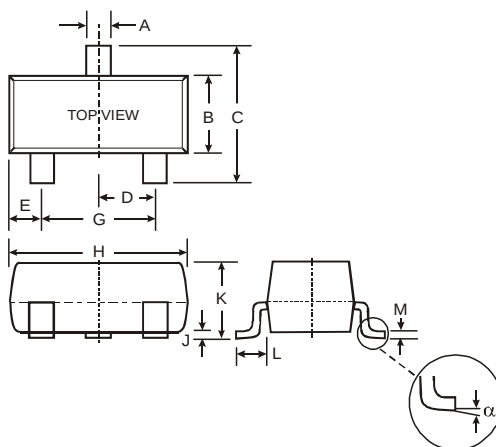


### Features

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

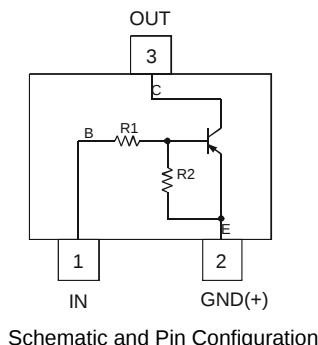
### Mechanical Data

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



| SOT-23               |       |       |
|----------------------|-------|-------|
| Dim                  | Min   | Max   |
| A                    | 0.37  | 0.51  |
| B                    | 1.20  | 1.40  |
| C                    | 2.30  | 2.50  |
| D                    | 0.89  | 1.03  |
| E                    | 0.45  | 0.60  |
| G                    | 1.78  | 2.05  |
| H                    | 2.80  | 3.00  |
| J                    | 0.013 | 0.10  |
| K                    | 0.903 | 1.10  |
| L                    | 0.45  | 0.61  |
| M                    | 0.085 | 0.180 |
| $\alpha$             | 0°    | 8°    |
| All Dimensions in mm |       |       |

| P/N       | R1 (NOM) | R2 (NOM) | Type Code |
|-----------|----------|----------|-----------|
| DDTB113EC | 1K       | 1K       | P60       |
| DDTB123EC | 2.2K     | 2.2K     | P61       |
| DDTB143EC | 4.7K     | 4.7K     | P62       |
| DDTB114EC | 10K      | 10K      | P63       |
| DDTB122JC | 0.22K    | 4.7K     | P64       |
| DDTB113ZC | 1K       | 10K      | P65       |
| DDTB123YC | 2.2K     | 10K      | P66       |
| DDTB133HC | 3.3K     | 10K      | P67       |
| DDTB123TC | 2.2K     | OPEN     | P69       |
| DDTB143TC | 4.7K     | OPEN     | P70       |
| DDTB114TC | 10K      | OPEN     | P71       |
| DDTB114GC | 0        | 10K      | P72       |



### 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, (1) to (2)                            | V <sub>EBO</sub> (MAX)            | -5                                                                                                      | V    |
| Output Current                                       | I <sub>C</sub>                    | -500                                                                                                    | 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. 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

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

## R1, R2 Types

| Characteristic          |                                                                                                      | Symbol              | Min                                                          | Typ | Max                                                          | Unit | Test Condition                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------|------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------|-----|--------------------------------------------------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage           | DDTB113EC<br>DDTB123EC<br>DDTB143EC<br>DDTB114EC<br>DDTB122JC<br>DDTB113ZC<br>DDTB123YC<br>DDTB133HC | V <sub>I(off)</sub> | -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                                                                                                                                                                                                                                                                                                                                                               |
|                         | DDTB113EC<br>DDTB123EC<br>DDTB143EC<br>DDTB114EC<br>DDTB122JC<br>DDTB113ZC<br>DDTB123YC<br>DDTB133HC | V <sub>I(on)</sub>  | —                                                            | —   | -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           | DDTB113EC<br>DDTB123EC<br>DDTB143EC<br>DDTB114EC<br>DDTB122JC<br>DDTB113ZC<br>DDTB123YC<br>DDTB133HC | I <sub>I</sub>      | —                                                            | —   | -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         | DDTB113EC<br>DDTB123EC<br>DDTB143EC<br>DDTB114EC<br>DDTB122JC<br>DDTB113ZC<br>DDTB123YC<br>DDTB133HC | G <sub>I</sub>      | 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                                                                                                                                                                                                                                                                                                                                                                 |
| Gain-Bandwidth Product* |                                                                                                      | f <sub>T</sub>      | —                                                            | 200 | —                                                            | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz                                                                                                                                                                                                                                                                                                                                                    |

\* Transistor - For Reference Only

# Electrical Characteristics

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

## R1-Only, R2-Only Types

| 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       | DDTB123TC<br>DDTB143TC<br>DDTB114TC<br>DDTB114GC | 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               | DDTB123TC<br>DDTB143TC<br>DDTB114TC<br>DDTB114GC | I <sub>EBO</sub>     | —<br>—<br>—<br>-300     | —                      | -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            | DDTB123TC<br>DDTB143TC<br>DDTB114TC<br>DDTB114GC | 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> = -5mA, V <sub>CE</sub> = -5V                                                          |
| Gain-Bandwidth Product*              |                                                  | f <sub>T</sub>       | —                       | 200                    | —                            | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz                                              |

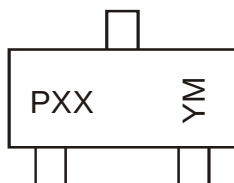
\* Transistor - For Reference Only

## Ordering Information (Note 4)

| Device        | Packaging | Shipping         |
|---------------|-----------|------------------|
| DDTB113EC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB123EC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB143EC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB114EC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB122JC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB113ZC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB123YC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB133HC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB123TC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB143TC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB114TC-7-F | SOT-23    | 3000/Tape & Reel |
| DDTB114GC-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



PXX = 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 | 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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