

# DDTC (R1-ONLY SERIES) CA

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

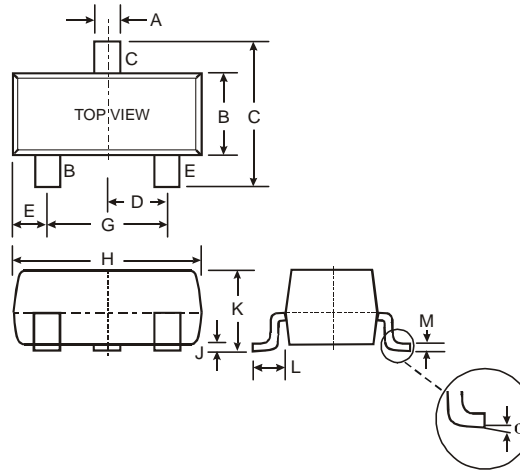
NEW PRODUCT

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistor, R1 only
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 2 and 3)**

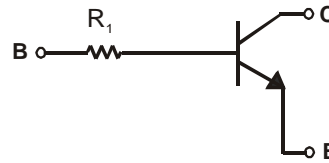
## Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- 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 Marking 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



SCHEMATIC DIAGRAM

P/N	R1 (NOM)	MARKING
DDTC113TCA	1K $\Omega$	N01
DDTC123TCA	2.2K $\Omega$	N03
DDTC143TCA	4.7K $\Omega$	N07
DDTC114TCA	10K $\Omega$	N12
DDTC124TCA	22K $\Omega$	N16
DDTC144TCA	47K $\Omega$	N19
DDTC115TCA	100K $\Omega$	N23
DDTC125TCA	200K $\Omega$	N25

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	50	V
Collector-Emitter Voltage	V <sub>CEO</sub>	50	V
Emitter-Base Voltage	V <sub>EBO</sub>	5	V
Collector Current	I <sub>C</sub> (Max)	100	mA
Power Dissipation	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	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:
1. 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>
  2. No purposefully added lead. Halogen and Antimony Free.
  3. 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.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	50	—	—	V	I <sub>C</sub> = 50μA
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	50	—	—	V	I <sub>C</sub> = 1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	5	—	—	V	I <sub>E</sub> = 50μA
Collector Cutoff Current	I <sub>CB0</sub>	—	—	0.5	μA	V <sub>CB</sub> = 50V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	0.5	μA	V <sub>EB</sub> = 4V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	0.3	V	I <sub>C</sub> /I <sub>B</sub> = 10mA/1mA DDTC113TCA I <sub>C</sub> /I <sub>B</sub> = 5mA/0.5mA DDTC123TCA I <sub>C</sub> /I <sub>B</sub> = 2.5mA/.25mA DDTC143TCA I <sub>C</sub> /I <sub>B</sub> = 1mA/.1mA DDTC114TCA I <sub>C</sub> /I <sub>B</sub> = 5mA/0.5mA DDTC124TCA I <sub>C</sub> /I <sub>B</sub> = 2.5mA/.25mA DDTC144TCA I <sub>C</sub> /I <sub>B</sub> = 1mA/0.1mA DDTC115TCA I <sub>C</sub> /I <sub>B</sub> = .5mA/.05mA DDTC125TCA
DC Current Transfer Ratio	h <sub>FE</sub>	100	250	600	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V
Input Resistor (R <sub>1</sub> ) Tolerance	ΔR <sub>1</sub>	-30	—	+30	%	—
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 – DDTC114TCA**

NEW PRODUCT

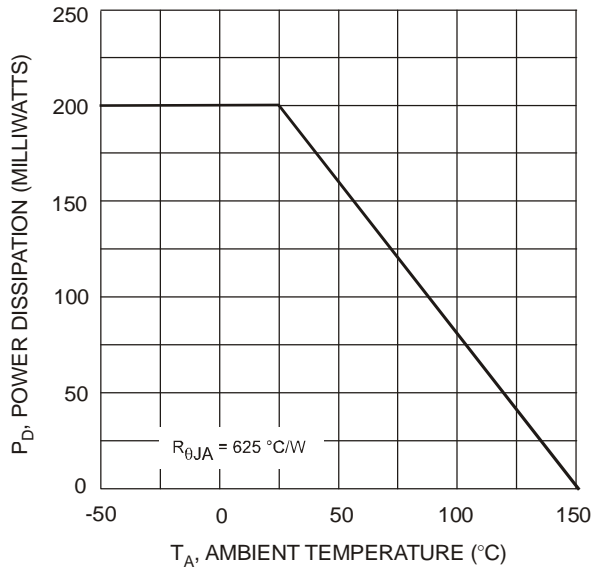


Fig. 1 Derating Curve

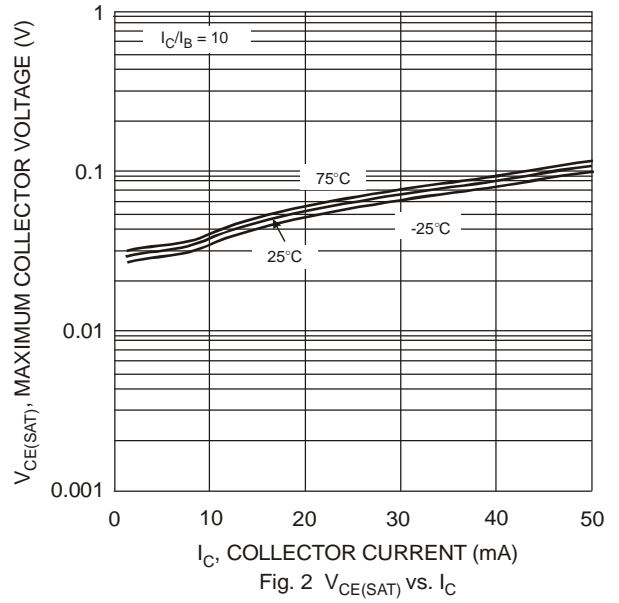


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

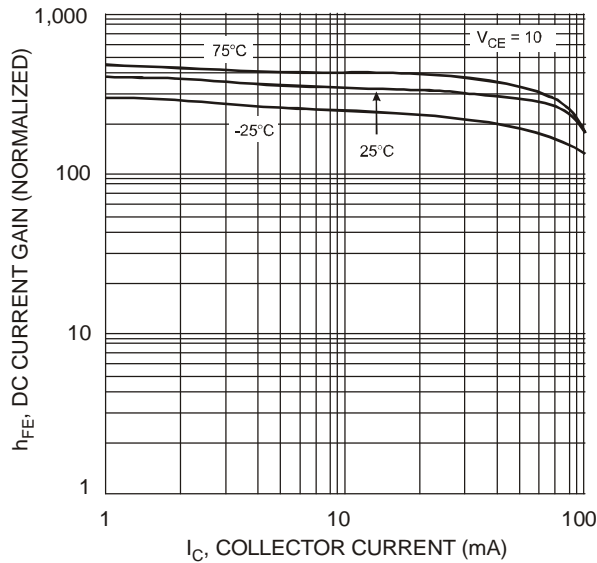


Fig. 3 DC Current Gain

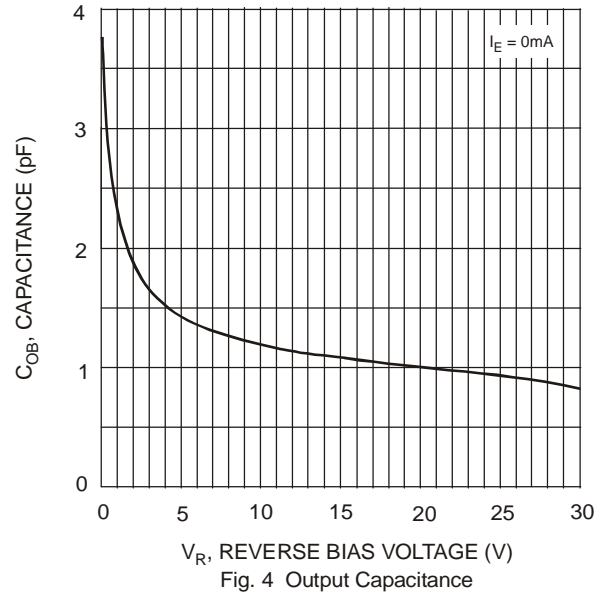


Fig. 4 Output Capacitance

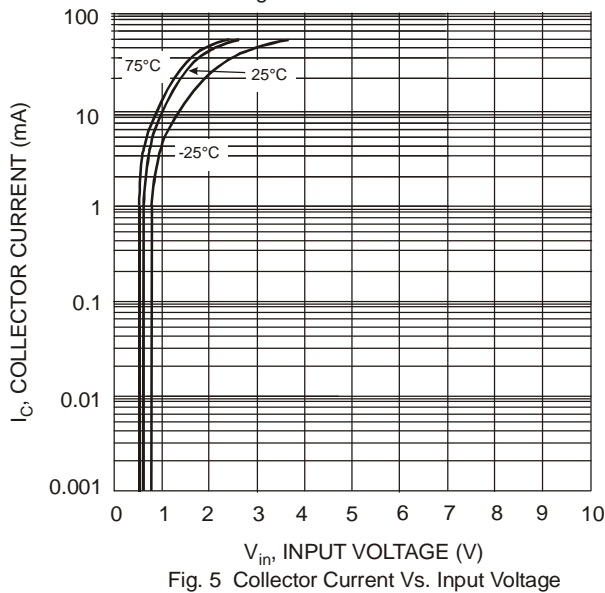


Fig. 5 Collector Current Vs. Input Voltage

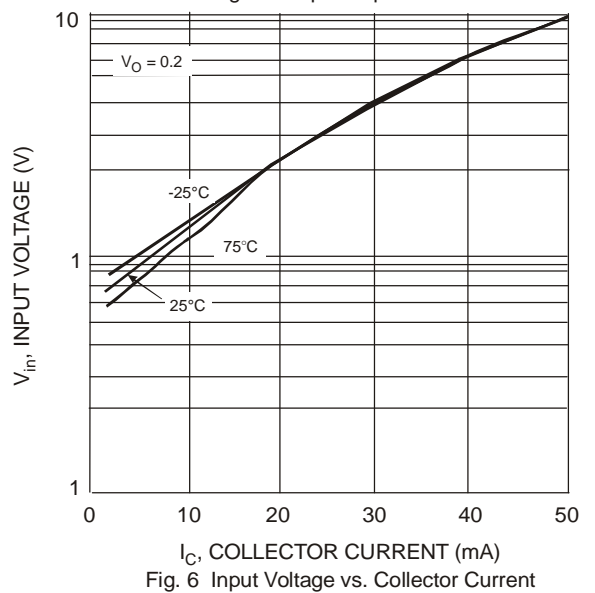


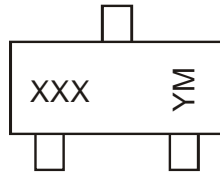
Fig. 6 Input Voltage vs. Collector Current

## Ordering Information (Note 4)

Device	Packaging	Shipping
DDTC113TCA-7-F	SOT-23	3000/Tape & Reel
DDTC123TCA-7-F	SOT-23	3000/Tape & Reel
DDTC143TCA-7-F	SOT-23	3000/Tape & Reel
DDTC114TCA-7-F	SOT-23	3000/Tape & Reel
DDTC124TCA-7-F	SOT-23	3000/Tape & Reel
DDTC144TCA-7-F	SOT-23	3000/Tape & Reel
DDTC115TCA-7-F	SOT-23	3000/Tape & Reel
DDTC125TCA-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



XXX = 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	2006	2007	2008	2009	2010	2011	2012
Code	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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