DDTC (R1 = R2 SERIES) UA

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

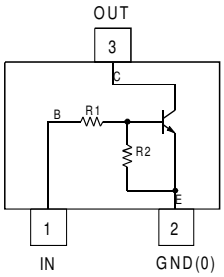
- Case: SOT323
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

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

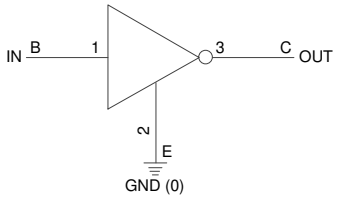
SOT323



Top View



Device Schematic



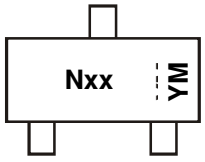
Equivalent Inverter Circuit

Ordering Information (Note 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
DDTC123EUA-7-F	AEC-Q101	N04	7	8	3,000
DDTC143EUA-7-F	AEC-Q101	N08	7	8	3,000
DDTC114EUA-7-F	AEC-Q101	N13	7	8	3,000
DDTC114EUAQ-7-F	Automotive	N13	7	8	3,000
DDTC124EUA-7-F	AEC-Q101	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	AEC-Q101	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	AEC-Q101	N24	7	8	3,000
DDTC115EUAQ-7-F	Automotive	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/.

Marking Information



Nxx = Product Type Marking Code (See Table Above)
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
Code	F	G	H	I	J	K	L	M

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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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)>	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 (Note 6)	P_D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	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 = 1mA, DDTC115EUA
				1.4	3		V_O = 0.3V, I_O = 2mA, DDTC144EUA
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 (Note 7)		f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

Notes: 6. Mounted on FR-4 PC Board with minimum recommended pad layout.
7. Transistor - For Reference Only.

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Typical Curves – DDTC143EUA (@T_A = +25°C, unless otherwise specified.)

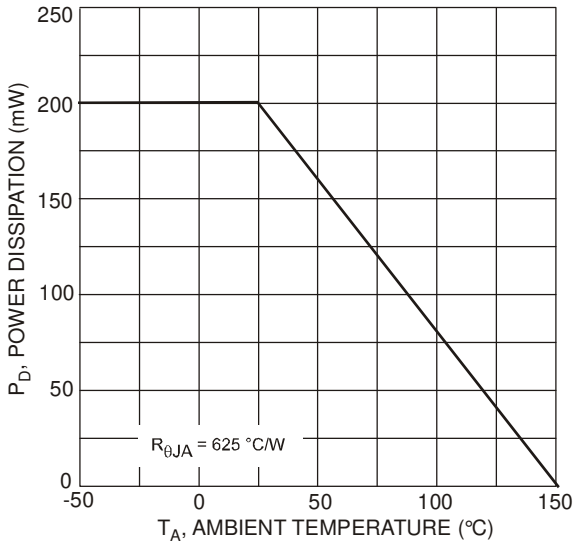


Fig. 1 Power Dissipation vs. Ambient Temperature

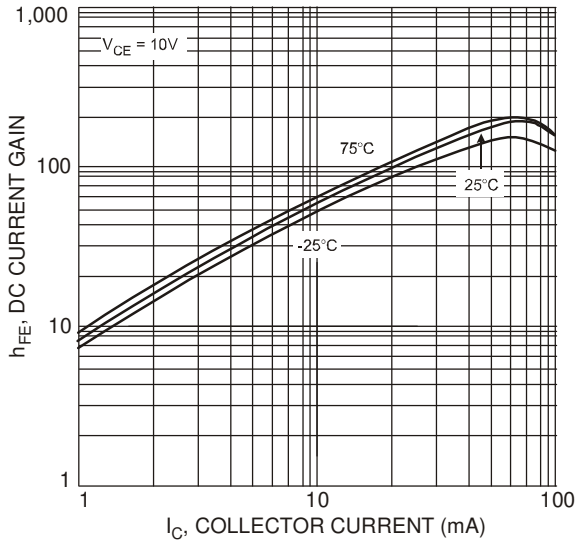


Fig. 2 Typical DC Current Gain vs. Collector Current

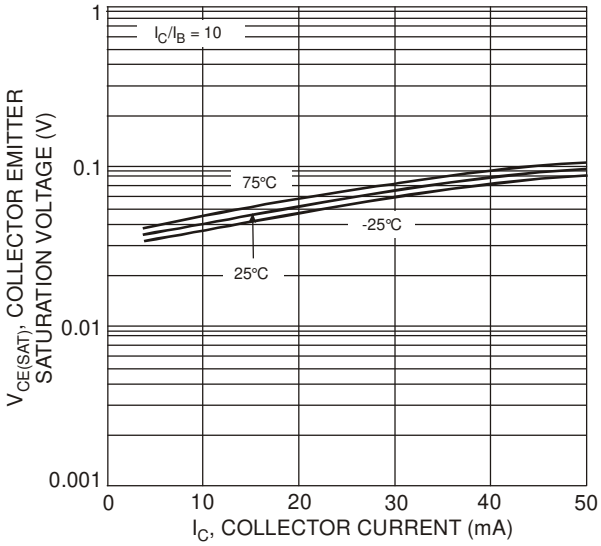


Fig. 3. Collector Emitter Saturation Voltage vs. Collector Current

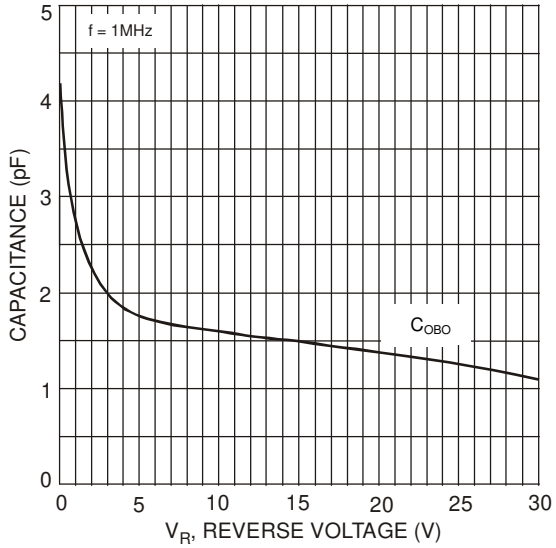


Fig. 4 Typical Capacitance Characteristics

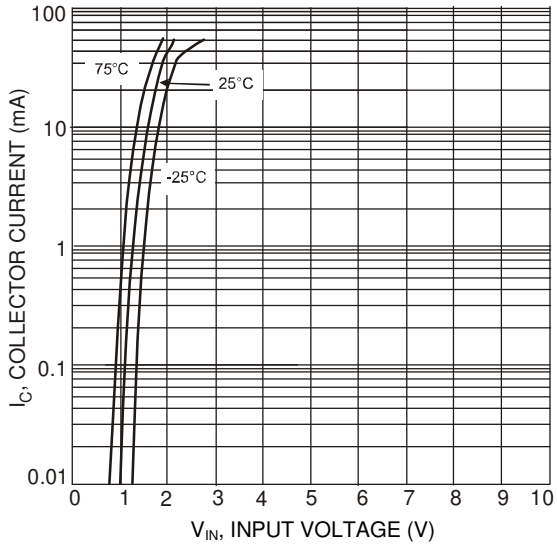


Fig. 5 Collector Current vs. Input Voltage

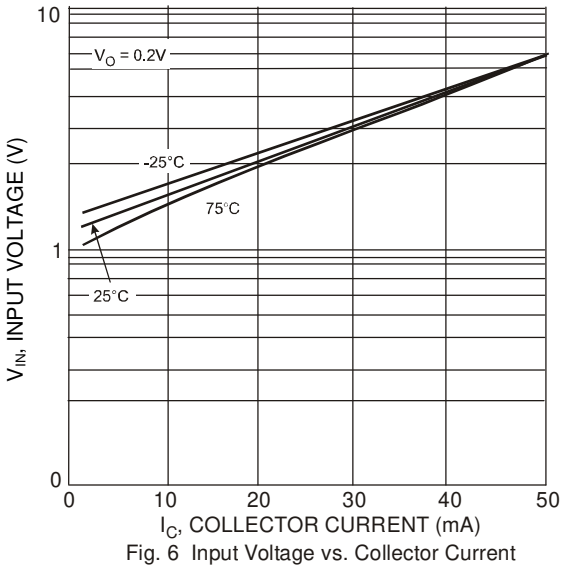


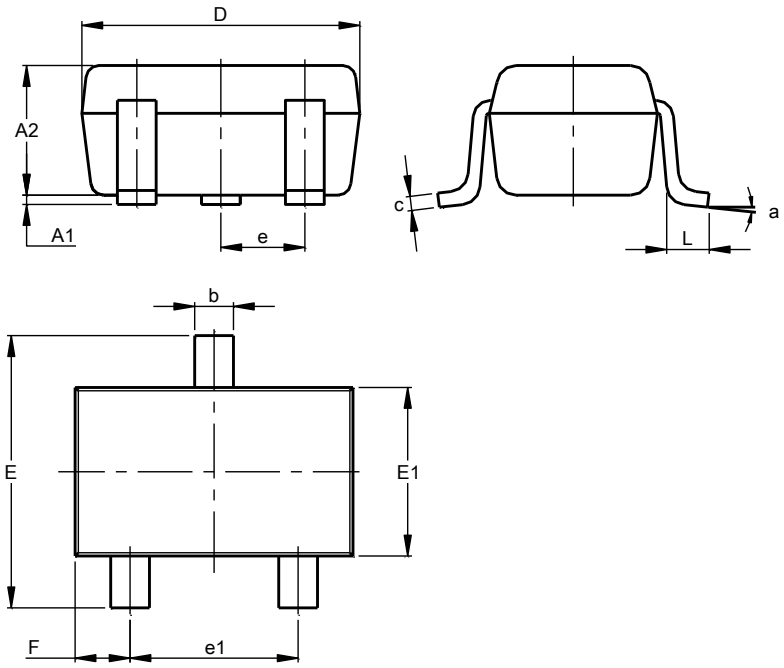
Fig. 6 Input Voltage vs. Collector Current

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Package Outline Dimensions

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

SOT323

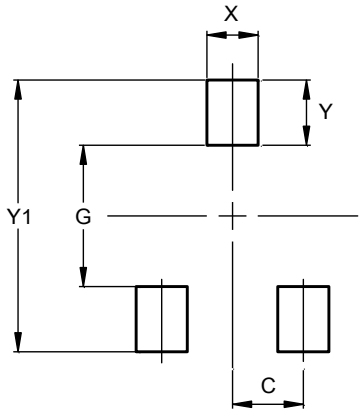


SOT323			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT323



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.470
Y	0.600
Y1	2.500

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