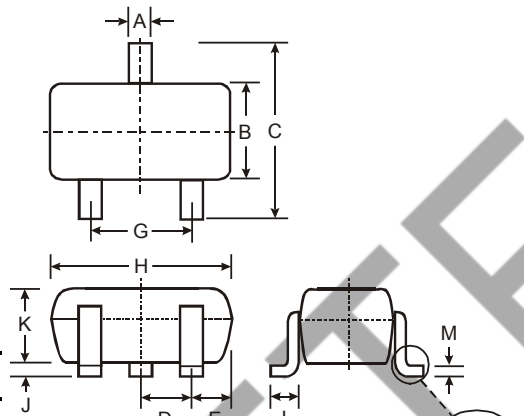


NPN PRE-BIASED 100 MA SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>

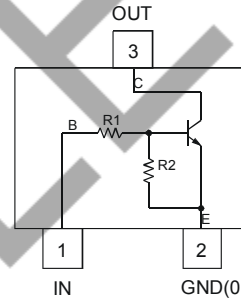


| SOT-323 | | |
|----------|--------------|------|
| Dim | Min | Max |
| A | 0.25 | 0.40 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Nominal | |
| E | 0.30 | 0.40 |
| G | 1.20 | 1.40 |
| H | 1.80 | 2.20 |
| J | 0.0 | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.18 |
| α | 0°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

All Dimensions in mm

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)



Schematic and Pin Configuration

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

Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|-------------|------|
| Supply Voltage, (3) to (2) | V _{CC} | 50 | V |
| Input Voltage, (1) to (2) DDTC122LU | V _{IN} | -5 to +6 | V |
| | | -5 to +6 | |
| Input Voltage, (2) to (1) DDTC142JU | V _{EBO (MAX)} | 5 | V |
| | | | |
| Output Current | I _C | 100 | mA |
| Power Dissipation | P _d | 200 | mW |
| | | | |
| Thermal Resistance, Junction to Ambient Air | R _{θJA} | 625 | °C/W |
| | | | |
| Operating and Storage Temperature Range | T _j , T _{STG} | -55 to +150 | °C |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 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.
 5. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/package-outlines.html>.

Electrical Characteristics @_{T_A} = 25°C unless otherwise specified **R1, R2 Types**

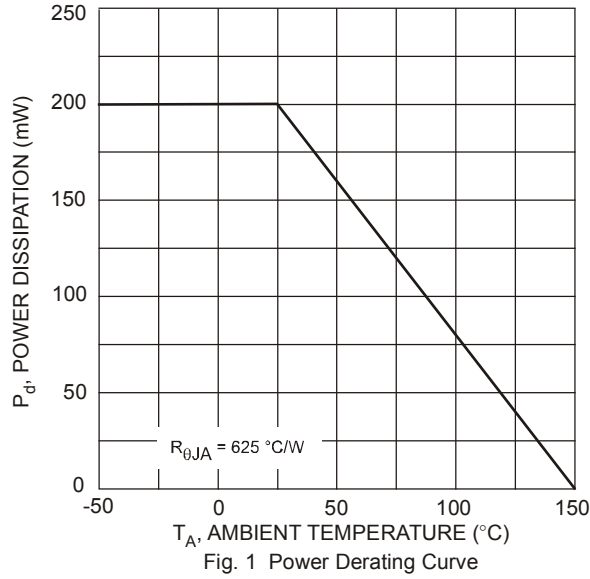
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition | |
|-------------------------|------------------------|--------------|------------|-----|------------|----------------|--|
| Input Voltage | DDTC122LU DDTC142JU | $V_{I(off)}$ | 0.3 0.3 | — | — | V | $V_{CC} = 5V, I_O = 100\mu A$ |
| | DDTC122LU DDTC142JU | $V_{I(on)}$ | — | — | 2.0 2.0 | V | $V_O = 0.3V, I_O = 20mA$ $V_O = 0.3V, I_O = 20mA$ |
| Output Voltage | | $V_{O(on)}$ | — | — | 0.3V | V | $I_O/I_I = 5mA/0.25mA$ |
| Input Current | DDTC122LU DDTC142JU | I_I | — | — | 28 13 | mA | $V_I = 5V$ |
| Output Current | | $I_{O(off)}$ | — | — | 0.5 | μA | $V_{CC} = 50V, V_I = 0V$ |
| DC Current Gain | DDTC122LU DDTC142JU | G_I | 56 56 | — | — | — | $V_O = 5V, I_O = 10mA$ |
| Gain-Bandwidth Product* | | f_T | — | 200 | — | MHz | $V_{CE} = 10V, I_E = 5mA, f = 100MHz$ |

* Transistor - For Reference Only

Electrical Characteristics @_{T_A} = 25°C unless otherwise specified **R1-Only Types**

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition | |
|--------------------------------------|------------------------|---------------|------------|------------|------------|-----------------|--|
| Collector-Base Breakdown Voltage | BV_{CBO} | 50 | — | — | V | $I_C = 50\mu A$ | |
| Collector-Emitter Breakdown Voltage | BV_{CEO} | 40 | — | — | V | $I_C = 1mA$ | |
| Emitter-Base Breakdown Voltage | DDTC122TU DDTC142TU | BV_{EBO} | 5 | — | — | V | $I_E = 50\mu A$ $I_E = 50\mu A$ |
| Collector Cutoff Current | | I_{CBO} | — | — | 0.5 | μA | $V_{CB} = 50V$ |
| Emitter Cutoff Current | DDTC122TU DDTC142TU | I_{EBO} | — | — | 0.5 0.5 | μA | $V_{EB} = 4V$ |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | — | — | 0.3 | V | $I_C = 5mA, I_B = 0.25mA$ |
| DC Current Transfer Ratio | DDTC122TU DDTC142TU | h_{FE} | 100 100 | 250 250 | 600 600 | — | $I_C = 1mA, V_{CE} = 5V$ |
| Gain-Bandwidth Product* | | f_T | — | 200 | — | MHz | $V_{CE} = 10V, I_E = -5mA, f = 100MHz$ |

* Transistor - For Reference Only

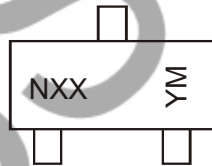


Ordering Information (Notes 4 & 6)

| 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:
- 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.
 - Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/package-outlines.html>.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



NXX = Product Type Marking Code, See Table on Page 1
 1 = Date Code Marking
 Y = Year ex: I = 2021
 M = Month ex: 9 = September

Date Code Key

| Year | 2010 | ... | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|------|------|-----|------|------|------|------|------|------|------|------|------|
| Code | X | ... | I | J | K | L | M | N | O | P | R |

| 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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