

# DDTC (R1≠R2 SERIES) CA

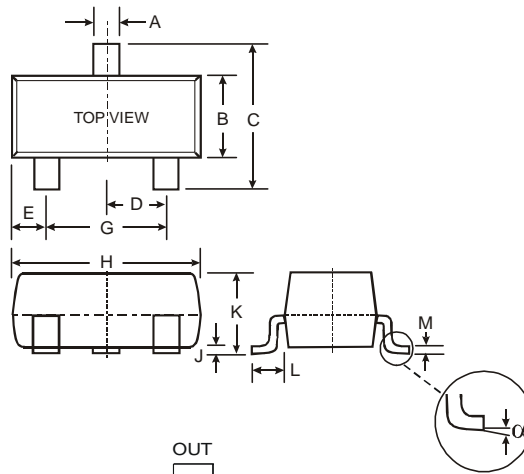
## NPN PRE-BIASED SMALL SIGNAL SOT-23 SURFACE MOUNT TRANSISTOR

### Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1≠R2
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 1 and 2)**

### Mechanical Data

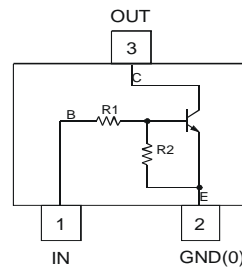
- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking and Date Code: See Table Below & Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)



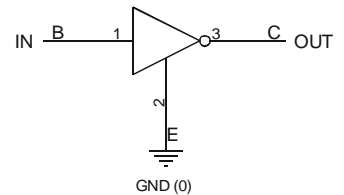
SOT-23		
Dim	Min	Max
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
$\alpha$	0°	8°

All Dimensions in mm

P/N	R1 (NOM)	R2 (NOM)	Type Code
DDTC113ZCA	1K $\Omega$	10K $\Omega$	N02
DDTC123YCA	2.2K $\Omega$	10K $\Omega$	N05
DDTC123JCA	2.2K $\Omega$	47K $\Omega$	N06
DDTC143XCA	4.7K $\Omega$	10K $\Omega$	N09
DDTC143FCA	4.7K $\Omega$	22K $\Omega$	N10
DDTC143ZCA	4.7K $\Omega$	47K $\Omega$	N11
DDTC114YCA	10K $\Omega$	47K $\Omega$	N14
DDTC114WCA	10K $\Omega$	4.7K $\Omega$	N15
DDTC124XCA	22K $\Omega$	47K $\Omega$	N18
DDTC144VCA	47K $\Omega$	10K $\Omega$	N21
DDTC144WCA	47K $\Omega$	22K $\Omega$	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>	-5 to +10 -5 to +12 -5 to +12 -7 to +20 -6 to +30 -5 to +30 -6 to +40 -10 to +30 -10 to +40 -15 to +40 -10 to +40	V
Output Current	I <sub>O</sub>	100 100 100 100 100 100 70 100 50 30 30	mA
Output Current	I <sub>C</sub> (Max)	100	mA

- Notes:
1. No purposefully added lead. Halogen and Antimony Free.
  2. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb<sub>2</sub>O<sub>3</sub> Fire Retardants.

## Thermal Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	R <sub>θJA</sub>	625	°C/W
Operating and Storage Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 3. Mounted on FR4 PC Board with recommended pad layout as shown on Diodes Inc., suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>

## Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition		
Input Voltage	V <sub>I(off)</sub>	0.3			V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA		
		0.3						
		0.5						
		0.3						
		0.3						
		0.5	—	—				
		0.3						
		0.8						
		0.4						
		1.0						
		0.8						
		3.0					V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA
		3.0						
		1.1						
2.5								
1.3								
1.3								
1.4								
3.0								
2.5								
5.0								
4.0								
0.3			V	I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA				
0.1				I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA				
0.3				I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA				
0.3				I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA				
Output Voltage	V <sub>O(on)</sub>	—	0.1	0.3		DDTC123JCA DDTC143ZCA DDTC114YCA All Others		
Input Current	I <sub>I</sub>	—	—	7.2	mA	V <sub>I</sub> = 5V		
		—	—	3.8				
		—	—	3.6				
		—	—	1.8				
		—	—	1.8				
		—	—	1.8				
		—	—	0.88				
		—	—	0.88				
		—	—	0.36				
		—	—	0.16				
		—	—	0.16				
Output Current	I <sub>O(off)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V		
DC Current Gain	G <sub>I</sub>	33			—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA		
		33						
		80						
		30						
		68						
		80	—	—				
		68						
		24						
		68						
		33						
		56						
		33						
		56						
Input Resistor Tolerance	ΔR <sub>1</sub>	-30	—	+30	%	—		
Resistance Ratio Tolerance	ΔR <sub>2</sub> /R <sub>1</sub>	-20	—	+20	%	—		
Gain-Bandwidth Product*	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz		

\* Transistor - For Reference Only

**Typical Curves – DDTC123JCA**

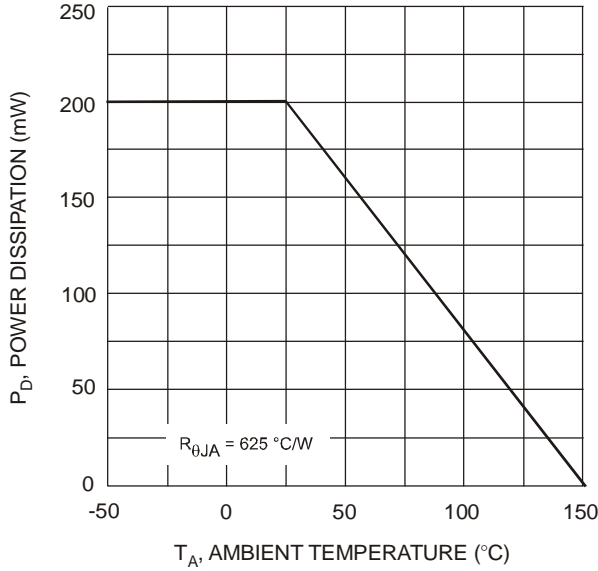


Fig. 1 Derating Curve

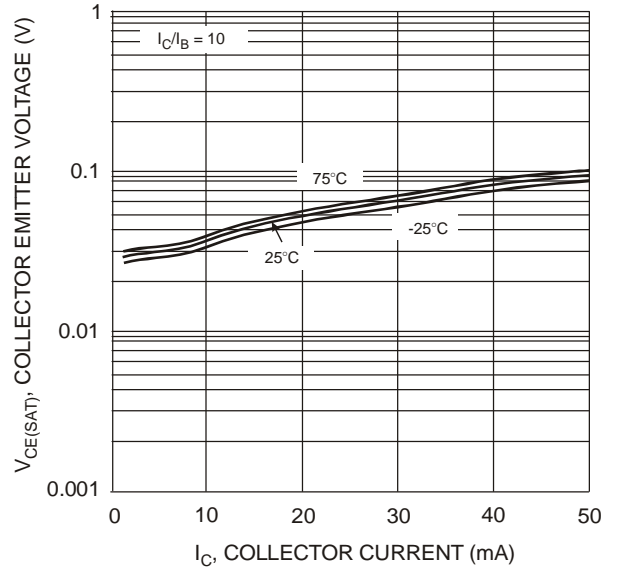


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

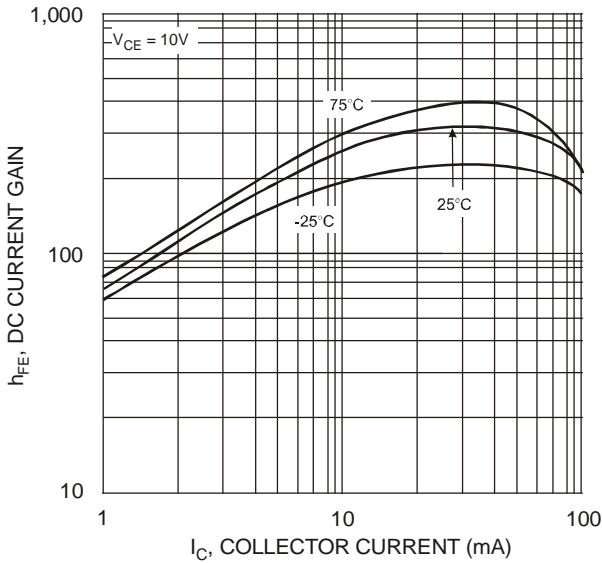


Fig. 3 DC Current Gain

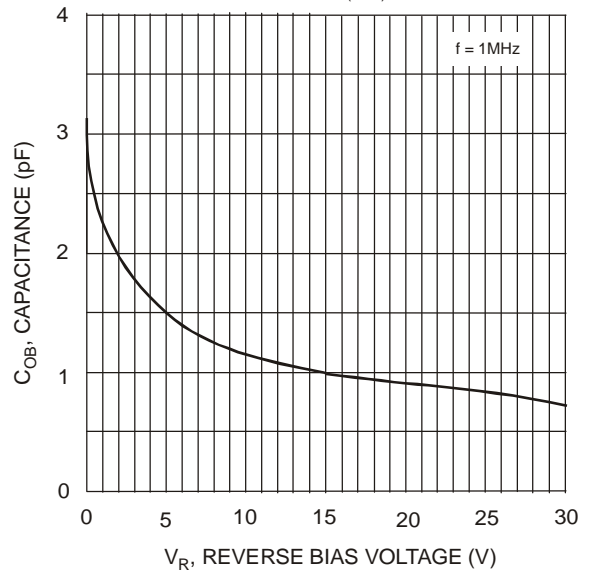


Fig. 4 Output Capacitance

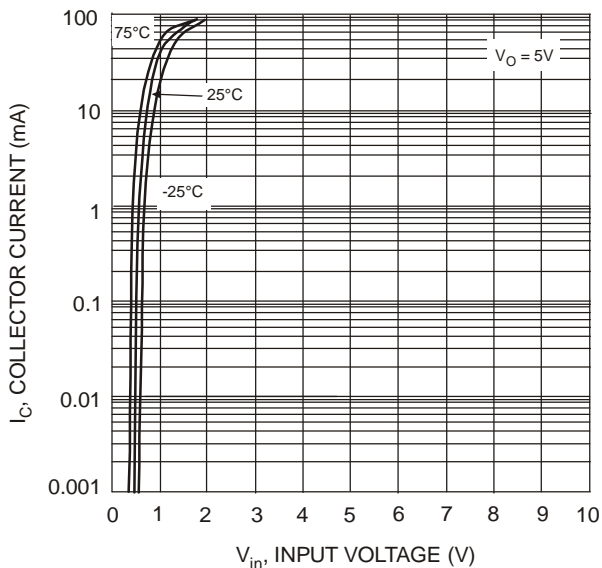


Fig. 5 Collector Current vs. Input Voltage

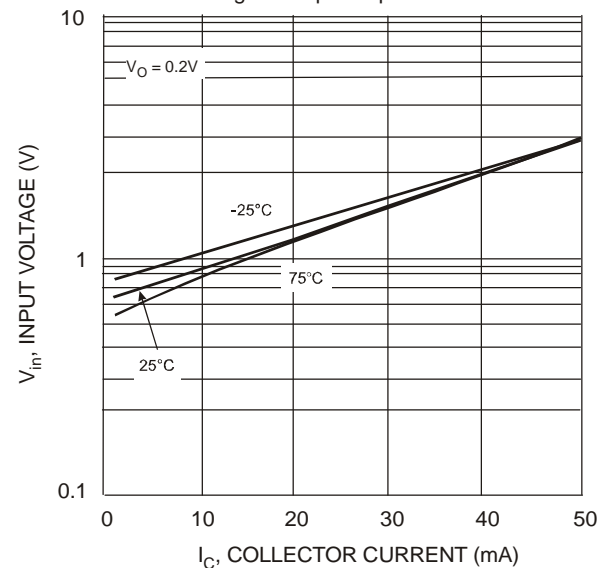


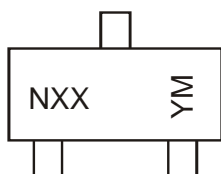
Fig. 6 Input Voltage vs. Collector Current

## Ordering Information (Note 4)

Device	Packaging	Shipping
DDTC113ZCA-7-F	SOT-23	3000/Tape & Reel
DDTC123YCA-7-F	SOT-23	3000/Tape & Reel
DDTC123JCA-7-F	SOT-23	3000/Tape & Reel
DDTC143XCA-7-F	SOT-23	3000/Tape & Reel
DDTC143FCA-7-F	SOT-23	3000/Tape & Reel
DDTC143ZCA-7-F	SOT-23	3000/Tape & Reel
DDTC114YCA-7-F	SOT-23	3000/Tape & Reel
DDTC114WCA-7-F	SOT-23	3000/Tape & Reel
DDTC124XCA-7-F	SOT-23	3000/Tape & Reel
DDTC144VCA-7-F	SOT-23	3000/Tape & Reel
DDTC144WCA-7-F	SOT-23	3000/Tape & Reel

Notes: 4. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



NXX = Product Type Marking Code, See Table on Page 1  
 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

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