

**NPN PRE-BIASED SMALL SIGNAL SOT23 SURFACE MOUNT TRANSISTOR**
**Features**

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

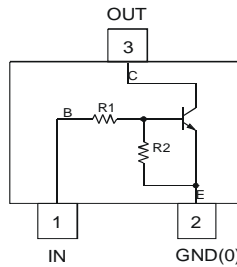
**Mechanical Data**

- Case: SOT23
- Case material: Molded Plastic. "Green" Molding Compound.
- Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish
- Weight: 0.008 grams (approximate)

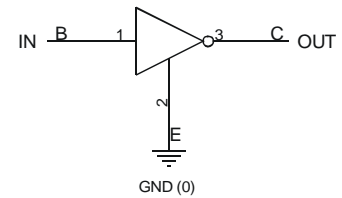
Part Number	R1, R2 (NOM)
DDTC123ECA	2.2KΩ
DDTC143ECA	4.7KΩ
DDTC114ECA	10KΩ
DDTC124ECA	22KΩ
DDTC144ECA	47KΩ
DDTC115ECA	100KΩ



Top View



Device Schematic

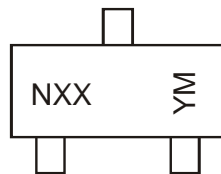


Equivalent Inverter Circuit

**Ordering Information** (Note 3 & 4)

Product	Grade	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC123ECA-7-F	Commercial	N04	7	8	3,000
DDTC123ECAQ-7-F	Automotive	N04	7	8	3,000
DDTC143ECA-7-F	Commercial	N08	7	8	3,000
DDTC114ECA-7-F	Commercial	N13	7	8	3,000
DDTC114ECAQ-7-F	Automotive	N13	7	8	3,000
DDTC114ECAQ-13-F	Automotive	N13	13	8	10,000
DDTC124ECA-7-F	Commercial	N17	7	8	3,000
DDTC144ECA-7-F	Commercial	N20	7	8	3,000
DDTC144ECAQ-7-F	Automotive	N20	7	8	3,000
DDTC144ECAQ-13-F	Automotive	N20	13	8	10,000
DDTC115ECA-7-F	Commercial	N24	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  3. For packaging details, go to our website at <http://www.diodes.com>.
  4. Products with Q-suffix are automotive grade. Automotive products are electrical and thermal the same as the commercial, except where specified.

**Marking Information**


NXX = Product Type Marking Code, See Table above  
 YM = Date Code Marking  
 Y = Year (ex: X = 2010)  
 M = Month (ex: 9 = September)

## Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2015
Code	N	P	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
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				

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

Characteristic		Symbol	Value	Unit
Supply Voltage <Pin: (3) to (2)>		V <sub>CC</sub>	50	V
Input Voltage <Pin: (1) to (2)>	DDTC123ECA	V <sub>IN</sub>	-10 to +12	V
	DDTC143ECA		-10 to +30	
	DDTC114ECA		-10 to +40	
	DDTC124ECA		-10 to +40	
	DDTC144ECA		-10 to +40	
Output Current	DDTC123ECA	I <sub>O</sub>	100	mA
	DDTC143ECA		100	
	DDTC114ECA		50	
	DDTC124ECA		30	
	DDTC144ECA		30	
DDTC115ECA	20			
Output Current		I <sub>C</sub> (Max)	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5 & 6)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	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: 5. Mounted on FR4 PC Board with minimum recommended pad layout  
6. 150mW per element must not be exceeded.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
						V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
Input Voltage	V <sub>I(off)</sub>	0.5	1.1	—	V	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
	V <sub>I(on)</sub>	—	1.9	3		
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	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	G <sub>I</sub>	20 20 30 35 56 68 80 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 V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
Input Resistor Tolerance	ΔR <sub>1</sub>	-30	—	+30	%	—
Resistance Ratio Tolerance	ΔR <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

**Typical Characteristics – DDTC143ECA**

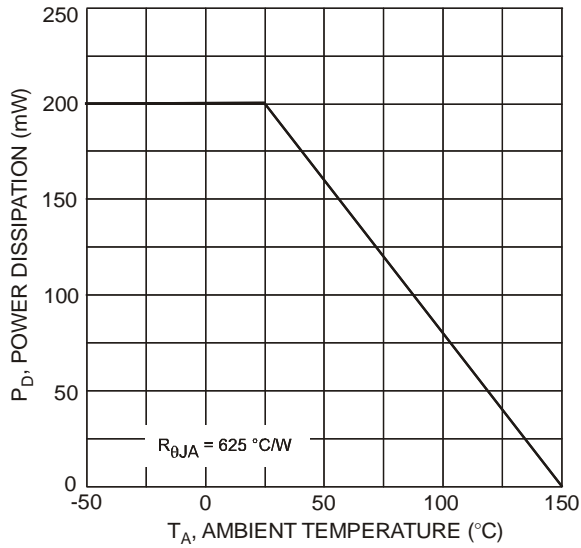


Fig. 1 Power Dissipation vs. Ambient Temperature

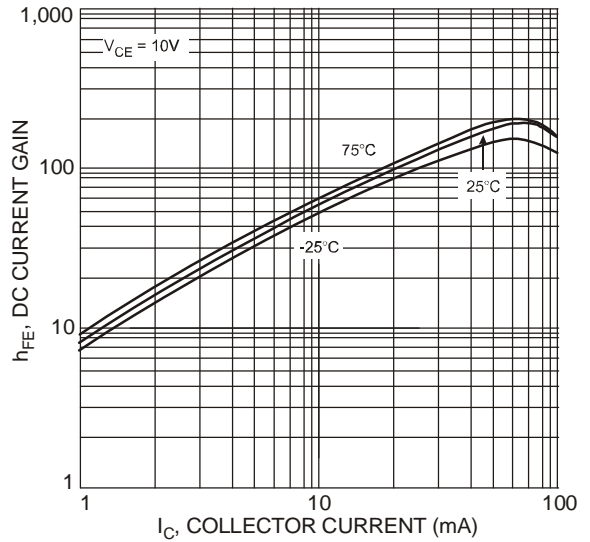


Fig. 2 Typical DC Current Gain vs. Collector Current

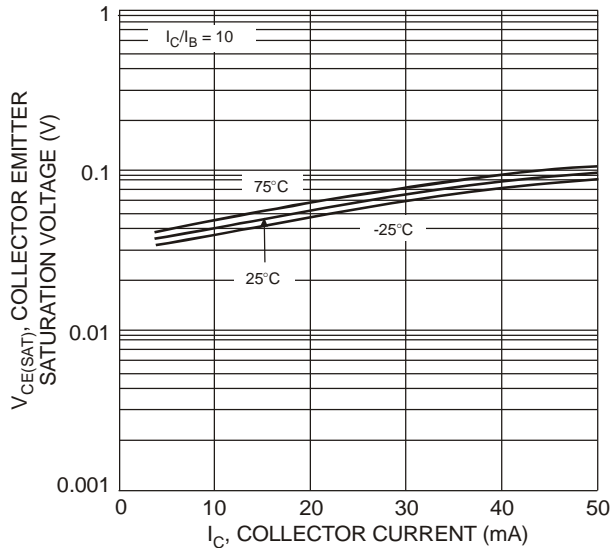


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

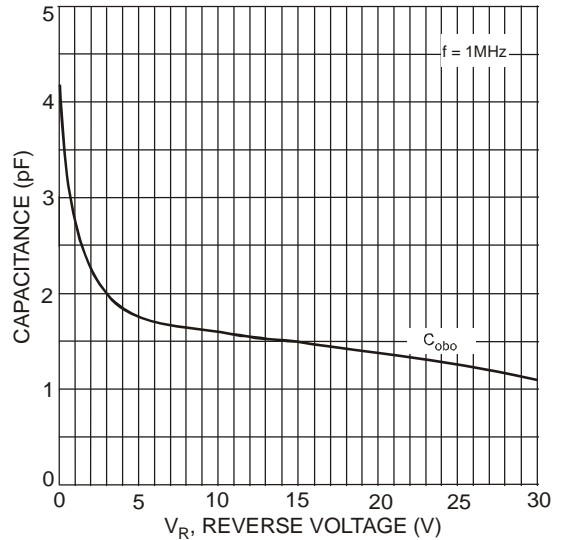


Fig. 4 Typical Capacitance Characteristics

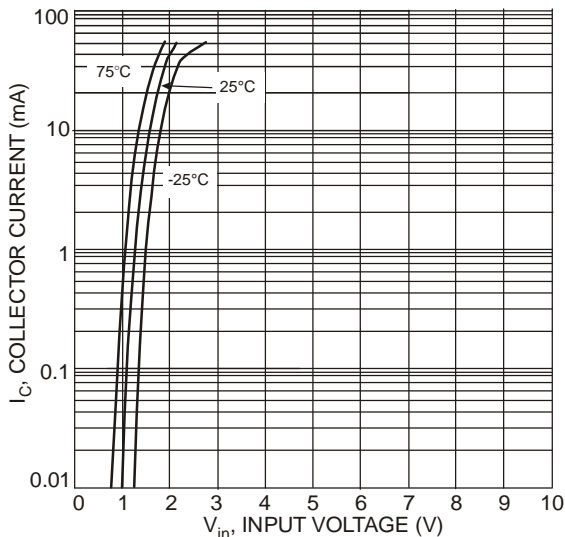


Fig. 5 Collector Current vs. Input Voltage

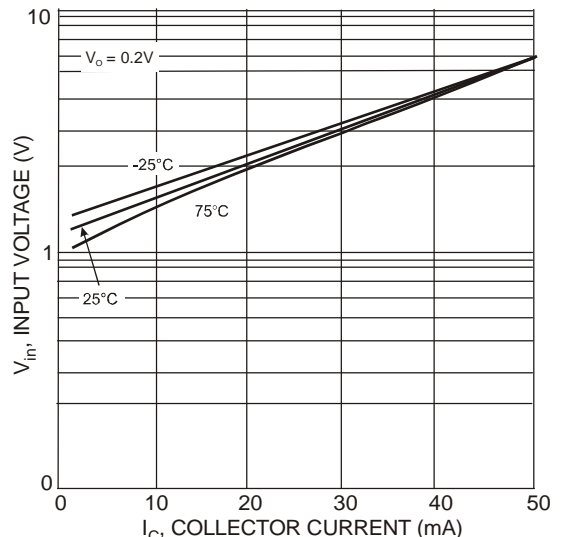
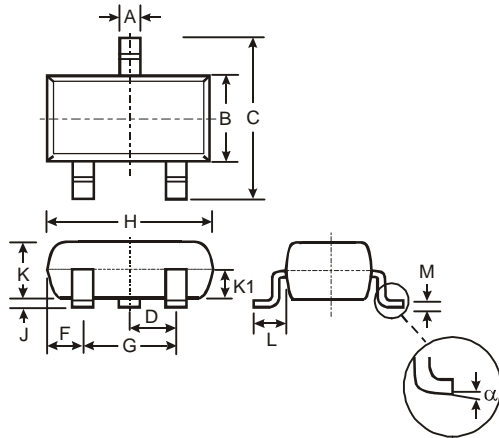


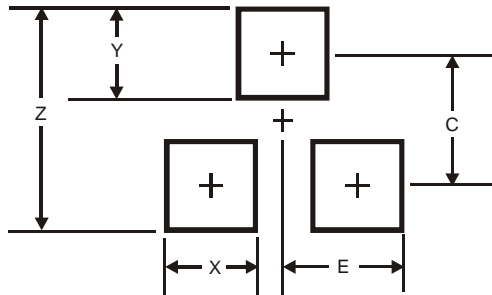
Fig. 6 Input Voltage vs. Collector Current

**Package Outline Dimensions**



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
$\alpha$	0°	8°	-
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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