

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistor, R1 Only
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

| Part Number | R1 (NOM) | Marking |
|-------------|----------|---------|
| DDTC113TE   | 1kΩ      | N01     |
| DDTC123TE   | 2.2kΩ    | N03     |
| DDTC143TE   | 4.7kΩ    | N07     |
| DDTC114TE   | 10kΩ     | N12     |
| DDTC124TE   | 22kΩ     | N16     |
| DDTC144TE   | 47kΩ     | N19     |
| DDTC115TE   | 100kΩ    | N23     |
| DDTC125TE   | 200kΩ    | N25     |

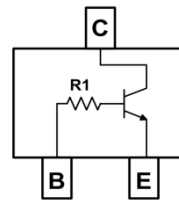
SOT523



Top View

## Mechanical Data

- Case: SOT523
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish. Solderable per MIL-STD-202, Method 208 
- Weight: 0.002 grams (Approximate)



Device Schematic – Top View

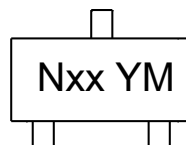
## Ordering Information (Note 5)

| Part Number    | Compliance | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|----------------|------------|--------------------|-----------------|-------------------|
| DDTC113TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC123TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC143TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC114TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC124TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC124TEQ-7-F | Automotive | 7                  | 8               | 3,000             |
| DDTC144TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC115TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC125TE-7-F  | AEC-Q101   | 7                  | 8               | 3,000             |

- 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

SOT523



Nxx = Product Type Marking Code  
(See Table in Features)  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: F = 2018)  
 M or  $\bar{M}$  = Month (ex: 9 = September)

### Date Code Key

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|------|------|------|------|------|------|------|------|------|------|------|
| Code | F    | G    | H    | I    | J    | K    | L    | M    | N    | O    |

| 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   |

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic            | Symbol              | Value | Unit |
|---------------------------|---------------------|-------|------|
| Collector-Base Voltage    | V <sub>CBO</sub>    | 50    | V    |
| Collector-Emitter Voltage | V <sub>CEO</sub>    | 50    | V    |
| Emitter-Base Voltage      | V <sub>EBO</sub>    | 5     | V    |
| Collector Current         | I <sub>C(MAX)</sub> | 100   | mA   |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                       | Symbol                            | Value       | Unit |
|------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation                                    | P <sub>D</sub>                    | 150         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R <sub>θJA</sub>                  | 833         | °C/W |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** (@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>    | 50  | —   | —   | V    | I <sub>C</sub> = 1mA                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Emitter-Base Breakdown Voltage             | BV <sub>EBO</sub>    | 5   | —   | —   | V    | I <sub>E</sub> = 50μA                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Collector Cutoff Current                   | I <sub>CBO</sub>     | —   | —   | 0.5 | μA   | V <sub>CB</sub> = 50V                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Emitter Cutoff Current                     | I <sub>EBO</sub>     | —   | —   | 0.5 | μA   | V <sub>EB</sub> = 4V                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Collector-Emitter Saturation Voltage       | V <sub>CE(SAT)</sub> | —   | —   | 0.3 | V    | I <sub>C</sub> /I <sub>B</sub> = 10mA/1mA DDTC113TE<br>I <sub>C</sub> /I <sub>B</sub> = 5mA/0.5mA DDTC123TE<br>I <sub>C</sub> /I <sub>B</sub> = 2.5mA/0.25mA DDTC143TE<br>I <sub>C</sub> /I <sub>B</sub> = 1mA/0.1mA DDTC114TE<br>I <sub>C</sub> /I <sub>B</sub> = 5mA/0.5mA DDTC124TE<br>I <sub>C</sub> /I <sub>B</sub> = 2.5mA/0.25mA DDTC144TE<br>I <sub>C</sub> /I <sub>B</sub> = 1mA/0.1mA DDTC115TE<br>I <sub>C</sub> /I <sub>B</sub> = 0.5mA/0.05mA DDTC125TE |
| DC Current Transfer Ratio                  | h <sub>FE</sub>      | 100 | 250 | 600 | —    | I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Input Resistor (R <sub>1</sub> ) Tolerance | ΔR <sub>1</sub>      | -30 | —   | +30 | %    | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Gain-Bandwidth Product (Note 7)            | f <sub>T</sub>       | —   | 250 | —   | MHz  | V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA, f = 100MHz                                                                                                                                                                                                                                                                                                                                                                                                             |

Notes: 6. Mounted on FR-4 PC Board with minimum recommended pad layout.  
7. Transistor only.

# Typical Curves – DDTC114TE

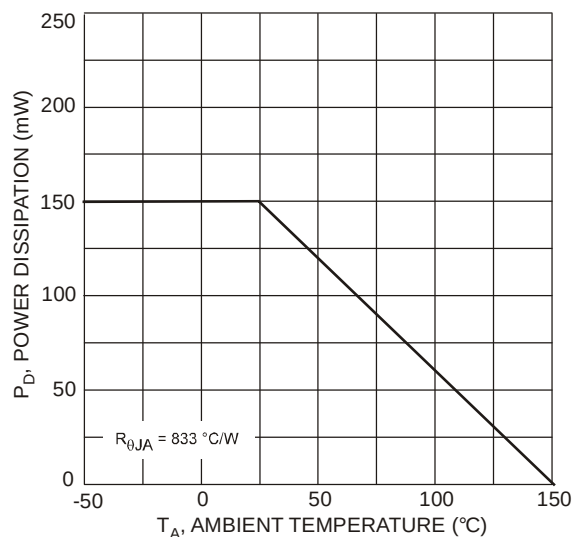


Fig. 1 Power Dissipation vs. Ambient Temperature

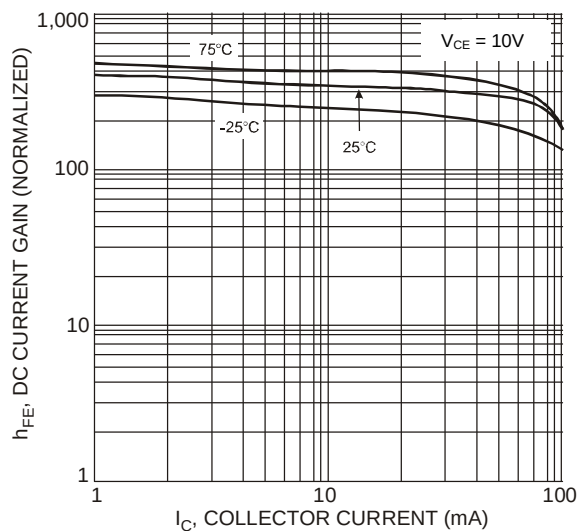


Fig. 2 Typical DC Current Gain vs. Collector Current

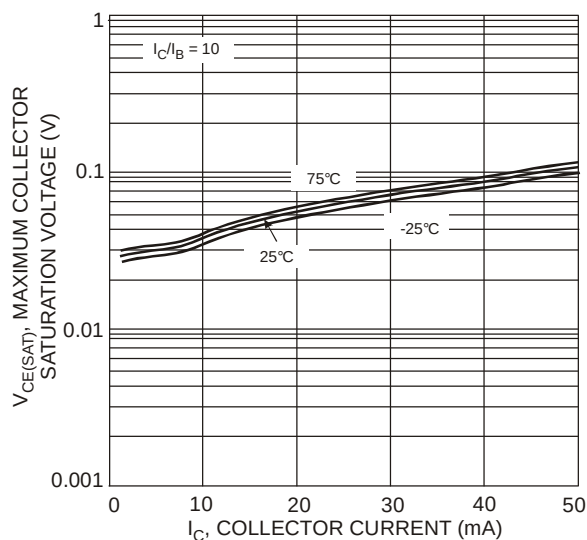


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

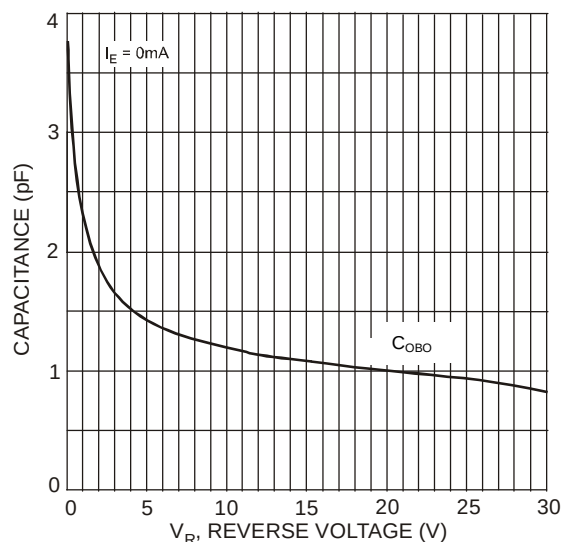


Fig. 4 Typical Capacitance Characteristics

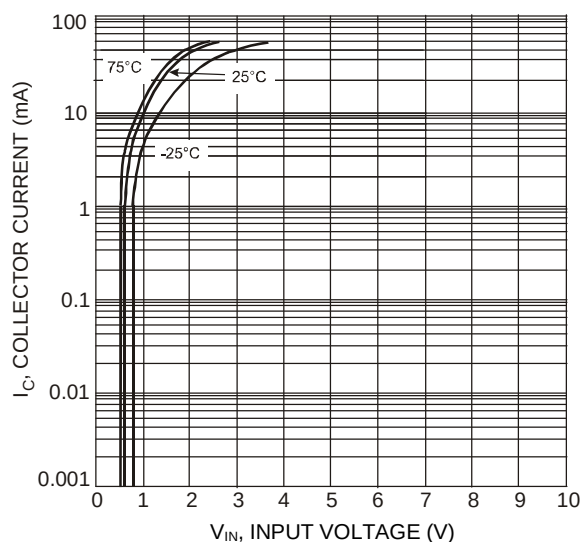


Fig. 5 Collector Current vs. Input Voltage

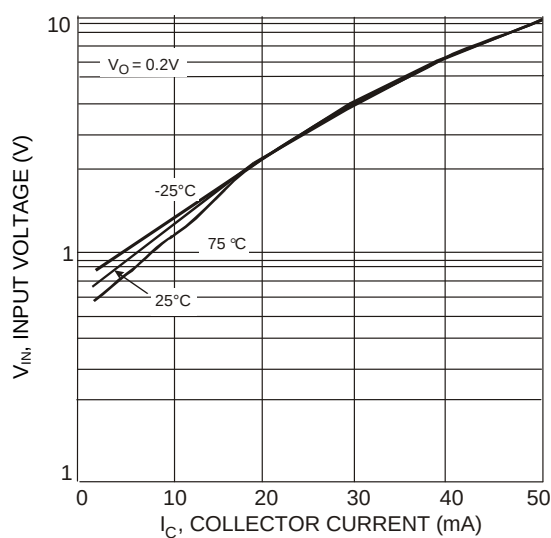
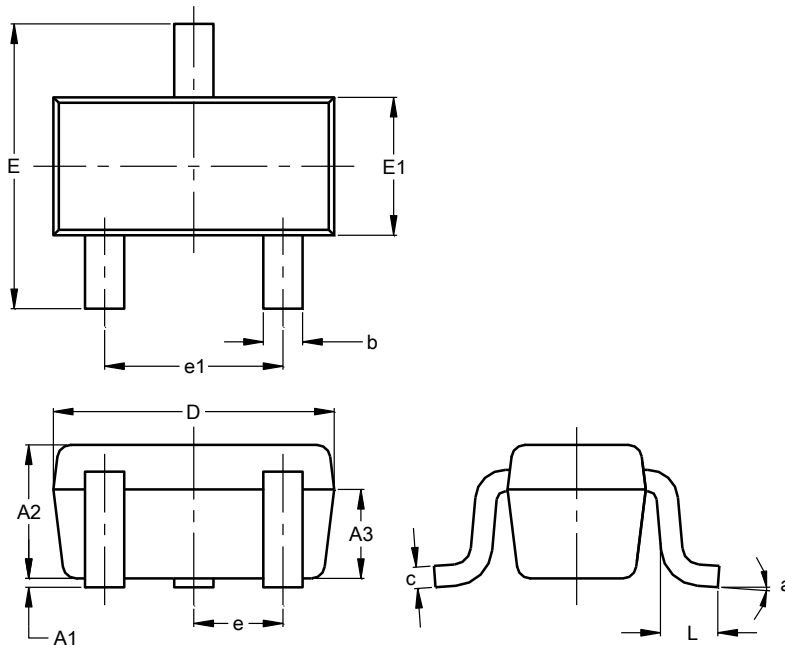


Fig. 6 Input Voltage vs. Collector Current

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT523

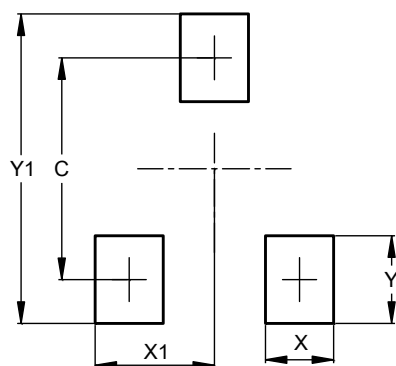


| SOT523               |          |      |      |
|----------------------|----------|------|------|
| Dim                  | Min      | Max  | Typ  |
| A1                   | 0.00     | 0.10 | 0.05 |
| A2                   | 0.60     | 0.80 | 0.75 |
| A3                   | 0.45     | 0.65 | 0.50 |
| b                    | 0.15     | 0.30 | 0.22 |
| c                    | 0.10     | 0.20 | 0.12 |
| D                    | 1.50     | 1.70 | 1.60 |
| E                    | 1.45     | 1.75 | 1.60 |
| E1                   | 0.75     | 0.85 | 0.80 |
| e                    | 0.50 BSC |      |      |
| e1                   | 0.90     | 1.10 | 1.00 |
| L                    | 0.20     | 0.40 | 0.33 |
| a                    | 0°       | --   | 8°   |
| All Dimensions in mm |          |      |      |

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT523



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 1.29          |
| X          | 0.40          |
| X1         | 0.70          |
| Y          | 0.51          |
| Y1         | 1.80          |

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

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

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