DDTC (R1 = R2 SERIES) CA

NPN PRE-BIASED SMALL SIGNAL SOT-23 SURFACE MOUNT TRANSISTOR

Lead-free Green

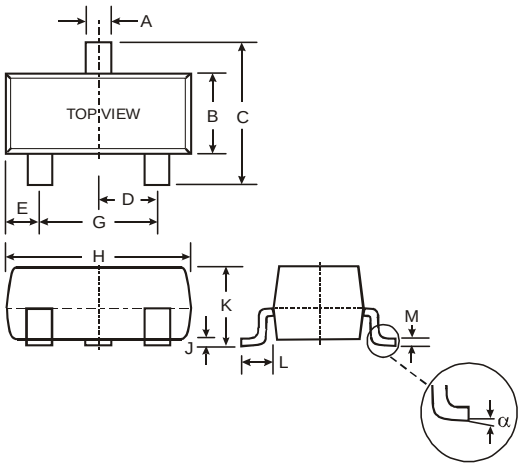
Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistors, R1 = R2
- **Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 2 and 3)**

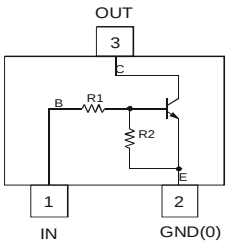
Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking: Date Code and Marking Code: See Table Below & Page 4
- Ordering Information: See Page 4
- Weight: 0.008 grams (approximate)

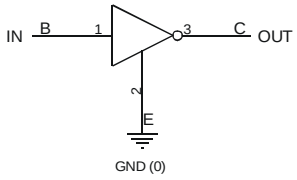
P/N	R1, R2 (NOM)	Type Code
DDTC123ECA	2.2KΩ	N04
DDTC143ECA	4.7KΩ	N08
DDTC114ECA	10KΩ	N13
DDTC124ECA	22KΩ	N17
DDTC144ECA	47KΩ	N20
DDTC115ECA	100KΩ	N24



SOT-23		
Dim	**Min**	**Max**
A	0.37	0.51
B	1.20	1.40
C	2.30	2.50
D	0.89	1.03
E	0.45	0.60
G	1.78	2.05
H	2.80	3.00
J	0.013	0.10
K	0.903	1.10
L	0.45	0.61
M	0.085	0.180
α	0°	8°
All Dimensions in mm		



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)	DDTC123ECA	V_{IN}	-10 to +12	V
	DDTC143ECA		-10 to +30	
	DDTC114ECA		-10 to +40	
	DDTC124ECA		-10 to +40	
	DDTC144ECA		-10 to +40	
	DDTC115ECA		-10 to +40	
Output Current	DDTC123ECA	I_O	100	mA
	DDTC143ECA		100	
	DDTC114ECA		50	
	DDTC124ECA		30	
	DDTC144ECA		30	
	DDTC115ECA		20	
Output Current	All	I_C (Max)	100	mA
Power Dissipation		P_D	200	mW
Thermal Resistance, Junction to Ambient Air	(Note 1)	$R_{\theta JA}$	625	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

Notes:
1. 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/datasheets/ap02001.pdf
2. No purposefully added lead. Halogen and Antimony Free.
3. Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb_2O_3 Fire Retardants.

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_O = 0.3V, I_O = 20mA, DDTC123ECA V_O = 0.3V, I_O = 20mA, DDTC143ECA V_O = 0.3V, I_O = 10mA, DDTC114ECA V_O = 0.3V, I_O = 5mA, DDTC124ECA V_O = 0.3V, I_O = 2mA, DDTC144ECA V_O = 0.3V, I_O = 1mA, DDTC115ECA
Output Voltage		$V_{O(on)}$	—	0.1	0.3	V	I_O/I_I =10mA/0.5mA, DDTC123ECA I_O/I_I =10mA/0.5mA, DDTC143ECA I_O/I_I =10mA/0.5mA, DDTC114ECA I_O/I_I =10mA/0.5mA, DDTC124ECA I_O/I_I =10mA/0.5mA, DDTC144ECA I_O/I_I =5mA/0.25mA, DDTC115ECA
Input Current	DDTC123ECA DDTC143ECA DDTC114ECA DDTC124ECA DDTC144ECA DDTC115ECA	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	DDTC123ECA DDTC143ECA DDTC114ECA DDTC124ECA DDTC144ECA DDTC115ECA	G_I	20 20 30 56 68 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
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

Typical Curves – DDTC143ECA

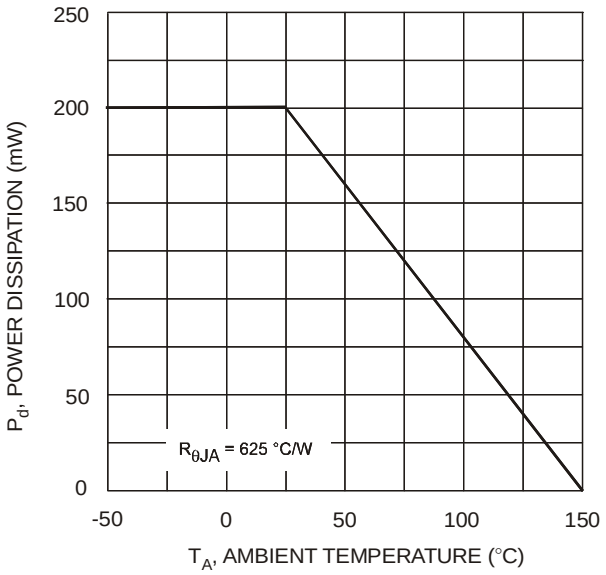


Fig. 1 Derating Curve

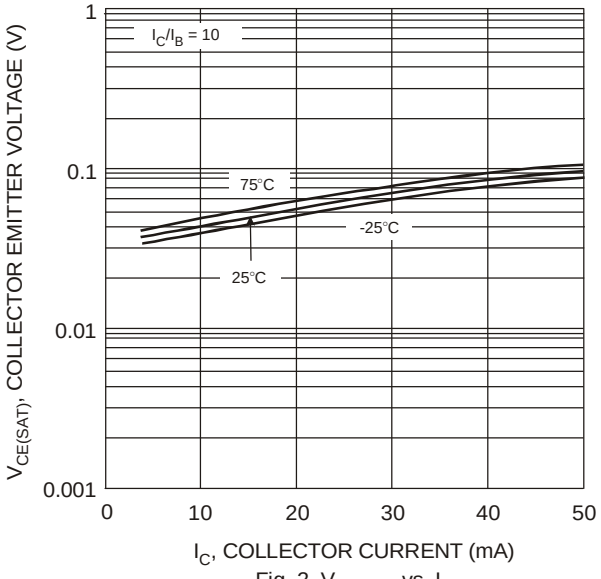


Fig. 2 $V_{CE(SAT)}$ vs. I_C

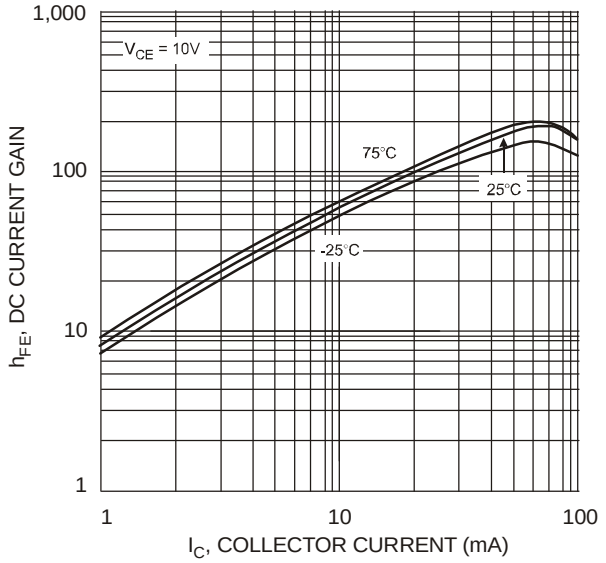


Fig. 3 DC Current Gain

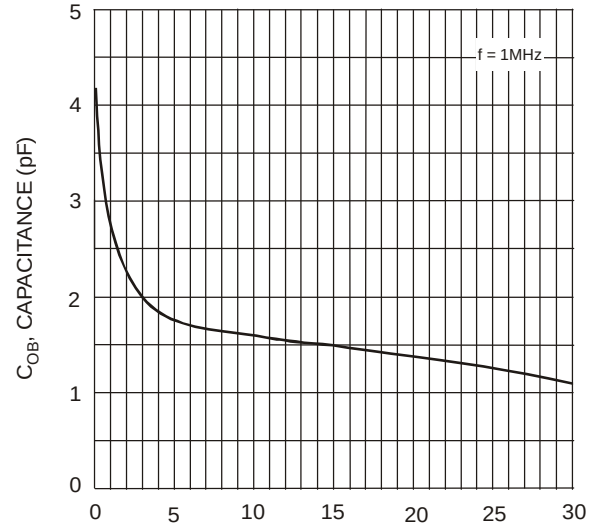


Fig. 4 Output Capacitance

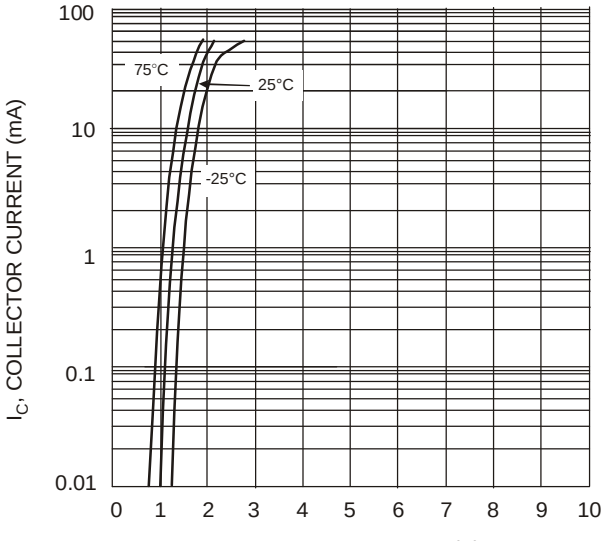


Fig. 5 Collector Current vs. Input Voltage

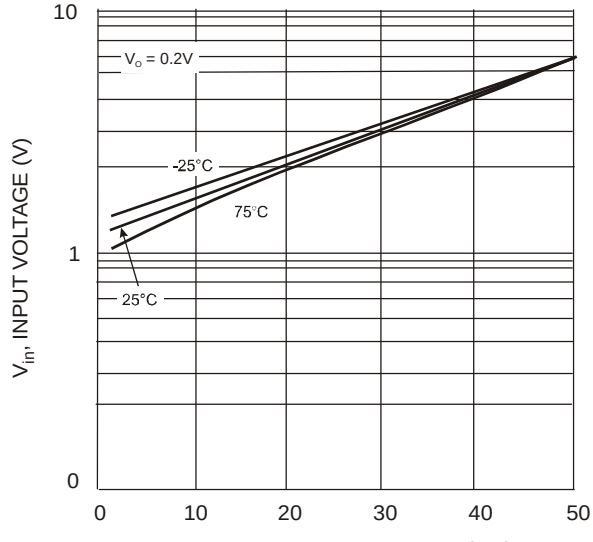


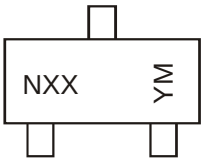
Fig. 6 Input Voltage vs. Collector Current

Ordering Information (Note 4)

Device	Packaging	Shipping
DDTC123ECA-7-F	SOT-23	3000/Tape & Reel
DDTC143ECA-7-F	SOT-23	3000/Tape & Reel
DDTC114ECA-7-F	SOT-23	3000/Tape & Reel
DDTC124ECA-7-F	SOT-23	3000/Tape & Reel
DDTC144ECA-7-F	SOT-23	3000/Tape & Reel
DDTC115ECA-7-F	SOT-23	3000/Tape & Reel

Notes: 4. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

Marking Information



NXX = Product Type Marking Code, See Table on Page 1
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