



**THE DATASHEET OF  
DDTC115ECA-7-F**



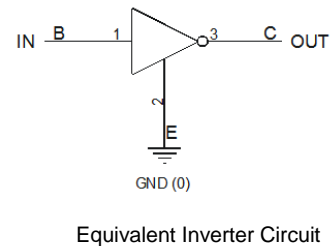
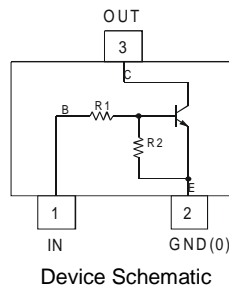
**NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR**
**Features**

- 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**

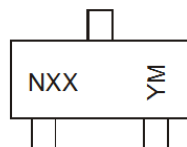
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208③
- Weight: 0.008 grams (Approximate)

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


**Ordering Information** (Notes 4, 5 & 6)

Part Number	Status	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DDTC123ECA-7-F	Active	AEC-Q101	N04	7	8	3,000
DDTC123ECAQ-7-F	Active	Automotive	N04	7	8	3,000
DDTC143ECA-7-F	Active	AEC-Q101	N08	7	8	3,000
DDTC143ECA-13-F	Active	AEC-Q101	N08	13	8	10,000
DDTC114ECA-7-F	Active	AEC-Q101	N13	7	8	3,000
DDTC114ECAQ-7-F	NRND (Use ADTC114ECAQ)	Automotive	N13	7	8	3,000
DDTC114ECAQ-13-F	NRND (Use ADTC114ECAQ)	Automotive	N13	13	8	10,000
DDTC124ECA-7-F	Active	AEC-Q101	N17	7	8	3,000
DDTC144ECA-7-F	Active	AEC-Q101	N20	7	8	3,000
DDTC144ECAQ-7-F	Active	Automotive	N20	7	8	3,000
DDTC144ECAQ-13-F	Active	Automotive	N20	13	8	10,000
DDTC115ECA-7-F	Active	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) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
  6. NRND = Not Recommended for New Design.

**Marking Information**


NXX = Product Type Marking Code, See Ordering Information  
 YM = Date Code Marking  
 Y = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

**Date Code Key**

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
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
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	
	DDTC115ECA		-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 7)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 7)	R <sub>θJA</sub>	625	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Note: 7. Mounted on FR4 PC Board with minimum recommended pad layout

**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 <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
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 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 (Note 8)	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz

Note: 8. Transistor - For Reference Only

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

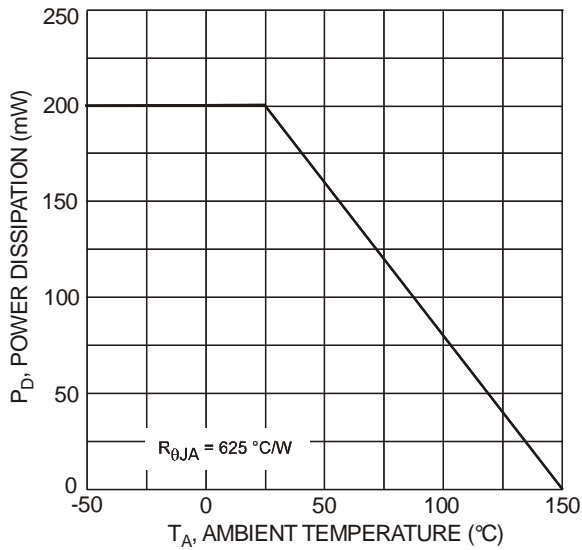


Fig. 1 Power Dissipation vs. Ambient Temperature

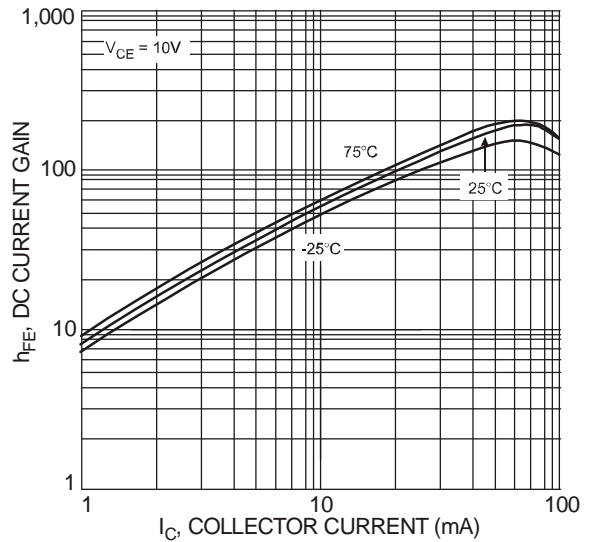


Fig. 2 Typical DC Current Gain vs. Collector Current

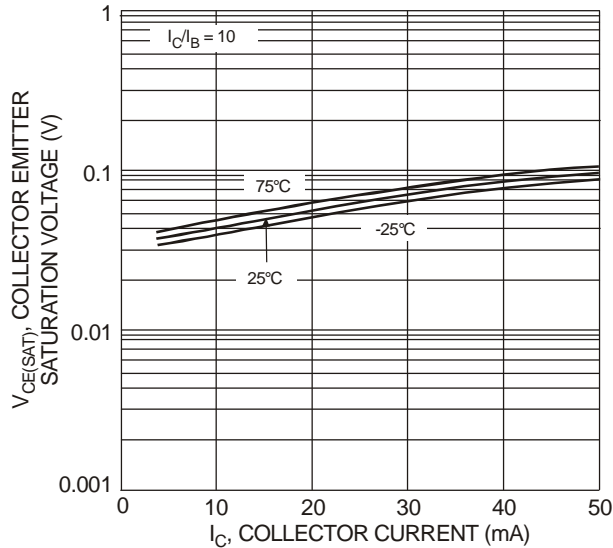


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

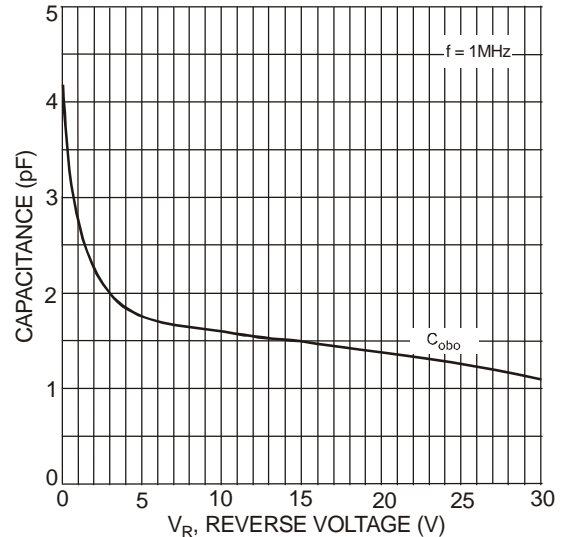


Fig. 4 Typical Capacitance Characteristics

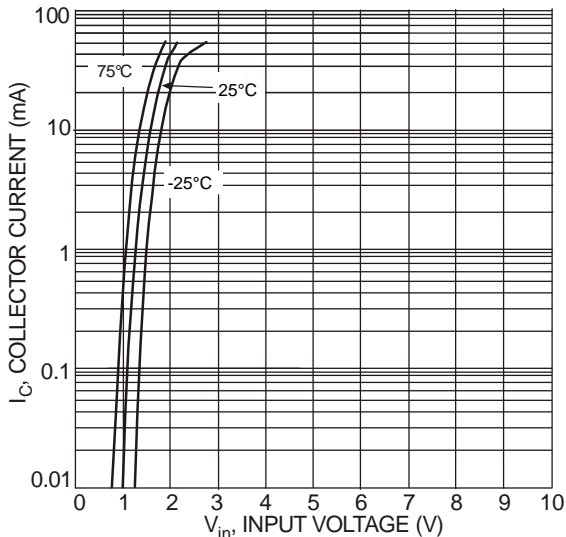


Fig. 5 Collector Current vs. Input Voltage

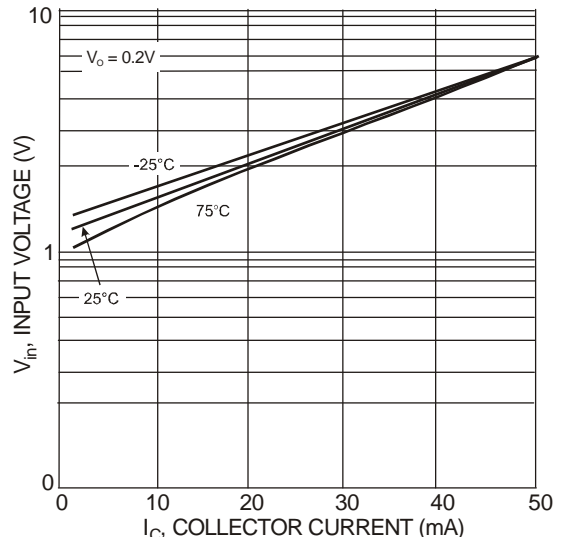
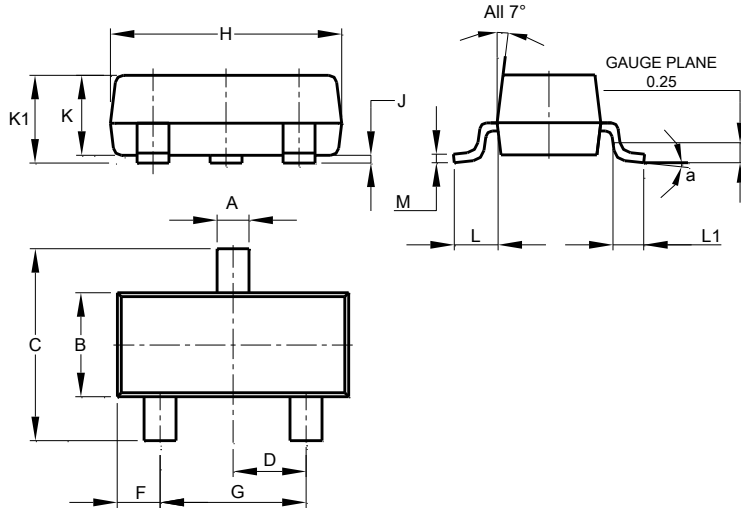


Fig. 6 Input Voltage vs. Collector Current

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**

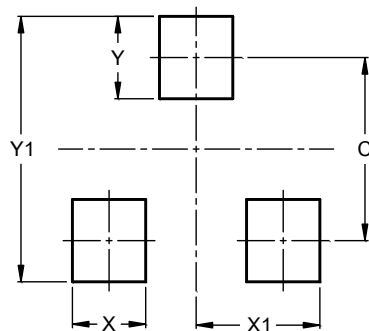


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT23**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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