

# DDTA (R1 = R2 SERIES) KA

PNP PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

| Obsolete Part Number | Alternative Part Number |
|----------------------|-------------------------|
| DDTA114EKA           | DDTA114EKA              |
| DDTA115EKA           | DDTA115EKA              |
| DDTA123EKA           | DDTA123EKA              |
| DDTA124EKA           | DDTA124EKA              |
| DDTA143EKA           | DDTA143EKA              |
| DDTA144EKA           | DDTA144EKA              |

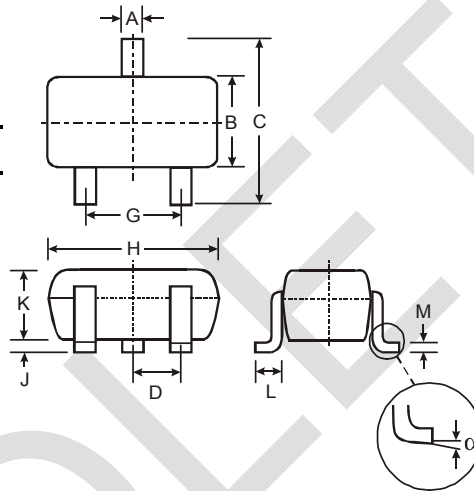
## Features

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

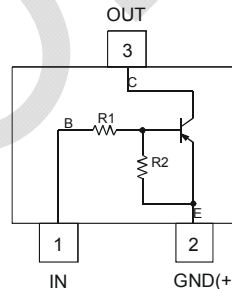
## Mechanical Data

- Case: SC-59
- Case Material: Molded Plastic, "Green" Molding Compound, Note 4. 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)

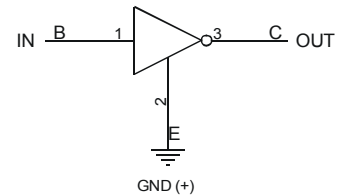
| P/N        | R1, R2 (NOM)  | Type Code |
|------------|---------------|-----------|
| DDTA123EKA | 2.2K $\Omega$ | P04       |
| DDTA143EKA | 4.7K $\Omega$ | P08       |
| DDTA114EKA | 10K $\Omega$  | P13       |
| DDTA124EKA | 22K $\Omega$  | P17       |
| DDTA144EKA | 47K $\Omega$  | P20       |
| DDTA115EKA | 100K $\Omega$ | P24       |



| 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 |
| $\alpha$             | 0°    | 8°   |
| All Dimensions in mm |       |      |



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)<br>DDTA123EKA<br>DDTA143EKA<br>DDTA114EKA<br>DDTA124EKA<br>DDTA144EKA<br>DDTA115EKA | V <sub>IN</sub>                   | +10 to -12<br>+10 to -30<br>+10 to -40<br>+10 to -40<br>+10 to -40<br>+10 to -40 | V    |
| Output Current<br>DDTA123EKA<br>DDTA143EKA<br>DDTA114EKA<br>DDTA124EKA<br>DDTA144EKA<br>DDTA115EKA            | I <sub>O</sub>                    | -100<br>-100<br>-50<br>-30<br>-100<br>-20                                        | mA   |
| Output Current All                                                                                            | I <sub>C</sub> (Max)              | -100                                                                             | mA   |
| Power Dissipation                                                                                             | P <sub>d</sub>                    | 200                                                                              | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 1)                                                          | 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:
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](http://www.diodes.com/products/lead_free/index.php).
  4. 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.

## 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>            | -0.5                             | -1.1 | —                                                | V    | V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA                                                                                                                                                                                                                                                                                                                                |
|                                                                                                     | V <sub>I(on)</sub>             | —                                | -1.9 | -3                                               |      | V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA, DDTA123EKA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA, DDTA143EKA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -10mA, DDTA114EKA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA, DDTA124EKA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA, DDTA144EKA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -1mA, DDTA115EKA |
| Output Voltage                                                                                      | V <sub>O(on)</sub>             | —                                | -0.1 | -0.3                                             | V    | I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA, DDTA123EKA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA, DDTA143EKA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA, DDTA114EKA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA, DDTA124EKA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA/-0.5mA, DDTA144EKA<br>I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA, DDTA115EKA    |
| Input Current<br>DDTA123EKA<br>DDTA143EKA<br>DDTA114EKA<br>DDTA124EKA<br>DDTA144EKA<br>DDTA115EKA   | I <sub>I</sub>                 | —                                | —    | -3.8<br>-1.8<br>-0.88<br>-0.36<br>-0.18<br>-0.15 | 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<br>DDTA123EKA<br>DDTA143EKA<br>DDTA114EKA<br>DDTA124EKA<br>DDTA144EKA<br>DDTA115EKA | G <sub>I</sub>                 | 20<br>20<br>30<br>56<br>68<br>82 | —    | —                                                | —    | V <sub>O</sub> = -5V, I <sub>O</sub> = -20mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA                                                                                      |
| Input Resistor (R <sub>1</sub> ) Tolerance                                                          | ΔR <sub>1</sub>                | -30                              | —    | +30                                              | %    | —                                                                                                                                                                                                                                                                                                                                                                             |
| Resistance Ratio                                                                                    | R <sub>2</sub> /R <sub>1</sub> | 0.8                              | 1    | 1.2                                              | —    | —                                                                                                                                                                                                                                                                                                                                                                             |
| 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 – DDTA143EKA**

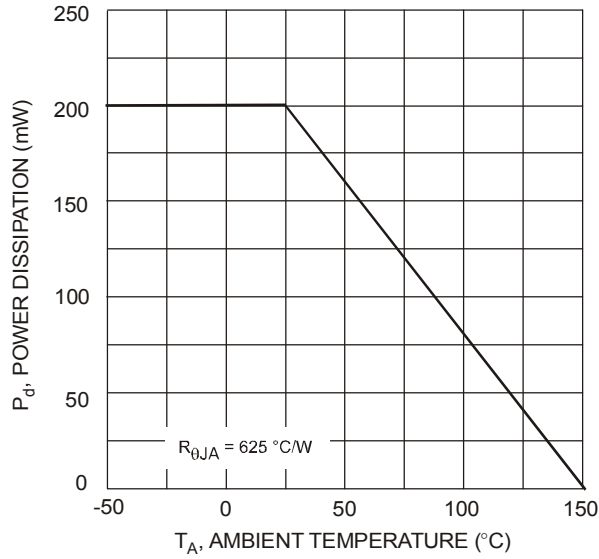


Fig. 1 Derating Curve

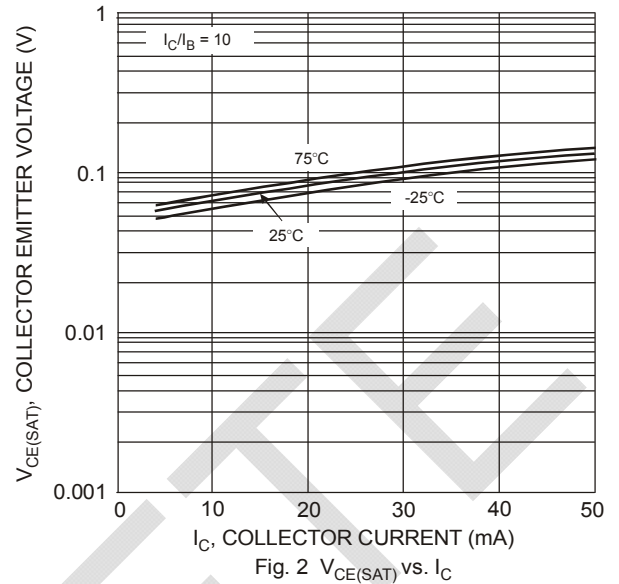


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

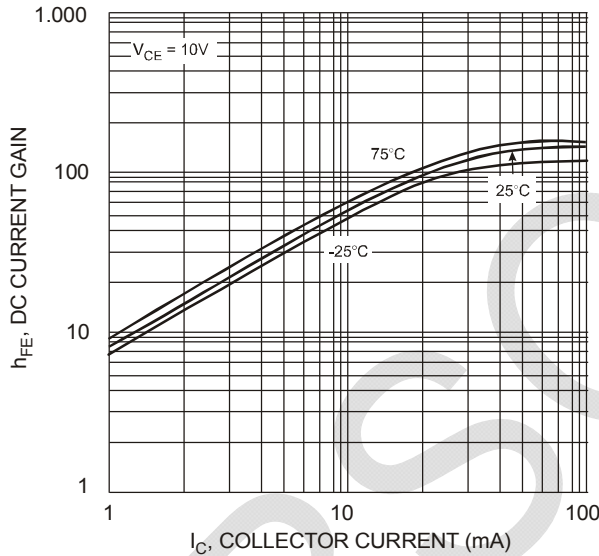


Fig. 3 DC Current Gain

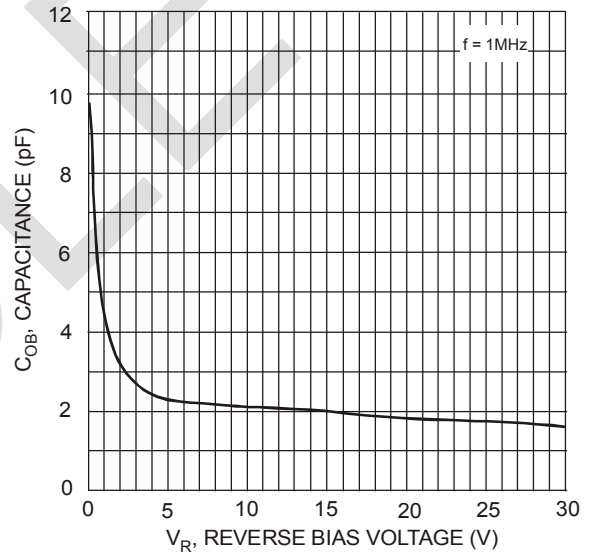


Fig. 4 Output Capacitance

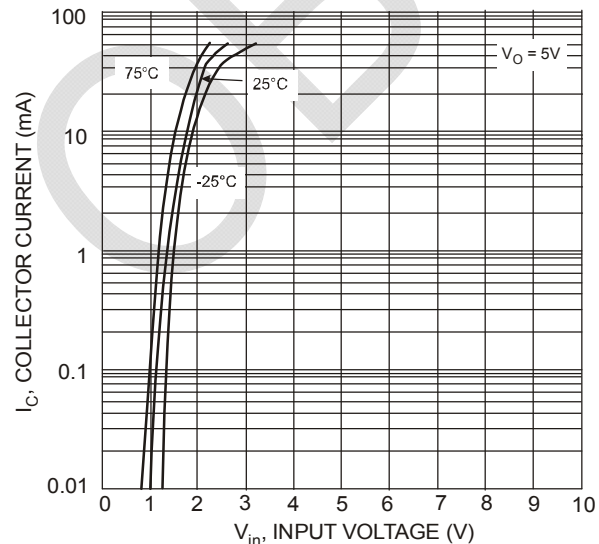


Fig. 5 Collector Current vs. Input Voltage

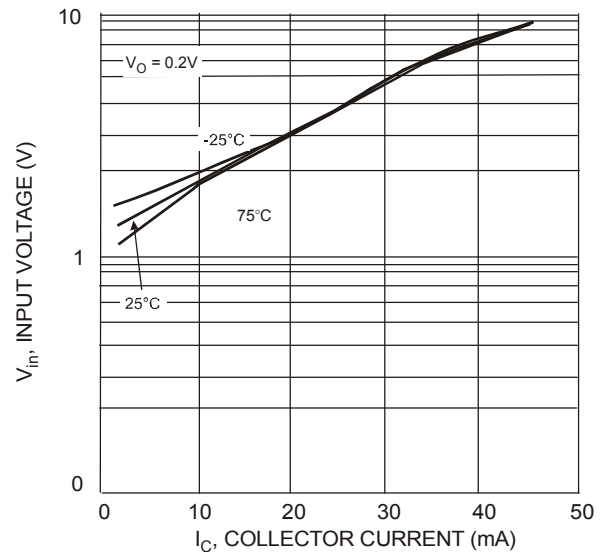
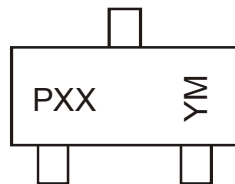


Fig. 6 Input Voltage vs. Collector Current

**Ordering Information** (Note 4 & 5)

| Device         | Packaging | Shipping         |
|----------------|-----------|------------------|
| DDTA123EKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA143EKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA114EKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA124EKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA144EKA-7-F | SC-59     | 3000/Tape & Reel |
| DDTA115EKA-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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