

**PNP PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR**
**Features**

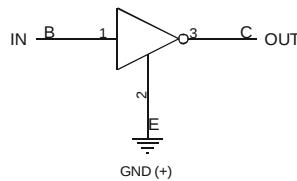
- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDTC)
- Built-In Biasing Resistors, R1≠R2
- "Lead Free", RoHS Compliant (Note 1)
- Halogen and Antimony Free "Green" Device (Note 2)
- Qualified to AEC-Q101 Standards for High Reliability

| Part Number | 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     |

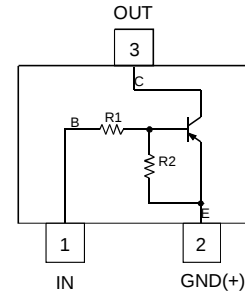
SOT523



Top View



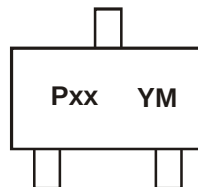
Device Schematic


 Package Pin Out  
Configuration

**Ordering Information** (Note 3)

| Part Number   | Case   | Packaging        |
|---------------|--------|------------------|
| DDTA113ZE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA123YE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA123JE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA143XE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA143FE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA143ZE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA114YE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA114WE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA124XE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA144VE-7-F | SOT523 | 3000/Tape & Reel |
| DDTA144WE-7-F | SOT523 | 3000/Tape & Reel |

- 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>.

**Marking Information**


Pxx = Product Type Marking Code (See Features Table)  
 YM = Date Code Marking  
 Y = Year (ex: T = 2006)  
 M = Month (ex: 9 = September)

## Date Code Key

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | S    | 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<sub>A</sub> = 25°C unless otherwise specified

| Characteristic             | Symbol              | Value                                                                                                                                                                                                                                                         | Unit |
|----------------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Supply Voltage, (2) to (3) | V <sub>CC</sub>     | -50                                                                                                                                                                                                                                                           | V    |
| Input Voltage, (1) to (2)  | 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 All         | I <sub>C(MAX)</sub> | -100                                                                                                                                                                                                                                                          | mA   |

**Thermal Characteristics**

| Characteristic                                       | Symbol                            | Value       | Unit |
|------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                                    | P <sub>D</sub>                    | 150         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 4) | R <sub>θJA</sub>                  | 833         | °C/W |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**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 <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   |                                                                                                                                             | ΔR <sub>1</sub>                 | -30                                                                                  | —    | +30                                                                                       | %    | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Resistance Ratio Tolerance |                                                                                                                                             | ΔR <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, f = 100MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

\* Transistor – For Reference Only

 Notes: 4. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com>.

**Typical Curves – DDTA123JE**

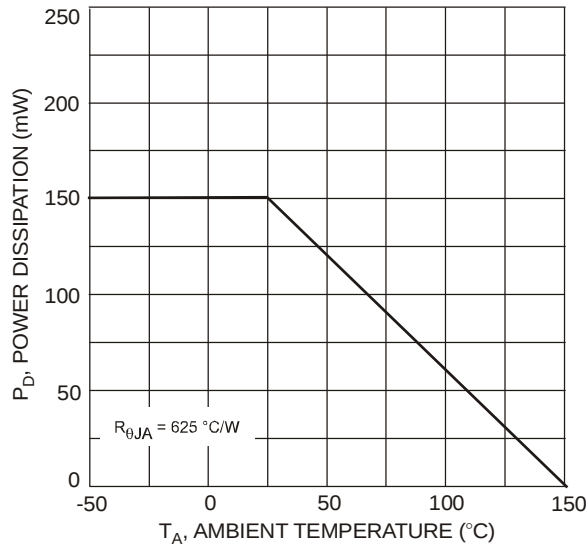


Fig. 1 Power Dissipation vs. Ambient Temperature

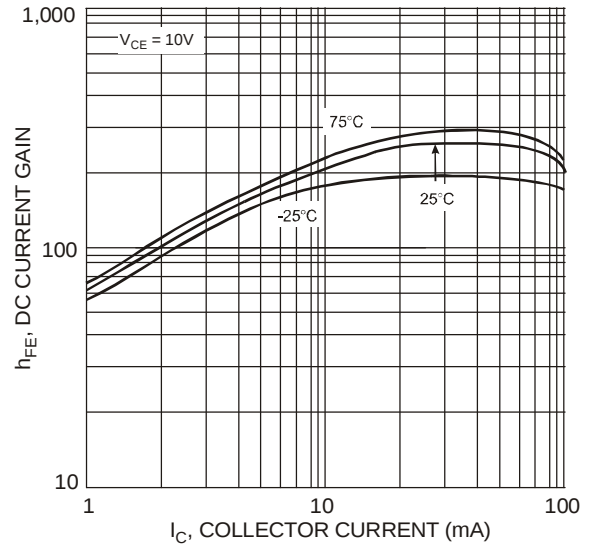


Fig. 2 Typical DC Current Gain vs. Collector Current

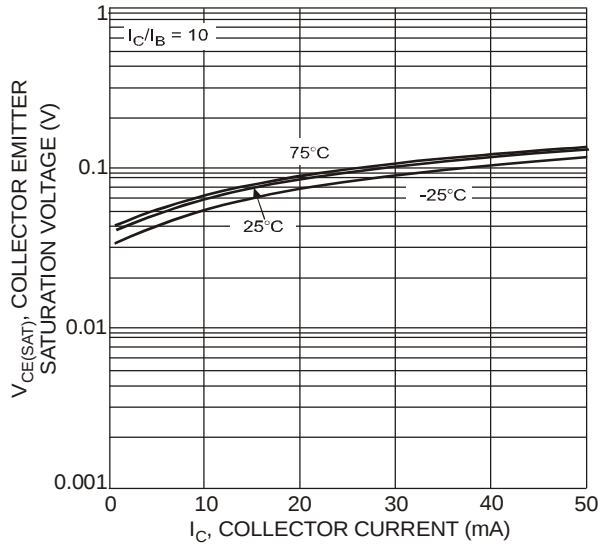


Fig. 3 Collector Emitter Saturation Voltage vs. Collector Current

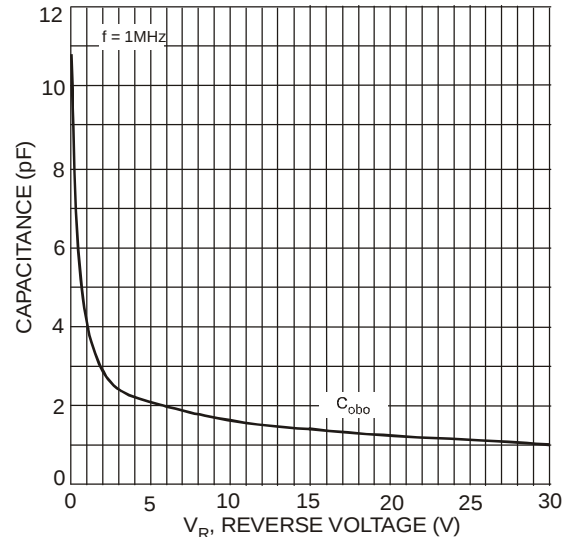


Fig. 4 Typical Capacitance Characteristics

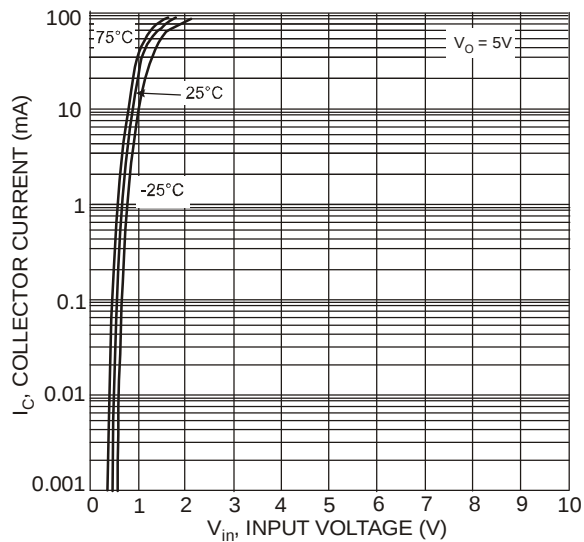


Fig. 5 Collector Current vs. Input Voltage

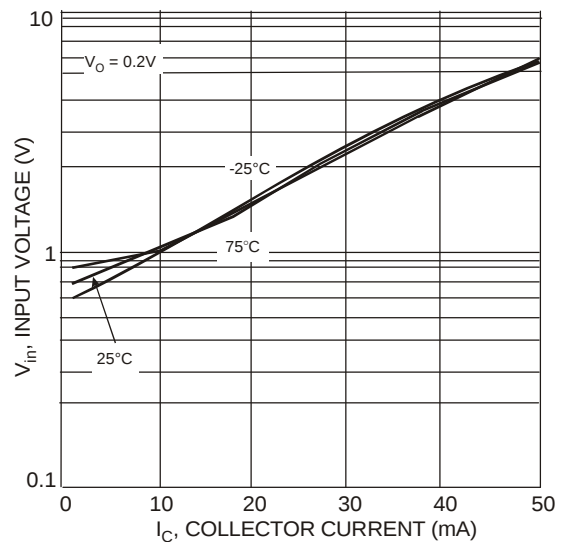
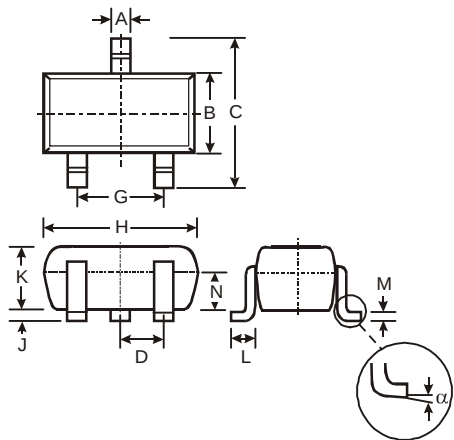


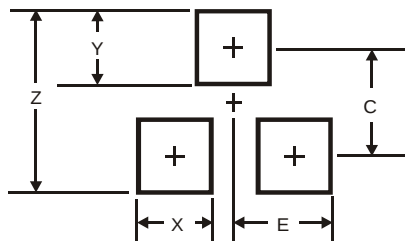
Fig. 6 Input Voltage vs. Collector Current

## Package Outline Dimensions



| SOT523               |      |      |      |
|----------------------|------|------|------|
| 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 |      |      |      |

## Suggested Pad Layout



| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 1.8           |
| X          | 0.4           |
| Y          | 0.51          |
| C          | 1.3           |
| E          | 0.7           |

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