

# DDTC (R1≠R2 SERIES) UA

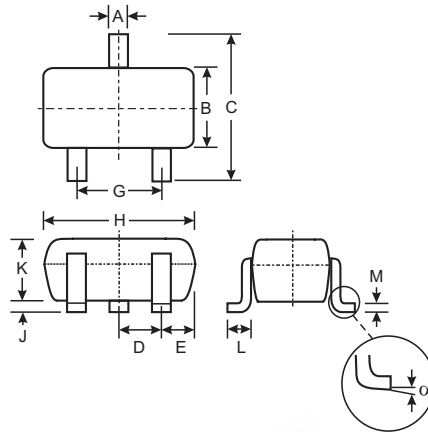
## NPN PRE-BIASED SMALL SIGNAL SOT-323 SURFACE MOUNT TRANSISTOR

### 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)**

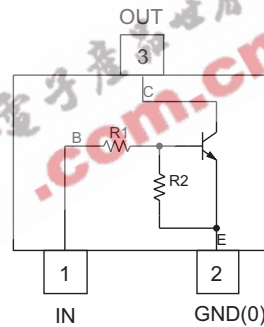
### Mechanical Data

- 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)

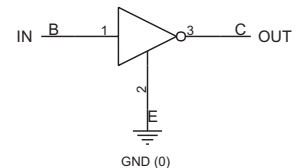


SOT-323		
Dim	Min	Max
A	0.25	0.40
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
E	0.30	0.40
G	1.20	1.40
H	1.80	2.20
J	0.0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.18
α	0°	8°
<b>All Dimensions in mm</b>		

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



Schematic and Pin Configuration



Equivalent Inverter Circuit

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage, (3) to (2)	V <sub>CC</sub>	50	V
Input Voltage, (1) to (2)	V <sub>IN</sub>	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 <sub>O</sub>	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 <sub>C</sub> (Max)	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](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	$V_{I(off)}$	DDTC113ZUA	0.3			$V_{CC} = 5V, I_O = 100\mu A$	
		DDTC123YUA	0.3				
Input Voltage	$V_{I(on)}$	DDTC123JUA	0.5			$V_O = 0.3V, I_O = 20mA$ $V_O = 0.3V, I_O = 20mA$ $V_O = 0.3V, I_O = 5mA$ $V_O = 0.3V, I_O = 20mA$ $V_O = 0.3V, I_O = 3mA$ $V_O = 0.3V, I_O = 5mA$ $V_O = 0.3V, I_O = 1mA$ $V_O = 0.3V, I_O = 2mA$ $V_O = 0.3V, I_O = 2mA$ $V_O = 0.3V, I_O = 2mA$ $V_O = 0.3V, I_O = 2mA$	
		DDTC143XUA	0.3				
		DDTC143FUA	0.3				
		DDTC143ZUA	0.5				
		DDTC114YUA	0.3				
		DDTC114WUA	0.8				
		DDTC124XUA	0.4				
		DDTC144VUA	1.0				
		DDTC144WUA	0.8				
		DDTC113ZUA					3.0
		DDTC123YUA					3.0
		DDTC123JUA					1.1
DDTC143XUA				2.5			
DDTC143FUA				1.3			
DDTC143ZUA				1.3			
DDTC114YUA				1.4			
DDTC114WUA				3.0			
DDTC124XUA				2.5			
DDTC144VUA				5.0			
DDTC144WUA				4.0			
Output Voltage	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I = 5mA/0.25mA$ DDCT123JUA $I_O/I_I = 5mA/0.25mA$ DDCT143ZUA $I_O/I_I = 5mA/0.25mA$ DDCT114YUA $I_O/I_I = 10mA/0.5mA$ All Others	
Input Current	$I_I$	DDTC113ZUA	—	—	7.2	mA	$V_I = 5V$
		DDTC123YUA	—	—	3.8		
		DDTC123JUA	—	—	3.6		
		DDTC143XUA	—	—	1.8		
		DDTC143FUA	—	—	1.8		
		DDTC143ZUA	—	—	1.8		
		DDTC114YUA	—	—	0.88		
		DDTC114WUA	—	—	0.88		
		DDTC124XUA	—	—	0.36		
		DDTC144VUA	—	—	0.16		
		DDTC144WUA	—	—	0.16		
		Output Current	$I_{O(off)}$	—	—		
DC Current Gain	$G_I$	DDTC113ZUA	33				$V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 10mA$ $V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 5mA$ $V_O = 5V, I_O = 5mA$
		DDTC123YUA	33				
		DDTC123JUA	80				
		DDTC143XUA	30				
		DDTC143FUA	68				
		DDTC143ZUA	80				
		DDTC114YUA	68				
		DDTC114WUA	24				
		DDTC124XUA	68				
		DDTC144VUA	33				
		DDTC144WUA	56				
		Input Resistor Tolerance	$\Delta R_1$	-30	—		
Resistance Ratio Tolerance	$\Delta R_2/R_1$	-20	—	+20	%	—	
Gain-Bandwidth Product*	$f_T$	—	250	—	MHz	$V_{CE} = 10V, I_E = 5mA, f = 100MHz$	

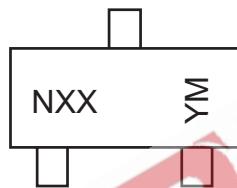
\* Transistor - For Reference Only

## 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**

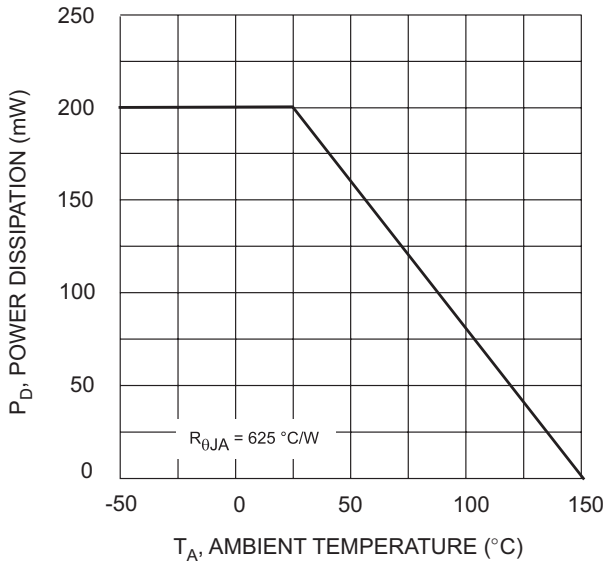


Fig. 1 Derating Curve

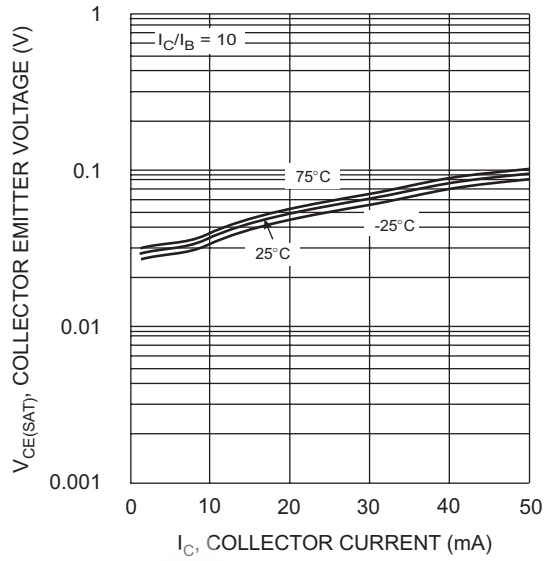


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

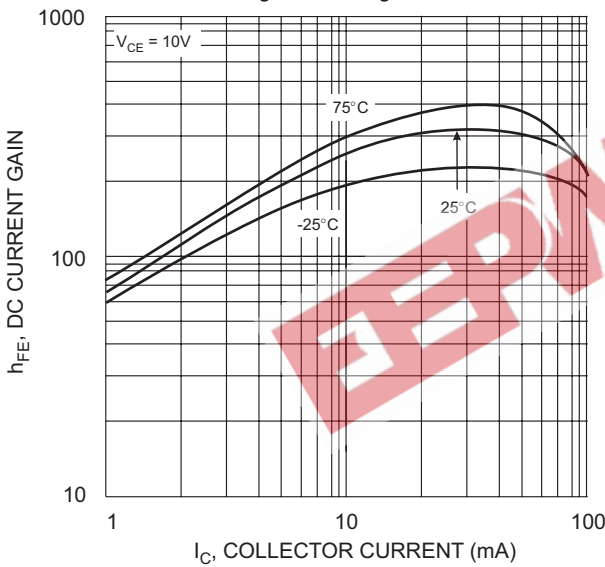


Fig. 3 DC Current Gain

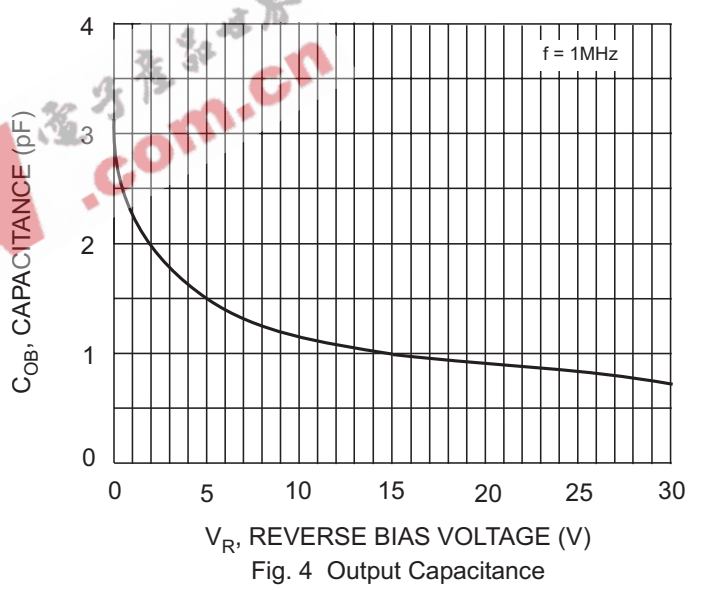


Fig. 4 Output Capacitance

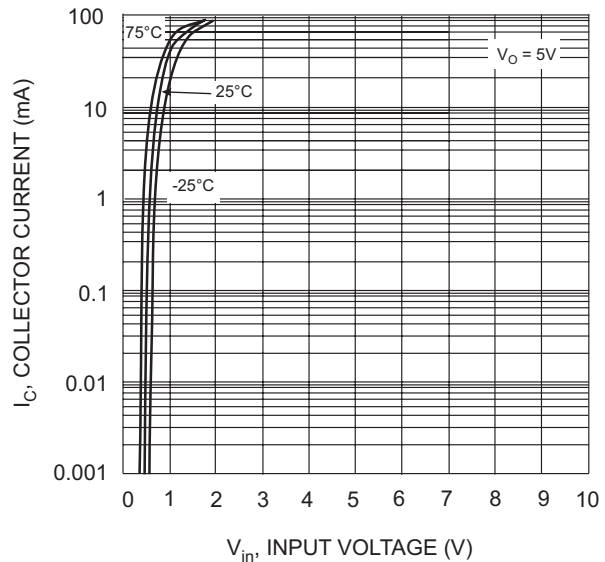


Fig. 5 Collector Current Vs. Input Voltage

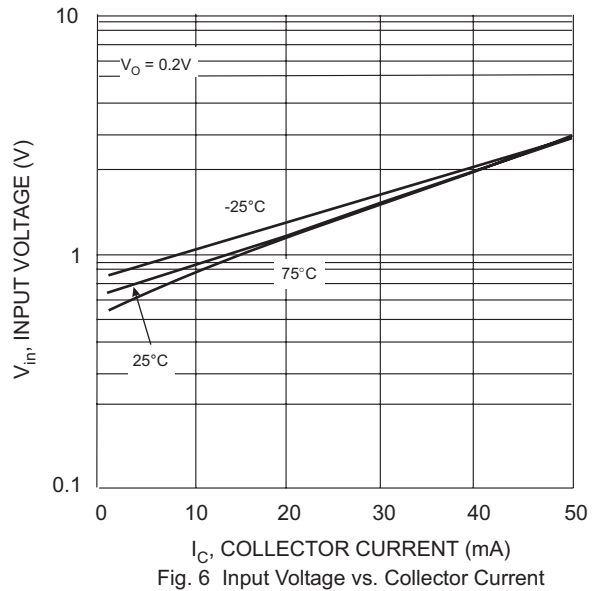


Fig. 6 Input Voltage vs. Collector Current

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