DDTC115GUA | $I_{EBO}$ | 300<br>140<br>65<br>30 | — | 580<br>260<br>130<br>58 | μA | $V_{EB}$ = 4V |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | — | — | 0.3 | V | $I_C$ = 10mA, $I_B$ = 0.5mA |
| DC Current Transfer Ratio | DDTC114GUA<br>DDTC124GUA<br>DDTC144GUA<br>DDTC115GUA | $h_{FE}$ | 30<br>56<br>68<br>82 | — | — | — | $I_C$ = 5mA, $V_{CE}$ = 5V |
| Bleeder Resistor ($R_2$) Tolerance | | $\Delta R_2$ | -30 | — | +30 | % | — |
| Gain-Bandwidth Product* | | $f_T$ | — | 250 | — | MHz | $V_{CE}$ = 10V, $I_E$ = -5mA, f = 100MHz |

* Transistor - For Reference Only

## Typical Characteristics – DDTC114GUA

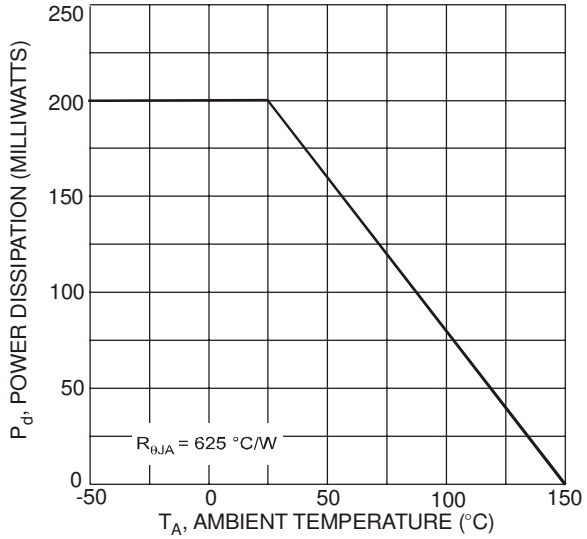



Fig. 1 Derating Curve

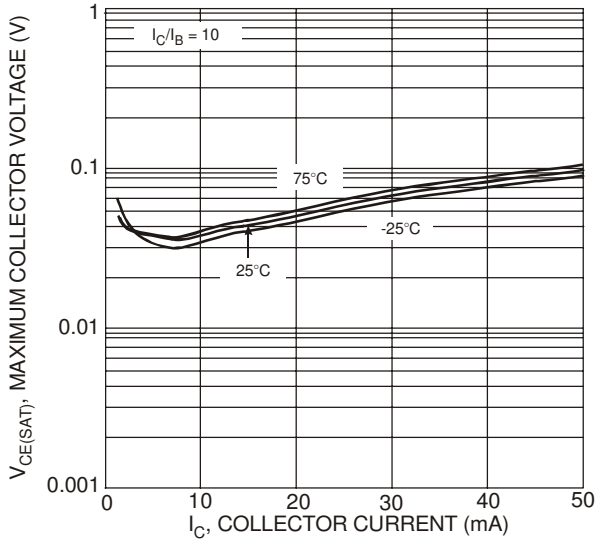



Fig. 2 $V_{CE(SAT)}$ vs. $I_C$

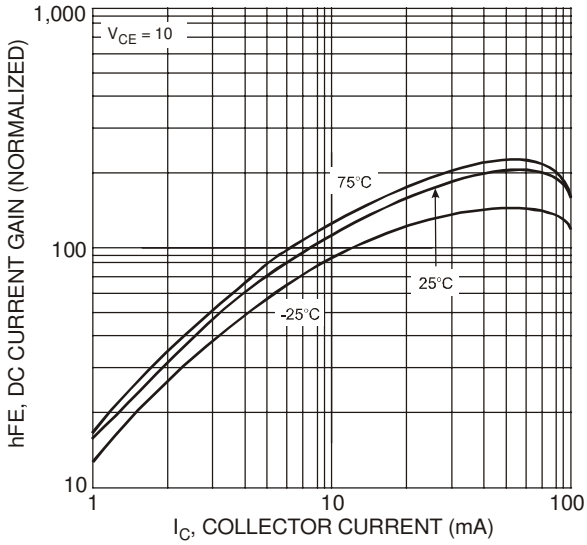



Fig. 3 DC Current Gain

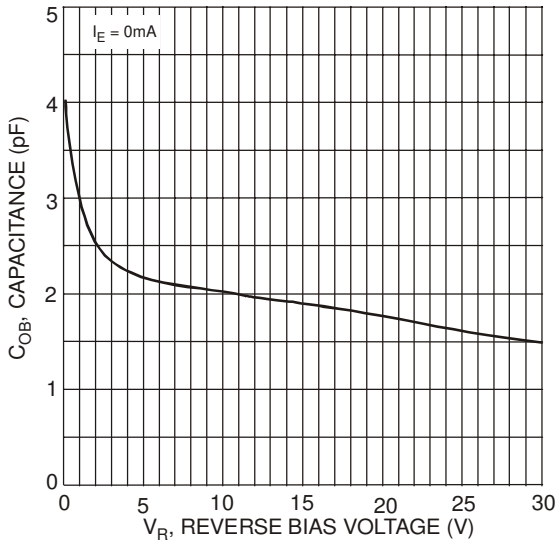



Fig. 4 Output Capacitance

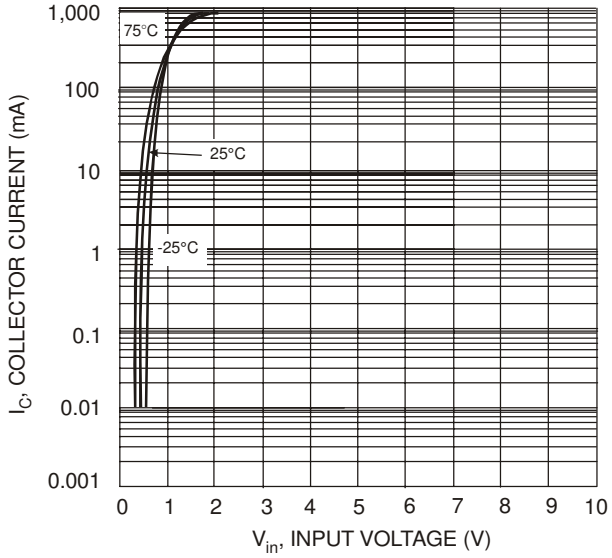



Fig. 5 Collector Current vs. Input Voltage

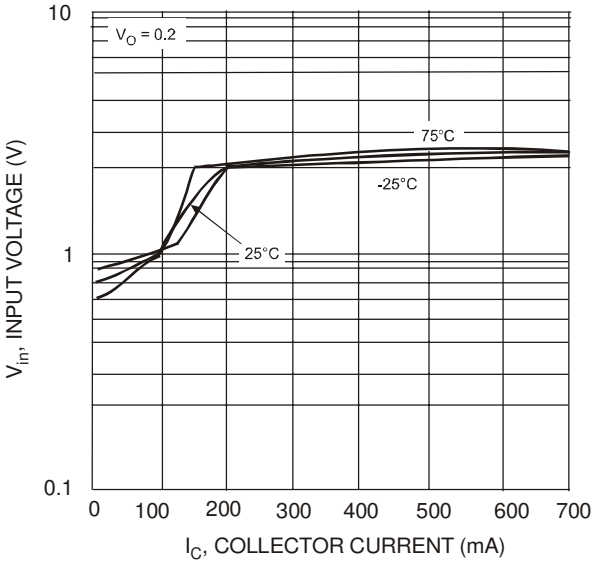


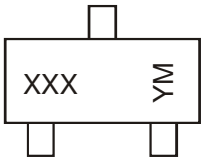

Fig. 6 Input Voltage vs. Collector Current

## Ordering Information (Note 4 & 5)

| Device | Packaging | Shipping |
|---|---|---|
| DDTC114GUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC124GUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC144GUA-7-F | SOT-323 | 3000/Tape & Reel |
| DDTC115GUA-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




XXX = 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 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|---|---|---|---|---|---|---|
| Code | 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 |