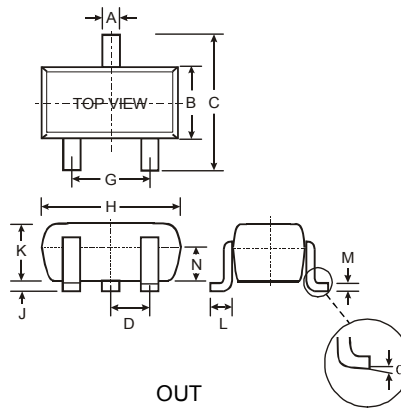


Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1≠R2
- **Lead Free/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3 and 4)**

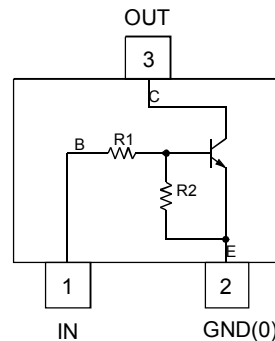
Mechanical Data

- Case: SOT-523
- 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 Information: See Table Below & Page 4
- Ordering Information: See Page 4
- Weight: 0.002 grams (approximate)

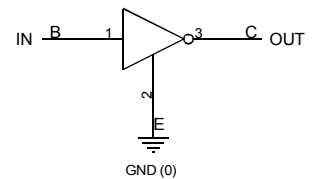


| SOT-523 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.22 |
| B | 0.75 | 0.85 | 0.80 |
| C | 1.45 | 1.75 | 1.60 |
| D | — | — | 0.50 |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| J | 0.00 | 0.10 | 0.05 |
| K | 0.60 | 0.80 | 0.75 |
| L | 0.10 | 0.30 | 0.22 |
| M | 0.10 | 0.20 | 0.12 |
| N | 0.45 | 0.65 | 0.50 |
| α | 0° | 8° | — |
| All Dimensions in mm | | | |

| P/N | R1 (NOM) | R2 (NOM) | Marking |
|-----------|----------|----------|---------|
| DDTC113ZE | 1KΩ | 10KΩ | N02 |
| DDTC123YE | 2.2KΩ | 10KΩ | N05 |
| DDTC123JE | 2.2KΩ | 47KΩ | N06 |
| DDTC143XE | 4.7KΩ | 10KΩ | N09 |
| DDTC143FE | 4.7KΩ | 22KΩ | N10 |
| DDTC143ZE | 4.7KΩ | 47KΩ | N11 |
| DDTC114YE | 10KΩ | 47KΩ | N14 |
| DDTC114WE | 10KΩ | 4.7KΩ | N15 |
| DDTC124XE | 22KΩ | 47KΩ | N18 |
| DDTC144VE | 47KΩ | 10KΩ | N21 |
| DDTC144WE | 47KΩ | 22KΩ | N22 |



Schematic and Pin Configuration



Equivalent Inverter Circuit

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) | V _{IN} | DDTC113ZE: -5 to +10 DDTC123YE: -5 to +12 DDTC123JE: -5 to +12 DDTC143XE: -7 to +20 DDTC143FE: -6 to +30 DDTC143ZE: -5 to +30 DDTC114YE: -6 to +40 DDTC114WE: -10 to +30 DDTC124XE: -10 to +40 DDTC144VE: -15 to +40 DDTC144WE: -10 to +40 | V |
| Output Current | I _O | DDTC113ZE: 100 DDTC123YE: 100 DDTC123JE: 100 DDTC143XE: 100 DDTC143FE: 100 DDTC143ZE: 100 DDTC114YE: 70 DDTC114WE: 100 DDTC124XE: 50 DDTC144VE: 30 DDTC144WE: 30 | mA |
| Output Current | I _C (Max) | All: 100 | mA |

- Notes:
1. Mounted on FR4 PC Board with recommended pad layout 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 UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

Thermal Characteristics @_{T_A} = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation | P _d | 150 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 1) | R _{θJA} | 833 | °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 | |
|----------------------------|---------------------------------|--------------------------|---------------------|-----|------|--|------|
| Input Voltage | V _{I(off)} | 0.3 | | | V | V _{CC} = 5V, I _O = 100μA | |
| | | DDTC113ZE | 0.3 | | | | |
| DDTC123YE | | 0.5 | | | | | |
| DDTC123JE | | 0.3 | | | | | |
| DDTC143XE | | 0.3 | | | | | |
| DDTC143FE | | 0.5 | | | | | |
| DDTC143ZE | | 0.3 | | | | | |
| DDTC114YE | | 0.3 | | | | | |
| DDTC114WE | | 0.8 | | | | | |
| DDTC124XE | | 0.4 | | | | | |
| DDTC144VE | 1.0 | | | | | | |
| DDTC144WE | 0.8 | | | | | | |
| Input Voltage | V _{I(on)} | | | 3.0 | 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 | |
| | | DDTC113ZE | | | | | 3.0 |
| | | DDTC123YE | | | | | 1.1 |
| | | DDTC123JE | | | | | 2.5 |
| | | DDTC143XE | | | | | 1.3 |
| | | DDTC143FE | | | | | 1.3 |
| | | DDTC143ZE | | | | | 1.4 |
| | | DDTC114YE | | | | | 3.0 |
| | | DDTC114WE | | | | | 2.5 |
| | | DDTC124XE | | | | | 5.0 |
| DDTC144VE | | | 4.0 | | | | |
| DDTC144WE | | | | | | | |
| Output Voltage | V _{O(on)} | — | 0.1 | 0.3 | V | I _O /I _I = 5mA/0.25mA DDTC123JE I _O /I _I = 5mA/0.25mA DDTC143ZE I _O /I _I = 5mA/0.25mA DDTC114YE I _O /I _I = 10mA/0.5mA All Others | |
| Input Current | I _I | | | 7.2 | mA | V _I = 5V | |
| | | DDTC113ZE | | | | | 3.8 |
| | | DDTC123YE | | | | | 3.6 |
| | | DDTC123JE | | | | | 1.8 |
| | | DDTC143XE | | | | | 1.8 |
| | | DDTC143FE | | | | | 1.8 |
| | | DDTC143ZE | | | | | 0.88 |
| | | DDTC114YE | | | | | 0.88 |
| | | DDTC114WE | | | | | 0.36 |
| | | DDTC124XE | | | | | 0.16 |
| | | DDTC144VE | | | | | 0.16 |
| | | DDTC144WE | | | | | |
| | | Output Current | I _{O(off)} | — | | | — |
| DC Current Gain | G _I | 33 | | | — | 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 | |
| | | DDTC113ZE | 33 | | | | |
| | | DDTC123YE | 80 | | | | |
| | | DDTC123JE | 30 | | | | |
| | | DDTC143XE | 68 | | | | |
| | | DDTC143FE | 80 | | | | |
| | | DDTC143ZE | 68 | | | | |
| | | DDTC114YE | 24 | | | | |
| | | DDTC114WE | 68 | | | | |
| | | DDTC124XE | 33 | | | | |
| | | DDTC144VE | 56 | | | | |
| | | DDTC144WE | | | | | |
| | | Input Resistor Tolerance | ΔR ₁ | -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

TYPICAL CURVES – DDTC123JE



Fig. 1 Derating Curve



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



Fig. 3 DC Current Gain



Fig. 4 Output Capacitance

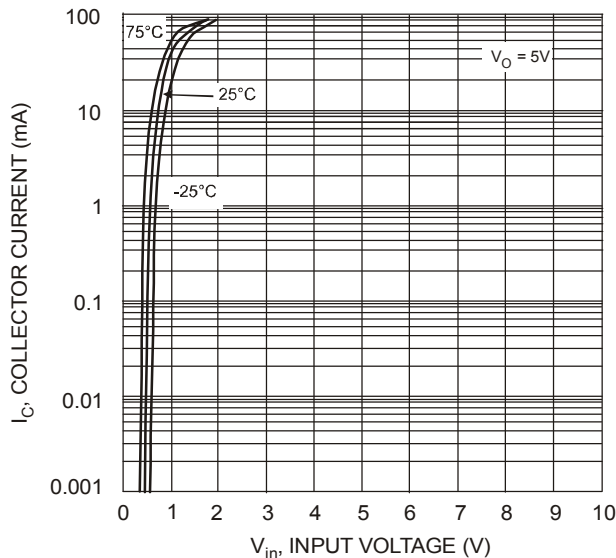


Fig. 5 Collector Current vs. Input Voltage

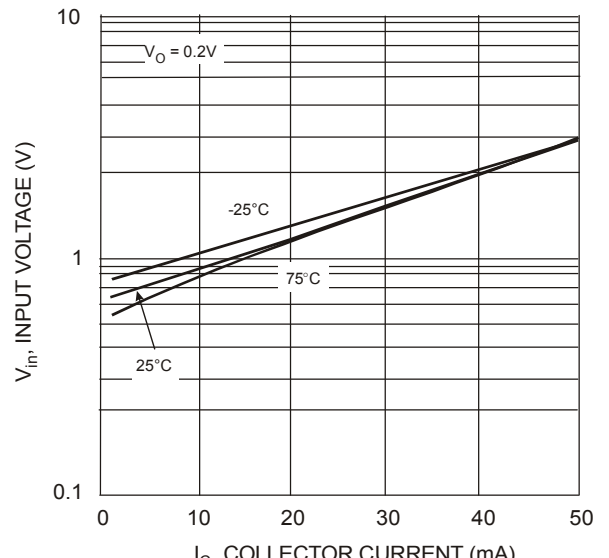


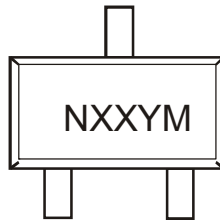
Fig. 6 Input Voltage vs. Collector Current

Ordering Information (Note 5)

| Device | Packaging | Shipping |
|---------------|-----------|------------------|
| DDTC113ZE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC123YE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC123JE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC143XE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC143FE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC143ZE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC114YE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC114WE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC124XE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC144VE-7-F | SOT-523 | 3000/Tape & Reel |
| DDTC144WE-7-F | SOT-523 | 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, e.g. N02 = DDTC113ZE)
 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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