

DDTC (R1≠R2 SERIES) CA

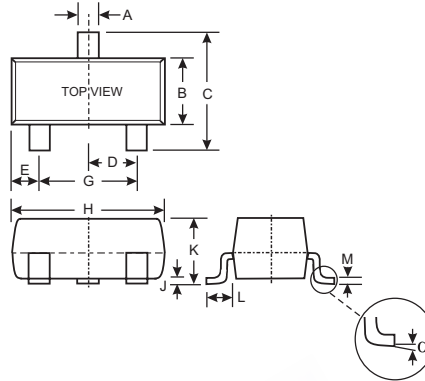
NPN PRE-BIASED SMALL SIGNAL SOT-23 SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1≠R2
- Lead Free/RoHS Compliant (Note 2)

Mechanical Data

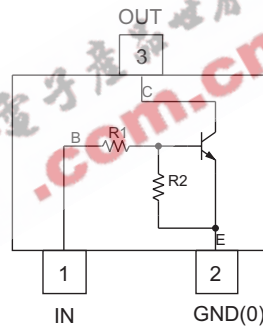
- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Table Below & Page 3)
- Ordering Information (See Page 2)
- Weight: 0.008 grams (approximate)



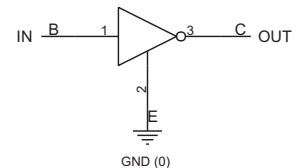
| SOT-23 | | |
|--------|-------|-------|
| Dim | Min | Max |
| A | 0.37 | 0.51 |
| B | 1.20 | 1.40 |
| C | 2.30 | 2.50 |
| D | 0.89 | 1.03 |
| E | 0.45 | 0.60 |
| G | 1.78 | 2.05 |
| H | 2.80 | 3.00 |
| J | 0.013 | 0.10 |
| K | 0.903 | 1.10 |
| L | 0.45 | 0.61 |
| M | 0.085 | 0.180 |
| α | 0° | 8° |

All Dimensions in mm

| P/N | R1 (NOM) | R2 (NOM) | Type Code |
|------------|----------|----------|-----------|
| DDTC113ZCA | 1KΩ | 10KΩ | N02 |
| DDTC123YCA | 2.2KΩ | 10KΩ | N05 |
| DDTC123JCA | 2.2KΩ | 47KΩ | N06 |
| DDTC143XCA | 4.7KΩ | 10KΩ | N09 |
| DDTC143FCA | 4.7KΩ | 22KΩ | N10 |
| DDTC143ZCA | 4.7KΩ | 47KΩ | N11 |
| DDTC114YCA | 10KΩ | 47KΩ | N14 |
| DDTC114WCA | 10KΩ | 4.7KΩ | N15 |
| DDTC124XCA | 22KΩ | 47KΩ | N18 |
| DDTC144VCA | 47KΩ | 10KΩ | N21 |
| DDTC144WCA | 47KΩ | 22KΩ | N22 |



Schematic and Pin Configuration



Equivalent Inverter Circuit

Maximum Ratings @ TA = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|---|------|
| Supply Voltage, (3) to (2) | V _{CC} | 50 | V |
| Input Voltage, (1) to (2) | V _{IN} | -5 to +10 -5 to +12 -5 to +12 -7 to +20 -6 to +30 -5 to +30 -6 to +40 -10 to +30 -10 to +40 -10 to +40 -15 to +40 -10 to +40 | V |
| Output Current | I _O | 100 100 100 100 100 100 70 100 50 30 30 | mA |
| Output Current | I _C (Max) | 100 | mA |
| Power Dissipation | P _d | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 1) | R _{θJA} | 625 | °C/W |
| Operating and Storage and Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Note: 1. Mounted on FR4 PC Board with recommended pad layout which can be found at <http://www.diodes.com/datasheets/ap02001.pdf>.
2. No purposefully added lead.

Electrical Characteristics @ T_A = 25°C unless otherwise specified

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition | |
|----------------------------|--|---------------------------------|---|-----|--|------|---|--|
| Input Voltage | DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA | V _{I(off)} | 0.3 0.3 0.5 0.3 0.3 0.5 0.3 0.8 0.4 1.0 0.8 | — | — | — | V | V _{CC} = 5V, I _O = 100μA |
| | DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA | V _{I(on)} | — | — | 3.0 3.0 1.1 2.5 1.3 1.3 1.4 3.0 2.5 5.0 4.0 | — | V | V _O = 0.3V, I _O = 20mA V _O = 0.3V, I _O = 20mA V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 20mA V _O = 0.3V, I _O = 3mA V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 1mA V _O = 0.3V, I _O = 2mA V _O = 0.3V, I _O = 2mA V _O = 0.3V, I _O = 2mA V _O = 0.3V, I _O = 2mA |
| Output Voltage | | V _{O(on)} | — | 0.1 | 0.3 | V | I _O /I _I = 5mA/0.25mA DDCT123JCA I _O /I _I = 5mA/0.25mA DDCT143ZCA I _O /I _I = 5mA/0.25mA DDCT114YCA I _O /I _I = 10mA/0.5mA All Others | |
| Input Current | DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA | I _I | — | — | 7.2 3.8 3.6 1.8 1.8 1.8 0.88 0.88 0.36 0.16 0.16 | mA | V _I = 5V | |
| Output Current | | I _{O(off)} | — | — | 0.5 | μA | V _{CC} = 50V, V _I = 0V | |
| DC Current Gain | DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA | G _I | 33 33 80 30 68 80 68 24 68 33 56 | — | — | — | V _O = 5V, I _O = 5mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA | |
| Input Resistor Tolerance | | ΔR ₁ | -30 | — | +30 | % | — | |
| Resistance Ratio Tolerance | | ΔR ₂ /R ₁ | -20 | — | +20 | % | — | |
| Gain-Bandwidth Product* | | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = 5mA, f = 100MHz | |

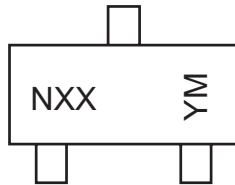
* Transistor - For Reference Only

Ordering Information (Note 3)

| Device | Packaging | Shipping |
|----------------|-----------|------------------|
| DDTC113ZCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC123YCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC123JCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC143XCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC143FCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC143ZCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC114YCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC114WCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC124XCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC144VCA-7-F | SOT-23 | 3000/Tape & Reel |
| DDTC144WCA-7-F | SOT-23 | 3000/Tape & Reel |

Note: 3. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



NXX = 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 | 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 |



TYPICAL CURVES - DDTC123JCA

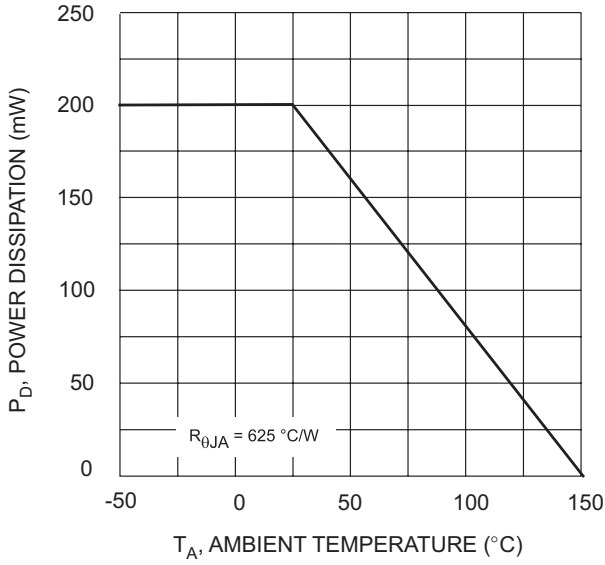


Fig. 1 Derating Curve

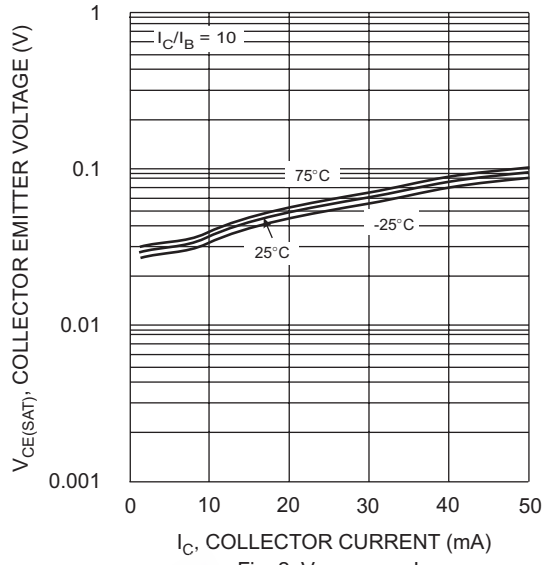


Fig. 2 $V_{CE(SAT)}$ vs. I_C

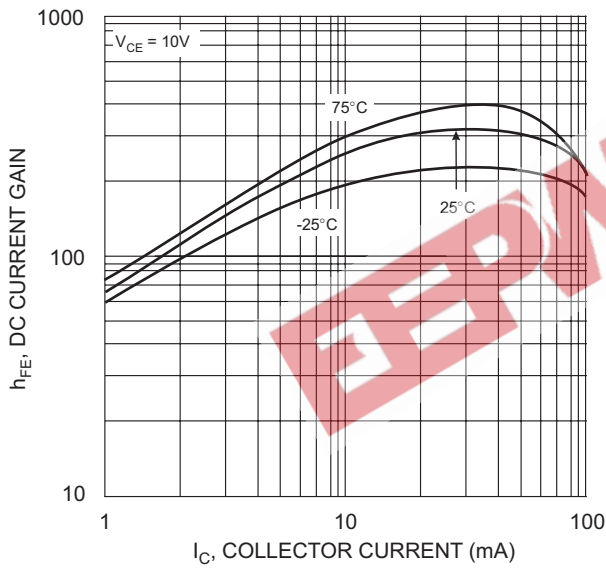


Fig. 3 DC Current Gain

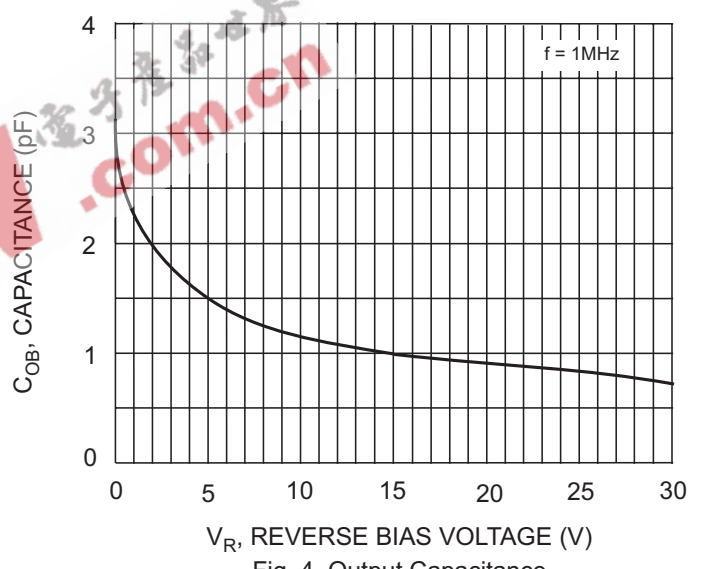


Fig. 4 Output Capacitance

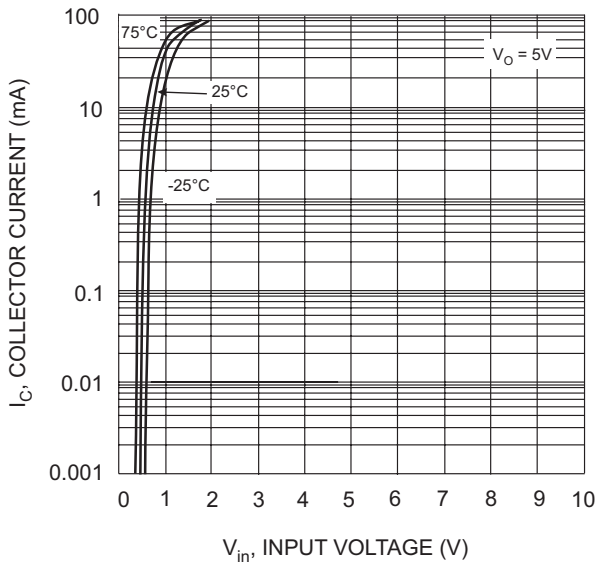


Fig. 5 Collector Current Vs. Input Voltage

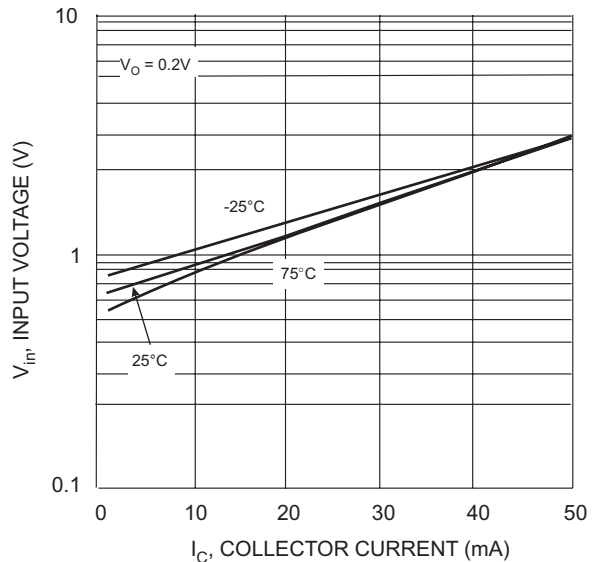


Fig. 6 Input Voltage vs. Collector Current

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