DDTC (R1≠R2 SERIES) UA

50V NPN PRE-BIASED TRANSISTORS IN SOT323

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- Surface Mount Package Suited for Automated Assembly
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative.**
  https://www.diodes.com/quality/product-definitions/

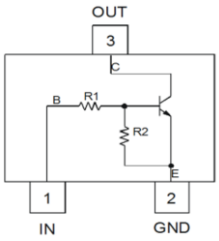
Mechanical Data

- Package: SOT323
- Package 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: 0.006 grams (Approximate)

Part Number	R1(NOM)	R2(NOM)
DDTC113ZUA	1kΩ	10kΩ
DDTC123YUA	2.2kΩ	10kΩ
DDTC123JUA	2.2kΩ	47kΩ
DDTC143XUA	4.7kΩ	10kΩ
DDTC143FUA	4.7kΩ	22kΩ
DDTC143ZUA	4.7kΩ	47kΩ
DDTC114YUA	10kΩ	47kΩ
DDTC114WUA	10kΩ	4.7kΩ
DDTC124XUA	22kΩ	47kΩ
DDTC144VUA	47kΩ	10kΩ
DDTC144WUA	47kΩ	22kΩ

SOT323

Top View



Device Schematic

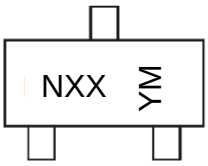
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Quantity	Carrier
DDTC113ZUA-7-F	SOT323	N02	7	8	3,000	Reel
DDTC123YUA-7-F	SOT323	N05	7	8	3,000	Reel
DDTC123JUA-7-F	SOT323	N06	7	8	3,000	Reel
DDTC143XUA-7-F	SOT323	N09	7	8	3,000	Reel
DDTC143FUA-7-F	SOT323	N10	7	8	3,000	Reel
DDTC143ZUA-7-F	SOT323	N11	7	8	3,000	Reel
DDTC114YUA-7-F	SOT323	N14	7	8	3,000	Reel
DDTC114WUA-7-F	SOT323	N15	7	8	3,000	Reel
DDTC124XUA-7-F	SOT323	N18	7	8	3,000	Reel
DDTC144VUA-7-F	SOT323	N21	7	8	3,000	Reel
DDTC144WUA-7-F	SOT323	N22	7	8	3,000	Reel

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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information

SOT323



NXX = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$= Year (ex: K = 2023)
M = Month (ex: D = December)

Date Code Key

Year	2020	……	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	H	……	K	L	M	N	P	R	S	T	U	V

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 NPN Section (@T_{amb} = +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)>	DDTC113ZUA	V_{IN}	-5 to +10	V
	DDTC123YUA		-5 to +12	
	DDTC123JUA		-5 to +12	
	DDTC143XUA		-7 to +20	
	DDTC143FUA		-6 to +30	
	DDTC143ZUA		-5 to +30	
	DDTC114YUA		-6 to +40	
	DDTC114WUA		-10 to +30	
	DDTC124XUA		-10 to +40	
	DDTC144VUA		-15 to +40	
	DDTC144WUA		-10 to +40	
Output Current	DDTC113ZUA	I_{OUT}	100	mA
	DDTC123YUA		100	
	DDTC123JUA		100	
	DDTC143XUA		100	
	DDTC143FUA		100	
	DDTC143ZUA		100	
	DDTC114YUA		70	
	DDTC114WUA		100	
	DDTC124XUA		50	
	DDTC144VUA		30	
	DDTC144WUA		30	
Output Current		I_C (max)	100	mA

Thermal Characteristics (@T_{amb} = +25°C, unless otherwise specified.)

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

Notes: 5. Mounted on FR4 PC Board with minimum recommended pad layout.
6. 150mW per element must not be exceeded.

Electrical Characteristics (@T_{amb} = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
	DDTC113ZUA	$V_{IN(off)}$	0.3	—	—		V_{CC} = 5V, I_{OUT} = 100µA
	DDTC123YUA		0.3				
	DDTC123JUA		0.5				
	DDTC143XUA		0.3				
	DDTC143FUA		0.3				
	DDTC143ZUA		0.5				
	DDTC114YUA		0.3				
	DDTC114WUA		0.8				
	DDTC124XUA		0.4				
	DDTC144VUA		1.0				
	DDTC144WUA		0.8				
Input Voltage	DDTC113ZUA	$V_{IN(on)}$	—	—	3.0	V	V_{OUT} = 0.3V, I_{OUT} = 20mA
	DDTC123YUA				3.0		V_{OUT} = 0.3V, I_{OUT} = 20mA
	DDTC123JUA				1.1		V_{OUT} = 0.3V, I_{OUT} = 5mA
	DDTC143XUA				2.5		V_{OUT} = 0.3V, I_{OUT} = 20mA
	DDTC143FUA				1.3		V_{OUT} = 0.3V, I_{OUT} = 3mA
	DDTC143ZUA				1.3		V_{OUT} = 0.3V, I_{OUT} = 5mA
	DDTC114YUA				1.4		V_{OUT} = 0.3V, I_{OUT} = 1mA
	DDTC114WUA				3.0		V_{OUT} = 0.3V, I_{OUT} = 2mA
	DDTC124XUA				2.5		V_{OUT} = 0.3V, I_{OUT} = 2mA
	DDTC144VUA				5.0		V_{OUT} = 0.3V, I_{OUT} = 2mA
	DDTC144WUA				4.0		V_{OUT} = 0.3V, I_{OUT} = 2mA
Output Voltage		$V_{OUT(on)}$	—	0.1	0.3	V	I_{OUT}/I_{IN} = 5mA / 0.25mA DDTC123JUA
							I_{OUT}/I_{IN} = 5mA / 0.25mA DDTC143ZUA
							I_{OUT}/I_{IN} = 5mA / 0.25mA DDTC114YUA
							I_{OUT}/I_{IN} = 10mA / 0.5mA All Others
Input Current	DDTC113ZUA	I_{IN}	—	—	7.2	mA	V_{IN} = 5V
	DDTC123YUA				3.8		
	DDTC123JUA				3.6		
	DDTC143XUA				1.8		
	DDTC143FUA				1.8		
	DDTC143ZUA				1.8		
	DDTC114YUA				0.88		
	DDTC114WUA				0.88		
	DDTC124XUA				0.36		
	DDTC144VUA				0.16		
	DDTC144WUA				0.16		
Output Current		$I_{OUT(off)}$	—	—	0.5	µA	V_{CC} = 50V, V_{IN} = 0V
DC Current Gain	DDTC113ZUA	G_I	33	—	—	—	V_{OUT} = 5V, I_{OUT} = 5mA
	DDTC123YUA		33				V_{OUT} = 5V, I_{OUT} = 10mA
	DDTC123JUA		80				V_{OUT} = 5V, I_{OUT} = 10mA
	DDTC143XUA		30				V_{OUT} = 5V, I_{OUT} = 10mA
	DDTC143FUA		68				V_{OUT} = 5V, I_{OUT} = 10mA
	DDTC143ZUA		80				V_{OUT} = 5V, I_{OUT} = 10mA
	DDTC114YUA		68				V_{OUT} = 5V, I_{OUT} = 5mA
	DDTC114WUA		24				V_{OUT} = 5V, I_{OUT} = 10mA
	DDTC124XUA		68				V_{OUT} = 5V, I_{OUT} = 5mA
	DDTC144VUA		33				V_{OUT} = 5V, I_{OUT} = 5mA
	DDTC144WUA		56				V_{OUT} = 5V, I_{OUT} = 5mA
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		$\Delta R_2/R_1$	-20	—	+20	%	—
Gain-Bandwidth Product		f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

Typical Curves – Total Device

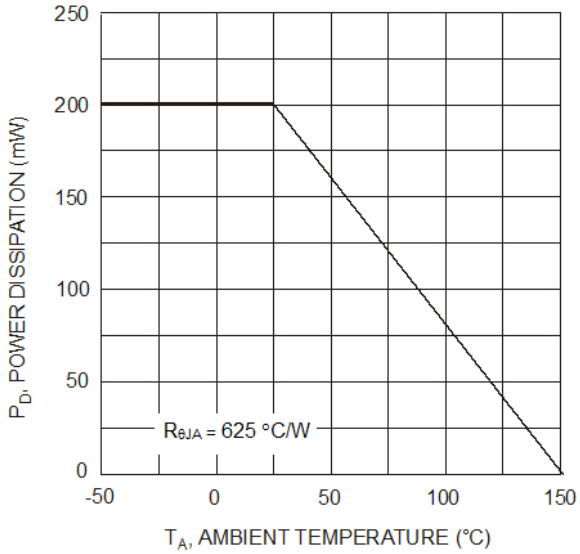


Figure 1. Derating Curve

Typical Curves – DDTC123JUA (@T_A = +25°C, unless otherwise specified.)

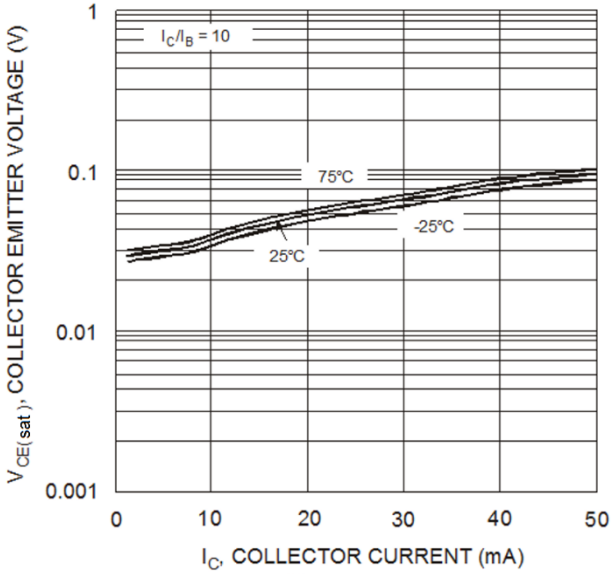


Figure 2. $V_{CE(sat)}$ VS I_C

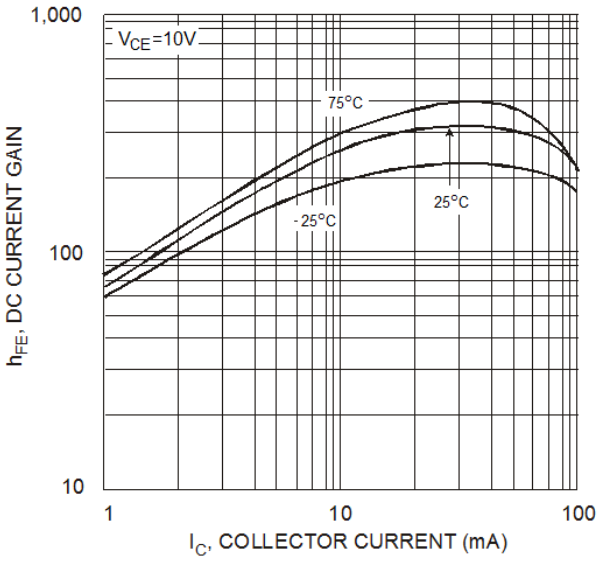


Figure 3. DC Current Gain

Typical Curves – DDTC123JUA (continued)

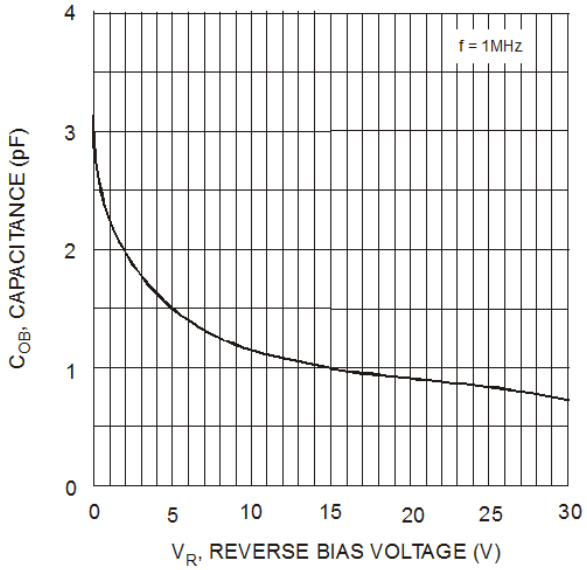


Figure 4. Output Capacitance

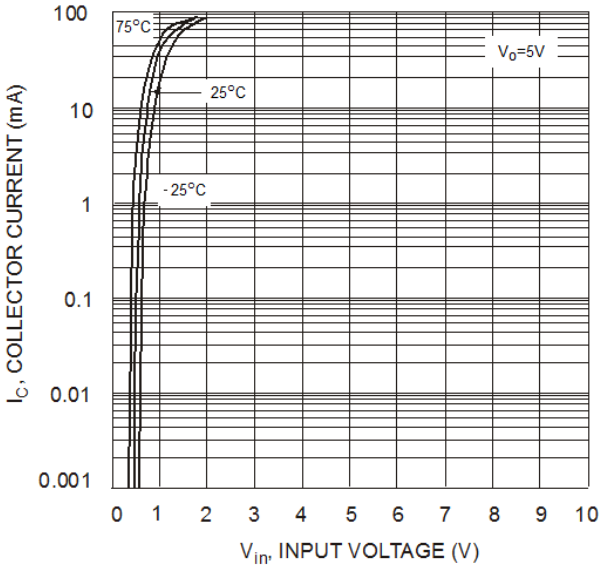


Figure 5. Collector Current vs Input Voltage

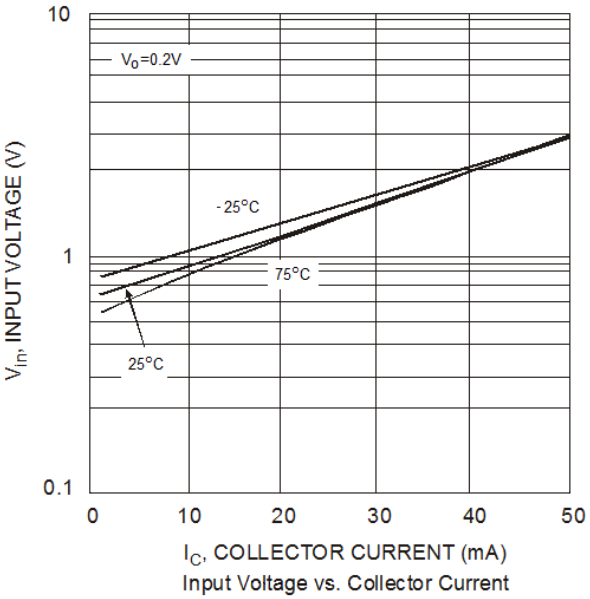
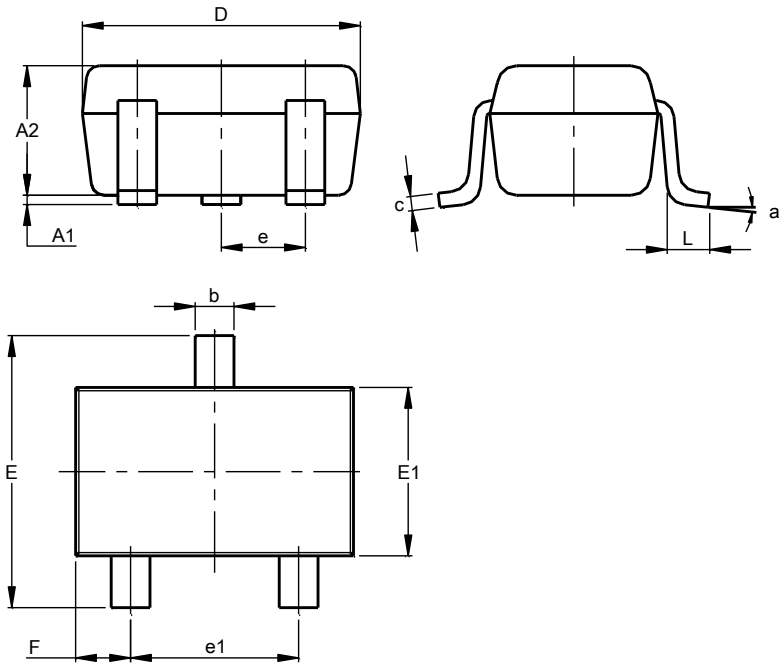


Figure 6. Input Voltage vs Collector Current

Package Outline Dimensions

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

SOT323

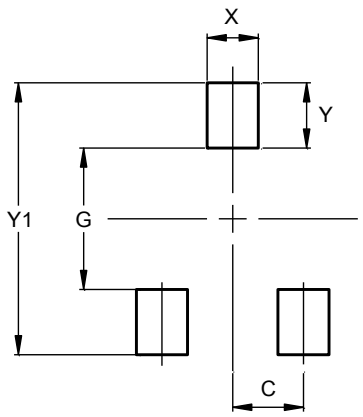


SOT323			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.25	0.40	0.30
c	0.10	0.18	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
e1	1.20	1.40	1.30
F	0.375	0.475	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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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