

**NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR**
**Product Summary**

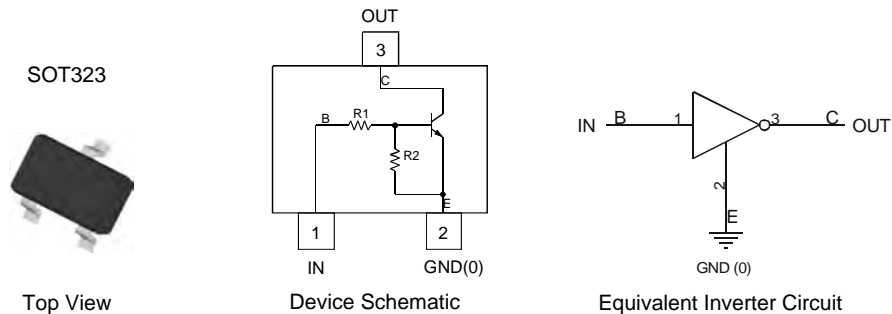
Part Number	R1, R2 (NOM)
DDTC123EUA	2.2K $\Omega$
DDTC143EUA	4.7K $\Omega$
DDTC114EUA	10K $\Omega$
DDTC124EUA	22K $\Omega$
DDTC144EUA	47K $\Omega$
DDTC115EUA	100K $\Omega$

**Features and Benefits**

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

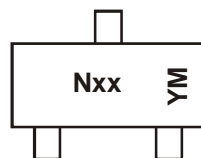
**Mechanical Data**

- Case: SOT323
- 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)


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

Product	Grade	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC123EUA-7-F	Commercial	N04	7	8	3,000
DDTC143EUA-7-F	Commercial	N08	7	8	3,000
DDTC114EUA-7-F	Commercial	N13	7	8	3,000
DDTC124EUA-7-F	Commercial	N17	7	8	3,000
DDTC124EUAQ-7-F	Automotive	N17	7	8	3,000
DDTC124EUAQ-13-F	Automotive	N17	13	8	10,000
DDTC144EUA-7-F	Commercial	N20	7	8	3,000
DDTC144EUAQ-7-F	Automotive	N20	7	8	3,000
DDTC144EUAQ-13-F	Automotive	N20	13	8	10,000
DDTC115EUA-7-F	Commercial	N24	7	8	3,000

- Notes:
1. No purposefully added lead.
  2. Diodes Inc's "Green" policy can be found on our website at <http://www.diodes.com>.
  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	2017
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)>	V <sub>IN</sub>	-10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40	V
Output Current	I <sub>O</sub>	100 100 50 30 100 20	mA
Output Current	I <sub>C(MAX)</sub>	100	mA

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 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

**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	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC123EUA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA, DDTC143EUA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 10mA, DDTC114EUA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA, DDTC124EUA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA, DDTC144EUA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA, DDTC115EUA
Output Voltage	V <sub>O(ON)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC123EUA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC143EUA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC114EUA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC124EUA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA, DDTC144EUA I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA, DDTC115EUA
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 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
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

Notes: 5. 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>.  
6. 150mW per element must not be exceeded.

**Typical Curves – DDTC143EUA** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

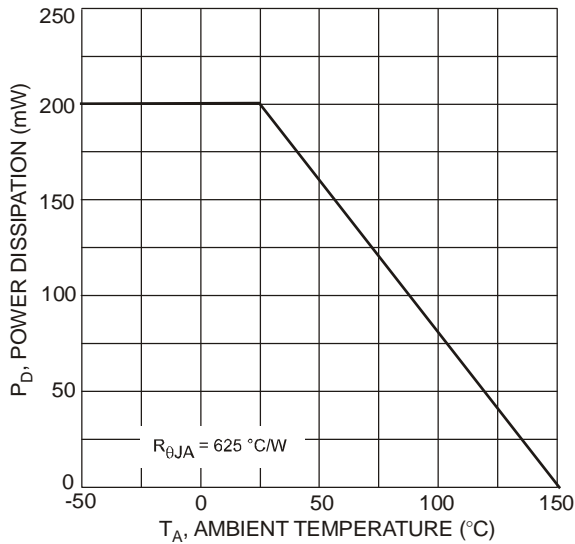


Fig. 1 Power Dissipation vs. Ambient Temperature

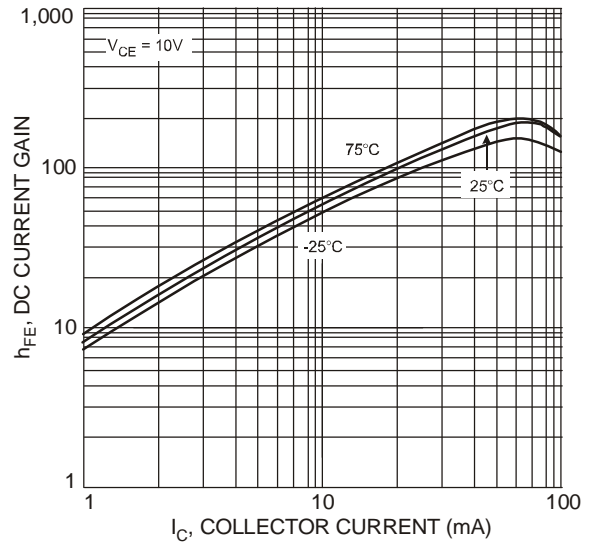


Fig. 2 Typical DC Current Gain vs. Collector Current

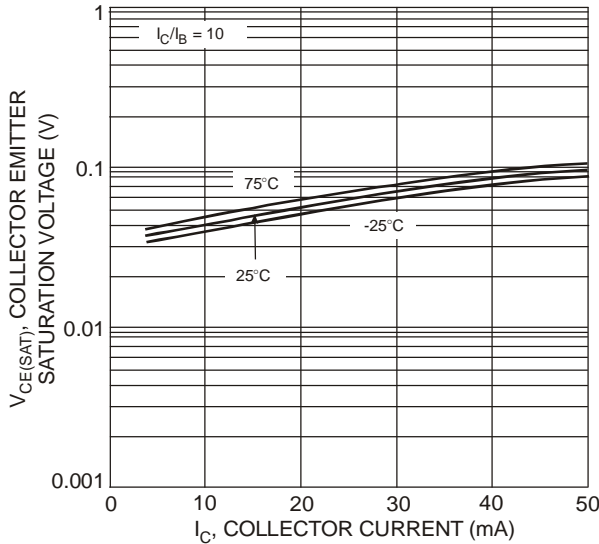


Fig. 3. Collector Emitter Saturation Voltage vs. Collector Current

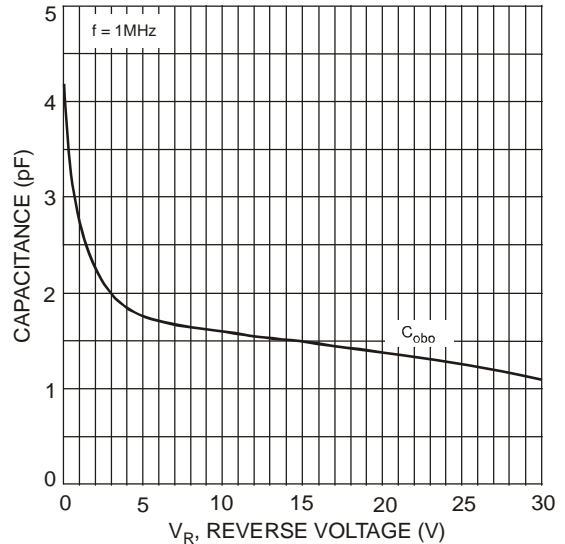


Fig. 4 Typical Capacitance Characteristics

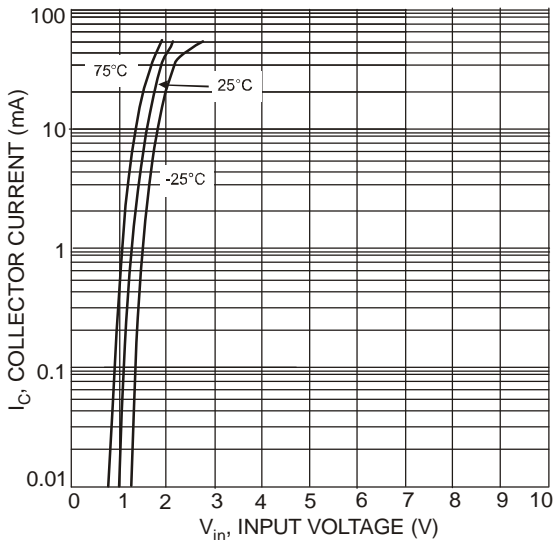


Fig. 5 Collector Current vs. Input Voltage

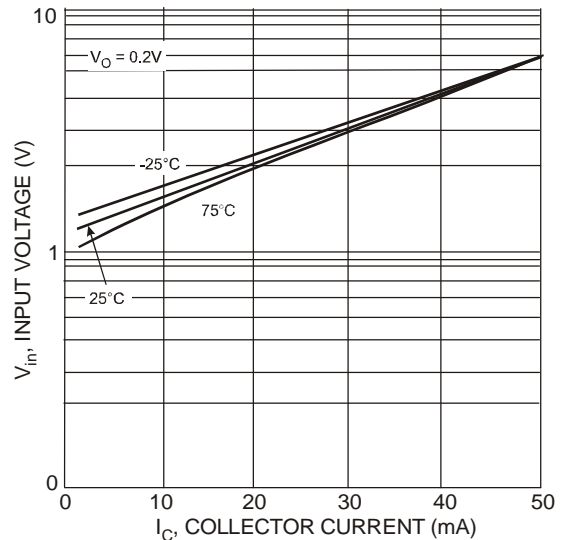
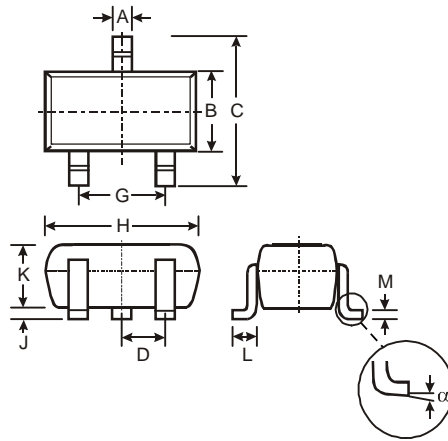


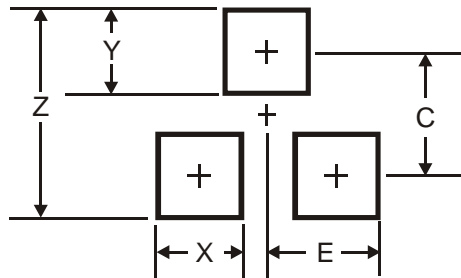
Fig. 6 Input Voltage vs. Collector Current

**Package Outline Dimensions**



SOT323			
Dim	Min	Max	Typ
A	0.25	0.40	0.30
B	1.15	1.35	1.30
C	2.00	2.20	2.10
D	-	-	0.65
G	1.20	1.40	1.30
H	1.80	2.20	2.15
J	0.0	0.10	0.05
K	0.90	1.00	1.00
L	0.25	0.40	0.30
M	0.10	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

**Suggested Pad Layout**



Dimensions	Value (in mm)
Z	2.8
X	0.7
Y	0.9
C	1.9
E	1.0

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