

NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

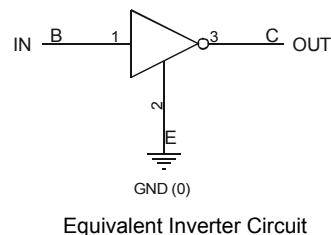
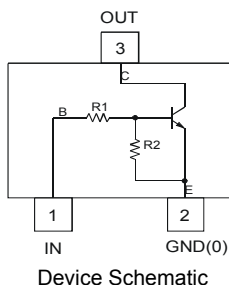
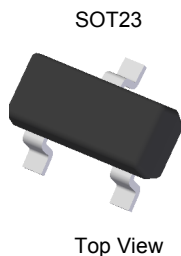
Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability PPAP Capable (Note 4)**

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 @3
- Weight: 0.008 grams (approximate)

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

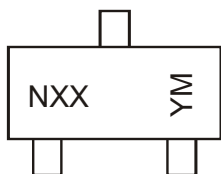


Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC123ECA-7-F	AEC-Q101	N04	7	8	3,000
DDTC123ECAQ-7-F	Automotive	N04	7	8	3,000
DDTC143ECA-7-F	AEC-Q101	N08	7	8	3,000
DDTC143ECA-13-F	AEC-Q101	N08	13	8	10,000
DDTC114ECA-7-F	AEC-Q101	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	AEC-Q101	N17	7	8	3,000
DDTC144ECA-7-F	AEC-Q101	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	AEC-Q101	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. See 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/.
 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	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				

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

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

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R _{θJA}	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Note: 6. Mounted on FR4 PC Board with minimum recommended pad layout

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage		V _{I(off)}	0.5	1.1	—	V	V _{CC} = 5V, I _O = 100μA
		V _{I(on)}	—	1.9	3		V _O = 0.3V, I _O = 20mA, DDTC123ECA V _O = 0.3V, I _O = 20mA, DDTC143ECA V _O = 0.3V, I _O = 10mA, DDTC114ECA V _O = 0.3V, I _O = 5mA, DDTC124ECA V _O = 0.3V, I _O = 2mA, DDTC144ECA V _O = 0.3V, I _O = 1mA, DDTC115ECA
Output Voltage		V _{O(on)}	—	0.1	0.3	V	I _O /I _I = 10mA/0.5mA DDTC123ECA I _O /I _I = 10mA/0.5mA DDTC143ECA I _O /I _I = 10mA/0.5mA DDTC114ECA I _O /I _I = 10mA/0.5mA DDTC124ECA I _O /I _I = 10mA/0.5mA DDTC144ECA I _O /I _I = 5mA/0.25mA DDTC115ECA
Input Current	DDTC123ECA DDTC143ECA DDTC114ECA DDTC124ECA DDTC144ECA DDTC115ECA	I _I	—	—	3.8 1.8 0.88 0.36 0.18 0.15	mA	V _I = 5V
Output Current		I _{O(off)}	—	—	0.5	μA	V _{CC} = 50V, V _I = 0V
DC Current Gain	DDTC123ECA DDTC143ECA DDTC114ECA DDTC114ECAQ DDTC124ECA DDTC144ECA DDTC144ECAQ DDTC115ECA	G _I	20 20 30 35 56 68 80 82	—	—	—	V _O = 5V, I _O = 20mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA
Input Resistor Tolerance		ΔR ₁	-30	—	+30	%	—
Resistance Ratio Tolerance		ΔR ₂ /R ₁	0.8	1	1.2	%	—
Gain-Bandwidth Product (Note 7)		f _T	—	250	—	MHz	V _{CE} = 10V, I _E = 5mA, f = 100MHz

Note: 7. Transistor - For Reference Only

Typical Characteristics – DDTC143ECA (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

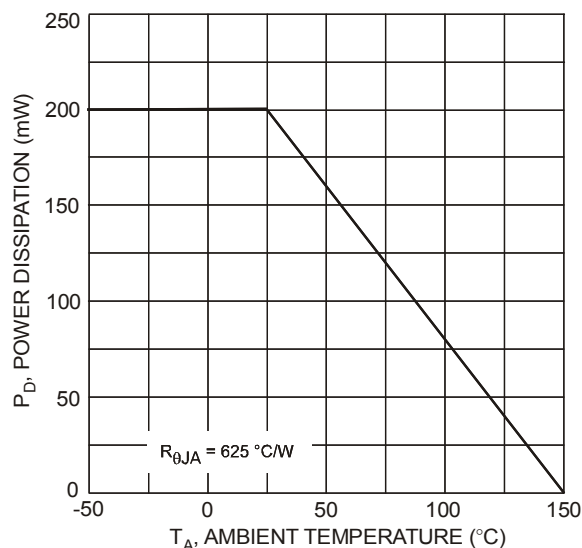


Fig. 1 Power Dissipation vs. Ambient Temperature

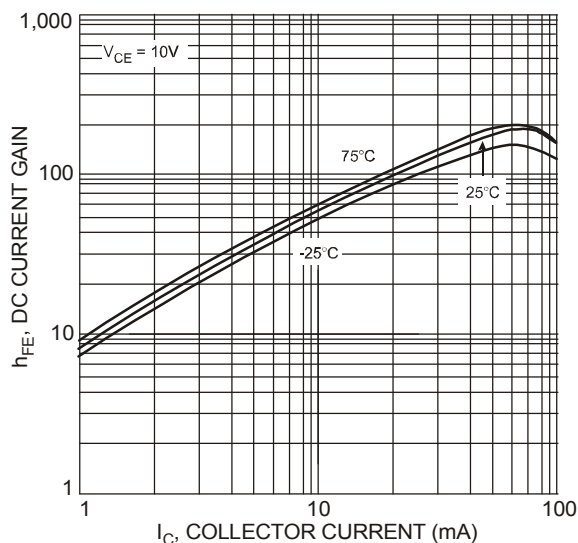


Fig. 2 Typical DC Current Gain vs. Collector Current

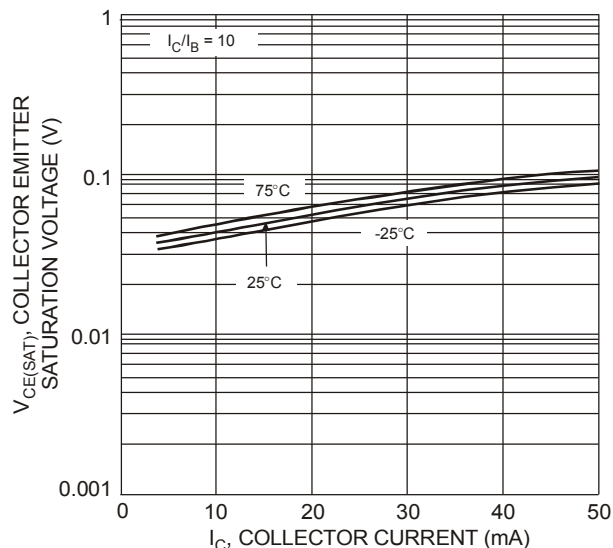


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

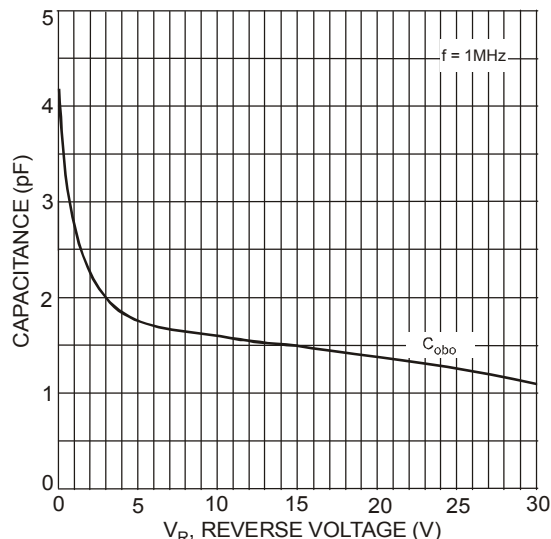


Fig. 4 Typical Capacitance Characteristics

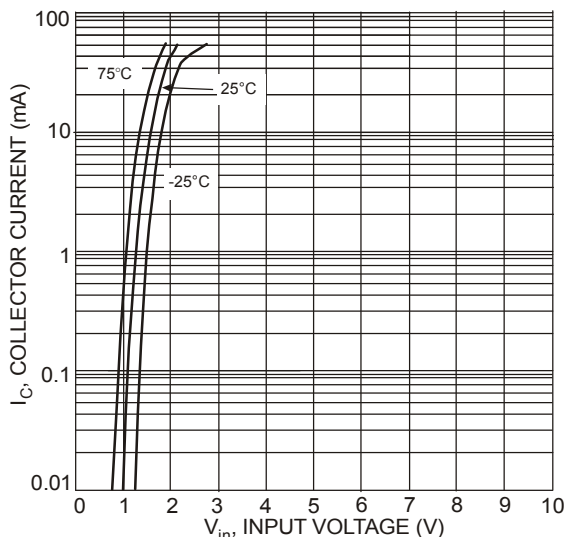


Fig. 5 Collector Current vs. Input Voltage

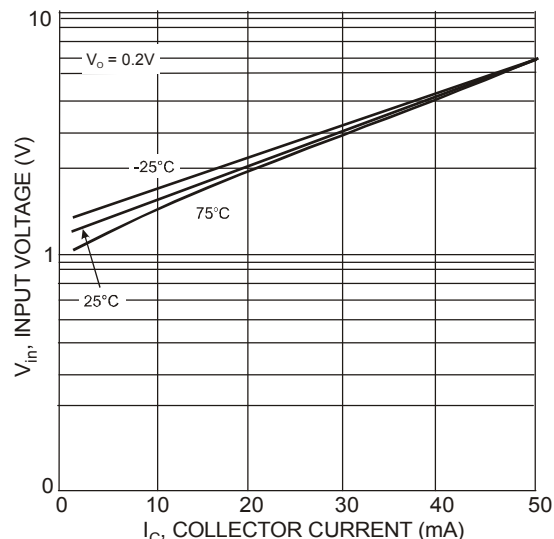
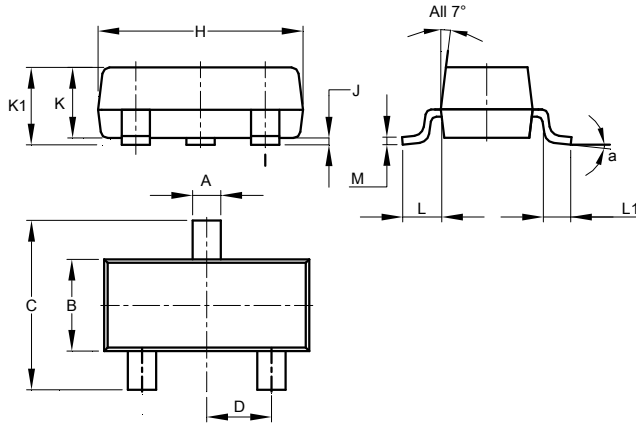


Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions

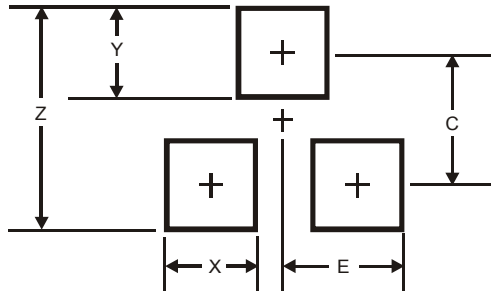
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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