SPICE MODELS: DDTC113TE DDTC123TE DDTC143TE DDTC114TE DDTC124TE DDTC144TE DDTC115TE DDTC125TE

DDTC (R1-ONLY SERIES) E

NPN PRE-BIASED SMALL SIGNAL SOT-523 SURFACE MOUNT TRANSISTOR

NEW PRODUCT

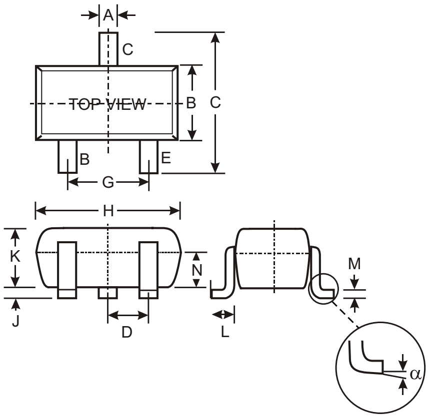
Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistor, R1 only
- Also Available in Lead Free Version

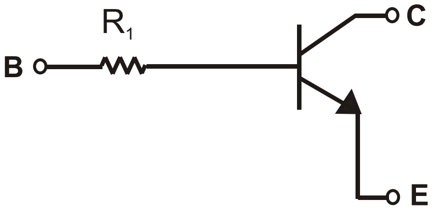
Mechanical Data

- Case: SOT-523, Molded Plastic
- Case material - UL Flammability Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Solderable per MIL-STD-202, Method 208
- Also Available in Lead Free Plating (Matte Tin Finish). Please see Ordering Information, Note 3, on Page 2
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Diagrams & Page 2)
- Weight: 0.002 grams (approx.)
- Ordering Information (See Page 2)

P/N	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



SOT-523			
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			



SCHEMATIC DIAGRAM

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
Power Dissipation	P_d	150	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	$R_{\theta JA}$	833	°C/W
Operating and Storage and Temperature Range	T_j, T_{STG}	-55 to +150	°C

Note: 1. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com/datasheets/ap02001.pdf.

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/.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

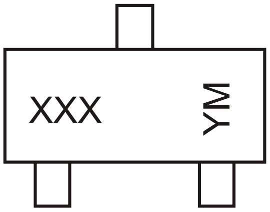
* Transistor - For Reference Only

Ordering Information (Note 2)

Device	Packaging	Shipping
DDTC113TE-7	SOT-523	3000/Tape & Reel
DDTC123TE-7	SOT-523	3000/Tape & Reel
DDTC143TE-7	SOT-523	3000/Tape & Reel
DDTC114TE-7	SOT-523	3000/Tape & Reel
DDTC124TE-7	SOT-523	3000/Tape & Reel
DDTC144TE-7	SOT-523	3000/Tape & Reel
DDTC115TE-7	SOT-523	3000/Tape & Reel
DDTC125TE-7	SOT-523	3000/Tape & Reel

Notes: 2. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.
3. For Lead Free version (with Lead Free terminal finish) part number, please add "-F" suffix to part number above. Example: DDTC125TE-7-F.

Marking Information



XXX = Product Type Marking Code
See Sheet 1 Diagrams
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009
Code	N	P	R	S	T	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

TYPICAL CURVES - DDTC114TE

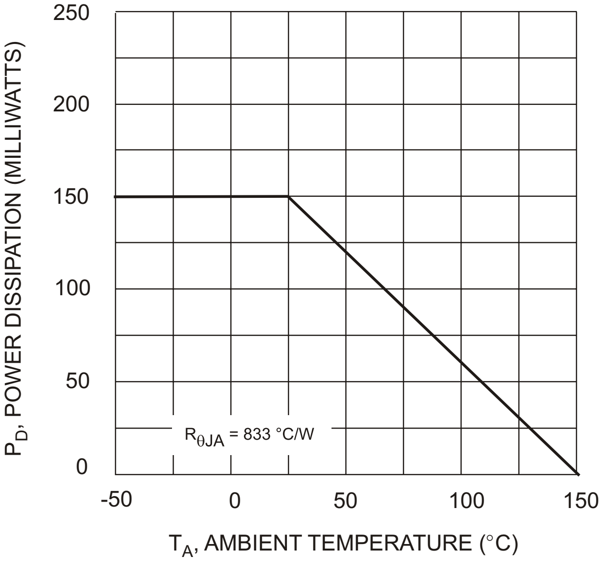


Fig. 1 Derating Curve

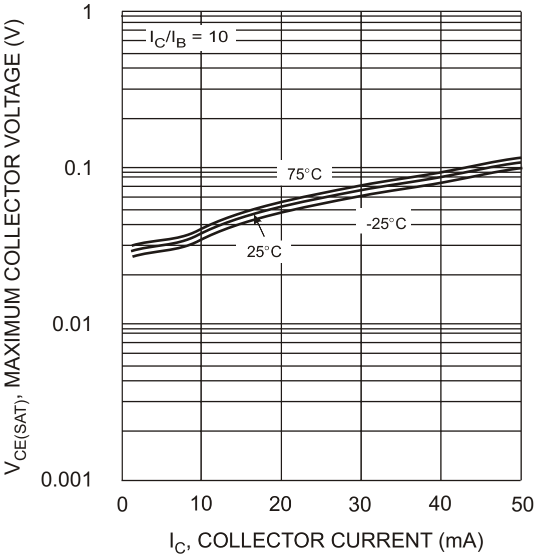


Fig. 2 $V_{CE(SAT)}$ vs. I_C

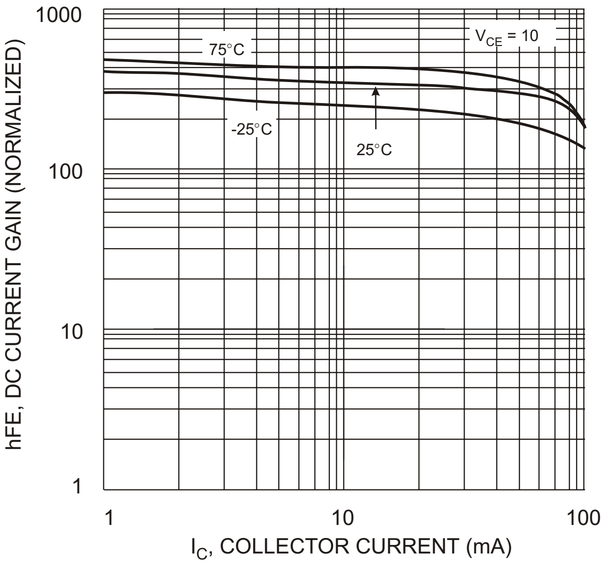


Fig. 3 DC Current Gain

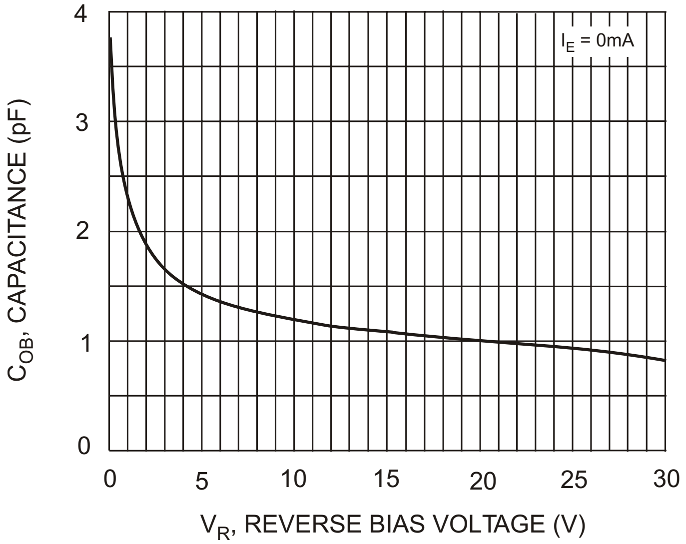


Fig. 4 Output Capacitance

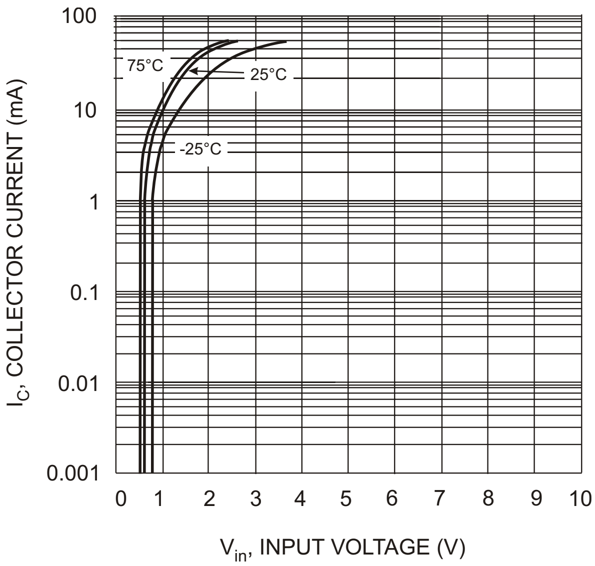


Fig. 5 Collector Current Vs. Input Voltage

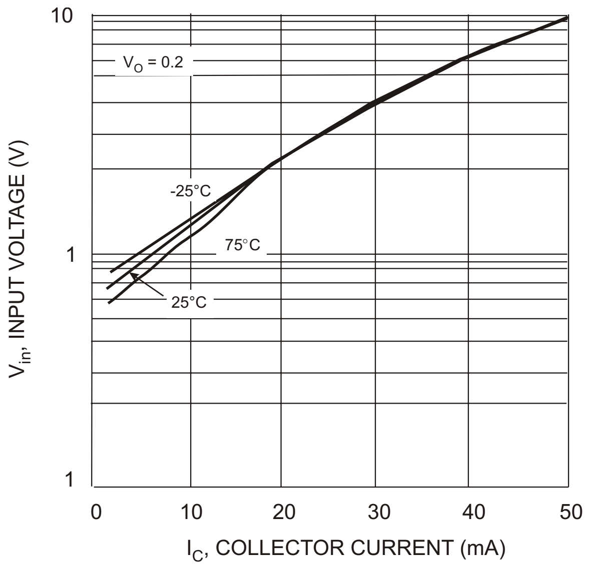


Fig. 6 Input Voltage vs. Collector Current