

DDTC (R1≠R2 SERIES) UA

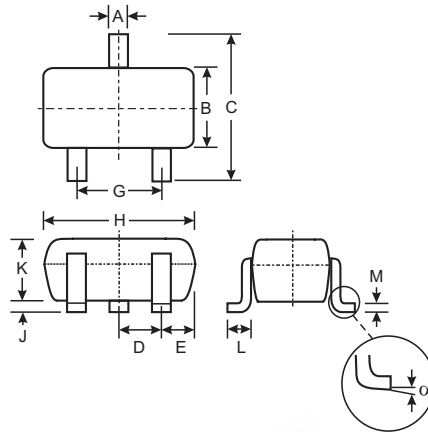
NPN PRE-BIASED SMALL SIGNAL SOT-323 SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1≠R2
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2 & 3)**

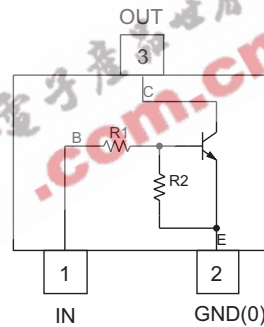
Mechanical Data

- Case: SOT-323
- Case Material: Molded Plastic, "Green" Molding Compound, Note 3. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking: Date Code and Type Code, See Page 3
- Type Code: See Table Below
- Ordering Information (See Page 3)
- Weight: 0.006 grams (approximate)

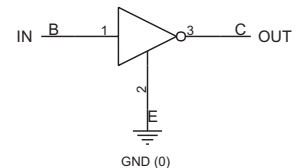


SOT-323		
Dim	Min	Max
A	0.25	0.40
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
E	0.30	0.40
G	1.20	1.40
H	1.80	2.20
J	0.0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.18
α	0°	8°
All Dimensions in mm		

P/N	R1 (NOM)	R2 (NOM)	Type Code
DDTC113ZUA	1K Ω	10K Ω	N02
DDTC123YUA	2.2K Ω	10K Ω	N05
DDTC123JUA	2.2K Ω	47K Ω	N06
DDTC143XUA	4.7K Ω	10K Ω	N09
DDTC143FUA	4.7K Ω	22K Ω	N10
DDTC143ZUA	4.7K Ω	47K Ω	N11
DDTC114YUA	10K Ω	47K Ω	N14
DDTC114WUA	10K Ω	4.7K Ω	N15
DDTC124XUA	22K Ω	47K Ω	N18
DDTC144VUA	47K Ω	10K Ω	N21
DDTC144WUA	47K Ω	22K Ω	N22



Schematic and Pin Configuration



Equivalent Inverter Circuit

Maximum Ratings @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage, (3) to (2)	V _{CC}	50	V
Input Voltage, (1) to (2)	V _{IN}	DDTC113ZUA: -5 to +10 DDTC123YUA: -5 to +12 DDTC123JUA: -5 to +12 DDTC143XUA: -7 to +20 DDTC143FUA: -6 to +30 DDTC143ZUA: -5 to +30 DDTC114YUA: -6 to +40 DDTC114WUA: -10 to +30 DDTC124XUA: -10 to +40 DDTC144VUA: -15 to +40 DDTC144WUA: -10 to +40	V
Output Current	I _O	DDTC113ZUA: 100 DDTC123YUA: 100 DDTC123JUA: 100 DDTC143XUA: 100 DDTC143FUA: 100 DDTC143ZUA: 100 DDTC114YUA: 70 DDTC114WUA: 100 DDTC124XUA: 50 DDTC144VUA: 30 DDTC144WUA: 30	mA
Output Current	I _C (Max)	All: 100	mA

Note: 1. No purposefully added lead.

2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.

3. Product manufactured with Date Code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior to Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

Maximum Ratings (continued) @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Output Current	I_C (Max)	100	mA
Power Dissipation	P_d	200	mW
Thermal Resistance, Junction to Ambient Air (Note 4)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage and Temperature Range	T_j, T_{STG}	-55 to +150	$^\circ\text{C}$

 Notes: 4. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.

Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(off)}$	0.3	—	—	—	$V_{CC} = 5V, I_O = 100\mu\text{A}$
		0.3	—	—		
Input Voltage	$V_{I(on)}$	—	—	3.0	—	$V_O = 0.3V, I_O = 20\text{mA}$ $V_O = 0.3V, I_O = 20\text{mA}$ $V_O = 0.3V, I_O = 5\text{mA}$ $V_O = 0.3V, I_O = 20\text{mA}$ $V_O = 0.3V, I_O = 3\text{mA}$ $V_O = 0.3V, I_O = 5\text{mA}$ $V_O = 0.3V, I_O = 1\text{mA}$ $V_O = 0.3V, I_O = 2\text{mA}$ $V_O = 0.3V, I_O = 2\text{mA}$ $V_O = 0.3V, I_O = 2\text{mA}$ $V_O = 0.3V, I_O = 2\text{mA}$
		0.5	—	3.0		
Output Voltage	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I = 5\text{mA}/0.25\text{mA}$ DDCT123JUA $I_O/I_I = 5\text{mA}/0.25\text{mA}$ DDCT143ZUA $I_O/I_I = 5\text{mA}/0.25\text{mA}$ DDCT114YUA $I_O/I_I = 10\text{mA}/0.5\text{mA}$ All Others
Input Current	I_I	—	—	7.2	mA	$V_I = 5V$
		—	—	3.8		
Input Current	I_I	—	—	3.6	mA	$V_I = 5V$
		—	—	1.8		
Input Current	I_I	—	—	1.8	mA	$V_I = 5V$
		—	—	1.8		
Input Current	I_I	—	—	0.88	mA	$V_I = 5V$
		—	—	0.88		
Input Current	I_I	—	—	0.36	mA	$V_I = 5V$
		—	—	0.16		
Input Current	I_I	—	—	0.16	mA	$V_I = 5V$
		—	—	0.16		
Output Current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50V, V_I = 0V$
DC Current Gain	G_I	33	—	—	—	$V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$
		33	—	—		
DC Current Gain	G_I	80	—	—	—	$V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$
		30	—	—		
DC Current Gain	G_I	68	—	—	—	$V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$
		68	—	—		
DC Current Gain	G_I	24	—	—	—	$V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$
		68	—	—		
DC Current Gain	G_I	33	—	—	—	$V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 10\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$ $V_O = 5V, I_O = 5\text{mA}$
		56	—	—		
Input Resistor Tolerance	ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance	$\Delta R_2/R_1$	-20	—	+20	%	—
Gain-Bandwidth Product*	f_T	—	250	—	MHz	$V_{CE} = 10V, I_E = 5\text{mA}, f = 100\text{MHz}$

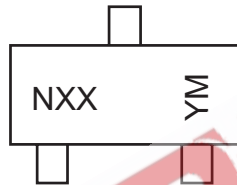
* Transistor - For Reference Only

Ordering Information (Note 4 & 5)

Device	Packaging	Shipping
DDTC113ZUA-7-F	SOT-323	3000/Tape & Reel
DDTC123YUA-7-F	SOT-323	3000/Tape & Reel
DDTC123JUA-7-F	SOT-323	3000/Tape & Reel
DDTC143XUA-7-F	SOT-323	3000/Tape & Reel
DDTC143FUA-7-F	SOT-323	3000/Tape & Reel
DDTC143ZUA-7-F	SOT-323	3000/Tape & Reel
DDTC114YUA-7-F	SOT-323	3000/Tape & Reel
DDTC114WUA-7-F	SOT-323	3000/Tape & Reel
DDTC124XUA-7-F	SOT-323	3000/Tape & Reel
DDTC144VUA-7-F	SOT-323	3000/Tape & Reel
DDTC144WUA-7-F	SOT-323	3000/Tape & Reel

- Notes: 4. Product manufactured with Date Code 0609 (week 9, 2006) and newer are built with Green Molding Compound. Product manufactured prior Date Code 0609 are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.
 5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



NXX = Product Type Marking Code
 See Sheet 1 Diagrams
 YM = Date Code Marking
 Y = Year ex: T = 2006
 M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	N	P	R	S	T	U	V	W	X	Y	Z

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

TYPICAL CURVES - DDTC123JUA

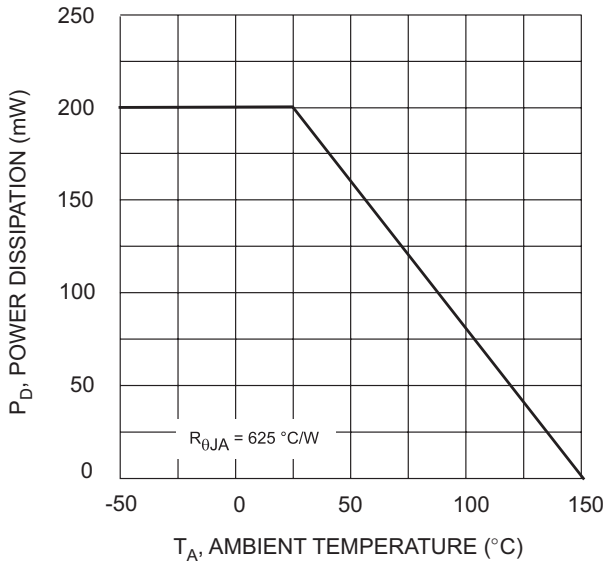


Fig. 1 Derating Curve

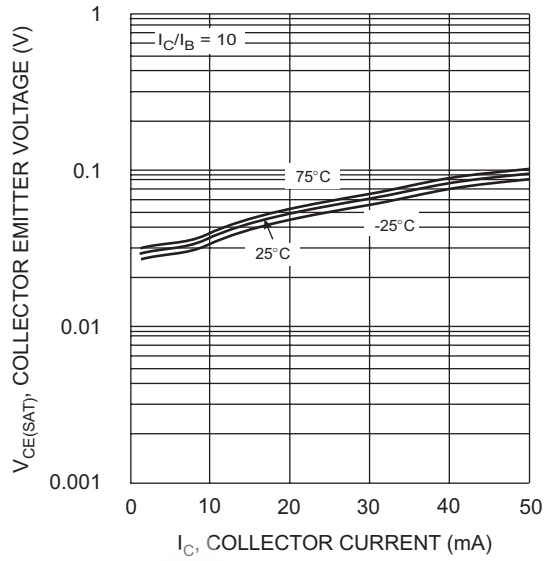


Fig. 2 $V_{CE(SAT)}$ vs. I_C

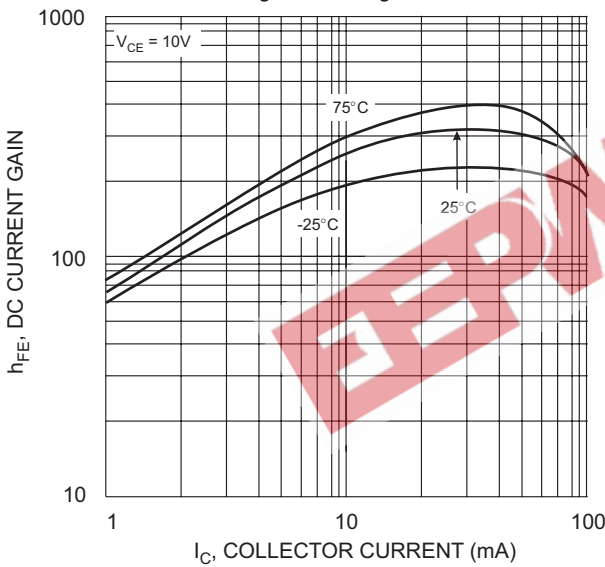


Fig. 3 DC Current Gain

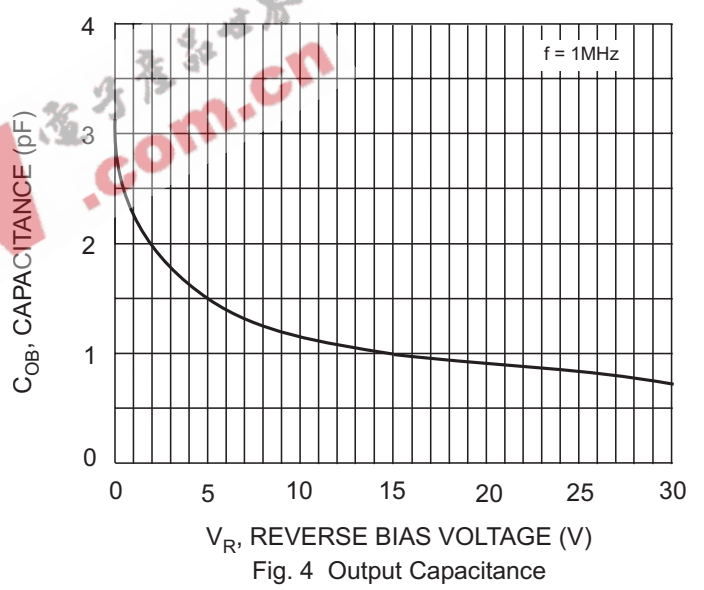


Fig. 4 Output Capacitance

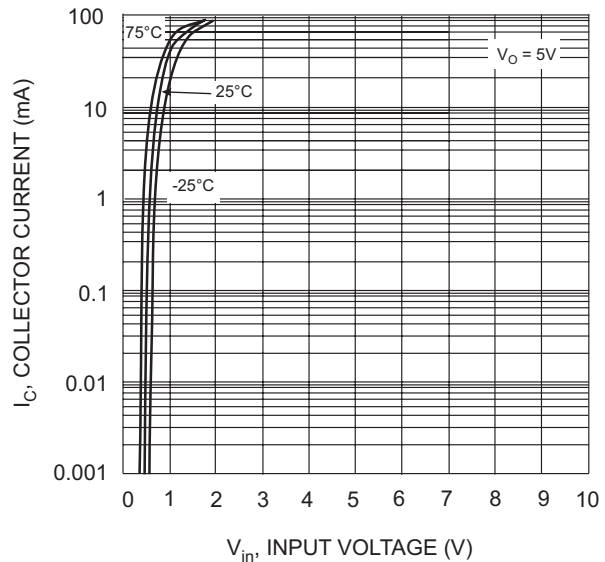


Fig. 5 Collector Current Vs. Input Voltage

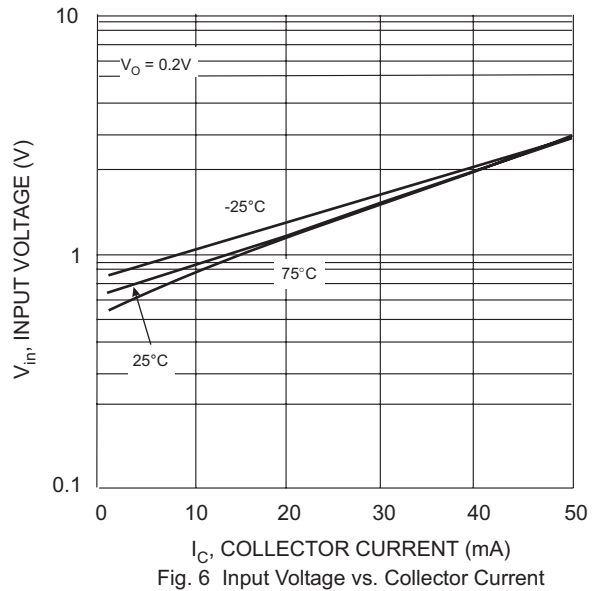


Fig. 6 Input Voltage vs. Collector Current

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