

NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR
Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 only
- **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)**

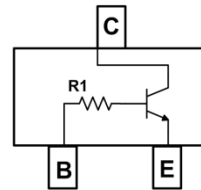
Mechanical Data

- Case: SOT23
- 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 ^{Ⓔ3}
- Weight: 0.008 grams (approximate)

| Part Number | R1 (NOM) |
|-------------|----------|
| DDTC113TCA | 1KΩ |
| DDTC123TCA | 2.2KΩ |
| DDTC143TCA | 4.7KΩ |
| DDTC114TCA | 10KΩ |
| DDTC124TCA | 22KΩ |
| DDTC144TCA | 47KΩ |
| DDTC115TCA | 100KΩ |
| DDTC125TCA | 200KΩ |



Top View

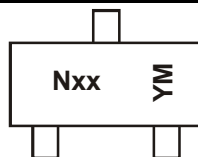


Device Schematic – Top View

Ordering Information (Notes 4 & 5)

| Product | Compliance | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------------|------------|---------|--------------------|-----------------|-------------------|
| DDTC113TCA-7-F | AEC-Q101 | N01 | 7 | 8 | 3,000 |
| DDTC123TCA-7-F | AEC-Q101 | N03 | 7 | 8 | 3,000 |
| DDTC143TCA-7-F | AEC-Q101 | N07 | 7 | 8 | 3,000 |
| DDTC143TCAQ-7-F | Automotive | N07 | 7 | 8 | 3,000 |
| DDTC143TCAQ-13-F | Automotive | N07 | 13 | 8 | 10,000 |
| DDTC114TCA-7-F | AEC-Q101 | N12 | 7 | 8 | 3,000 |
| DDTC124TCA-7-F | AEC-Q101 | N16 | 7 | 8 | 3,000 |
| DDTC144TCA-7-F | AEC-Q101 | N19 | 7 | 8 | 3,000 |
| DDTC115TCA-7-F | AEC-Q101 | N23 | 7 | 8 | 3,000 |
| DDTC125TCA-7-F | AEC-Q101 | N25 | 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 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|------|------|
| Code | T | U | V | W | X | Y | Z | A | B | C |

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

| Characteristic | Symbol | Value | Unit |
|---------------------------|-------------|-------|------|
| Collector-Base Voltage | V_{CB0} | 50 | V |
| Collector-Emitter Voltage | V_{CEO} | 50 | V |
| Emitter-Base Voltage | V_{EBO} | 5 | V |
| Collector Current | I_C (Max) | 100 | mA |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------------------------------|-----------------|-------------|--------------------|
| Power Dissipation (Note 6) | P_D | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | $R_{\theta JA}$ | 625 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------|---------------|------------|----------|------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV_{CB0} | 50 | — | — | V | $I_C = 50\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage | BV_{CEO} | 50 | — | — | V | $I_C = 1\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | 5 | — | — | V | $I_E = 50\mu\text{A}$ |
| Collector Cutoff Current | I_{CB0} | — | — | 0.5 | μA | $V_{CB} = 50\text{V}$ |
| Emitter Cutoff Current | I_{EBO} | — | — | 0.5 | μA | $V_{EB} = 4\text{V}$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | — | — | 0.3 | V | $I_C/I_B = 10\text{mA}/1\text{mA}$ DDTC113TCA $I_C/I_B = 5\text{mA}/0.5\text{mA}$ DDTC123TCA $I_C/I_B = 2.5\text{mA}/.25\text{mA}$ DDTC143TCA $I_C/I_B = 1\text{mA}/.1\text{mA}$ DDTC114TCA $I_C/I_B = 5\text{mA}/0.5\text{mA}$ DDTC124TCA $I_C/I_B = 2.5\text{mA}/.25\text{mA}$ DDTC144TCA $I_C/I_B = 1\text{mA}/0.1\text{mA}$ DDTC115TCA $I_C/I_B = .5\text{mA}/.05\text{mA}$ DDTC125TCA |
| DC Current Transfer Ratio | h_{FE} | 100 120 | 250 - | 600 630 | — | $I_C = 1\text{mA}, V_{CE} = 5\text{V}$ $I_C = 5\text{mA}, V_{CE} = 5\text{V}$ DDTC143TCAQ |
| Input Resistor (R_1) Tolerance | ΔR_1 | -30 | — | +30 | % | — |
| Gain-Bandwidth Product (Note 7) | f_T | — | 250 | — | MHZ | $V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHZ}$ |

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

Typical Characteristics – DDTC144TCA (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

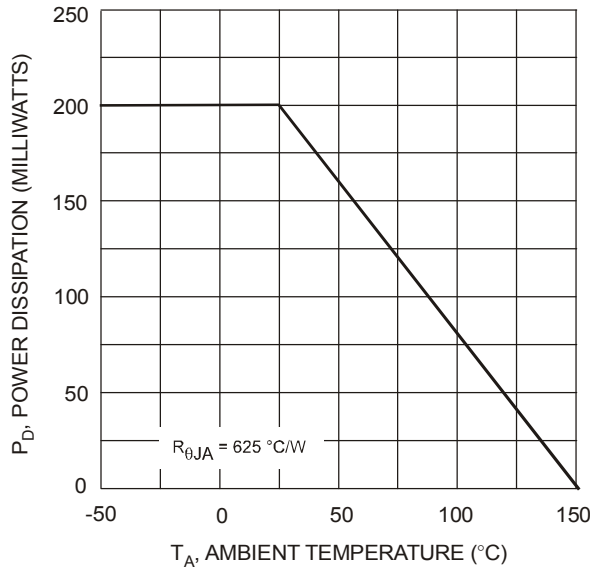


Fig. 1 Derating Curve

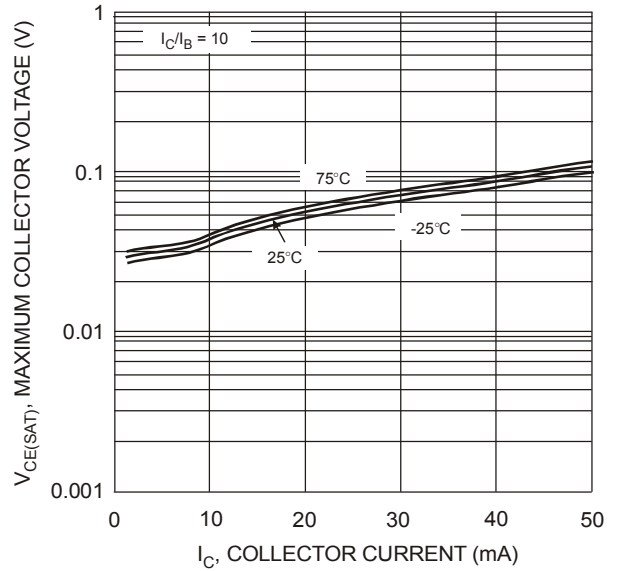


Fig. 2 $V_{CE(SAT)}$ vs. I_C

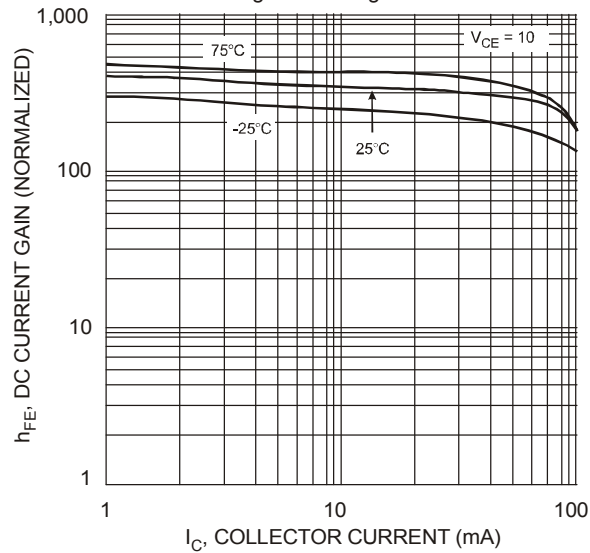


Fig. 3 DC Current Gain

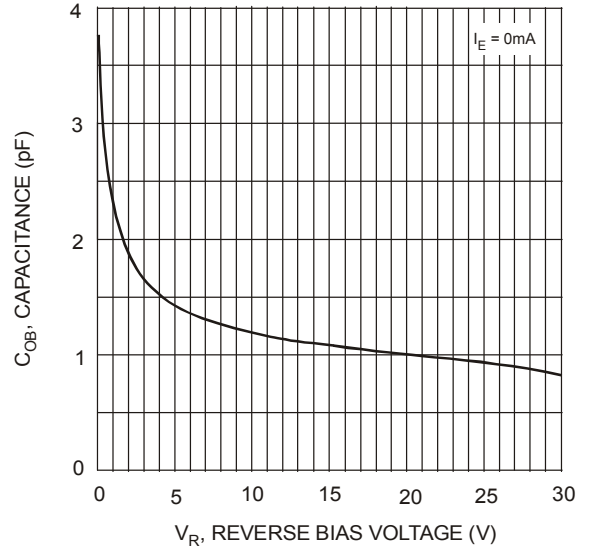


Fig. 4 Output Capacitance

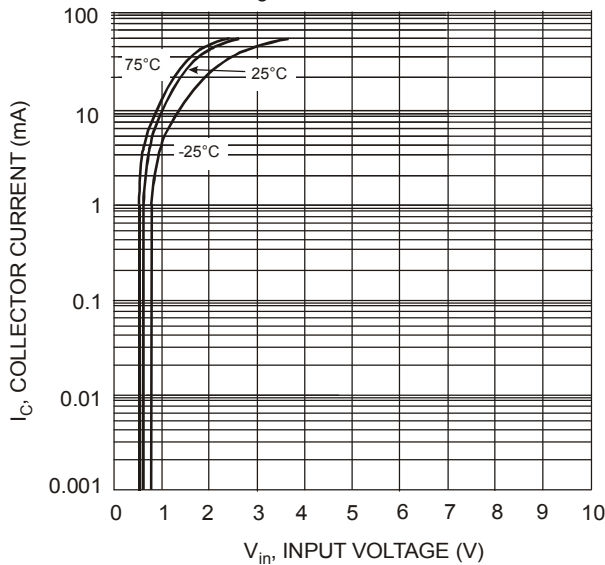


Fig. 5 Collector Current Vs. Input Voltage

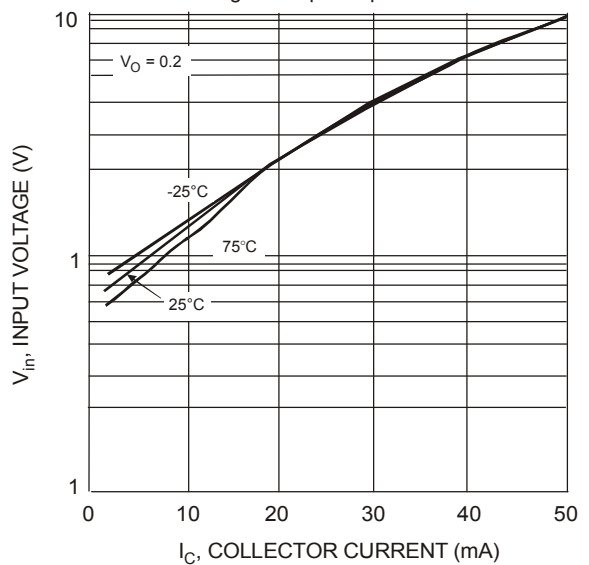
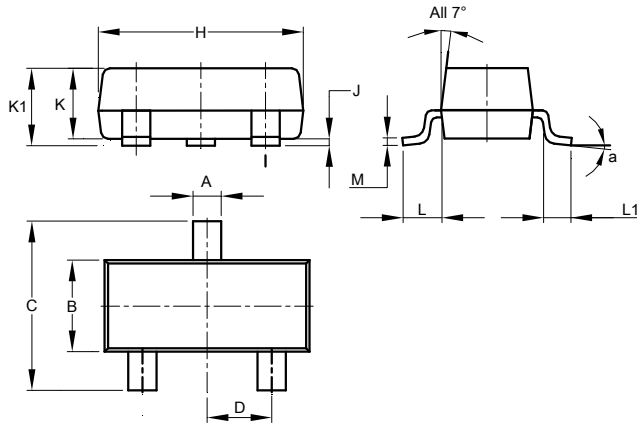


Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions

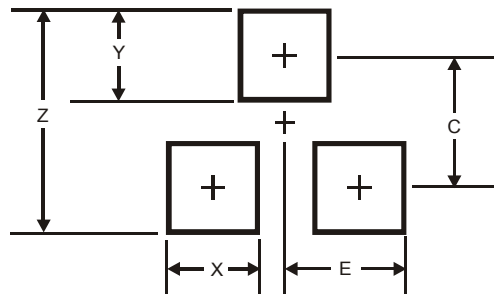
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT23 | | | |
|----------------------|-------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.37 | 0.51 | 0.40 |
| B | 1.20 | 1.40 | 1.30 |
| C | 2.30 | 2.50 | 2.40 |
| D | 0.89 | 1.03 | 0.915 |
| F | 0.45 | 0.60 | 0.535 |
| G | 1.78 | 2.05 | 1.83 |
| H | 2.80 | 3.00 | 2.90 |
| J | 0.013 | 0.10 | 0.05 |
| K | 0.890 | 1.00 | 0.975 |
| K1 | 0.903 | 1.10 | 1.025 |
| L | 0.45 | 0.61 | 0.55 |
| L1 | 0.25 | 0.55 | 0.40 |
| M | 0.085 | 0.150 | 0.110 |
| a | 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 | 2.9 |
| X | 0.8 |
| Y | 0.9 |
| C | 2.0 |
| E | 1.35 |

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