

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 |

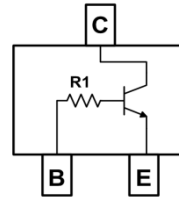
SOT523



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 ^(e3)
- Weight: 0.002 grams (Approximate)



Device Schematic – Top View

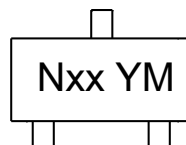
Ordering Information (Note 5)

| 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_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---------------------------|---------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 50 | V |
| Collector-Emitter Voltage | V _{CEO} | 50 | V |
| Emitter-Base Voltage | V _{EBO} | 5 | V |
| Collector Current | I _{C(MAX)} | 100 | mA |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation | P _D | 150 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 6) | R _{θJA} | 833 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------------|----------------------|-----|-----|-----|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV _{CBO} | 50 | — | — | V | I _C = 50μA |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | 50 | — | — | V | I _C = 1mA |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 5 | — | — | V | I _E = 50μA |
| Collector Cutoff Current | I _{CBO} | — | — | 0.5 | μA | V _{CB} = 50V |
| Emitter Cutoff Current | I _{EBO} | — | — | 0.5 | μA | V _{EB} = 4V |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | — | — | 0.3 | V | I _C /I _B = 10mA/1mA DDTC113TE I _C /I _B = 5mA/0.5mA DDTC123TE I _C /I _B = 2.5mA/0.25mA DDTC143TE I _C /I _B = 1mA/0.1mA DDTC114TE I _C /I _B = 5mA/0.5mA DDTC124TE I _C /I _B = 2.5mA/0.25mA DDTC144TE I _C /I _B = 1mA/0.1mA DDTC115TE I _C /I _B = 0.5mA/0.05mA DDTC125TE |
| DC Current Transfer Ratio | h _{FE} | 100 | 250 | 600 | — | I _C = 1mA, V _{CE} = 5V |
| Input Resistor (R ₁) Tolerance | ΔR ₁ | -30 | — | +30 | % | — |
| Gain-Bandwidth Product (Note 7) | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = -5mA, f = 100MHz |

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

Typical Curves – DDTC114TE

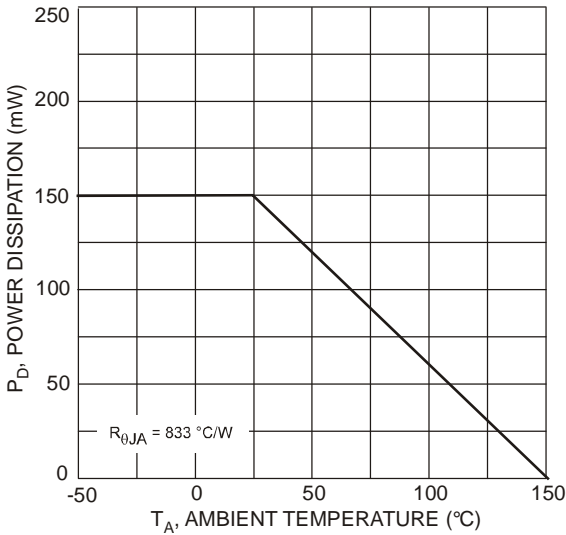


Fig. 1 Power Dissipation vs. Ambient Temperature

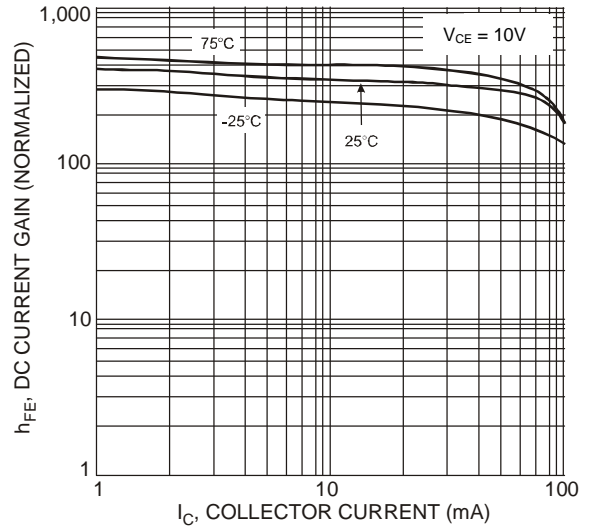


Fig. 2 Typical DC Current Gain vs. Collector Current

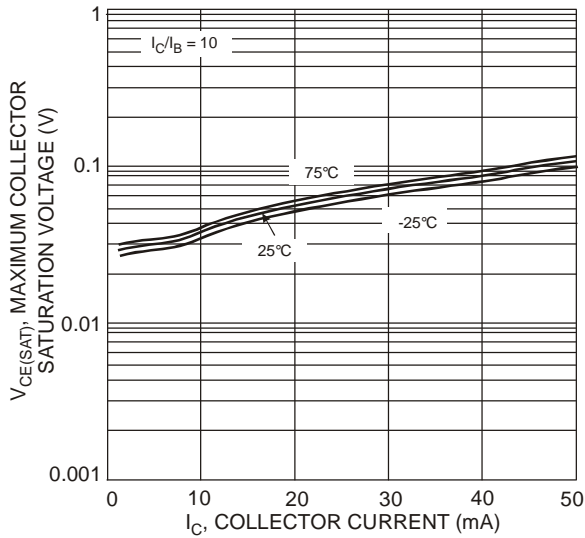


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

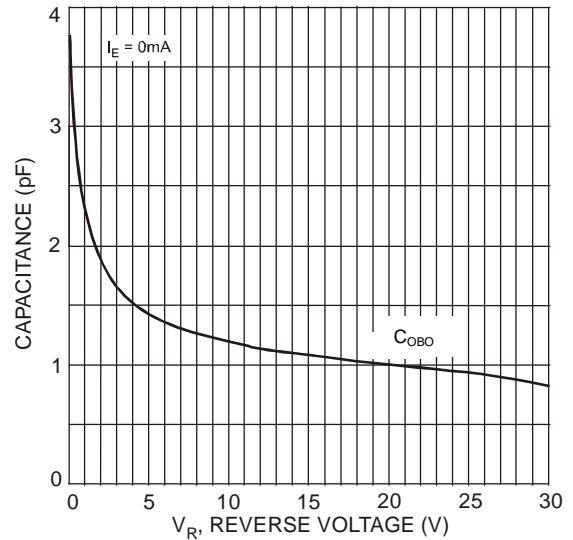


Fig. 4 Typical Capacitance Characteristics

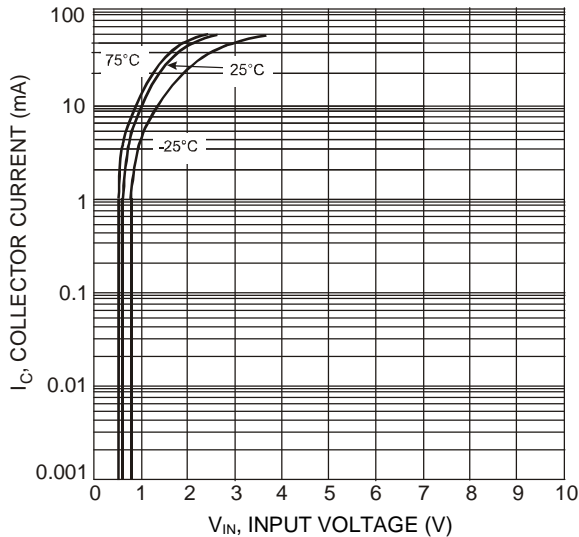


Fig. 5 Collector Current vs. Input Voltage

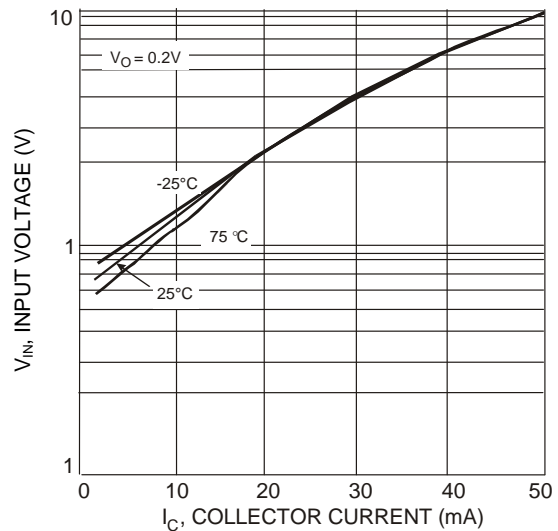
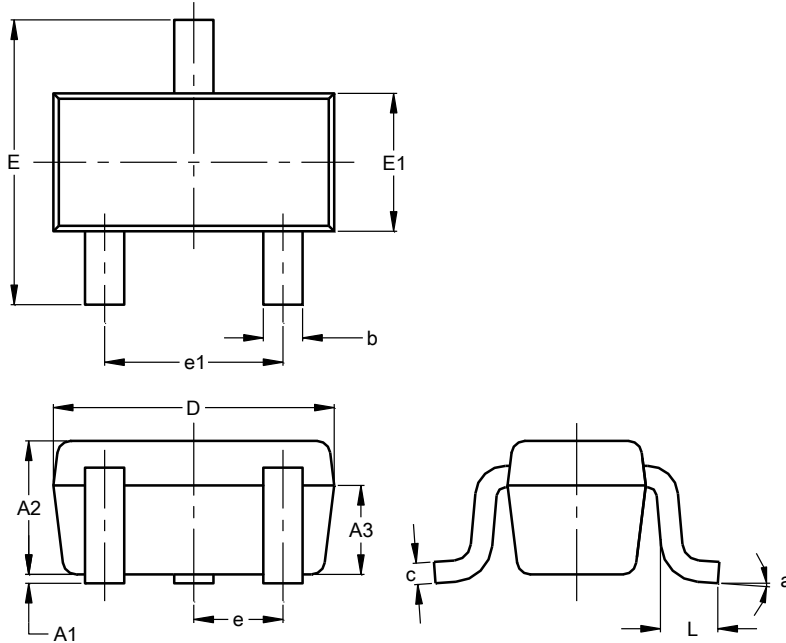


Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions

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

SOT523

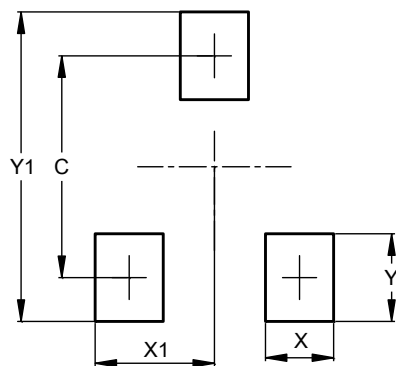


| SOT523 | | | |
|----------------------|----------|------|------|
| Dim | Min | Max | Typ |
| A1 | 0.00 | 0.10 | 0.05 |
| A2 | 0.60 | 0.80 | 0.75 |
| A3 | 0.45 | 0.65 | 0.50 |
| b | 0.15 | 0.30 | 0.22 |
| c | 0.10 | 0.20 | 0.12 |
| D | 1.50 | 1.70 | 1.60 |
| E | 1.45 | 1.75 | 1.60 |
| E1 | 0.75 | 0.85 | 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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