

# DDTA (R1≠R2 SERIES) E

PNP PRE-BIASED SMALL SIGNAL SOT-523  
SURFACE MOUNT TRANSISTOR

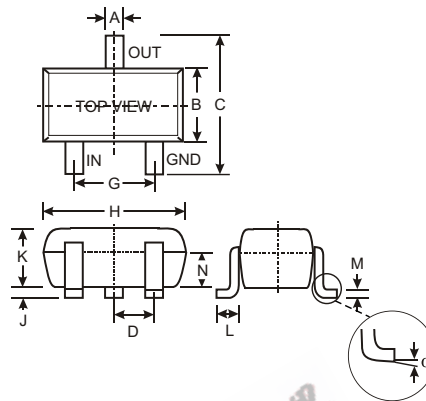
NEW PRODUCT

## Features

- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDTC)
- Built-In Biasing Resistors, R1≠R2

## Mechanical Data

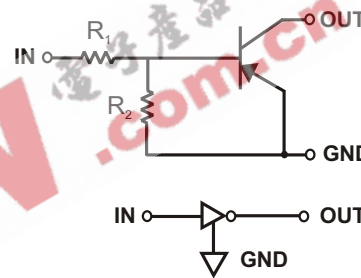
- Case: SOT-523, Molded Plastic
- Case material - UL Flammability Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Diagrams & Page 3)
- Weight: 0.002 grams (approx.)
- Ordering Information (See Page 2)



| 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 |
|-----------|----------|----------|---------|
| DDTA113ZE | 1KΩ      | 10KΩ     | P02     |
| DDTA123YE | 2.2KΩ    | 10KΩ     | P05     |
| DDTA123JE | 2.2KΩ    | 47KΩ     | P06     |
| DDTA143XE | 4.7KΩ    | 10KΩ     | P09     |
| DDTA143FE | 4.7KΩ    | 22KΩ     | P10     |
| DDTA143ZE | 4.7KΩ    | 47KΩ     | P11     |
| DDTA114YE | 10KΩ     | 47KΩ     | P14     |
| DDTA114WE | 10KΩ     | 4.7KΩ    | P15     |
| DDTA124XE | 22KΩ     | 47KΩ     | P18     |
| DDTA144VE | 47KΩ     | 10KΩ     | P21     |
| DDTA144WE | 47KΩ     | 22KΩ     | P22     |



SCHEMATIC DIAGRAM

## Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                       | Symbol                            | Value  | Unit |
|--|-----------------------------------|--|------|
| Supply Voltage, (3) to (1)                           | V <sub>CC</sub>                   | -50  | V    |
| Input Voltage, (2) to (1)                            | V <sub>IN</sub>                   | DDTA113ZE: +5 to -10<br>DDTA123YE: +5 to -12<br>DDTA123JE: +5 to -12<br>DDTA143XE: +7 to -20<br>DDTA143FE: +6 to -30<br>DDTA143ZE: +5 to -30<br>DDTA114YE: +6 to -40<br>DDTA114WE: +10 to -30<br>DDTA124XE: +10 to -40<br>DDTA144VE: +15 to -40<br>DDTA144WE: +10 to -40 | V    |
| Output Current                                       | I <sub>O</sub>                    | DDTA113ZE: -100<br>DDTA123YE: -100<br>DDTA123JE: -100<br>DDTA143XE: -100<br>DDTA143FE: -100<br>DDTA143ZE: -100<br>DDTA114YE: -70<br>DDTA114WE: -100<br>DDTA124XE: -50<br>DDTA144VE: -30<br>DDTA144WE: -30  | mA   |
| Output Current                                       | I <sub>C</sub> (Max)              | -100   | mA   |
| Power Dissipation                                    | P <sub>d</sub>                    | 150  | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 1) | R <sub>θJA</sub>                  | 833  | °C/W |
| Operating and Storage and Temperature Range          | T <sub>j</sub> , T <sub>STG</sub> | -55 to +150  | °C   |

Note: 1. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.

## Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic             |   | Symbol                          | Min  | Typ  | Max   | Unit | Test Condition   |  |
|----------------------------|---|---------------------------------|--|------|---|------|--|--|
| Input Voltage              | DDTA113ZE<br>DDTA123YE<br>DDTA123JE<br>DDTA143XE<br>DDTA143FE<br>DDTA143ZE<br>DDTA114YE<br>DDTA114WE<br>DDTA124XE<br>DDTA144VE<br>DDTA144WE | V <sub>I(off)</sub>             | -0.3<br>-0.3<br>-0.5<br>-0.3<br>-0.3<br>-0.5<br>-0.3<br>-0.8<br>-0.4<br>-1.0<br>-0.8 | —    | —   | —    | V  | V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA   |
|                            | DDTA113ZE<br>DDTA123YE<br>DDTA123JE<br>DDTA143XE<br>DDTA143FE<br>DDTA143ZE<br>DDTA114YE<br>DDTA114WE<br>DDTA124XE<br>DDTA144VE<br>DDTA144WE | V <sub>I(on)</sub>              | —  | —    | -3.0<br>-3.0<br>-1.1<br>-2.5<br>-1.3<br>-1.3<br>-1.4<br>-3.0<br>-2.5<br>-5.0<br>-4.0      | —    | V  | V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -3mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -1mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA |
| Output Voltage             |   | V <sub>O(on)</sub>              | —  | -0.1 | -0.3  | V    | I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA DDTA123E<br>I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA DDTA143E<br>I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA DDTA114E<br>I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA All Others |  |
| Input Current              | DDTA113ZE<br>DDTA123YE<br>DDTA123JE<br>DDTA143XE<br>DDTA143FE<br>DDTA143ZE<br>DDTA114YE<br>DDTA114WE<br>DDTA124XE<br>DDTA144VE<br>DDTA144WE | I <sub>I</sub>                  | —  | —    | -7.2<br>-3.8<br>-3.6<br>-1.8<br>-1.8<br>-1.8<br>-0.88<br>-0.88<br>-0.36<br>-0.16<br>-0.16 | mA   | V <sub>I</sub> = -5V   |  |
| Output Current             |   | I <sub>O(off)</sub>             | —  | —    | -0.5  | μA   | V <sub>CC</sub> = -50V, V <sub>I</sub> = 0V  |  |
| DC Current Gain            | DDTA113ZE<br>DDTA123YE<br>DDTA123JE<br>DDTA143XE<br>DDTA143FE<br>DDTA143ZE<br>DDTA114YE<br>DDTA114WE<br>DDTA124XE<br>DDTA144VE<br>DDTA144WE | G <sub>I</sub>                  | -33<br>-33<br>-80<br>-30<br>-68<br>-80<br>-68<br>-24<br>-68<br>-33<br>-56            | —    | —   | —    | V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA   |  |
| Input Resistor Tolerance   |   | DR <sub>1</sub>                 | -30  | —    | +30   | %    | —  |  |
| Resistance Ratio Tolerance |   | DR <sub>2</sub> /R <sub>1</sub> | -20  | —    | +20   | %    | —  |  |
| Gain-Bandwidth Product*    |   | f <sub>T</sub>                  | —  | 250  | —   | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA,<br>f = 100MHz  |  |

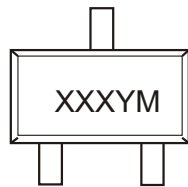
\* Transistor - For Reference Only

## Ordering Information (Note 2)

| Device      | Packaging | Shipping         |
|-------------|-----------|------------------|
| DDTA113ZE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA123YE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA123JE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA143XE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA143FE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA143ZE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA114YE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA114WE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA124XE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA144VE-7 | SOT-523   | 3000/Tape & Reel |
| DDTA144WE-7 | SOT-523   | 3000/Tape & Reel |

Notes: 2. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



XXX = Product Type Marking Code (See Page 1, e.g. P02 = DDTA113ZE)  
 YM = Date Code Marking  
 Y = Year ex: N = 2002  
 M = Month ex: 9 = September

### Date Code Key

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|------|------|------|------|------|------|------|------|------|
| Code | N    | P    | R    | S    | T    | U    | V    | W    |

| Month | Jan | Feb | March | 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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# TYPICAL CURVES - DDTA123JE

NEW PRODUCT

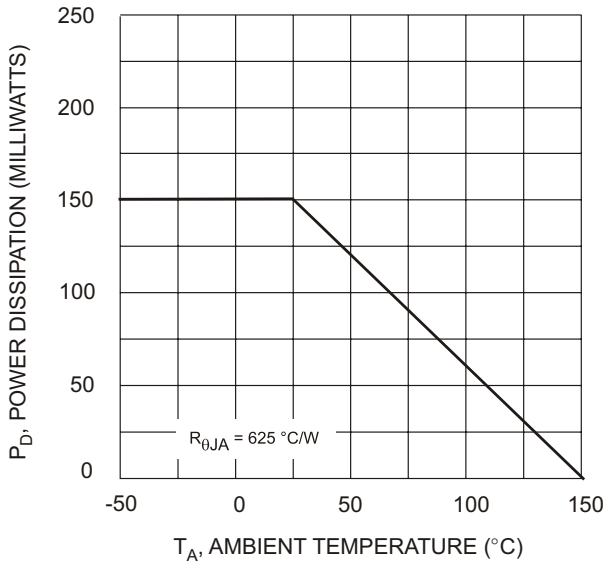


Fig. 1 Derating Curve

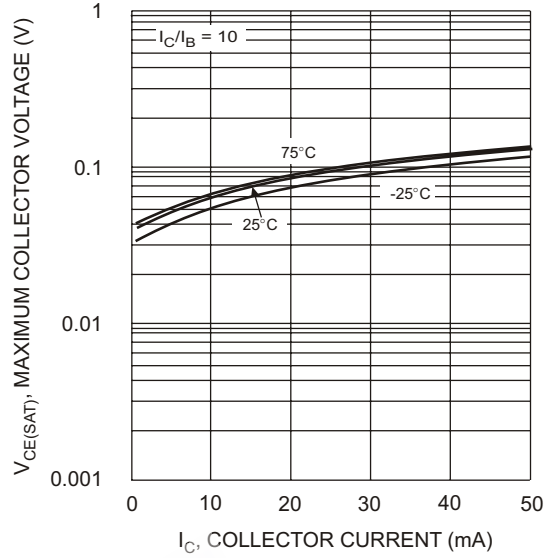


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

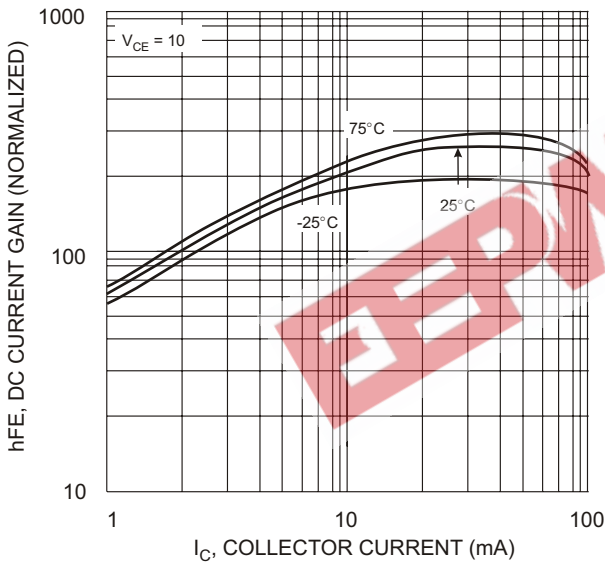


Fig. 3 DC CURRENT GAIN

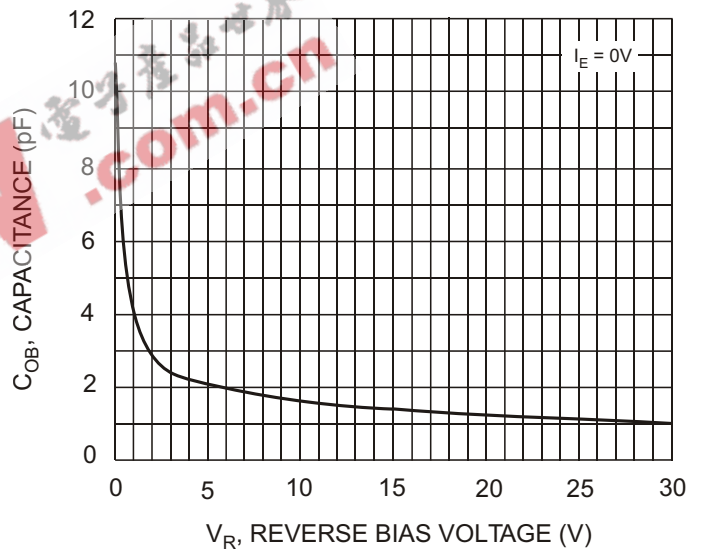


Fig. 4 Output Capacitance

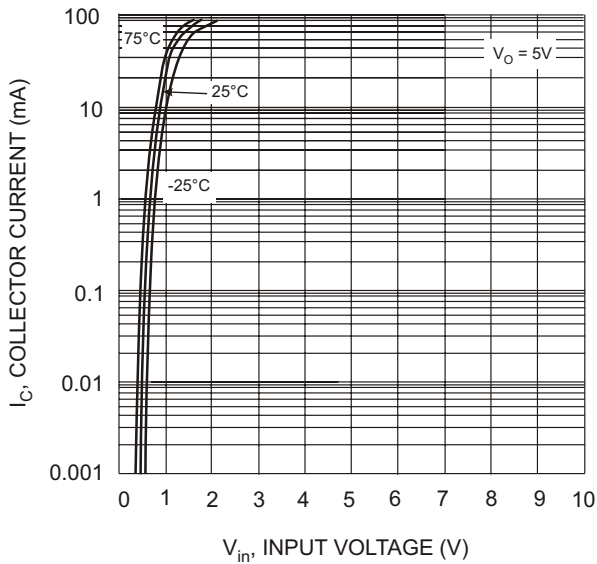


Fig. 5 Collector Current Vs. Input Voltage

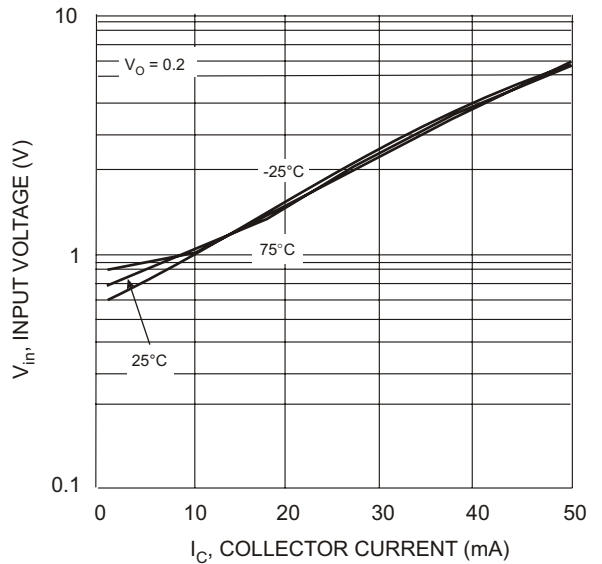


Fig. 6 Input Voltage vs. Collector Current