# DDTC (R1-ONLY SERIES) KA

## NPN PRE-BIASED SMALL SIGNAL SC-59 SURFACE MOUNT TRANSISTOR

Lead-free Green

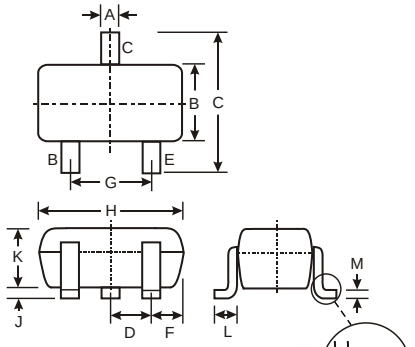
NEW PRODUCT

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistor, R1 only
- **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: Date Code and Type Code (See Diagrams & Page 2)
- Ordering Information (See Page 2)
- 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** | | |


SCHEMATIC DIAGRAM

| P/N | R1 (NOM) | Type Code |
|---|---|---|
| DDTC113TKA | 1KΩ | N01 |
| DDTC123TKA | 2.2KΩ | N03 |
| DDTC143TKA | 4.7KΩ | N07 |
| DDTC114TKA | 10KΩ | N12 |
| DDTC124TKA | 22KΩ | N16 |
| DDTC144TKA | 47KΩ | N19 |
| DDTC115TKA | 100KΩ | N23 |
| DDTC125TKA | 200KΩ | N25 |

## Maximum Ratings @ $T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 50 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 50 | V |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | V |
| Collector Current | $I_C$ (Max) | 100 | mA |
| Power Dissipation | $P_d$ | 200 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 1) | $R_{\theta JA}$ | 625 | °C/W |
| Operating and Storage and Temperature Range | $T_j$, $T_{STG}$ | -55 to +150 | °C |

Note: 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 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

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## Electrical Characteristics @ $T_A$ = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $BV_{CBO}$ | 50 | ¾ | ¾ | V | $I_C$ = 50µA |
| Collector-Emitter Breakdown Voltage | $BV_{CEO}$ | 50 | ¾ | ¾ | V | $I_C$ = 1mA |
| Emitter-Base Breakdown Voltage | $BV_{EBO}$ | 5 | ¾ | ¾ | V | $I_E$ = 50µA |
| Collector Cutoff Current | $I_{CBO}$ | ¾ | ¾ | 0.5 | µA | $V_{CB}$ = 50V |
| Emitter Cutoff Current | $I_{EBO}$ | ¾ | ¾ | 0.5 | µA | $V_{EB}$ = 4V |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | ¾ | ¾ | 0.3 | V | $I_C/I_B$ = 10mA/1mA DDTC113TKA<br>$I_C/I_B$ = 5mA/0.5mA DDTC123TKA<br>$I_C/I_B$ = 2.5mA/.25mA DDTC143TKA<br>$I_C/I_B$ = 1mA/.1mA DDTC114TKA<br>$I_C/I_B$ = 5mA/0.5mA DDTC124TKA<br>$I_C/I_B$ = 2.5mA/.25mA DDTC144TKA<br>$I_C/I_B$ = 1mA/0.1mA DDTC115TKA<br>$I_C/I_B$ = .5mA/.05mA DDTC125TKA |
| DC Current Transfer Ratio | $h_{FE}$ | 100 | 250 | 600 | ¾ | $I_C$ = 1mA, $V_{CE}$ = 5V |
| Input Resistor ($R_1$) Tolerance | $\Delta R_1$ | -30 | ¾ | +30 | % | ¾ |
| Gain-Bandwidth Product* | $f_T$ | ¾ | 250 | ¾ | MHz | $V_{CE}$ = 10V, $I_E$ = -5mA, f = 100MHz |

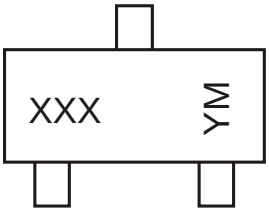
* Transistor - For Reference Only

## Ordering Information (Note 4 & 5)

| Device | Packaging | Shipping |
|---|---|---|
| DDTC113TKA-7-F | SC-59 | 3000/Tape & Reel |
| DDTC123TKA-7-F | SC-59 | 3000/Tape & Reel |
| DDTC143TKA-7-F | SC-59 | 3000/Tape & Reel |
| DDTC114TKA-7-F | SC-59 | 3000/Tape & Reel |
| DDTC124TKA-7-F | SC-59 | 3000/Tape & Reel |
| DDTC144TKA-7-F | SC-59 | 3000/Tape & Reel |
| DDTC115TKA-7-F | SC-59 | 3000/Tape & Reel |
| DDTC125TKA-7-F | SC-59 | 3000/Tape & Reel |

Notes: 4. Product manufactured with Date Code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.
5. For Packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

## Marking Information




XXX = Product Type Marking Code, See Table on Page 1
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 - DDTC114TKA

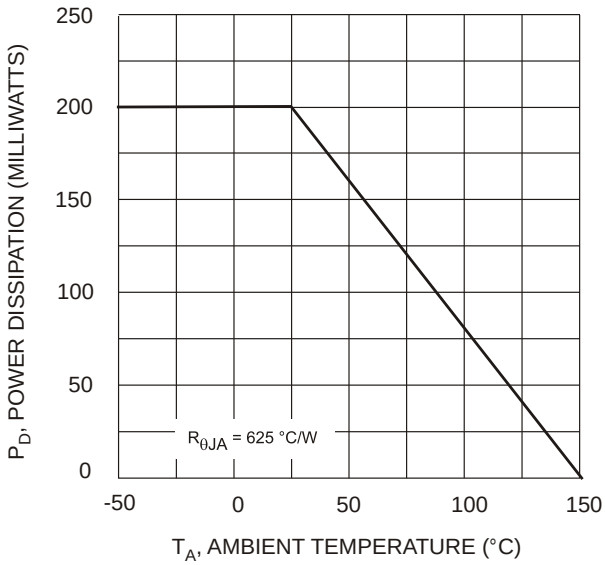


Fig. 1 Derating Curve

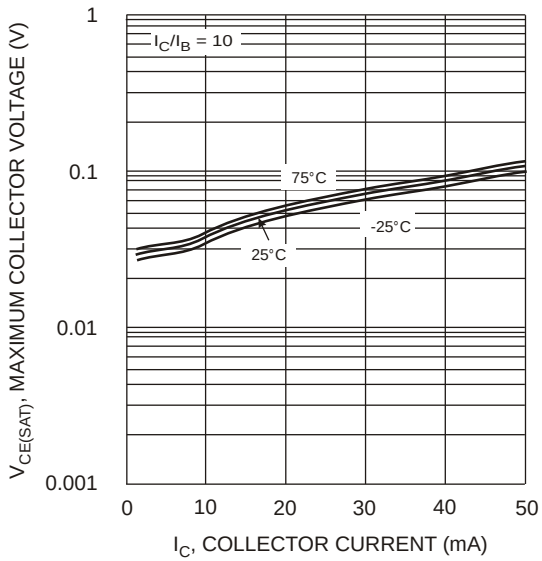


Fig. 2 $V_{CE(SAT)}$ vs. $I_C$

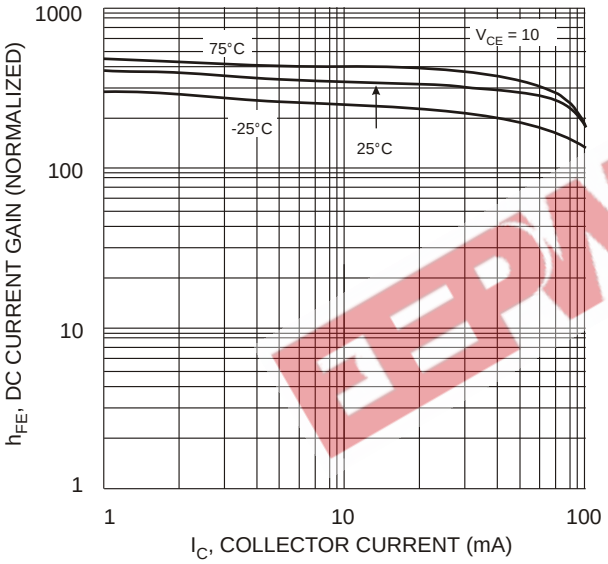


Fig. 3 DC Current Gain

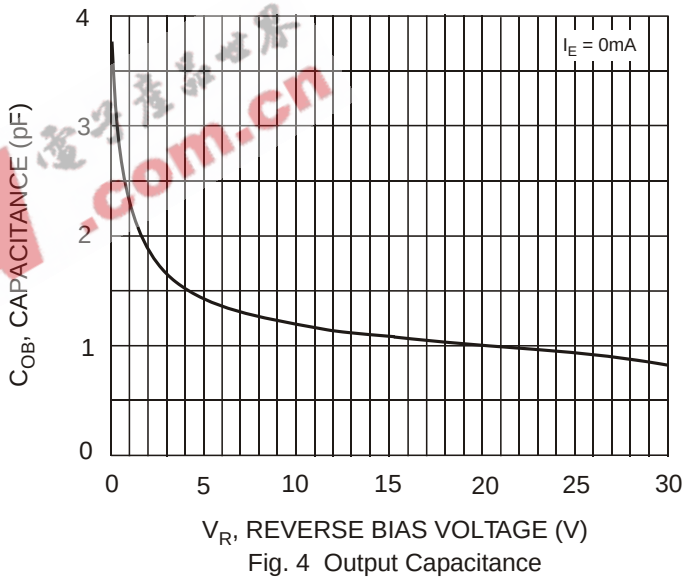


Fig. 4 Output Capacitance

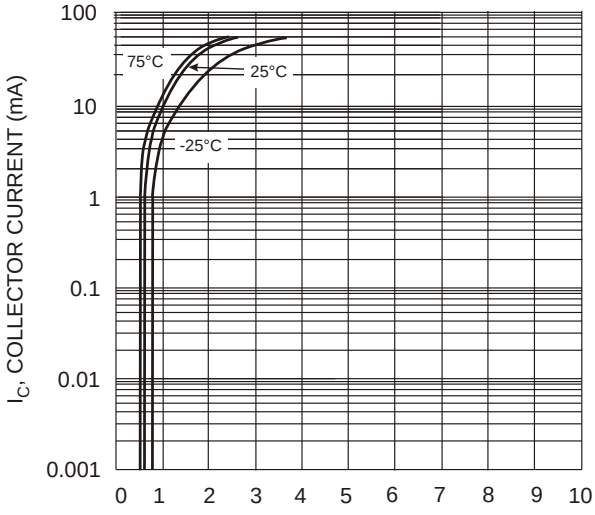


Fig. 5 Collector Current Vs. Input Voltage

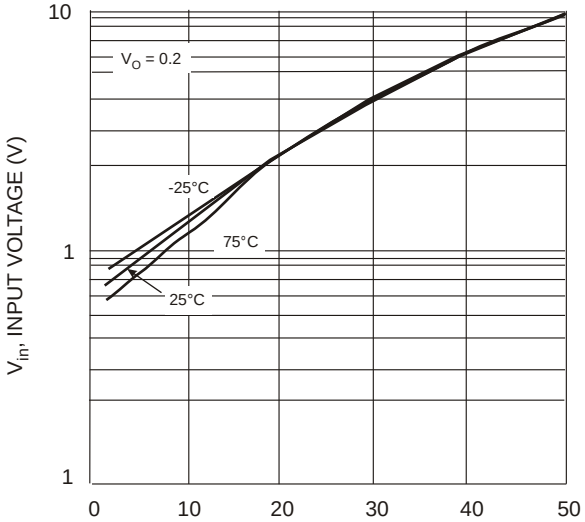


Fig. 6 Input Voltage vs. Collector Current

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