DDTC (R1≠R2 SERIES) E

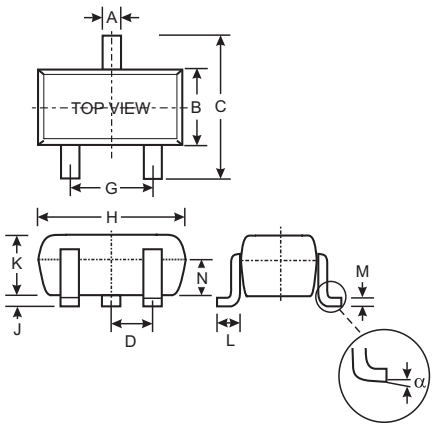
NPN PRE-BIASED SMALL SIGNAL SOT-523 SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1≠R2
- **Lead Free/RoHS Compliant (Note 2)**

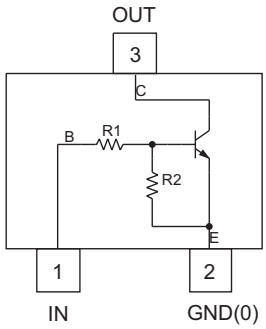
Mechanical Data

- Case: SOT-523
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Diagrams & Page 3)
- Weight: 0.002 grams (approximate)
- Ordering Information (See Page 2)

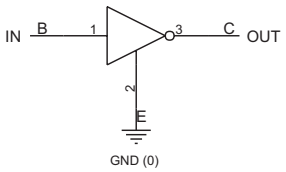


SOT-523			
Dim	**Min**	**Max**	**Typ**
A	0.15	0.30	0.22
B	0.75	0.85	0.80
C	1.45	1.75	1.60
D	—	—	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
J	0.00	0.10	0.05
K	0.60	0.80	0.75
L	0.10	0.30	0.22
M	0.10	0.20	0.12
N	0.45	0.65	0.50
α	0°	8°	—
All Dimensions in mm			

P/N	R1 (NOM)	R2 (NOM)	MARKING
DDTC113ZE	1KΩ	10KΩ	N02
DDTC123YE	2.2KΩ	10KΩ	N05
DDTC123JE	2.2KΩ	47KΩ	N06
DDTC143XE	4.7KΩ	10KΩ	N09
DDTC143FE	4.7KΩ	22KΩ	N10
DDTC143ZE	4.7KΩ	47KΩ	N11
DDTC114YE	10KΩ	47KΩ	N14
DDTC114WE	10KΩ	4.7KΩ	N15
DDTC124XE	22KΩ	47KΩ	N18
DDTC144VE	47KΩ	10KΩ	N21
DDTC144WE	47KΩ	22KΩ	N22



Schematic and Pin Configuration



Equivalent Inverter Circuit

Maximum Ratings @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage, (3) to (2)		V_{CC}	50	V
Input Voltage, (1) to (2)	DDTC113ZE DDTC123YE DDTC123JE DDTC143XE DDTC143FE DDTC143ZE DDTC114YE DDTC114WE DDTC124XE DDTC144VE DDTC144WE	V_{IN}	-5 to +10 -5 to +12 -5 to +12 -7 to +20 -6 to +30 -5 to +30 -6 to +40 -10 to +30 -10 to +40 -15 to +40 -10 to +40	V
Output Current	DDTC113ZE DDTC123YE DDTC123JE DDTC143XE DDTC143FE DDTC143ZE DDTC114YE DDTC114WE DDTC124XE DDTC144VE DDTC144WE	I_O	100 100 100 100 100 100 70 100 50 30 30	mA
Output Current	All	I_C (Max)	100	mA
Power Dissipation		P_d	150	mW
Thermal Resistance, Junction to Ambient Air (Note 1)		$R_{\theta JA}$	833	°C/W
Operating and Storage and Temperature Range		T_j, T_{STG}	-55 to +150	°C

Note: 1. Mounted on FR4 PC Board with recommended pad layout at http://www.diodes.com/datasheets/ap02001.pdf.
2. No purposefully added lead.

Electrical Characteristics @ $T_A = 25°C$ unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDTC113ZE DDTC123YE DDTC123JE DDTC143XE DDTC143FE DDTC143ZE DDTC114YE DDTC114WE DDTC124XE DDTC144VE DDTC144WE	$V_{I(off)}$	0.3 0.3 0.5 0.3 0.3 0.5 0.3 0.8 0.4 1.0 0.8	—	—	V	V_{CC} = 5V, I_O = 100μA
	DDTC113ZE DDTC123YE DDTC123JE DDTC143XE DDTC143FE DDTC143ZE DDTC114YE DDTC114WE DDTC124XE DDTC144VE DDTC144WE	$V_{I(on)}$	—	—	3.0 3.0 1.1 2.5 1.3 1.3 1.4 3.0 2.5 5.0 4.0		V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 5mA V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 3mA V_O = 0.3V, I_O = 5mA V_O = 0.3V, I_O = 1mA V_O = 0.3V, I_O = 2mA V_O = 0.3V, I_O = 2mA V_O = 0.3V, I_O = 2mA V_O = 0.3V, I_O = 2mA
Output Voltage		$V_{O(on)}$	—	0.1	0.3	V	I_O/I_I = 5mA/0.25mA DDCT123JE I_O/I_I = 5mA/0.25mA DDCT143ZE I_O/I_I = 5mA/0.25mA DDCT114YE I_O/I_I = 10mA/0.5mA All Others
Input Current	DDTC113ZE DDTC123YE DDTC123JE DDTC143XE DDTC143FE DDTC143ZE DDTC114YE DDTC114WE DDTC124XE DDTC144VE DDTC144WE	I_I	—	—	7.2 3.8 3.6 1.8 1.8 1.8 0.88 0.88 0.36 0.16 0.16	mA	V_I = 5V
Output Current		$I_{O(off)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DDTC113ZE DDTC123YE DDTC123JE DDTC143XE DDTC143FE DDTC143ZE DDTC114YE DDTC114WE DDTC124XE DDTC144VE DDTC144WE	G_I	33 33 80 30 68 80 68 24 68 33 56	—	—	—	V_O = 5V, I_O = 5mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 10mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA V_O = 5V, I_O = 5mA
Input Resistor 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

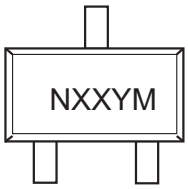
* Transistor - For Reference Only

Ordering Information (Note 3)

Device	Packaging	Shipping
DDTC113ZE-7-F	SOT-523	3000/Tape & Reel
DDTC123YE-7-F	SOT-523	3000/Tape & Reel
DDTC123JE-7-F	SOT-523	3000/Tape & Reel
DDTC143XE-7-F	SOT-523	3000/Tape & Reel
DDTC143FE-7-F	SOT-523	3000/Tape & Reel
DDTC143ZE-7-F	SOT-523	3000/Tape & Reel
DDTC114YE-7-F	SOT-523	3000/Tape & Reel
DDTC114WE-7-F	SOT-523	3000/Tape & Reel
DDTC124XE-7-F	SOT-523	3000/Tape & Reel
DDTC144VE-7-F	SOT-523	3000/Tape & Reel
DDTC144WE-7-F	SOT-523	3000/Tape & Reel

Notes: 3. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



NXX = Product Type Marking Code (See Page 1, e.g. N02 = DDTC113ZE)
YM = Date Code Marking
Y = Year ex: T = 2006
M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	N	P	R	S	T	U	V	W	X	Y	Z

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

TYPICAL CURVES - DDTC123JE

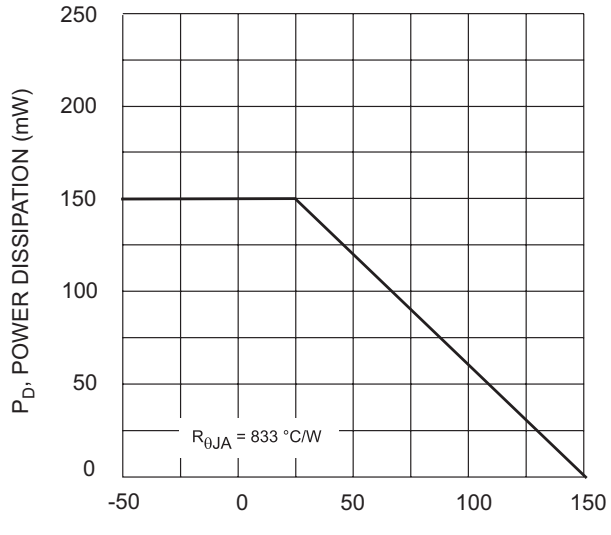


Fig. 1 Derating Curve

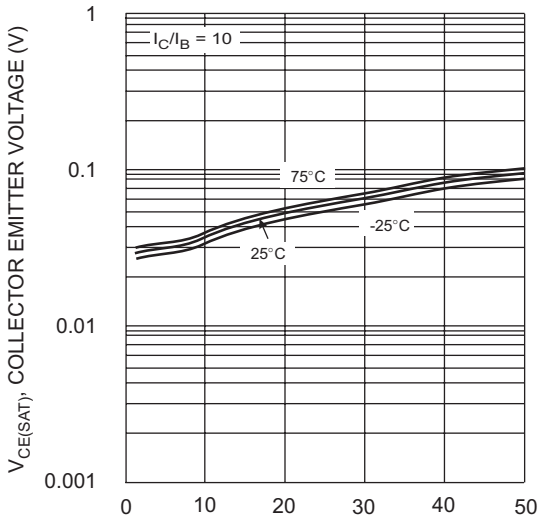


Fig. 2 $V_{CE(SAT)}$ vs. I_C

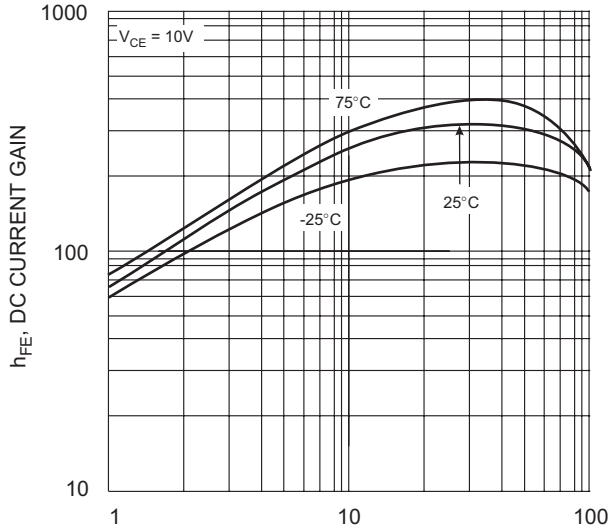


Fig. 3 DC Current Gain

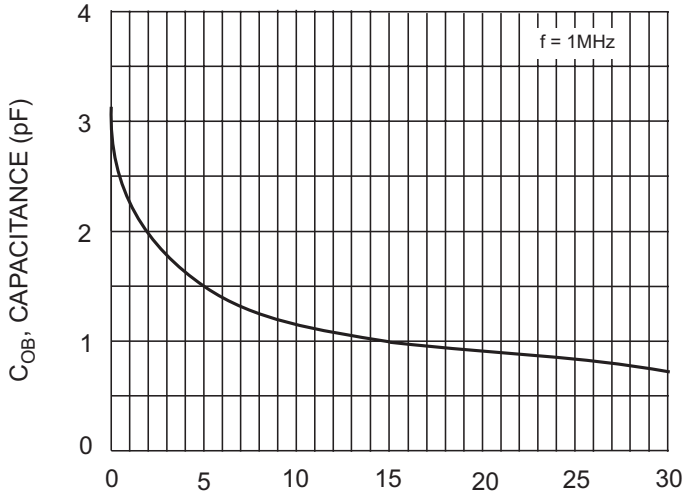


Fig. 4 Output Capacitance

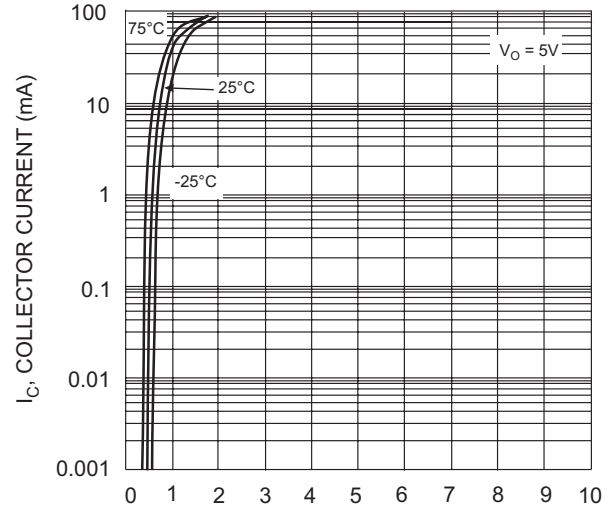


Fig. 5 Collector Current Vs. Input Voltage

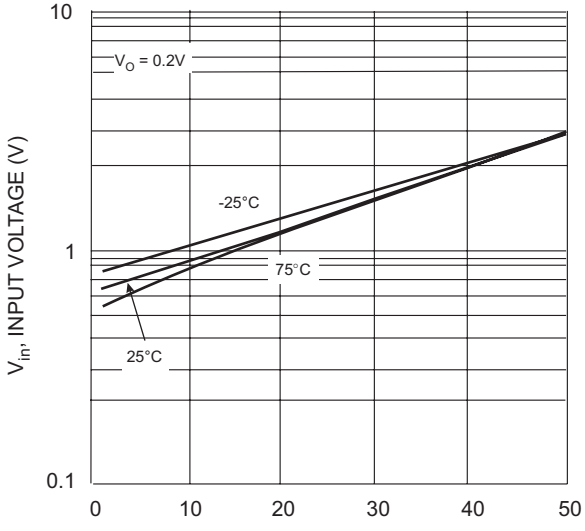


Fig. 6 Input Voltage vs. Collector Current

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