

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistor, R2 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**

| Part Number | R2 (NOM) | Marking |
|-------------|----------|---------|
| DDTC114GE   | 10kΩ     | N26     |
| DDTC124GE   | 22kΩ     | N27     |
| DDTC144GE   | 47kΩ     | N28     |
| DDTC115GE   | 100kΩ    | N29     |

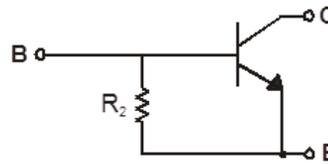
## Mechanical Data

- 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 208③
- Weight: 0.002 grams (Approximate)

SOT523



Top View



Schematic Diagram

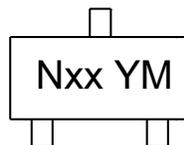
## Ordering Information (Note 4)

| Part Number   | Compliance | Reel Size (inches) | Tape Width (mm) | Quantity Per Reel |
|---------------|------------|--------------------|-----------------|-------------------|
| DDTC114GE-7-F | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC124GE-7-F | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC144GE-7-F | AEC-Q101   | 7                  | 8               | 3,000             |
| DDTC115GE-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. 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>CB0</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</sub> (Max) | 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 5) | 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>CB0</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> = 720μA, DDTC114GE<br>I <sub>E</sub> = 330μA, DDTC124GE<br>I <sub>E</sub> = 160μA, DDTC144GE<br>I <sub>E</sub> = 72μA, DDTC115GE |
| Collector Cutoff Current                     | I <sub>CBO</sub>     | —                      | —   | 0.5                     | μA   | V <sub>CB</sub> = 50V                                                                                                                           |
| Emitter Cutoff Current                       | I <sub>EBO</sub>     | 300<br>140<br>65<br>30 | —   | 580<br>260<br>130<br>58 | μA   | V <sub>EB</sub> = 4V                                                                                                                            |
| Collector-Emitter Saturation Voltage         | V <sub>CE(SAT)</sub> | —                      | —   | 0.3                     | V    | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA                                                                                                   |
| DC Current Transfer Ratio                    | h <sub>FE</sub>      | 30<br>56<br>68<br>82   | —   | —                       | —    | I <sub>C</sub> = 5mA, V <sub>CE</sub> = 5V                                                                                                      |
| Bleeder Resistor (R <sub>2</sub> ) Tolerance | ΔR <sub>2</sub>      | -30                    | —   | +30                     | %    | —                                                                                                                                               |
| Gain-Bandwidth Product (Note 6)              | f <sub>T</sub>       | —                      | 250 | —                       | MHz  | V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA, f = 100MHz                                                                                        |

Notes: 5. Mounted on FR-4 PC Board with minimum recommended pad layout.  
6. Transistor only.

**Typical Curves – DDTC114GE**

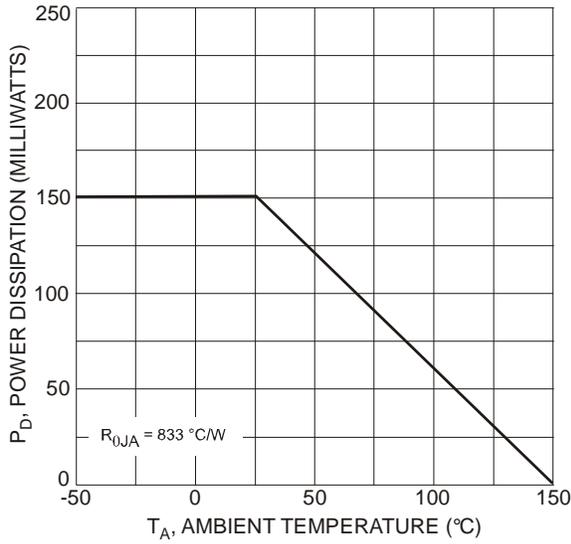


Fig. 1 Derating Curve

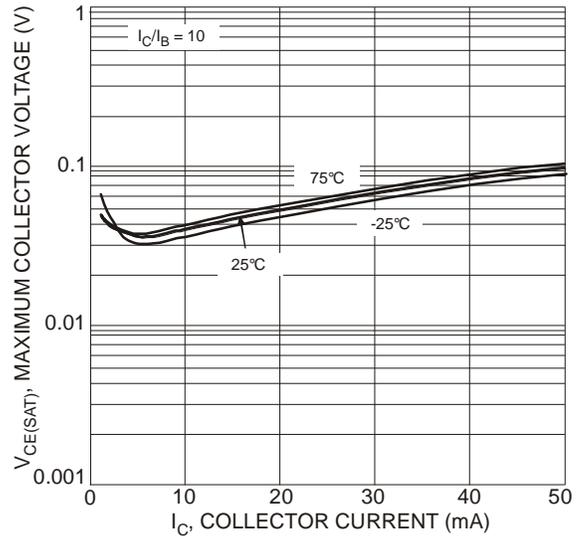


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

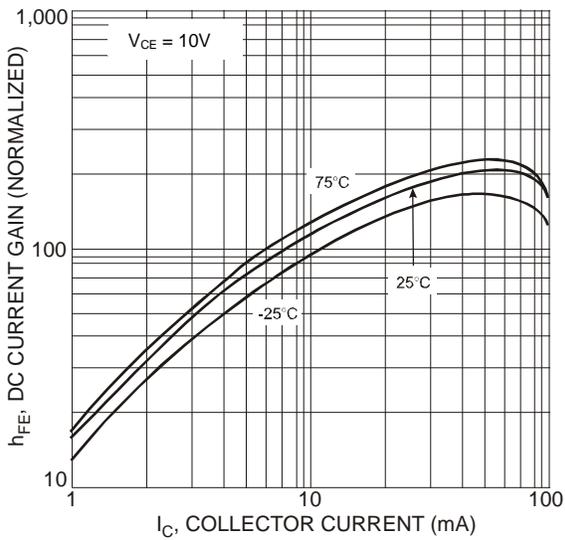


Fig. 3 DC Current Gain

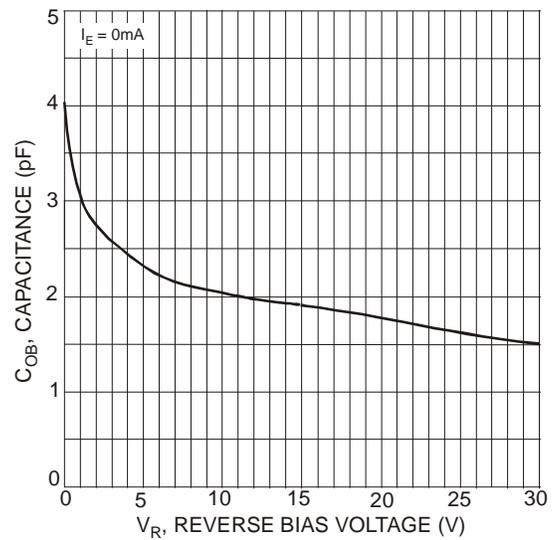


Fig. 4 Output Capacitance

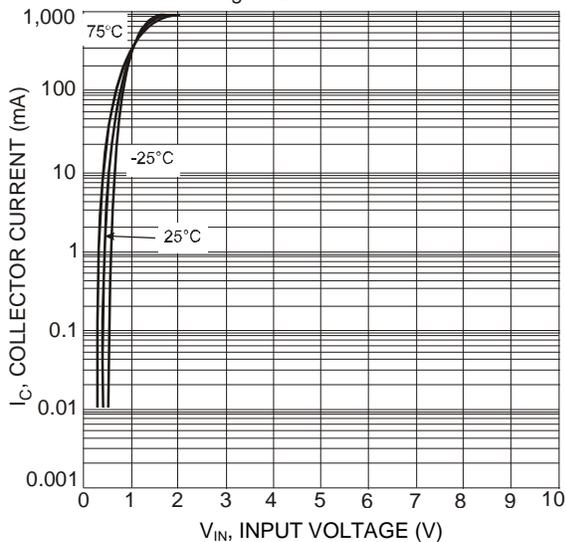


Fig. 5 Collector Current vs. Input Voltage

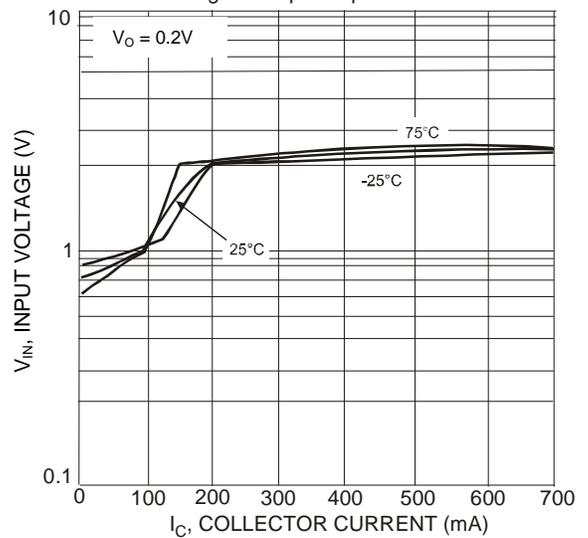
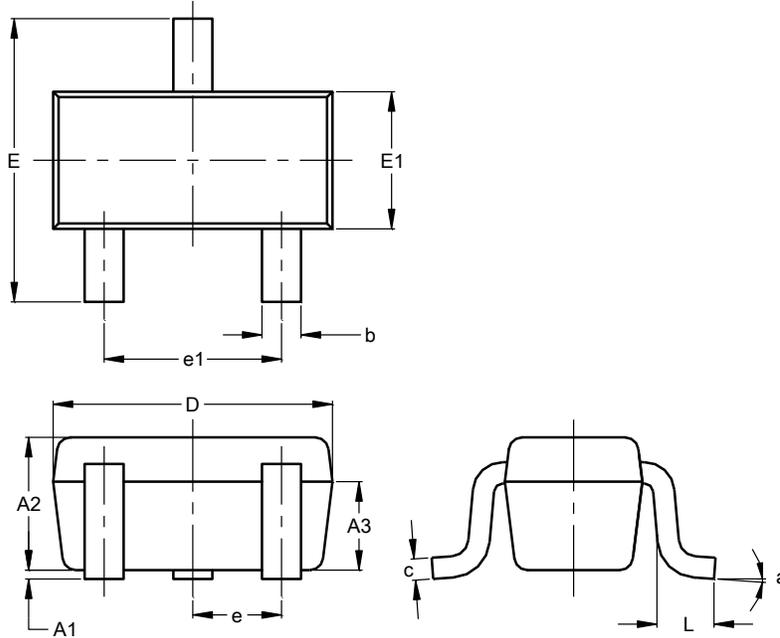


Fig. 6 Input Voltage vs. Collector Current

**Package Outline Dimensions**

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

**SOT523**

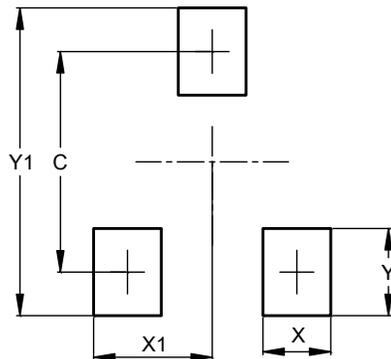


| SOT523               |          |      |      |
|----------------------|----------|------|------|
| Dim                  | Min      | Max  | Typ  |
| A1                   | 0.00     | 0.10 | 0.05 |
| A2                   | 0.60     | 0.80 | 0.75 |
| A3                   | 0.45     | 0.65 | 0.50 |
| 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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