

# DDTC (LO-R1) U

## NPN PRE-BIASED 100 mA SURFACE MOUNT TRANSISTOR

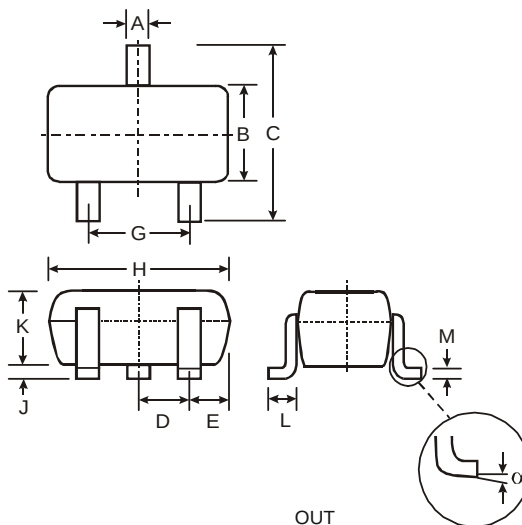
### Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors
- Lead Free/RoHS Compliant (Note 2)
- "Green" Device (Note 3 & 4)

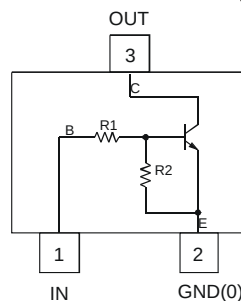
### Mechanical Data

- Case: SOT-323
- 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
- Terminal Connections: See Diagram
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking Information: See Table Below & Page 3
- Ordering Information: See Page 3
- Weight: 0.006 grams (approximate)

| P/N       | R1 (NOM)       | R2 (NOM)     | Type Code |
|-----------|----------------|--------------|-----------|
| DDTC122LU | 0.22K $\Omega$ | 10K $\Omega$ | N81       |
| DDTC142JU | 0.47K $\Omega$ | 10K $\Omega$ | N82       |
| DDTC122TU | 0.22K $\Omega$ | OPEN         | N83       |
| DDTC142TU | 0.47K $\Omega$ | OPEN         | N84       |



| SOT-323              |              |      |
|----------------------|--------------|------|
| Dim                  | Min          | Max  |
| A                    | 0.25         | 0.40 |
| B                    | 1.15         | 1.35 |
| C                    | 2.00         | 2.20 |
| D                    | 0.65 Nominal |      |
| E                    | 0.30         | 0.40 |
| G                    | 1.20         | 1.40 |
| H                    | 1.80         | 2.20 |
| J                    | 0.0          | 0.10 |
| K                    | 0.90         | 1.00 |
| L                    | 0.25         | 0.40 |
| M                    | 0.10         | 0.18 |
| $\alpha$             | 0°           | 8°   |
| All Dimensions in mm |              |      |



Schematic and Pin 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>                   | -5 to +6    | V    |
| Input Voltage, (2) to (1)                   | V <sub>EBO</sub> (MAX)            | 5           | V    |
| Output Current                              | I <sub>C</sub>                    | 100         | mA   |
| Power Dissipation                           | P <sub>d</sub>                    | 200         | mW   |
| Thermal Resistance, Junction to Ambient Air | 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

## R1, R2 Types

| Characteristic          |                        | Symbol              | Min        | Typ | Max        | Unit | Test Condition                                                                               |
|-------------------------|------------------------|---------------------|------------|-----|------------|------|----------------------------------------------------------------------------------------------|
| Input Voltage           | DDTC122LU<br>DDTC142JU | V <sub>I(off)</sub> | 0.3<br>0.3 | —   | —          | V    | V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA                                                 |
|                         | DDTC122LU<br>DDTC142JU | V <sub>I(on)</sub>  | —          | —   | 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 |
| Output Voltage          |                        | V <sub>O(on)</sub>  | —          | —   | 0.3V       | V    | I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA                                                  |
| Input Current           | DDTC122LU<br>DDTC142JU | I <sub>I</sub>      | —          | —   | 28<br>13   | 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         | DDTC122LU<br>DDTC142JU | G <sub>I</sub>      | 56<br>56   | —   | —          | —    | V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA                                                   |
| 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

| 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       | DDTC122TU<br>DDTC142TU | BV <sub>EBO</sub>    | 5          | —          | —          | V    | I <sub>E</sub> = 50μA<br>I <sub>E</sub> = 50μA           |
| Collector Cutoff Current             |                        | I <sub>CBO</sub>     | —          | —          | 0.5        | μA   | V <sub>CB</sub> = 50V                                    |
| Emitter Cutoff Current               | DDTC122TU<br>DDTC142TU | I <sub>EBO</sub>     | —<br>—     | —          | 0.5<br>0.5 | μA   | V <sub>EB</sub> = 4V                                     |
| Collector-Emitter Saturation Voltage |                        | V <sub>CE(sat)</sub> | —          | —          | 0.3        | V    | I <sub>C</sub> = 5mA, I <sub>B</sub> = 0.25mA            |
| DC Current Transfer Ratio            | DDTC122TU<br>DDTC142TU | h <sub>FE</sub>      | 100<br>100 | 250<br>250 | 600<br>600 | —    | I <sub>C</sub> = 1mA, 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 |

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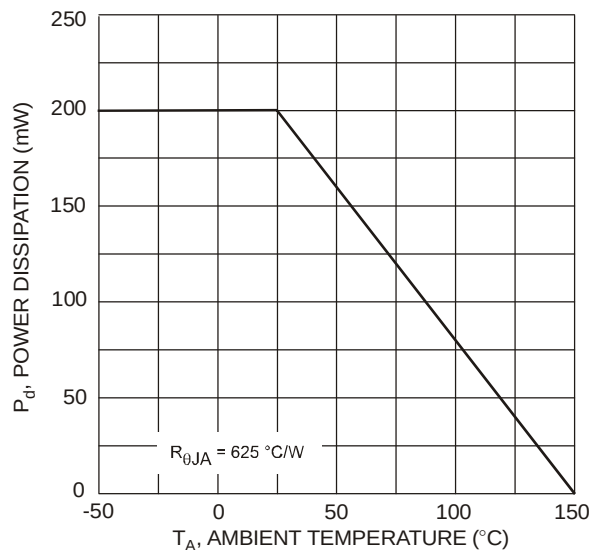


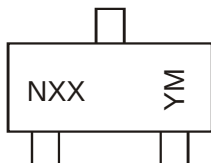
Fig. 1 Power Derating Curve

## Ordering Information (Note 4 & 5)

| Device        | Packaging | Shipping         |
|---------------|-----------|------------------|
| DDTC122LU-7-F | SOT-323   | 3000/Tape & Reel |
| DDTC142JU-7-F | SOT-323   | 3000/Tape & Reel |
| DDTC122TU-7-F | SOT-323   | 3000/Tape & Reel |
| DDTC142TU-7-F | SOT-323   | 3000/Tape & Reel |

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

## Marking Information



NXX = 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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- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)

[www.lifeelectronics.ru](http://www.lifeelectronics.ru)