

# DDTC (R1 = R2 SERIES) CA

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

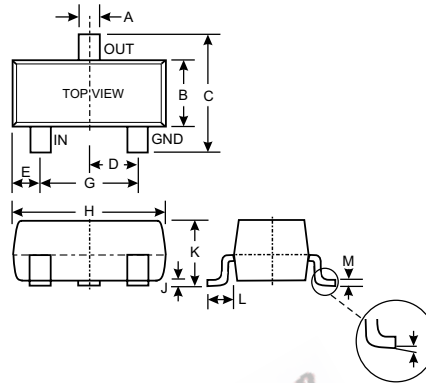
NEW PRODUCT

## Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2

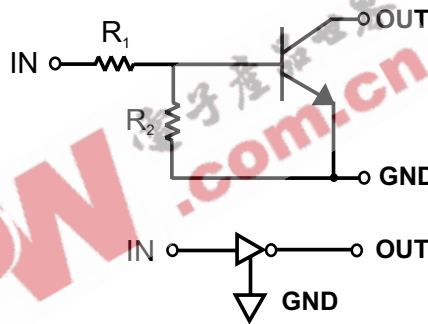
## Mechanical Data

- Case: SOT-23, 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
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Diagrams & Page 2)
- Weight: 0.008 grams (approx.)
- Ordering Information (See Page 2)



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	0.89	1.00
L	0.45	0.61
M	0.085	0.110
$\alpha$	0°	8°
All Dimensions in mm		

P/N	R1, R2 (NOM)	MARKING
DDTC123ECA	2.2K $\Omega$	N04
DDTC143ECA	4.7K $\Omega$	N08
DDTC114ECA	10K $\Omega$	N13
DDTC124ECA	22K $\Omega$	N17
DDTC144ECA	47K $\Omega$	N20
DDTC115ECA	100K $\Omega$	N24



SCHEMATIC DIAGRAM

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

Characteristic	Symbol	Value	Unit	
Supply Voltage, (3) to (1)	V <sub>CC</sub>	50	V	
Input Voltage, (2) to (1)	V <sub>IN</sub>	DDTC123ECA DDTC143ECA DDTC114ECA DDTC124ECA DDTC144ECA DDTC115ECA	-10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40 -10 to +40	V
Output Current	I <sub>O</sub>	DDTC123ECA DDTC143ECA DDTC114ECA DDTC124ECA DDTC144ECA DDTC115ECA	100 100 50 30 100 20	mA
Output Current	I <sub>C</sub> (Max)	All	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 and Temperature Range	T <sub>j</sub> , T <sub>STG</sub>		-55 to +150	°C

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

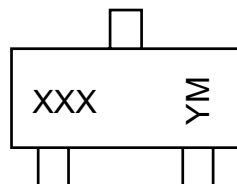
**Electrical Characteristics** @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage		V <sub>I(off)</sub>	0.5	1.1	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
		V <sub>I(on)</sub>	—	1.9	3		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC123ECA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC143ECA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 10mA, DDTC114ECA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA, DDTC124ECA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA, DDTC144ECA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA, DDTC115ECA
Output Voltage		V <sub>O(on)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC123ECA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC143ECA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC114ECA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC124ECA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC144ECA I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA, DDTC115ECA
Input Current	DDTC123ECA DDTC143ECA DDTC114ECA DDTC124ECA DDTC144ECA DDTC115ECA	I <sub>I</sub>	—	—	3.8 1.8 0.88 0.36 0.18 0.15	mA	V <sub>I</sub> = 5V
Output Current		I <sub>O(off)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
DC Current Gain	DDTC123ECA DDTC143ECA DDTC114ECA DDTC124ECA DDTC144ECA DDTC115ECA	G <sub>I</sub>	20 20 30 56 68 82	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 20mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
Input Resistor (R <sub>1</sub> ) Tolerance		ΔR <sub>1</sub>	-30	—	+30	%	—
Resistance Ratio		R <sub>2</sub> /R <sub>1</sub>	0.8	1	1.2	—	—
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

**Ordering Information** (Note 2)

Device	Packaging	Shipping
DDTC123ECA-7	SOT-23	3000/Tape & Reel
DDTC143ECA-7	SOT-23	3000/Tape & Reel
DDTC114ECA-7	SOT-23	3000/Tape & Reel
DDTC124ECA-7	SOT-23	3000/Tape & Reel
DDTC144ECA-7	SOT-23	3000/Tape & Reel
DDTC115ECA-7	SOT-23	3000/Tape & Reel

Notes: 2. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.**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 - DDTC143ECA

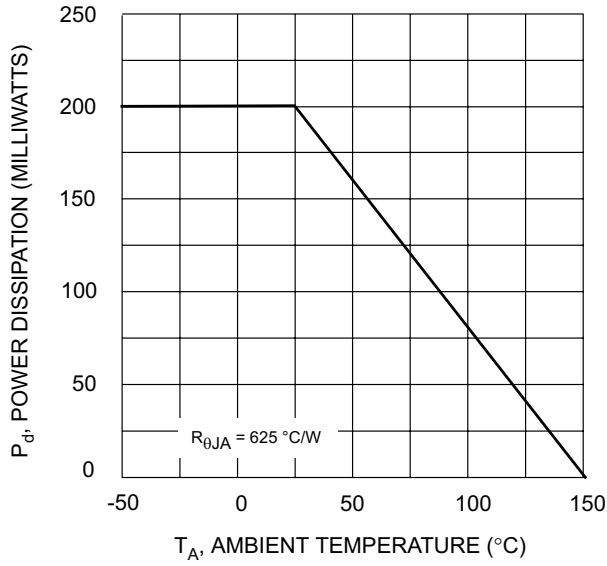


Fig. 1 Derating Curve

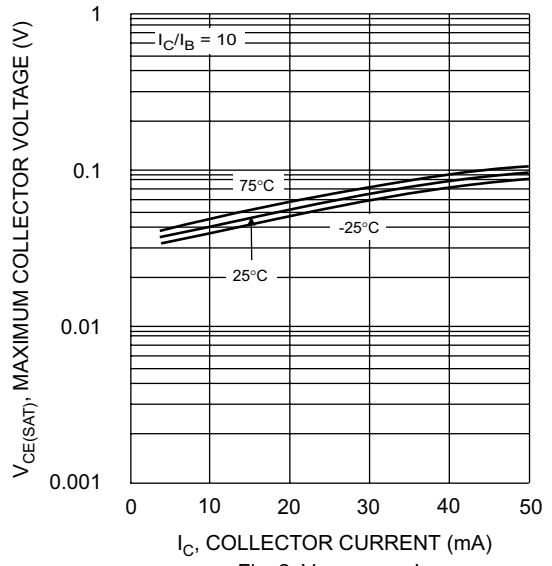


Fig. 2  $V_{\text{CE(SAT)}}$  vs.  $I_C$

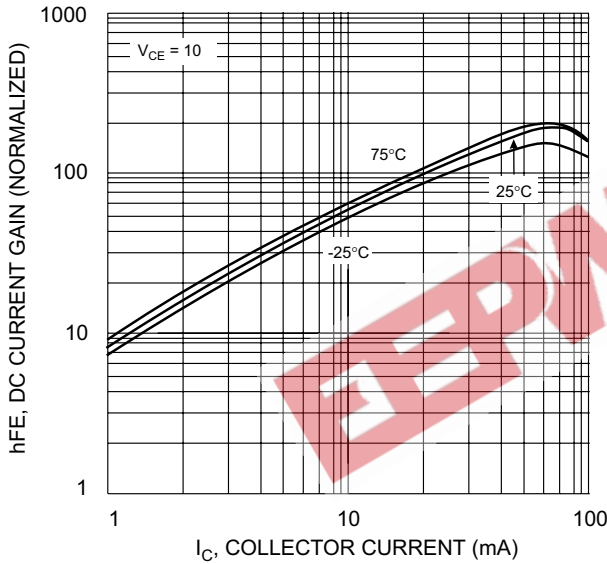


Fig. 3 DC CURRENT GAIN

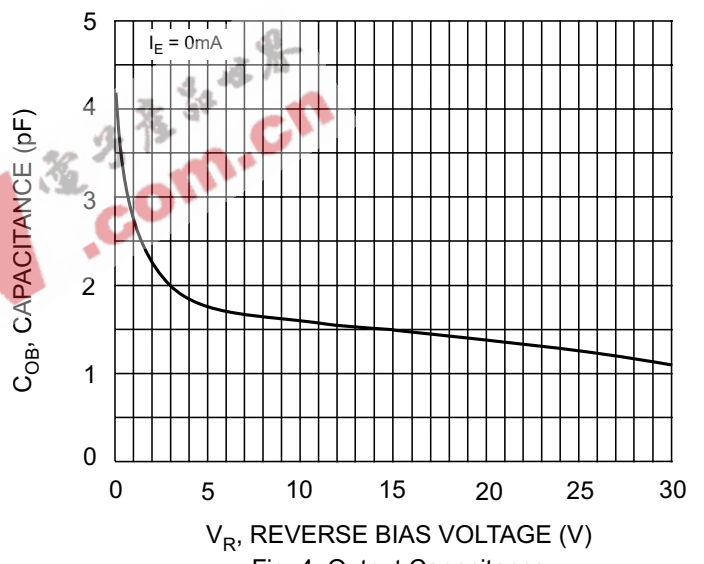


Fig. 4 Output Capacitance

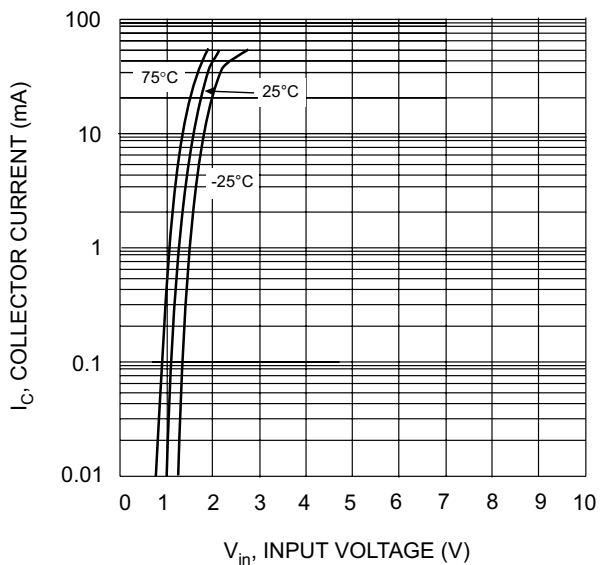


Fig. 5 Collector Current Vs. Input Voltage

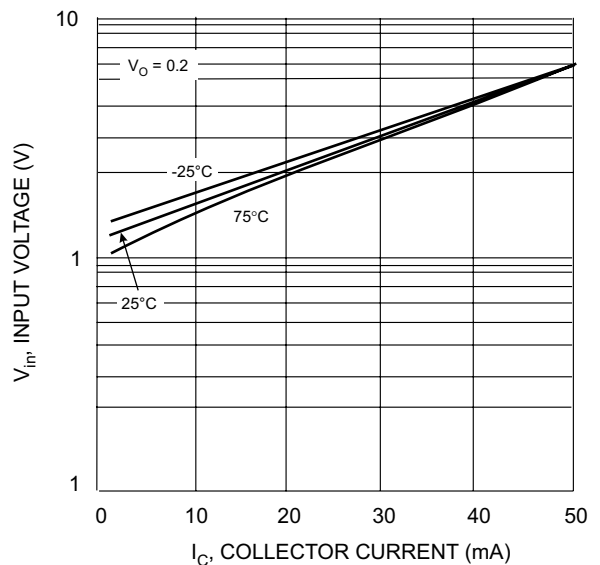


Fig. 6 Input Voltage vs. Collector Current