



**THE DATASHEET OF  
DDTC115TE-7**



**NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR**
**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

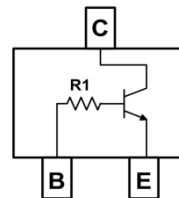
SOT523



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 ③
- Weight: 0.002 grams (Approximate)



Device Schematic – Top View

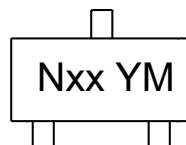
**Ordering Information** (Note 5)

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 I <sub>C</sub> /I <sub>B</sub> = 5mA/0.5mA DDTC123TE I <sub>C</sub> /I <sub>B</sub> = 2.5mA/0.25mA DDTC143TE I <sub>C</sub> /I <sub>B</sub> = 1mA/0.1mA DDTC114TE I <sub>C</sub> /I <sub>B</sub> = 5mA/0.5mA DDTC124TE I <sub>C</sub> /I <sub>B</sub> = 2.5mA/0.25mA DDTC144TE I <sub>C</sub> /I <sub>B</sub> = 1mA/0.1mA DDTC115TE 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**

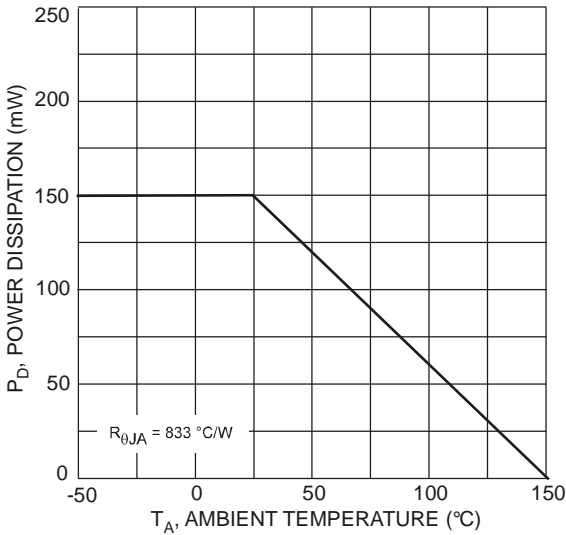


Fig. 1 Power Dissipation vs. Ambient Temperature

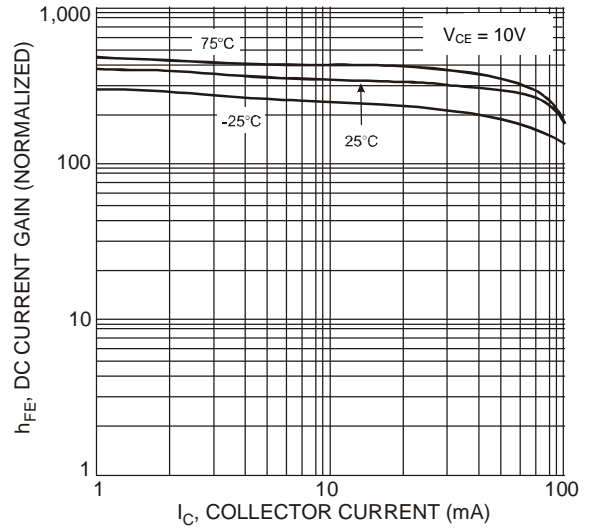


Fig. 2 Typical DC Current Gain vs. Collector Current

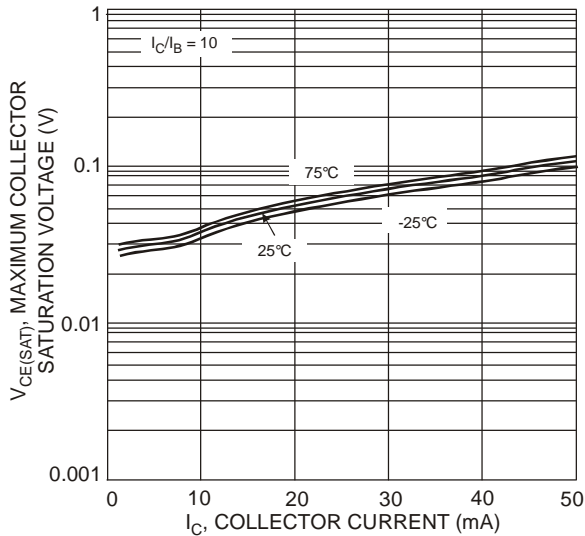


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

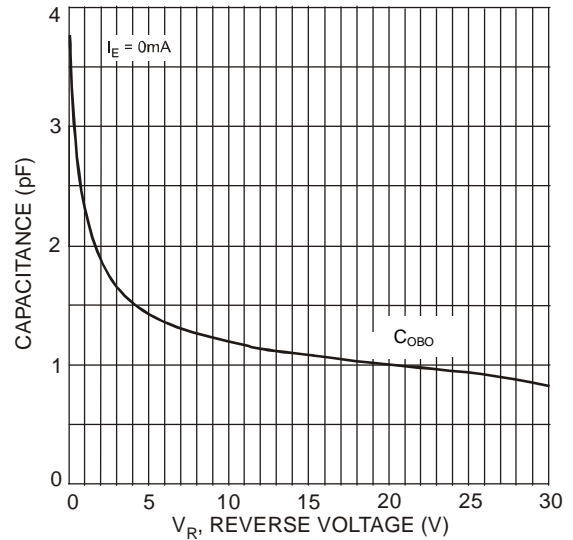


Fig. 4 Typical Capacitance Characteristics

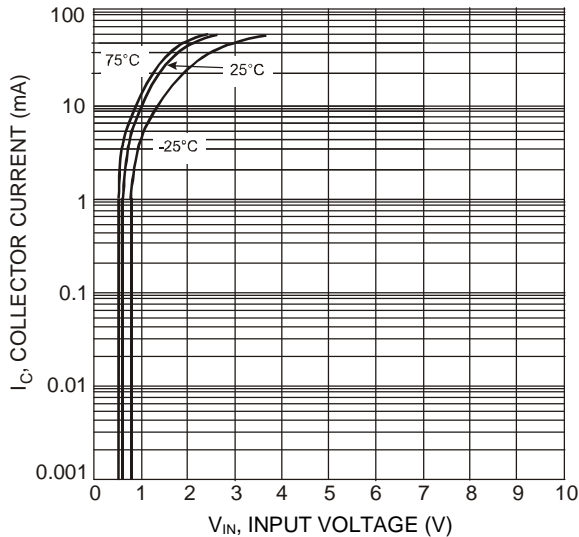


Fig. 5 Collector Current vs. Input Voltage

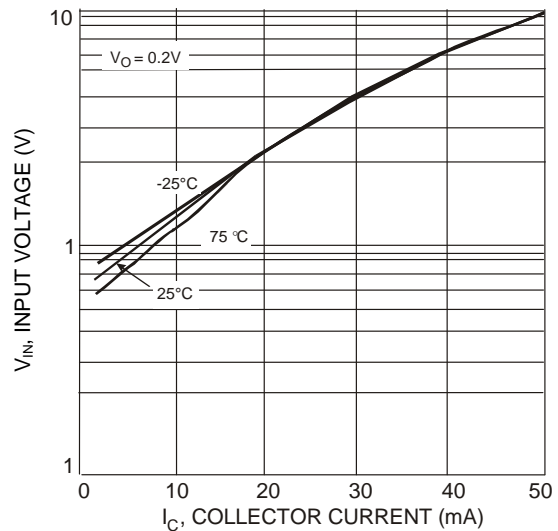
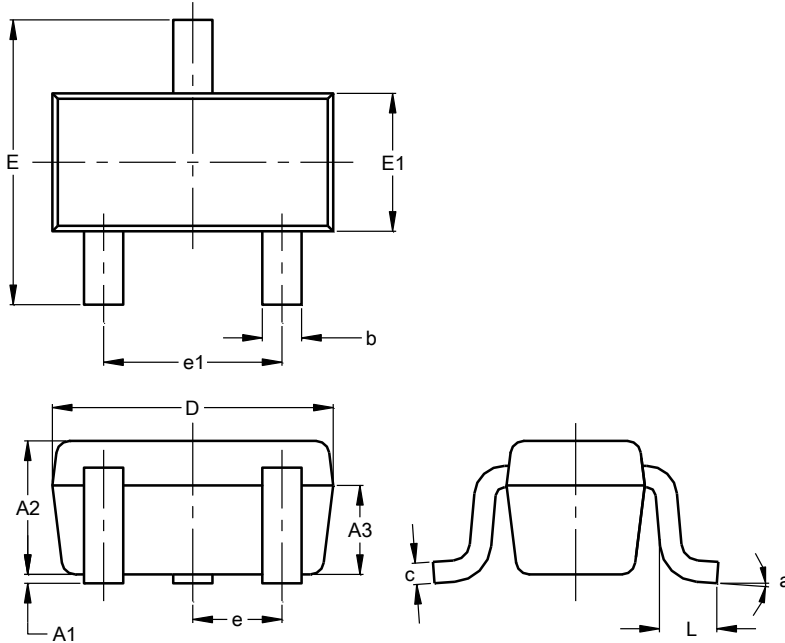


Fig. 6 Input Voltage vs. Collector Current

**Package Outline Dimensions**

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

**SOT523**

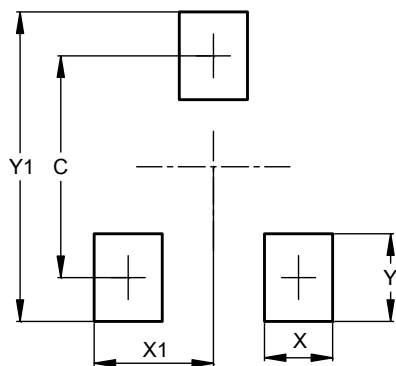


SOT523			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

**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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