DDTC (R1≠R2 SERIES) E

NPN PRE-BIASED TRANSISTOR IN SOT523

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)**
- **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

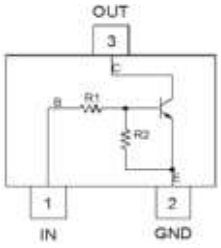
- Package: SOT523
- Package Material: Molded Plastic, "Green" Molding Compound UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.002 grams (Approximate)

Part Number	R1 (NOM)	R2 (NOM)
DDTC113ZE	1kΩ	10kΩ
DDTC123YE	2.2kΩ	10kΩ
DDTC123JE	2.2kΩ	47kΩ
DDTC143XE	4.7kΩ	10kΩ
DDTC143FE	4.7kΩ	22kΩ
DDTC143ZE	4.7kΩ	47kΩ
DDTC114YE	10kΩ	47kΩ
DDTC114WE	10kΩ	4.7kΩ
DDTC124XE	22kΩ	47kΩ
DDTC144VE	47kΩ	10kΩ
DDTC144WE	47kΩ	22kΩ

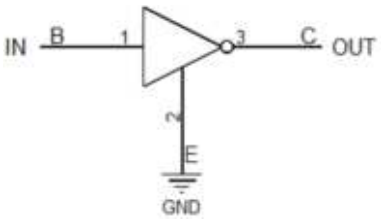
SOT523



Top View



Device Schematic



Equivalent Inverter Circuit

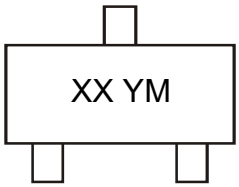
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DDTC113ZE-7-F	SOT523	N02	7	8	3,000	Reel
DDTC123YE-7-F	SOT523	N05	7	8	3,000	Reel
DDTC123JE-7-F	SOT523	N06	7	8	3,000	Reel
DDTC143XE-7-F	SOT523	N09	7	8	3,000	Reel
DDTC143FE-7-F	SOT523	N10	7	8	3,000	Reel
DDTC143ZE-7-F	SOT523	N11	7	8	3,000	Reel
DDTC114YE-7-F	SOT523	N14	7	8	3,000	Reel
DDTC114WE-7-F	SOT523	N15	7	8	3,000	Reel
DDTC124XE-7-F	SOT523	N18	7	8	3,000	Reel
DDTC144VE-7-F	SOT523	N21	7	8	3,000	Reel
DDTC144WE-7-F	SOT523	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/.

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Marking Information



XX = Product Type Marking Code
YM = Date Code Marking
Y or $\overline{Y}$ = Year (ex: M = 2025)
M or $\overline{M}$ = Month (ex: 2 = February)

Date Code Key

Year	2002	-	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Code	N	-	M	N	P	R	S	T	U	V	W	X

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)>	DDTC113ZE	V_{IN}	-5 to +10	V
	DDTC123YE		-5 to +12	
	DDTC123JE		-5 to +12	
	DDTC143XE		-7 to +20	
	DDTC143FE		-6 to +30	
	DDTC143ZE		-5 to +30	
	DDTC114YE		-6 to +40	
	DDTC114WE		-10 to +30	
	DDTC124XE		-10 to +40	
	DDTC144VE		-15 to +40	
	DDTC144WE		-10 to +40	
Output Current	DDTC113ZE	I_{OUT}	100	mA
	DDTC123YE		100	
	DDTC123JE		100	
	DDTC143XE		100	
	DDTC143FE		100	
	DDTC143ZE		100	
	DDTC114YE		70	
	DDTC114WE		100	
	DDTC124XE		50	
	DDTC144VE		30	
	DDTC144WE		30	
Output Current		$I_{C(max)}$	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 5 & 6)	P_D	150	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	833	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. Mounted on FR-4 PC board with minimum recommended pad layout.
6. 150mW per element must not be exceeded.

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDTC113ZE	$V_{I(off)}$	0.3	—	—	V	V_{CC} = 5V, I_O = 100µA
	DDTC123YE		0.3				
	DDTC123JE		0.5				
	DDTC143XE		0.3				
	DDTC143FE		0.3				
	DDTC143ZE		0.5				
	DDTC114YE		0.3				
	DDTC114WE		0.8				
	DDTC124XE		0.4				
	DDTC144VE		1.0				
	DDTC144WE		0.8				
	DDTC113ZE	$V_{I(on)}$	—	—	3.0		V_O = 0.3V, I_O = 20mA
	DDTC123YE				3.0		V_O = 0.3V, I_O = 20mA
	DDTC123JE				1.1		V_O = 0.3V, I_O = 5mA
	DDTC143XE				2.5		V_O = 0.3V, I_O = 20mA
	DDTC143FE				1.3		V_O = 0.3V, I_O = 3mA
	DDTC143ZE				1.3		V_O = 0.3V, I_O = 5mA
	DDTC114YE				1.4		V_O = 0.3V, I_O = 1mA
	DDTC114WE				3.0		V_O = 0.3V, I_O = 2mA
	DDTC124XE				2.5		V_O = 0.3V, I_O = 2mA
	DDTC144VE				5.0		V_O = 0.3V, I_O = 2mA
	DDTC144WE				4.0		V_O = 0.3V, I_O = 2mA
Output Voltage		$V_{O(on)}$	—	0.1	0.3	V	I_O/I_L = 5mA / 0.25mA DDTC123JE I_O/I_L = 5mA / 0.25mA DDTC143ZE I_O/I_L = 10mA / 0.25mA DDTC114YE I_O/I_L = 10mA / 0.5mA All Others
Input Current	DDTC113ZE	I_I	—	—	7.2	mA	V_I = 5V
	DDTC123YE				3.8		
	DDTC123JE				3.6		
	DDTC143XE				1.8		
	DDTC143FE				1.8		
	DDTC143ZE				1.8		
	DDTC114YE				0.88		
	DDTC114WE				0.88		
	DDTC124XE				0.36		
	DDTC144VE				0.16		
	DDTC144WE				0.16		
Output Current		$I_{O(off)}$	—	—	0.5	µA	V_{CC} = 50V, V_I = 0
DC Current Gain	DDTC113ZE	G_I	33	—	—	—	V_O = 5V, I_O = 5mA
	DDTC123YE		33				V_O = 5V, I_O = 10mA (Note 8)
	DDTC123JE		80				V_O = 5V, I_O = 10mA (Note 8)
	DDTC143XE		30				V_O = 5V, I_O = 10mA (Note 8)
	DDTC143FE		68				V_O = 5V, I_O = 10mA (Note 8)
	DDTC143ZE		80				V_O = 5V, I_O = 10mA (Note 8)
	DDTC114YE		68				V_O = 5V, I_O = 5mA
	DDTC114WE		24				V_O = 5V, I_O = 10mA (Note 8)
	DDTC124XE		68				V_O = 5V, I_O = 5mA
	DDTC144VE		33				V_O = 5V, I_O = 5mA
	DDTC144WE		56				V_O = 5V, I_O = 5mA
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		$\Delta(R_2/R_1)$	-20	—	+20	%	—
Transition Frequency (Note 7)		f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

Note: 7. Transistor - For reference only.
8. Short duration pulse test used to minimize self-heating effect.

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Typical Curves – DDC123JE (@T_A = +25°C, unless otherwise specified.)

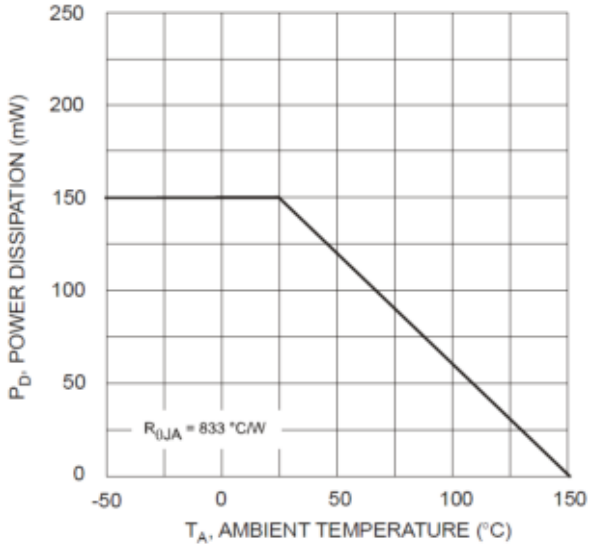


Figure 1. Derating Curve

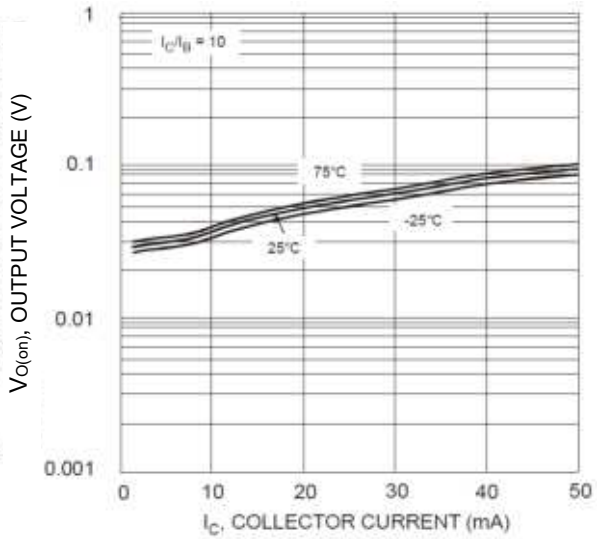


Figure 2. $V_{O(on)}$ vs. I_C

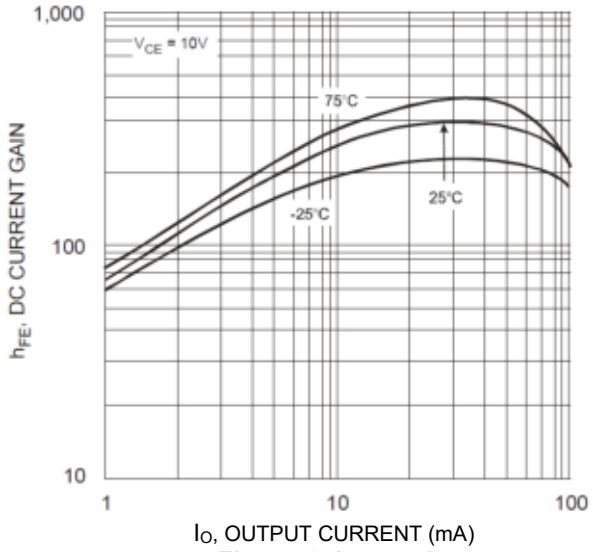


Figure 3. h_{FE} vs. I_O

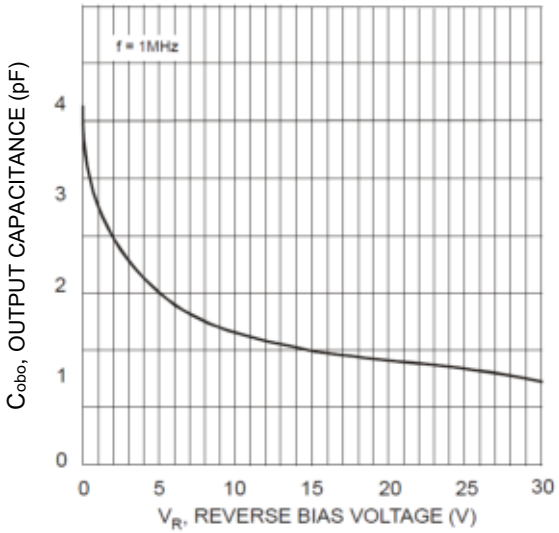


Figure 4. C_{obo} vs. V_R

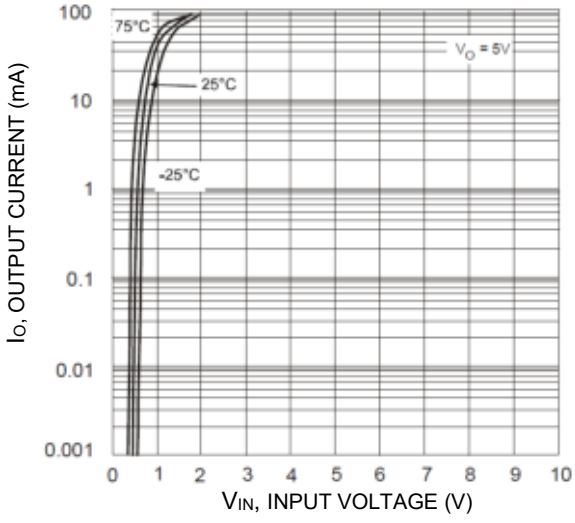


Figure 5. I_O vs. V_{IN}

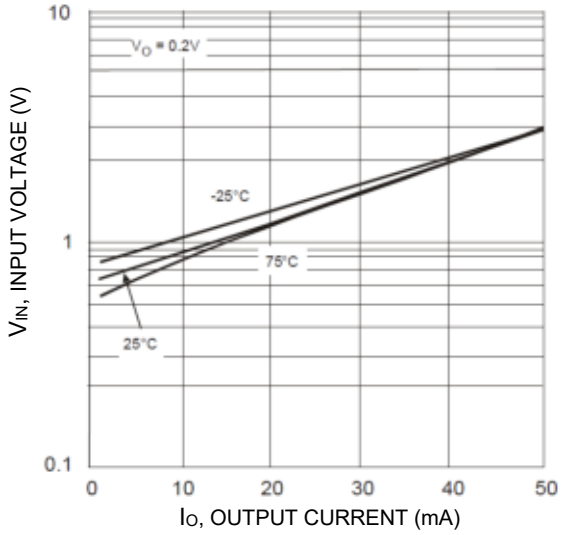


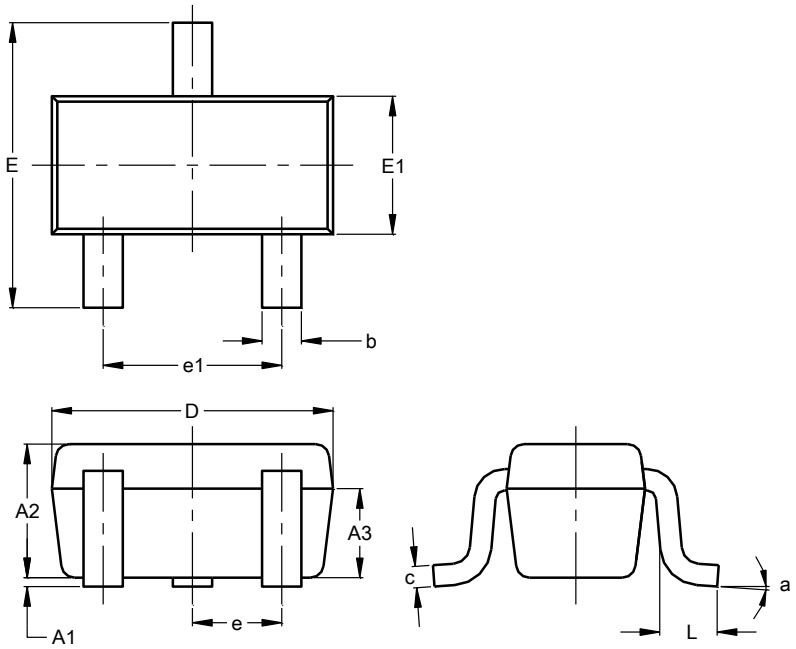
Figure 6. V_{IN} vs. I_O

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Package Outline Dimensions

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

SOT523

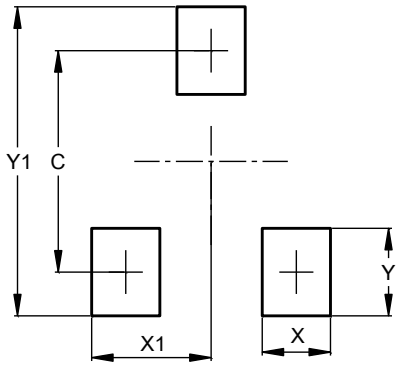


SOT523			
Dim	**Min**	**Max**	**Typ**
A1	0.00	0.10	0.05
A2	0.60	0.80	0.75
A3	0.45	0.65	0.50
b	0.15	0.30	0.22
c	0.10	0.20	0.12
D	1.50	1.70	1.60
E	1.45	1.75	1.60
E1	0.75	0.85	0.80
e	0.50 BSC		
e1	0.90	1.10	1.00
L	0.20	0.40	0.33
a	0°	--	8°
All Dimensions in mm			

Suggested Pad Layout

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

SOT523



Dimensions	Value
C	1.29
X	0.40
X1	0.70
Y	0.51
Y1	1.80

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