

**NPN PRE-BIASED SMALL SIGNAL SOT23 SURFACE MOUNT TRANSISTOR**
**Product Summary**

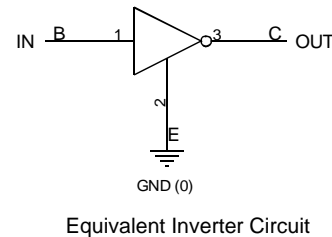
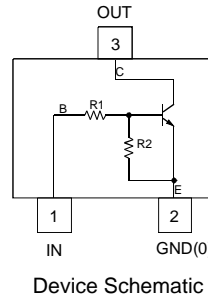
Part Number	R1 (NOM)	R2 (NOM)
DDTC113ZCA	1KΩ	10KΩ
DDTC123YCA	2.2KΩ	10KΩ
DDTC123JCA	2.2KΩ	47KΩ
DDTC143XCA	4.7KΩ	10KΩ
DDTC143FCA	4.7KΩ	22KΩ
DDTC143ZCA	4.7KΩ	47KΩ
DDTC114YCA	10KΩ	47KΩ
DDTC114WCA	10KΩ	4.7KΩ
DDTC124XCA	22KΩ	47KΩ
DDTC144VCA	47KΩ	10KΩ
DDTC144WCA	47KΩ	22KΩ

**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

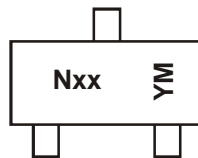
**Mechanical Data**

- Case: 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)


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

Product	Grade	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC113ZCA-7-F	Commercial	N02	7	8	3,000
DDTC123YCA-7-F	Commercial	N05	7	8	3,000
DDTC123JCA-7-F	Commercial	N06	7	8	3,000
DDTC143XCA-7-F	Commercial	N09	7	8	3,000
DDTC143FCA-7-F	Commercial	N10	7	8	3,000
DDTC143ZCA-7-F	Commercial	N11	7	8	3,000
DDTC143ZCAQ-7-F	Automotive	N11	7	8	3,000
DDTC143ZCAQ-13-F	Automotive	N11	13	8	10,000
DDTC114YCA-7-F	Commercial	N14	7	8	3,000
DDTC114YCAQ-7-F	Automotive	N14	7	8	3,000
DDTC114YCAQ-13-F	Automotive	N14	13	8	10,000
DDTC114WCA-7-F	Commercial	N15	7	8	3,000
DDTC124XCA-7-F	Commercial	N18	7	8	3,000
DDTC144VCA-7-F	Commercial	N21	7	8	3,000
DDTC144WCA-7-F	Commercial	N22	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: T = 2006)  
 M = Month (ex: 9 = September)

**Date Code Key**

Year Code	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	N	P	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E

Month Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	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>	DDTC113ZCA -5 to +10 DDTC123YCA -5 to +12 DDTC123JCA -5 to +12 DDTC143XCA -7 to +20 DDTC143FCA -6 to +30 DDTC143ZCA -5 to +30 DDTC114YCA -6 to +40 DDTC114WCA -10 to +30 DDTC124XCA -10 to +40 DDTC144VCA -15 to +40 DDTC144WCA -10 to +40	V
Output Current	I <sub>O</sub>	DDTC113ZCA 100 DDTC123YCA 100 DDTC123JCA 100 DDTC143XCA 100 DDTC143FCA 100 DDTC143ZCA 100 DDTC114YCA 70 DDTC114WCA 100 DDTC124XCA 50 DDTC144VCA 30 DDTC144WCA 30	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

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	
Input Voltage	DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA	V <sub>I(OFF)</sub>	0.3 0.3 0.5 0.3 0.3 0.5 0.3 0.8 0.4 1.0 0.8	—	—	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
	DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA		V <sub>I(ON)</sub>	—	—	3.0 3.0 1.1 2.5 1.3 1.3 1.4 3.0 2.5 5.0 4.0		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 3mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA
Output Voltage		V <sub>O(ON)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA DDTC123JCA I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA DDTC143ZCA I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA DDTC114YCA I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA All Others	
Input Current	DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA	I <sub>I</sub>	—	—	7.2 3.8 3.6 1.8 1.8 1.8 0.88 0.88 0.36 0.16 0.16	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	DDTC113ZCA DDTC123YCA DDTC123JCA DDTC143XCA DDTC143FCA DDTC143ZCA DDTC114YCA DDTC114YCAQ DDTC114WCA DDTC124XCA DDTC144VCA DDTC144WCA	G <sub>I</sub>	33 33 80 30 68 80 68 80 24 68 33 56	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA 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> = 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	
Input Resistor Tolerance		ΔR <sub>1</sub>	-30	—	+30	%	—	
Resistance Ratio Tolerance		ΔR <sub>2</sub> /R <sub>1</sub>	-20	—	+20	%	—	
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 – DDTC123JCA**

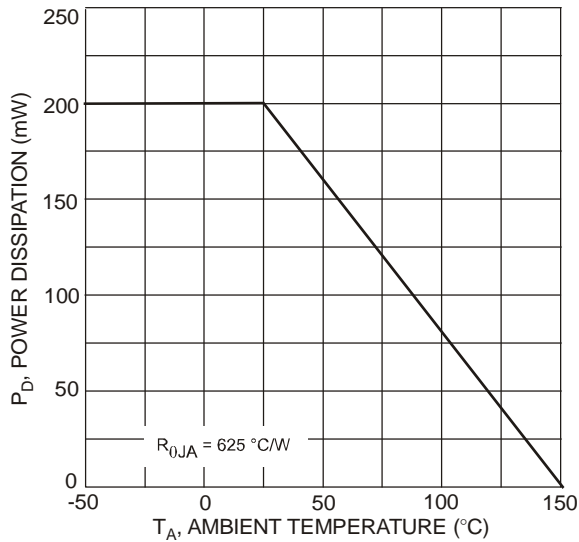


Fig. 1 Power Dissipation vs. Ambient Temperature

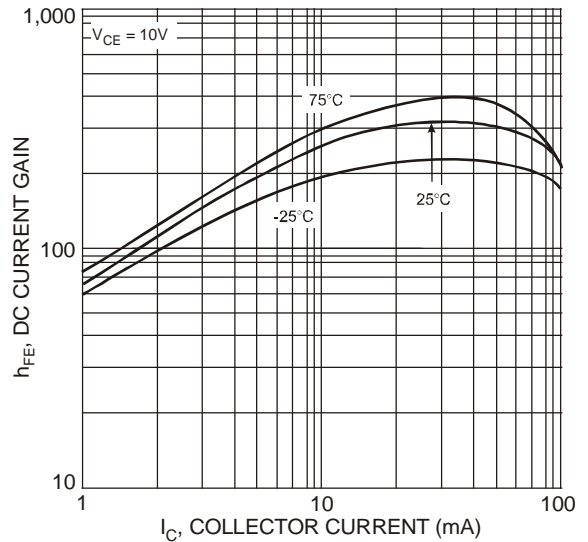


Fig. 2 Typical DC Current Gain vs. Collector Current

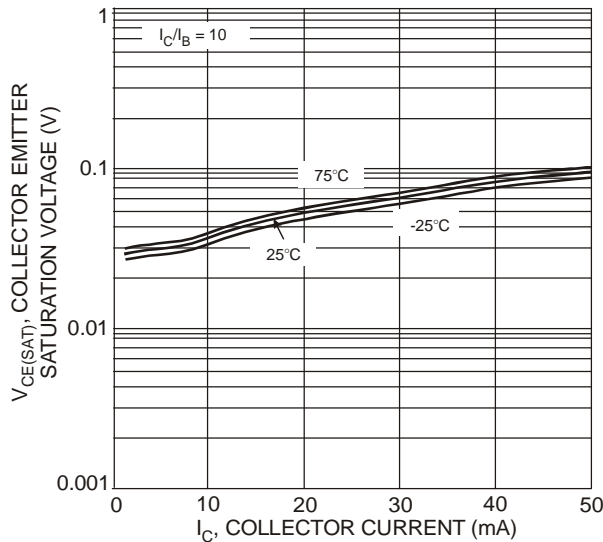


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

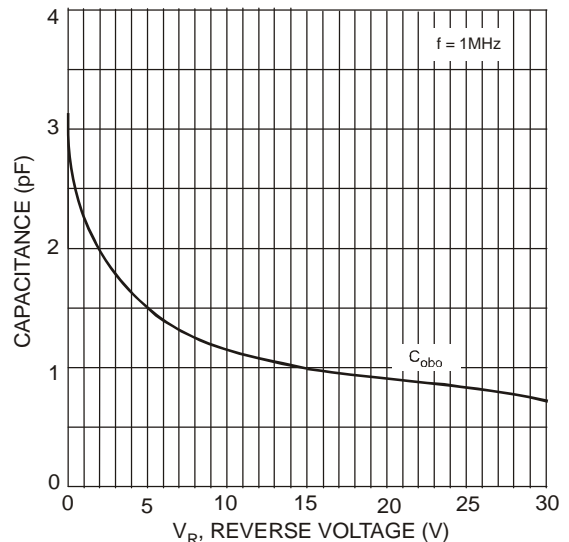


Fig. 4 Typical Capacitance Characteristics

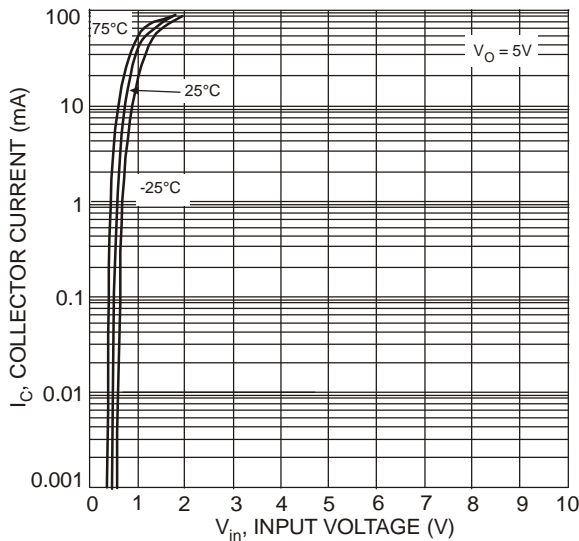


Fig. 5 Collector Current vs. Input Voltage

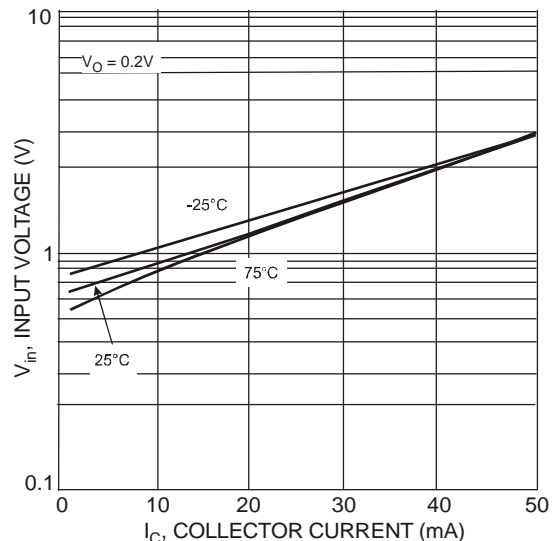
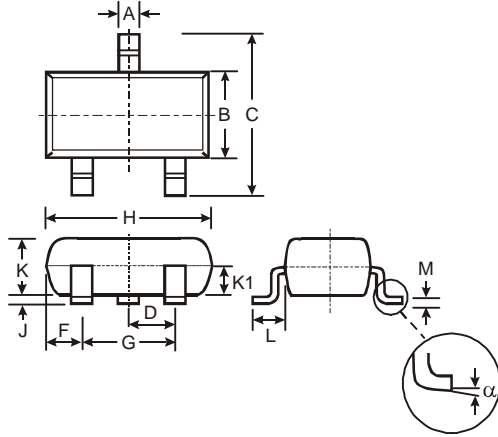


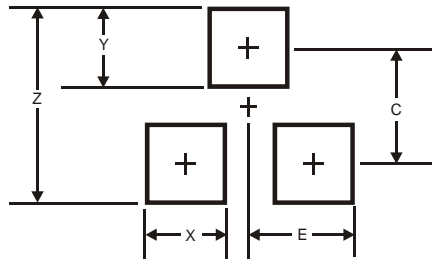
Fig. 6 Input Voltage vs. Collector Current

**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
α	0°	8°	-
All Dimensions in mm			

**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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