

NPN PRE-BIASED SMALL SIGNAL SOT23 SURFACE MOUNT TRANSISTOR
Product Summary

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

Features and Benefits

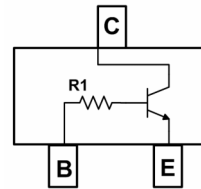
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 only
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: SOT23
- 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)



Top View

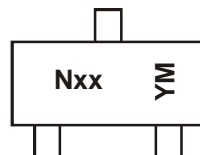


Device Schematic – Top View

Ordering Information (Note 3 & 4)

| Product | Grade | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|------------------|------------|---------|--------------------|-----------------|-------------------|
| DDTC113TCA-7-F | Commercial | N01 | 7 | 8 | 3,000 |
| DDTC123TCA-7-F | Commercial | N03 | 7 | 8 | 3,000 |
| DDTC143TCA-7-F | Commercial | 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 | Commercial | N12 | 7 | 8 | 3,000 |
| DDTC124TCA-7-F | Commercial | N16 | 7 | 8 | 3,000 |
| DDTC144TCA-7-F | Commercial | N19 | 7 | 8 | 3,000 |
| DDTC115TCA-7-F | Commercial | N23 | 7 | 8 | 3,000 |
| DDTC125TCA-7-F | Commercial | N25 | 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 | 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 |

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 |

Thermal Characteristics @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Notes 5 & 6) | P _D | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 5) | 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 |
|--|----------------------|------------|----------|------------|------|---|
| 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 = 50μA |
| Collector Cutoff Current | I _{CBO} | — | — | 0.5 | μA | V _{CB} = 50V |
| Emitter Cutoff Current | I _{EBO} | — | — | 0.5 | μA | V _{EB} = 4V |
| Collector-Emitter Saturation Voltage | V _{CE(sat)} | — | — | 0.3 | V | I _C /I _B = 10mA/1mA DDTC113TCA I _C /I _B = 5mA/0.5mA DDTC123TCA I _C /I _B = 2.5mA/.25mA DDTC143TCA I _C /I _B = 1mA/.1mA DDTC114TCA I _C /I _B = 5mA/0.5mA DDTC124TCA I _C /I _B = 2.5mA/.25mA DDTC144TCA I _C /I _B = 1mA/0.1mA DDTC115TCA I _C /I _B = .5mA/.05mA DDTC125TCA |
| DC Current Transfer Ratio | h _{FE} | 100 120 | 250 - | 600 630 | — | I _C = 1mA, V _{CE} = 5V I _C = 5mA, V _{CE} = 5V DDTC143TCAQ |
| Input Resistor (R ₁) Tolerance | ΔR ₁ | -30 | — | +30 | % | — |
| Gain-Bandwidth Product* | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = -5mA, f = 100MHz |

* Transistor - For Reference Only

- Notes: 5. Mounted on FR4 PC Board with minimum recommended pad layout
6. 150mW per element must not be exceeded.

Typical Characteristics – DDTC144TCA

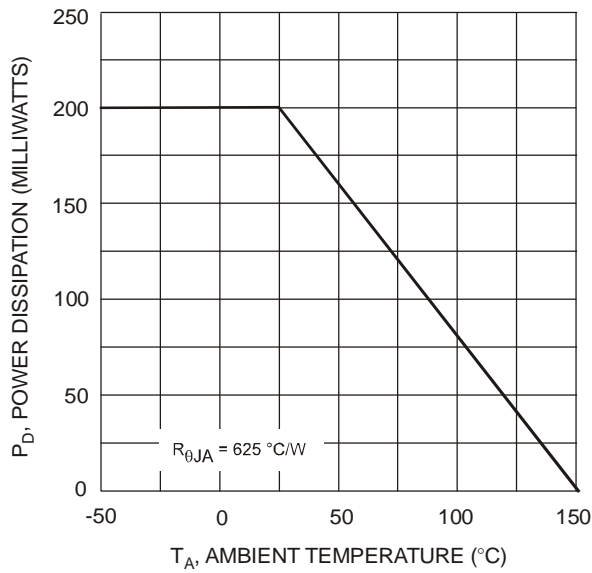


Fig. 1 Derating Curve

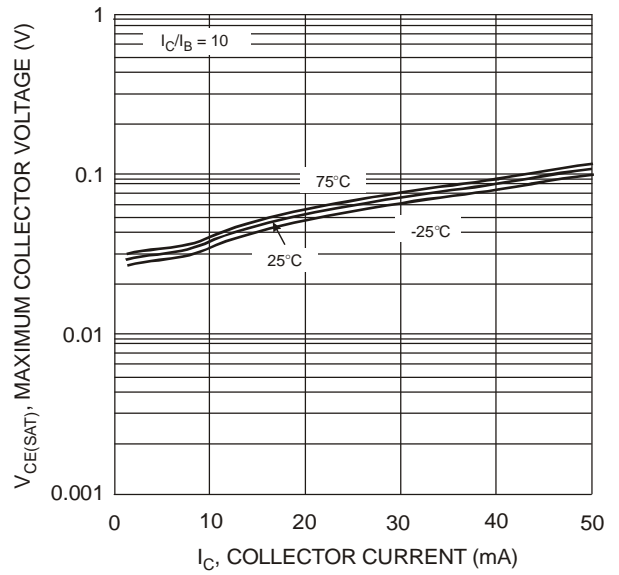


Fig. 2 $V_{CE(SAT)}$ vs. I_C

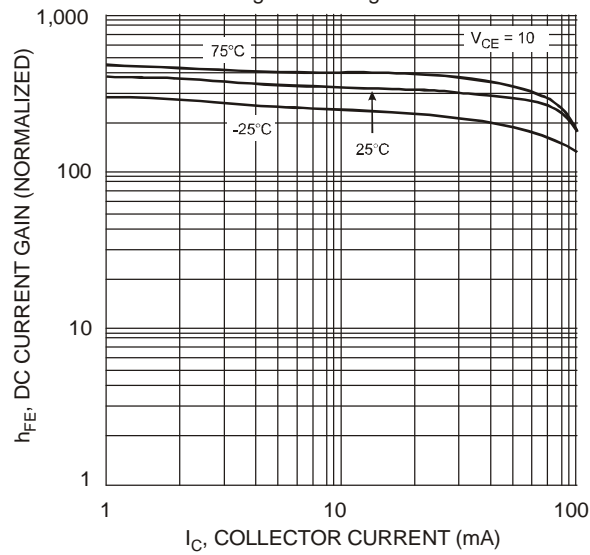


Fig. 3 DC Current Gain

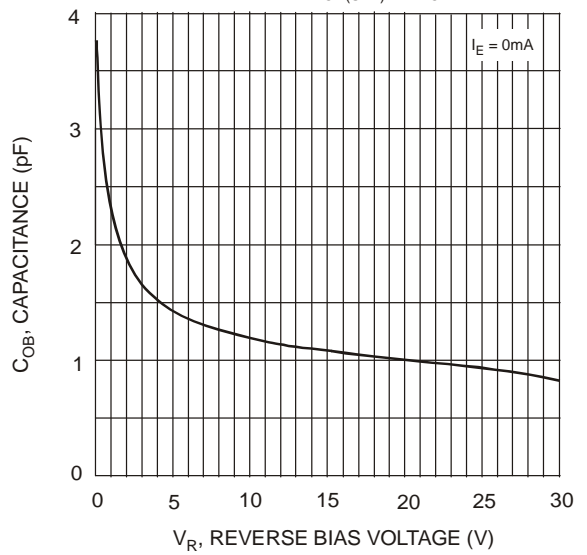


Fig. 4 Output Capacitance

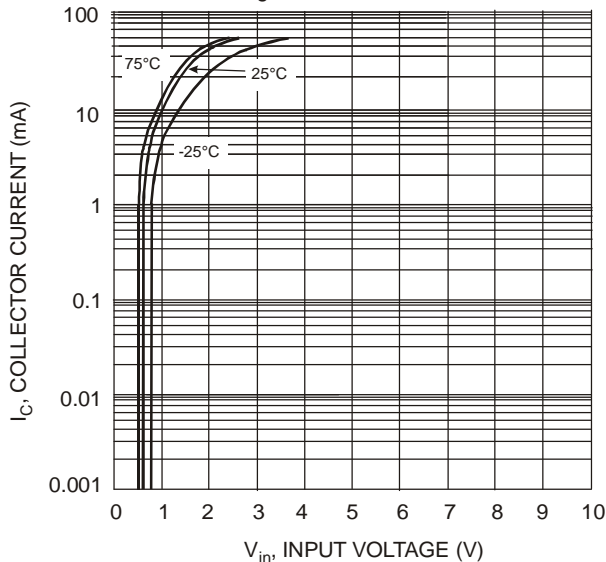


Fig. 5 Collector Current Vs. Input Voltage

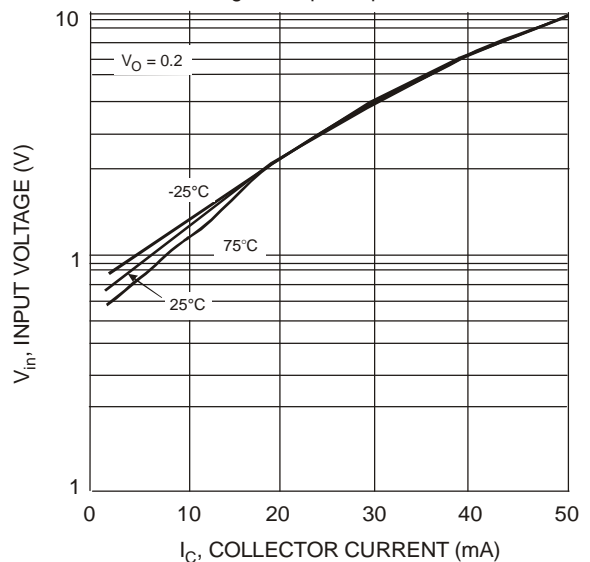
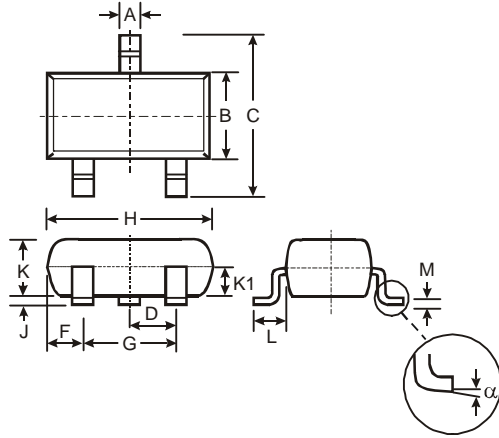


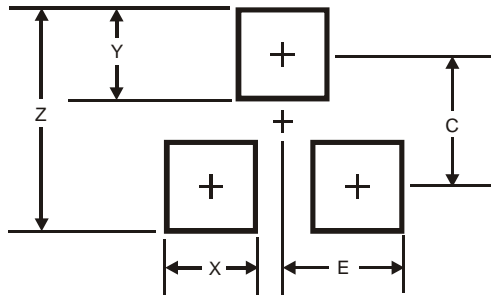
Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions



| 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 | 0.903 | 1.10 | 1.00 |
| K1 | - | - | 0.400 |
| L | 0.45 | 0.61 | 0.55 |
| M | 0.085 | 0.18 | 0.11 |
| α | 0° | 8° | - |
| All Dimensions in mm | | | |

Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z | 2.9 |
| X | 0.8 |
| Y | 0.9 |
| C | 2.0 |
| E | 1.35 |

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