

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

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 only
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

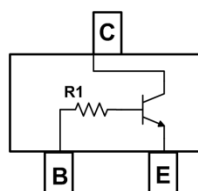
Part Number	R1 (NOM)
DDTC113TCA	1KΩ
DDTC123TCA	2.2KΩ
DDTC143TCA	4.7KΩ
DDTC114TCA	10KΩ
DDTC124TCA	22KΩ
DDTC144TCA	47KΩ
DDTC115TCA	100KΩ
DDTC125TCA	200KΩ

**Mechanical Data**

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 <sup>Ⓔ3</sup>
- Weight: 0.008 grams (approximate)



Top View

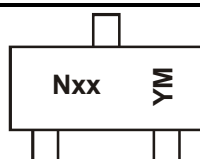


Device Schematic – Top View

**Ordering Information** (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC113TCA-7-F	AEC-Q101	N01	7	8	3,000
DDTC123TCA-7-F	AEC-Q101	N03	7	8	3,000
DDTC143TCA-7-F	AEC-Q101	N07	7	8	3,000
DDTC143TCAQ-7-F	Automotive	N07	7	8	3,000
DDTC143TCAQ-13-F	Automotive	N07	13	8	10,000
DDTC114TCA-7-F	AEC-Q101	N12	7	8	3,000
DDTC124TCA-7-F	AEC-Q101	N16	7	8	3,000
DDTC144TCA-7-F	AEC-Q101	N19	7	8	3,000
DDTC115TCA-7-F	AEC-Q101	N23	7	8	3,000
DDTC125TCA-7-F	AEC-Q101	N25	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_compliance\\_definitions/](http://www.diodes.com/quality/product_compliance_definitions/).
  5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Code	T	U	V	W	X	Y	Z	A	B	C

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

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</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

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	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
Collector-Base Breakdown Voltage	BV <sub>CBO</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>CBO</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>	100 120	250 -	600 630	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V I <sub>C</sub> = 5mA, V <sub>CE</sub> = 5V DDTC143TCAQ
Input Resistor (R <sub>1</sub> ) Tolerance	ΔR <sub>1</sub>	-30	—	+30	%	—
Gain-Bandwidth Product (Note 7)	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA, f = 100MHz

Notes: 6. Mounted on FR4 PC Board with minimum recommended pad layout  
 7. Transistor - For Reference Only

**Typical Characteristics – DDTC144TCA** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

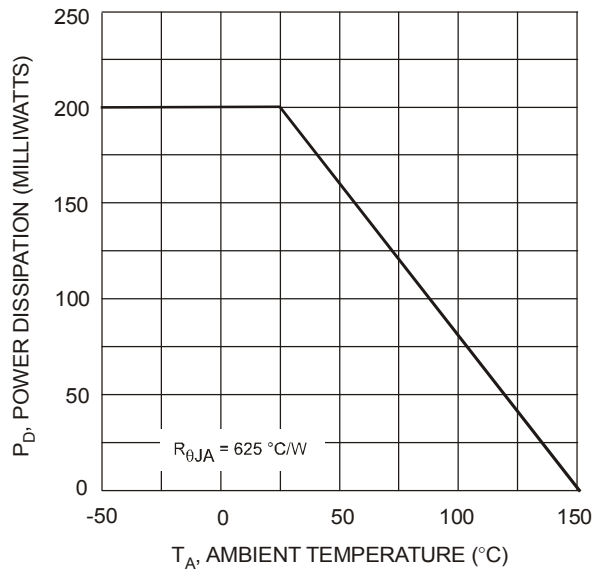


Fig. 1 Derating Curve

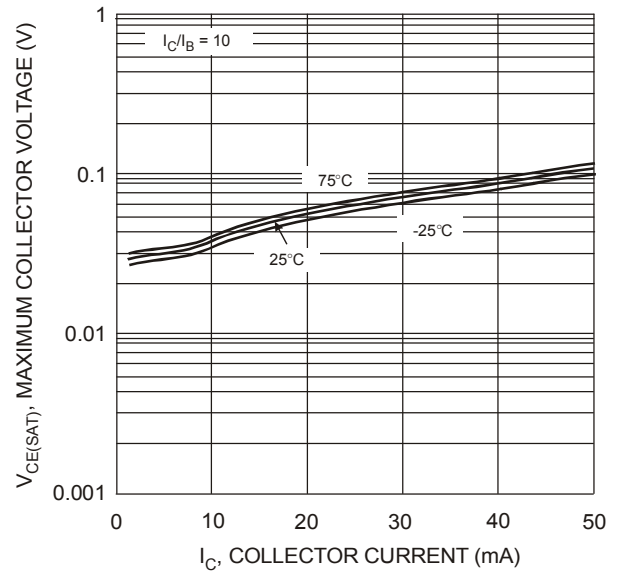


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

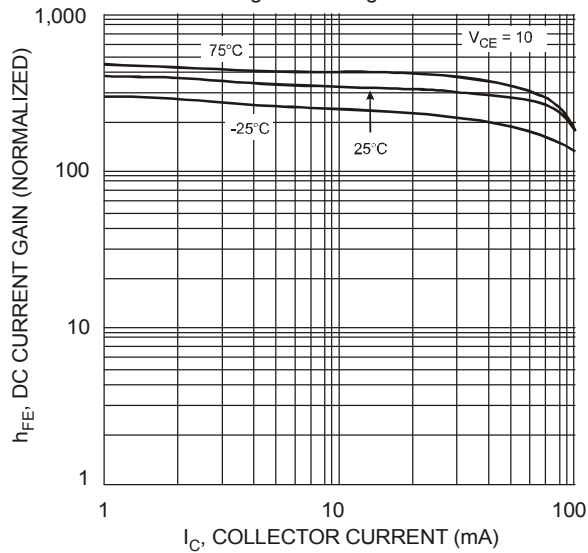


Fig. 3 DC Current Gain

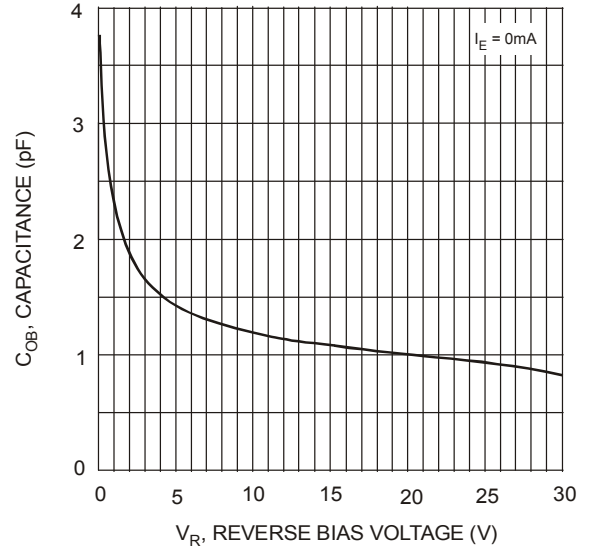


Fig. 4 Output Capacitance

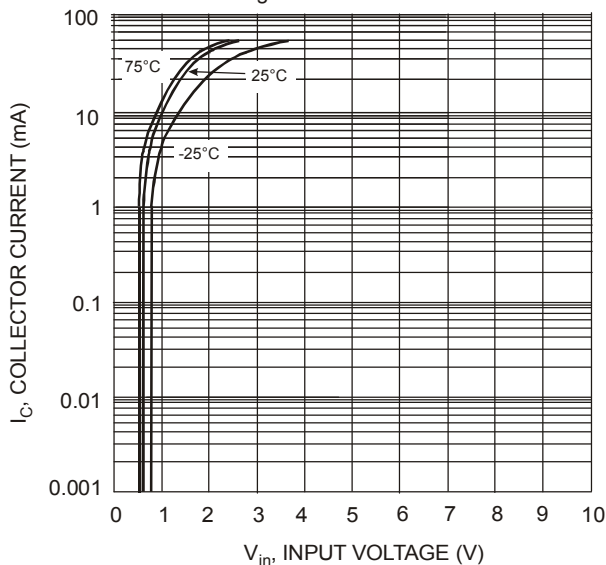


Fig. 5 Collector Current vs. Input Voltage

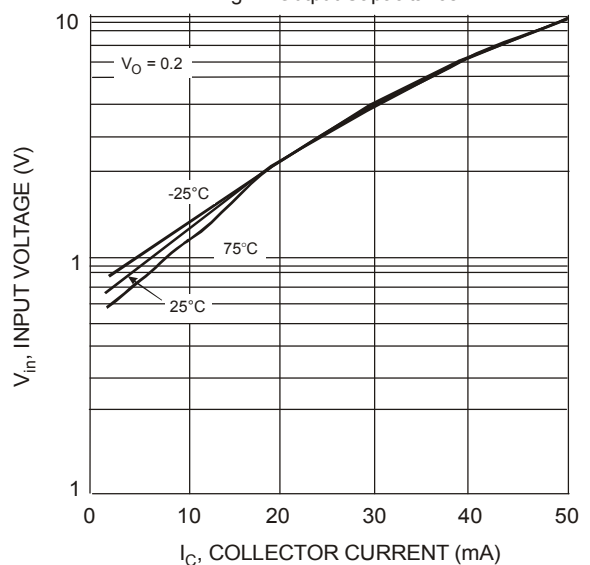
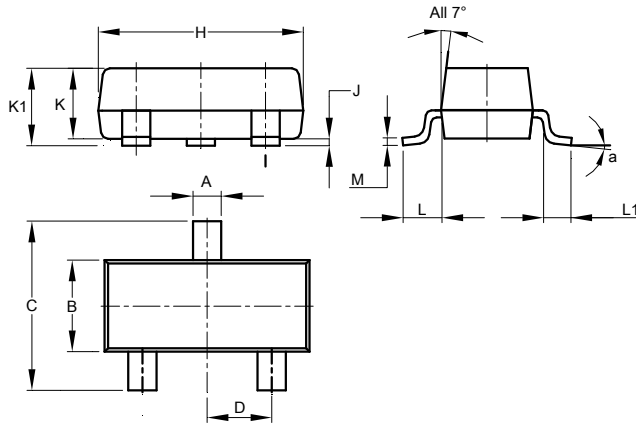


Fig. 6 Input Voltage vs. Collector Current

## Package Outline Dimensions

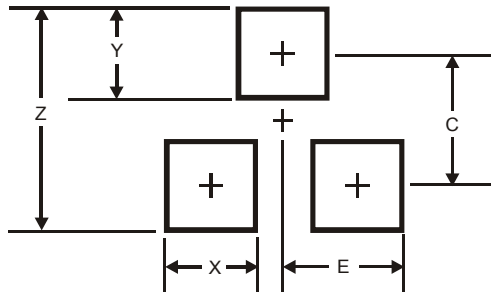
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	8°		
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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

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