DDTC (R1-ONLY SERIES) E

NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

Features

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

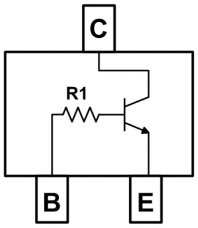
Part Number	R1 (NOM)	Marking
DDTC113TE	1KΩ	N01
DDTC123TE	2.2KΩ	N03
DDTC143TE	4.7KΩ	N07
DDTC114TE	10KΩ	N12
DDTC124TE	22KΩ	N16
DDTC144TE	47KΩ	N19
DDTC115TE	100KΩ	N23
DDTC125TE	200KΩ	N25

Mechanical Data

- Case: SOT523
- Case Material: Molded Plastic, "Green" Molding Compound (Notes 2 & 3). 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)

SOT523

Top View



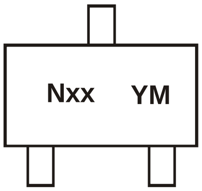
Device Schematic – Top View

Ordering Information (Note 4)

Part Number	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC113TE-7-F	7	8	3000
DDTC123TE-7-F	7	8	3000
DDTC143TE-7-F	7	8	3000
DDTC114TE-7-F	7	8	3000
DDTC124TE-7-F	7	8	3000
DDTC144TE-7-F	7	8	3000
DDTC115TE-7-F	7	8	3000
DDTC125TE-7-F	7	8	3000

Notes: 1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound.
4. For packaging details, go to our website at http://www.diodes.com.

Marking Information



Nxx = Product Type Marking Code
(See Table in Features)
YM = Date Code Marking
Y = Year (ex: X = 2010)
M = Month (ex: 9 = September)

Date Code Key

Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Code	X	Y	Z	A	B	C	D	E	F	G

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

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 5)	$R_{\theta JA}$	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 = 50mA
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/.25mA DDTC143TE I_C/I_B = 1mA/.1mA DDTC114TE I_C/I_B = 5mA/0.5mA DDTC124TE I_C/I_B = 2.5mA/.25mA DDTC144TE I_C/I_B = 1mA/0.1mA DDTC115TE I_C/I_B = .5mA/.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*	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz

* Transistor – For Reference Only

Notes: 5. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com.

Typical Curves – DDTC114TE

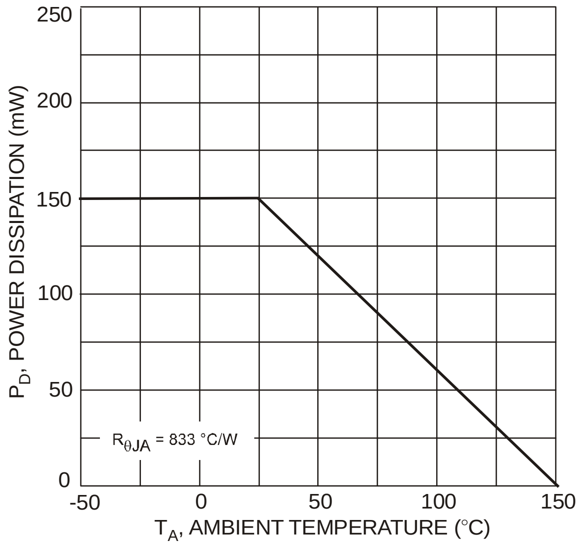


Fig. 1 Power Dissipation vs. Ambient Temperature

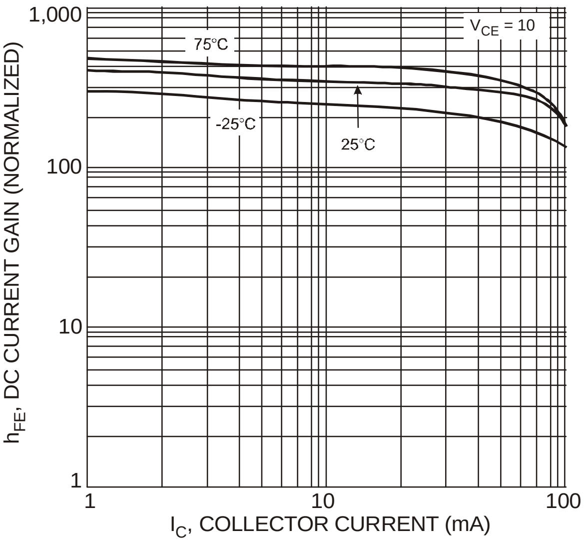


Fig. 2 Typical DC Current Gain vs. Collector Current

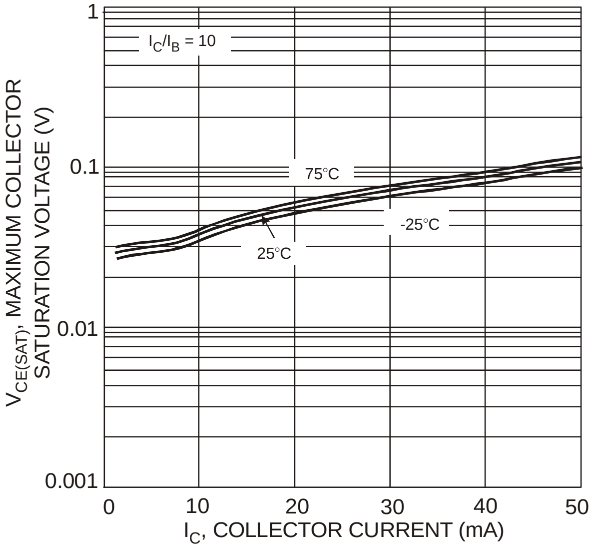


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

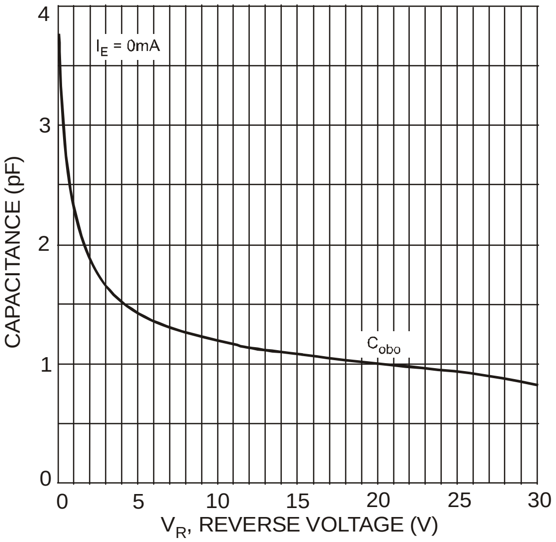


Fig. 4 Typical Capacitance Characteristics

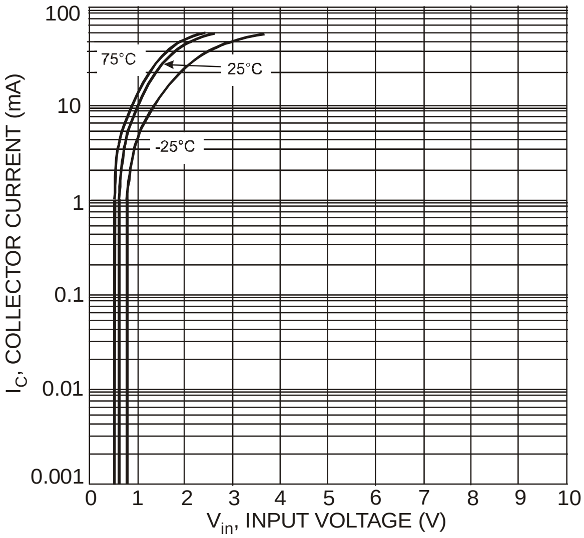


Fig. 5 Collector Current vs. Input Voltage

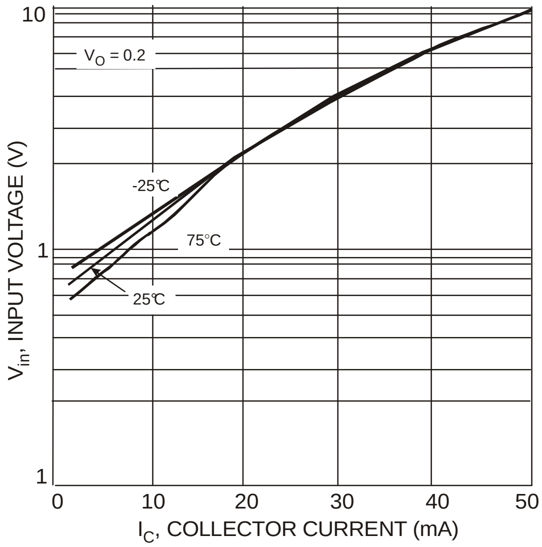
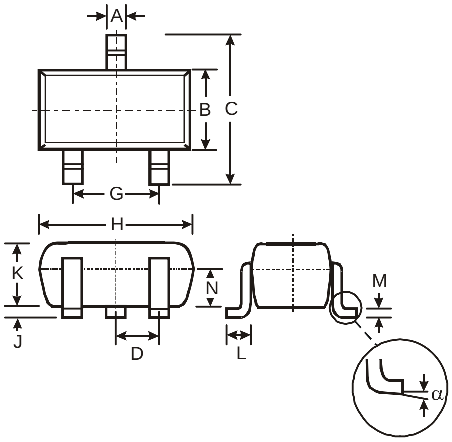


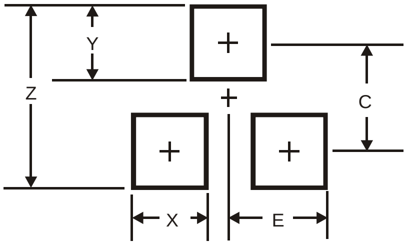
Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions



SOT523			
Dim	**Min**	**Max**	**Typ**
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			

Suggested Pad Layout



Dimensions	Value (in mm)
Z	1.8
X	0.4
Y	0.51
C	1.3
E	0.7

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