



**THE DATASHEET OF  
DDTD123YC-7-F**



## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTB)
- Built-In Biasing Resistors, R1, R2
- **Lead, Halogen and Antimony Free, RoHS Compliant**
- **"Green" Device (Notes 2 and 3)**

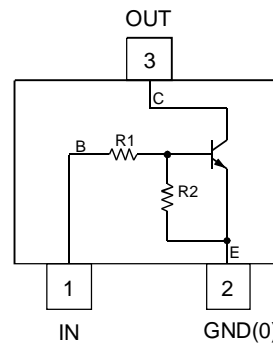
| Part Number | R1 (NOM) | R2 (NOM) | Marking |
|-------------|----------|----------|---------|
| DDTD113EC   | 1K       | 1K       | N60     |
| DDTD123EC   | 2.2K     | 2.2K     | N61     |
| DDTD143EC   | 4.7K     | 4.7K     | N62     |
| DDTD114EC   | 10K      | 10K      | N63     |
| DDTD122JC   | 0.22K    | 4.7K     | N64     |
| DDTD113ZC   | 1K       | 10K      | N65     |
| DDTD123YC   | 2.2K     | 10K      | N66     |
| DDTD133HC   | 3.3K     | 10K      | N67     |
| DDTD123TC   | 2.2K     | OPEN     | N69     |
| DDTD143TC   | 4.7K     | OPEN     | N70     |
| DDTD114TC   | 10K      | OPEN     | N71     |
| DDTD114GC   | 0        | 10K      | N72     |



Top View

## Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound, Note 3. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Marking Information: See Table and Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)



Package Pin Out Configuration

## 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>       | -10 to +10<br>-10 to +12<br>-10 to +30<br>-10 to +40<br>-5 to +5<br>-5 to +10<br>-5 to +12<br>-6 to +20 | V    |
| Input Voltage, (2) to (1)  | V <sub>EBO(MAX)</sub> | 5   | V    |
| Output Current             | I <sub>C</sub>        | 500   | mA   |

## Thermal Characteristics

| Characteristic                                       | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| 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. Halogen and Antimony Free.
  3. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.

**Electrical Characteristics - R1, R2 Types** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic             | Symbol   | Min  | Typ | Max  | Unit | Test Condition   |
|----------------------------|--|--|-----|--|------|--|
| Input Voltage              | DDTD113EC<br>DDTD123EC<br>DDTD143EC<br>DDTD114EC<br>DDTD122JC<br>DDTD113ZC<br>DDTD123YC<br>DDTD133HC | 0.5<br>0.5<br>0.5<br>0.5<br>0.5<br>0.3<br>0.3<br>0.3 | —   | —  | V    | V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA   |
|                            | DDTD113EC<br>DDTD123EC<br>DDTD143EC<br>DDTD114EC<br>DDTD122JC<br>DDTD113ZC<br>DDTD123YC<br>DDTD133HC | —  | —   | 3.0<br>3.0<br>3.0<br>3.0<br>3.0<br>2.0<br>2.0<br>2.0 | 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> = 20mA<br>V <sub>O</sub> = 0.3V, I <sub>O</sub> = 10mA<br>V <sub>O</sub> = 0.3V, I <sub>O</sub> = 30mA<br>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> = 20mA |
| Output Voltage             | V <sub>O(ON)</sub>   | —  | —   | 0.3V   | V    | I <sub>O</sub> /I <sub>I</sub> = -50mA/-2.5mA  |
| Input Current              | DDTD113EC<br>DDTD123EC<br>DDTD143EC<br>DDTD114EC<br>DDTD122JC<br>DDTD113ZC<br>DDTD123YC<br>DDTD133HC | —  | —   | 7.2<br>3.8<br>1.8<br>0.88<br>28<br>7.2<br>3.6<br>2.4 | 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            | DDTD113EC<br>DDTD123EC<br>DDTD143EC<br>DDTD114EC<br>DDTD122JC<br>DDTD113ZC<br>DDTD123YC<br>DDTD133HC | 33<br>39<br>47<br>56<br>47<br>56<br>56<br>56         | —   | —  | —    | V <sub>O</sub> = 5V, I <sub>O</sub> = 50mA   |
| Input Resistor Tolerance   | ΔR <sub>1</sub>  | -30  | —   | +30  | %    | —  |
| Resistance Ratio Tolerance | Δ(R <sub>2</sub> /R <sub>1</sub> )   | -20  | —   | +20  | %    | —  |
| Gain-Bandwidth Product*    | f <sub>T</sub>   | —  | 200 | —  | MHz  | V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA,<br>f = 100MHz   |

**Electrical Characteristics - R1 Only, R2 Only Types** @T<sub>A</sub> = 25°C unless otherwise specified

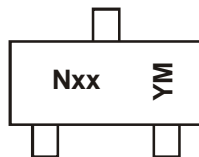
| Characteristic                       | Symbol   | Min               | Typ                     | Max                      | Unit                   | Test Condition  |
|--------------------------------------|--|-------------------|-------------------------|--------------------------|------------------------|---|
| Collector-Base Breakdown Voltage     | BV <sub>CBO</sub>                                | 50                | —                       | —                        | V                      | I <sub>C</sub> = 50μA   |
| Collector-Emitter Breakdown Voltage  | BV <sub>CEO</sub>                                | 40                | —                       | —                        | V                      | I <sub>C</sub> = 1mA  |
| Emitter-Base Breakdown Voltage       | DDTD123TC<br>DDTD143TC<br>DDTD114TC<br>DDTD114GC | BV <sub>EBO</sub> | 5                       | —                        | V                      | I <sub>E</sub> = 50μA<br>I <sub>E</sub> = 50μA<br>I <sub>E</sub> = 50μA<br>I <sub>E</sub> = 720μA |
| Collector Cutoff Current             | I <sub>CBO</sub>                                 | —                 | —                       | 0.5                      | μA                     | V <sub>CB</sub> = 50V   |
| Emitter Cutoff Current               | DDTD123TC<br>DDTD143TC<br>DDTD114TC<br>DDTD114GC | I <sub>EBO</sub>  | —                       | 0.5<br>0.5<br>0.5<br>580 | μA                     | V <sub>EB</sub> = 4V  |
| Collector-Emitter Saturation Voltage | V <sub>CE(SAT)</sub>                             | —                 | —                       | 0.3                      | V                      | I <sub>C</sub> = 50mA, I <sub>B</sub> = 2.5mA   |
| DC Current Transfer Ratio            | DDTD123TC<br>DDTD143TC<br>DDTD114TC<br>DDTD114GC | h <sub>FE</sub>   | 100<br>100<br>100<br>56 | 250<br>250<br>250<br>—   | 600<br>600<br>600<br>— | I <sub>C</sub> = 50mA, V <sub>CE</sub> = 5V   |
| Bias Resistor Tolerance              | ΔR <sub>1</sub> or ΔR <sub>2</sub>               | -30               | —                       | +30                      | %                      | —   |
| Gain-Bandwidth Product*              | f <sub>T</sub>                                   | —                 | 200                     | —                        | MHz                    | V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA,<br>f = 100MHz                                       |

\* Transistor - For Reference Only

**Ordering Information** (Note 4)

| Part Number   | Case   | Packaging        |
|---------------|--------|------------------|
| DDTD113EC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD123EC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD143EC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD114EC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD122JC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD113ZC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD123YC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD133HC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD123TC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD143TC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD114TC-7-F | SOT-23 | 3000/Tape & Reel |
| DDTD114GC-7-F | SOT-23 | 3000/Tape & Reel |

Notes: 4. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**


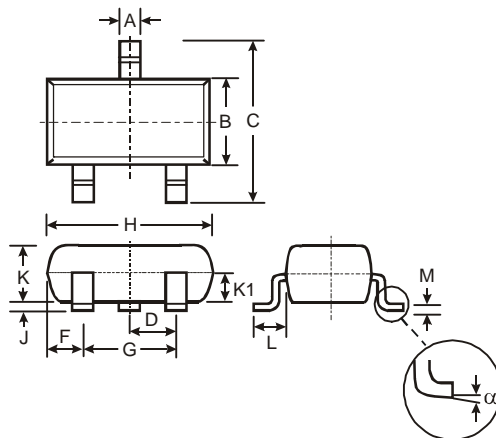
Nxx = Product Type Marking Code (See Page 1)  
 YM = Date Code Marking  
 Y = Year (ex: T = 2002)  
 M = Month (ex: 9 = September)

**Date Code Key**

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | N    | P    | R    | S    | T    | U    | V    | W    | X    | Y    | Z    | A    | B    | C    |

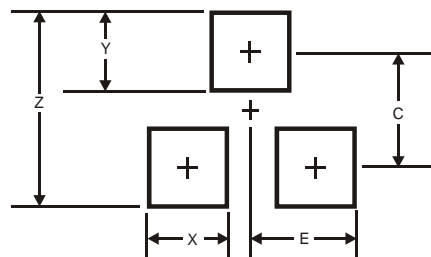
  

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

**Package Outline Dimensions**


| SOT-23   |       |      |       |
|----------|-------|------|-------|
| Dim      | Min   | Max  | Typ   |
| A        | 0.37  | 0.51 | 0.40  |
| B        | 1.20  | 1.40 | 1.30  |
| C        | 2.30  | 2.50 | 2.40  |
| D        | 0.89  | 1.03 | 0.915 |
| F        | 0.45  | 0.60 | 0.535 |
| G        | 1.78  | 2.05 | 1.83  |
| H        | 2.80  | 3.00 | 2.90  |
| J        | 0.013 | 0.10 | 0.05  |
| K        | 0.903 | 1.10 | 1.00  |
| K1       | -     | -    | 0.400 |
| L        | 0.45  | 0.61 | 0.55  |
| M        | 0.085 | 0.18 | 0.11  |
| $\alpha$ | 0°    | 8°   | -     |

All Dimensions in mm

**Suggested Pad Layout**


| Dimensions | Value (in mm) |
|------------|---------------|
| Z          | 2.9           |
| X          | 0.8           |
| Y          | 0.9           |
| C          | 2.0           |
| E          | 1.35          |

**IMPORTANT NOTICE**



Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

**LIFE SUPPORT**

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View DDTD123YC-7-F on WIN SOURCE](#)
-  [Diodes Incorporated Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management