DDTC (R1 = R2 SERIES) UA

NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

Product Summary

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

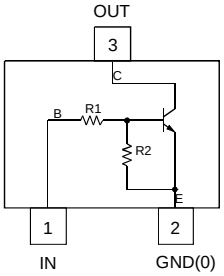
Features and Benefits

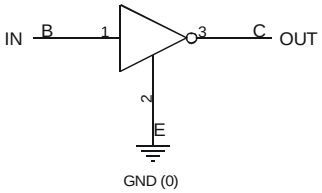
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **"Lead Free", RoHS Compliant (Note 1)**
- **Halogen and Antimony Free "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

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)

SOT323





Top View

Device Schematic

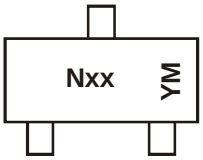
Equivalent Inverter Circuit

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

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Maximum Ratings @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage <Pine: (3) to (2)>		V_{CC}	50	V
Input Voltage <Pin: (1) to (2)>	DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC144EUA DDTC115EUA	V_{IN}	-10 to +12 -10 to +30 -10 to +40 -10 to +40 -10 to +40 -10 to +40	V
Output Current	DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC144EUA DDTC115EUA	I_O	100 100 50 30 100 20	mA
Output Current	All	$I_{C(MAX)}$	100	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 5 & 6)	P_D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

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	V_O = 0.3V, I_O = 20mA, DDTC123EUA V_O = 0.3V, I_O = 20mA, DDTC143EUA V_O = 0.3V, I_O = 10mA, DDTC114EUA V_O = 0.3V, I_O = 5mA, DDTC124EUA V_O = 0.3V, I_O = 2mA, DDTC144EUA V_O = 0.3V, I_O = 1mA, DDTC115EUA
Output Voltage		$V_{O(ON)}$	—	0.1	0.3	V	I_O/I_I = 10mA/0.5mA, DDTC123EUA I_O/I_I = 10mA/0.5mA, DDTC143EUA I_O/I_I = 10mA/0.5mA, DDTC114EUA I_O/I_I = 10mA/0.5mA, DDTC124EUA I_O/I_I = 10mA/0.5mA, DDTC144EUA I_O/I_I = 5mA/0.25mA, DDTC115EUA
Input Current	DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC144EUA DDTC115EUA	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	DDTC123EUA DDTC143EUA DDTC114EUA DDTC124EUA DDTC144EUA DDTC144EUAQ DDTC115EUA	G_I	20 20 30 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
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio		R_2/R_1	0.8	1	1.2	—	—
Gain-Bandwidth Product*		f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 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.

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Typical Curves – DDTC143EUA @T_A = 25°C unless otherwise specified

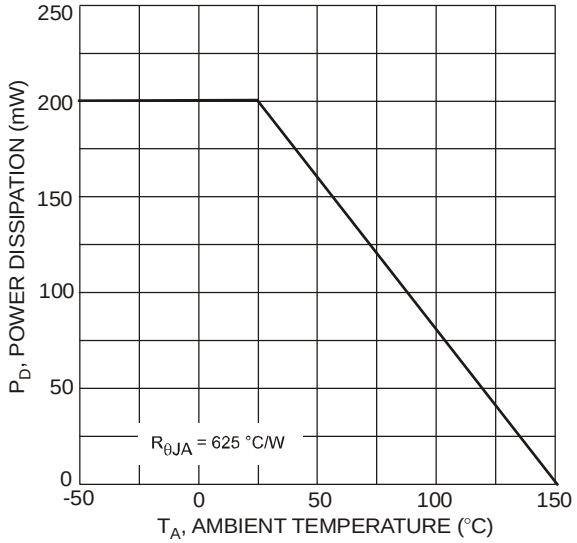

Fig. 1 Power Dissipation vs. Ambient Temperature

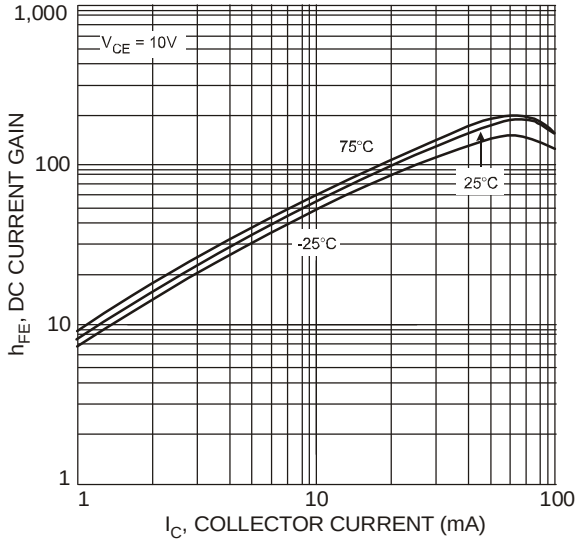

Fig. 2 Typical DC Current Gain vs. Collector Current

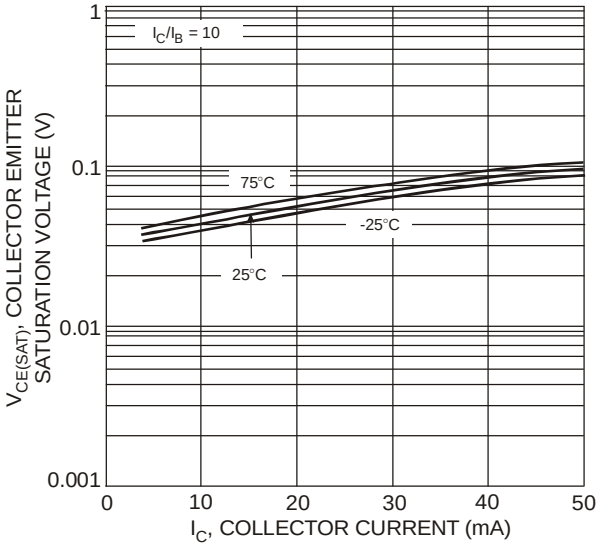

Fig. 3. Collector Emitter Saturation Voltage vs. Collector Current

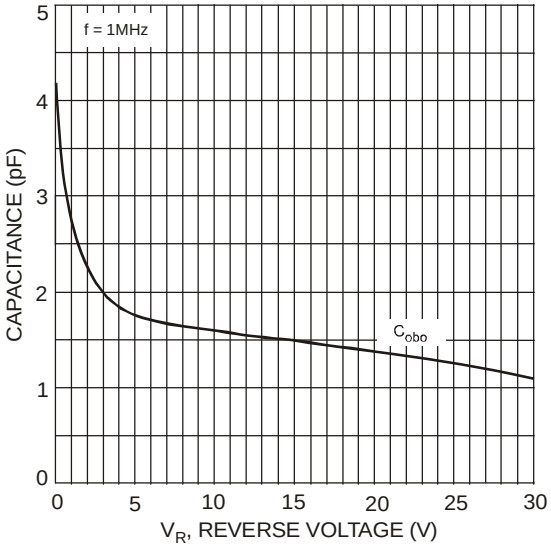

Fig. 4 Typical Capacitance Characteristics

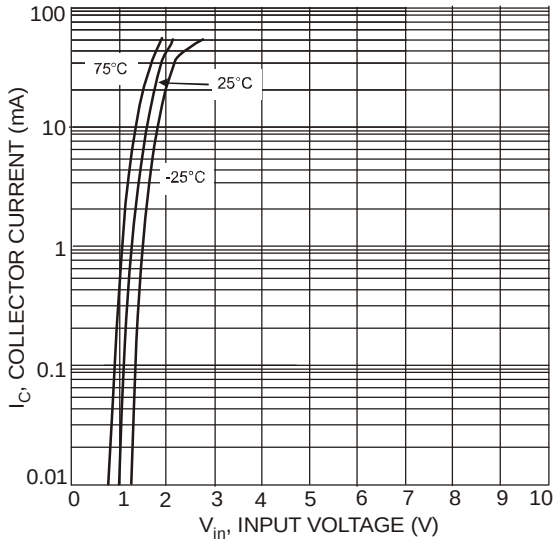

Fig. 5 Collector Current vs. Input Voltage

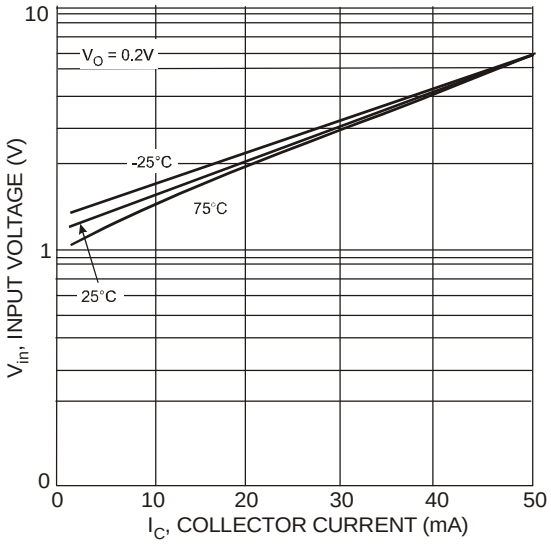

Fig. 6 Input Voltage vs. Collector Current

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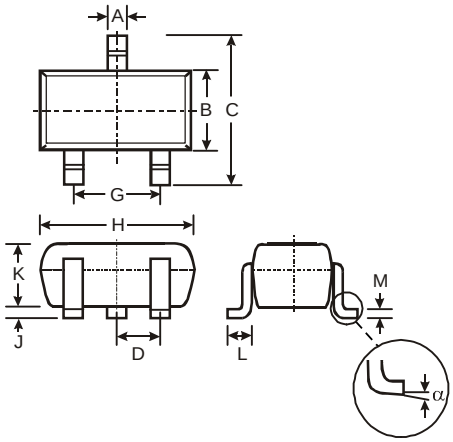
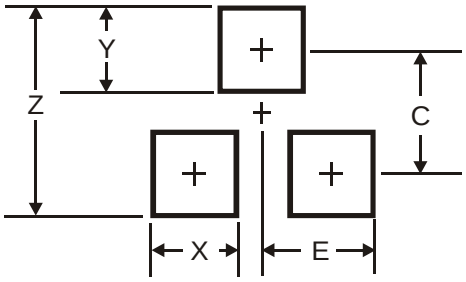
Package Outline Dimensions



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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