

# DDTA (R1≠R2 SERIES) KA

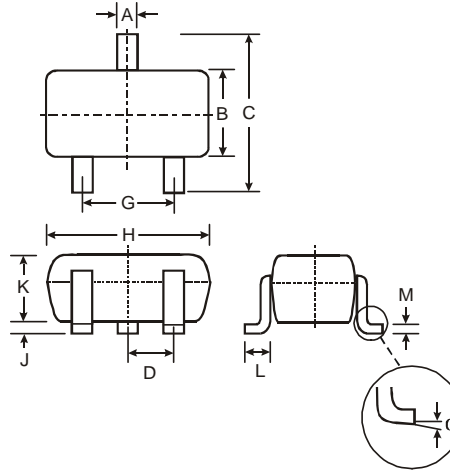
## PNP PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

### Features

- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDTC)
- Built-In Biasing Resistors, R1≠R2
- Lead Free/RoHS Compliant (Note 1)
- "Green" Device, Note 2 and 3

### Mechanical Data

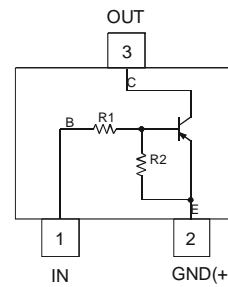
- Case: SC-59
- Case material: Molded Plastic, "Green" Molding Compound, Note 3. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Copper leadframe).
- Terminal Connections: See Diagram
- Marking Information: See Table Below & Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)



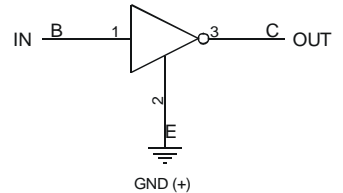
| SC-59 |       |      |
|-------|-------|------|
| Dim   | Min   | Max  |
| A     | 0.35  | 0.50 |
| B     | 1.50  | 1.70 |
| C     | 2.70  | 3.00 |
| D     | 0.95  |      |
| G     | 1.90  |      |
| H     | 2.90  | 3.10 |
| J     | 0.013 | 0.10 |
| K     | 1.00  | 1.30 |
| L     | 0.35  | 0.55 |
| M     | 0.10  | 0.20 |
| α     | 0°    | 8°   |

All Dimensions in mm

| P/N        | R1 (NOM) | R2 (NOM) | Type Code |
|------------|----------|----------|-----------|
| DDTA113ZKA | 1KΩ      | 10KΩ     | P02       |
| DDTA123YKA | 2.2KΩ    | 10KΩ     | P05       |
| DDTA123JKA | 2.2KΩ    | 47KΩ     | P06       |
| DDTA143XKA | 4.7KΩ    | 10KΩ     | P09       |
| DDTA143FKA | 4.7KΩ    | 22KΩ     | P10       |
| DDTA143ZKA | 4.7KΩ    | 47KΩ     | P11       |
| DDTA114YKA | 10KΩ     | 47KΩ     | P14       |
| DDTA114WKA | 10KΩ     | 4.7KΩ    | P15       |
| DDTA124XKA | 22KΩ     | 47KΩ     | P18       |
| DDTA144VKA | 47KΩ     | 10KΩ     | P21       |
| DDTA144WKA | 47KΩ     | 22KΩ     | P22       |



Schematic and Pin Configuration



Equivalent Inverter Circuit

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

| Characteristic             | Symbol          | Value   | Unit |
|----------------------------|-----------------|---|------|
| Supply Voltage, (3) to (2) | V <sub>CC</sub> | -50   | V    |
| Input Voltage, (1) to (2)  | V <sub>IN</sub> | +5 to -10<br>+5 to -12<br>+5 to -12<br>+7 to -20<br>+6 to -30<br>+5 to -30<br>+6 to -40<br>+10 to -30<br>+10 to -40<br>+15 to -40<br>+10 to -40 | V    |
| Output Current             | I <sub>O</sub>  | -100<br>-100<br>-100<br>-100<br>-100<br>-100<br>-70<br>-100<br>-50<br>-30<br>-30  | mA   |

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Product manufactured with Date Code 0627 (week 27, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0627 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

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

| Characteristic                                       | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation                                    | P <sub>d</sub>                    | 200         | mW   |
| Output Current                                       | I <sub>C</sub> (Max)              | -100        | mA   |
| Thermal Resistance, Junction to Ambient Air (Note 4) | R <sub>θJA</sub>                  | 625         | °C/W |
| Operating and Storage Temperature Range              | T <sub>j</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

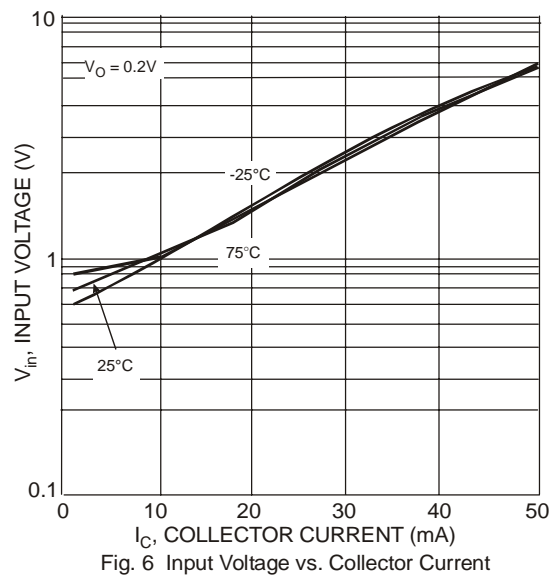
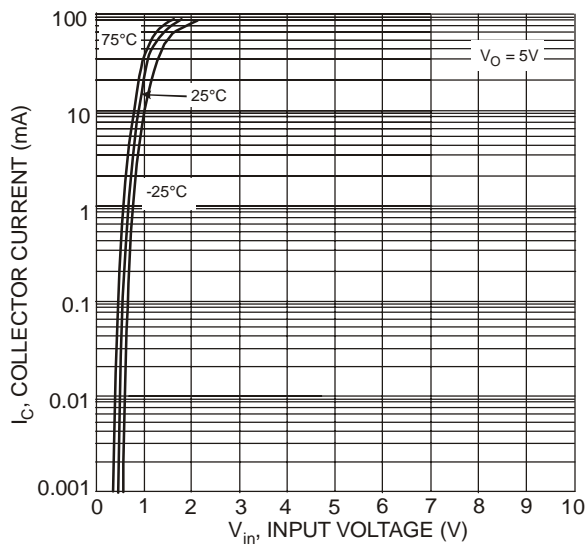
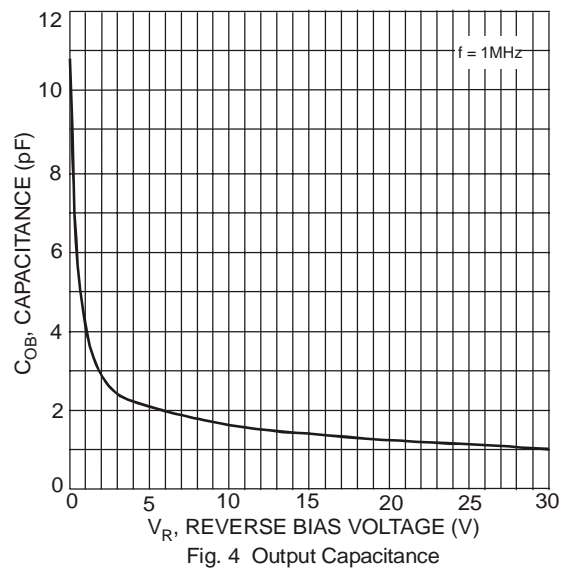
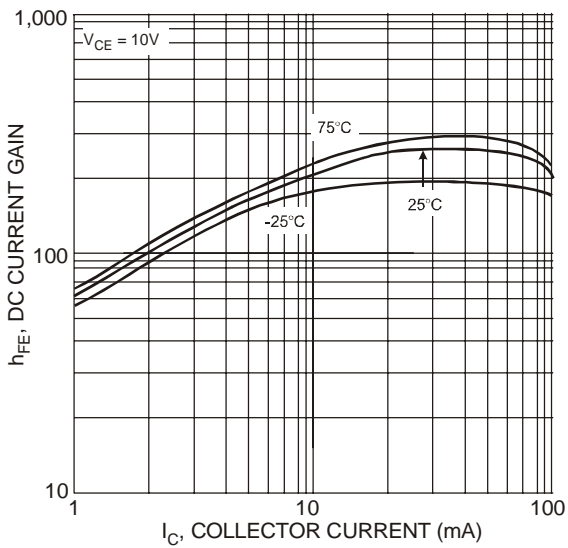
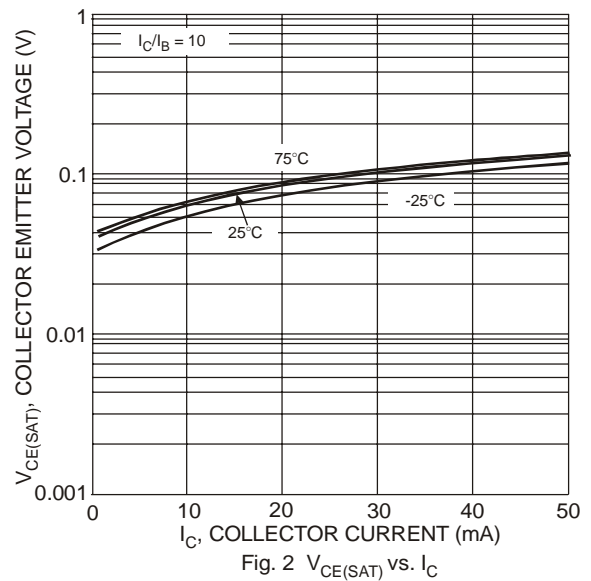
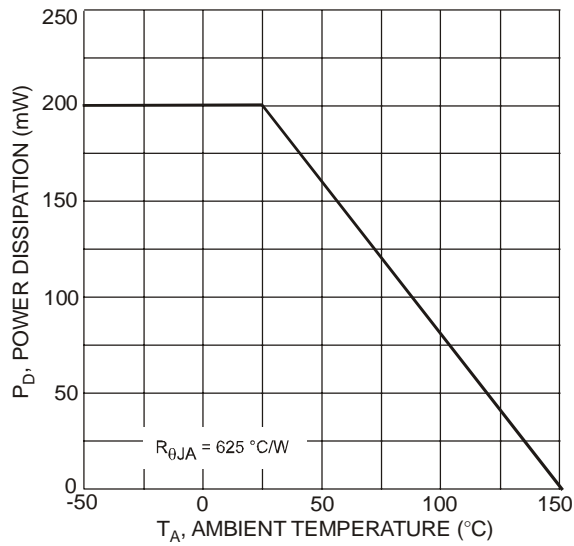
Notes: 4. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.

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

| Characteristic          | Symbol                     | Min                 | Typ                             | Max   | Unit | Test Condition  |      |    |  |  |
|-------------------------|----------------------------|---------------------|---------------------------------|-------|------|---|------|----|--|--|
| Input Voltage           | V <sub>I(off)</sub>        | -0.3                |                                 |       | V    | V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA                |      |    |  |  |
|                         |                            | -0.3                |                                 |       |      |   |      |    |  |  |
| -0.5                    |                            |                     |                                 |       |      |   |      |    |  |  |
| -0.3                    |                            |                     |                                 |       |      |   |      |    |  |  |
| -0.3                    |                            |                     |                                 |       |      |   |      |    |  |  |
| -0.5                    |                            | —                   | —                               |       |      |   |      |    |  |  |
| -0.3                    |                            |                     |                                 |       |      |   |      |    |  |  |
| -0.8                    |                            |                     |                                 |       |      |   |      |    |  |  |
| -0.4                    |                            |                     |                                 |       |      |   |      |    |  |  |
| -1.0                    |                            |                     |                                 |       |      |   |      |    |  |  |
| -0.8                    |                            |                     |                                 |       |      |   |      |    |  |  |
| Input Voltage           |                            | V <sub>I(on)</sub>  |                                 |       |      |   | -3.0 | 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 |  |
|                         |                            |                     |                                 |       |      |   | -3.0 |    |  |  |
|                         |                            |                     |                                 | -1.1  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -2.5  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -1.3  |      |   |      |    |  |  |
|                         |                            |                     | —                               | —     |      |   |      |    |  |  |
|                         |                            |                     |                                 | -1.4  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -3.0  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -2.5  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -5.0  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -4.0  |      |   |      |    |  |  |
|                         | Output Voltage             |                     | V <sub>O(on)</sub>              | —     | -0.1 | -0.3  | V    |    |  | I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA DDTA123JKA<br>I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA DDTA143ZKA<br>I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA DDTA114YKA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA All Others |
|                         | Input Current              |                     | I <sub>I</sub>                  |       |      | -7.2  | mA   |    |  | V <sub>I</sub> = -5V   |
|                         |                            |                     |                                 | -3.8  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -3.6  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -1.8  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -1.8  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -1.8  |      |   |      |    |  |  |
|                         |                            |                     |                                 | -0.88 |      |   |      |    |  |  |
|                         |                            |                     |                                 | -0.88 |      |   |      |    |  |  |
|                         |                            |                     |                                 | -0.36 |      |   |      |    |  |  |
|                         |                            |                     |                                 | -0.16 |      |   |      |    |  |  |
|                         |                            |                     |                                 | -0.16 |      |   |      |    |  |  |
| Output Current          |                            | I <sub>O(off)</sub> |                                 | —     | —    | -0.5  |      | μA | V <sub>CC</sub> = -50V, V <sub>I</sub> = 0V  |  |
| DC Current Gain         |                            | G <sub>I</sub>      |                                 | -33   |      |   |      | —  | V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA   |  |
|                         | -33                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -80                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -30                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -68                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -80                        |                     | —                               | —     |      |   |      |    |  |  |
|                         | -68                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -24                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -68                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -33                        |                     |                                 |       |      |   |      |    |  |  |
|                         | -56                        |                     |                                 |       |      |   |      |    |  |  |
|                         | 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,<br>f = 100MHz |      |    |  |  |

\* Transistor - For Reference Only

## Typical Curves – DDTA123JKA

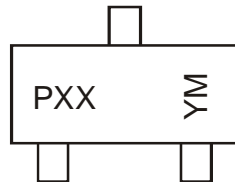


## Ordering Information (Note 3 & 5)

| Device         | Packaging | Shipping         |
|----------------|-----------|------------------|
| DDTA113ZKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA123YKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA123JKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA143XKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA143FKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA143ZKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA114YKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA114WKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA124XKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA144VKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA144WKA-7-F | SC-59     | 3000/Tape & Reel |

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



PXX = 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   |

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