DDTC (R1-ONLY SERIES) CA

NPN PRE-BIASED TRANSISTOR IN SOT23

Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-in Biasing Resistors, R1 Only
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DDTC143TCAQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  https://www.diodes.com/quality/product-definitions/

Mechanical Data

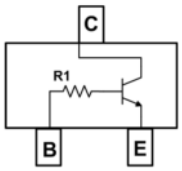
- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

Part Number	R1 (NOM)
DDTC113TCA	1kΩ
DDTC123TCA	2.2kΩ
DDTC143TCA	4.7kΩ
DDTC114TCA	10kΩ
DDTC124TCA	22kΩ
DDTC144TCA	47kΩ
DDTC115TCA	100kΩ
DDTC125TCA	200kΩ

SOT23



Top View



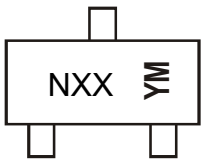
Device Schematic – Top View

Ordering Information (Note 4)

Orderable Part Number	Status	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
						Qty.	Carrier
DDTC113TCA-7-F	Active	SOT23	N01	7	8	3,000	Reel
DDTC123TCA-7-F	Active	SOT23	N03	7	8	3,000	Reel
DDTC143TCA-7-F	Active	SOT23	N07	7	8	3,000	Reel
DDTC143TCAQ-7-F	Active	SOT23	N07	7	8	3,000	Reel
DDTC143TCAQ-13-F	Active	SOT23	N07	13	8	10,000	Reel
DDTC114TCA-7-F	Active	SOT23	N12	7	8	3,000	Reel
DDTC124TCA-7-F	Active	SOT23	N16	7	8	3,000	Reel
DDTC144TCA-7-F	Active	SOT23	N19	7	8	3,000	Reel
DDTC115TCA-7-F	Active	SOT23	N23	7	8	3,000	Reel
DDTC125TCA-7-F	Obsolete	SOT23	N25	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



NXX = Product Type Marking Code (See Table above)
YM = Date Code Marking
Y or $\overline{Y}$ or $\underline{Y}$ = Year (ex: M = 2025)
M = Month (ex: 9 = September)

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

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Absolute Maximum Ratings (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	50	V
Emitter-Base Voltage	V_{EBO}	5	V
Collector Current	$I_{C\ (Max)}$	100	mA

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	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

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	—	—	V	I_C = 50µA
Collector-Emitter Breakdown Voltage	BV_{CEO}	50	—	—	V	I_C = 1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	I_E = 50µA
Collector Cutoff Current	I_{CBO}	—	—	0.5	µA	V_{CB} = 50V
Emitter Cutoff Current	I_{EBO}	—	—	0.5	µA	V_{EB} = 4V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.3	V	I_C/I_B = 10mA/1mA DDTC113TCA I_C/I_B = 5mA/0.5mA DDTC123TCA I_C/I_B = 2.5mA/.25mA DDTC143TCA I_C/I_B = 1mA/.1mA DDTC114TCA I_C/I_B = 5mA/0.5mA DDTC124TCA I_C/I_B = 2.5mA/.25mA DDTC144TCA I_C/I_B = 1mA/0.1mA DDTC115TCA I_C/I_B = 0.5mA/0.05mA DDTC125TCA
DC Current Transfer Ratio	h_{FE}	100 120	250 —	600 630	—	I_C = 1mA, V_{CE} = 5V I_C = 5mA, V_{CE} = 5V DDTC143TCAQ
Input Resistor (R_1) Tolerance	ΔR_1	-30	—	+30	%	—
Gain-Bandwidth Product (Note 6)	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = -5mA f = 100MHz

Notes: 5. Mounted on FR4 PC board with minimum recommended pad layout.
6. Transistor - for reference only.

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Typical Characteristics – DDTC144TCA (@ T_A = +25°C, unless otherwise specified.)

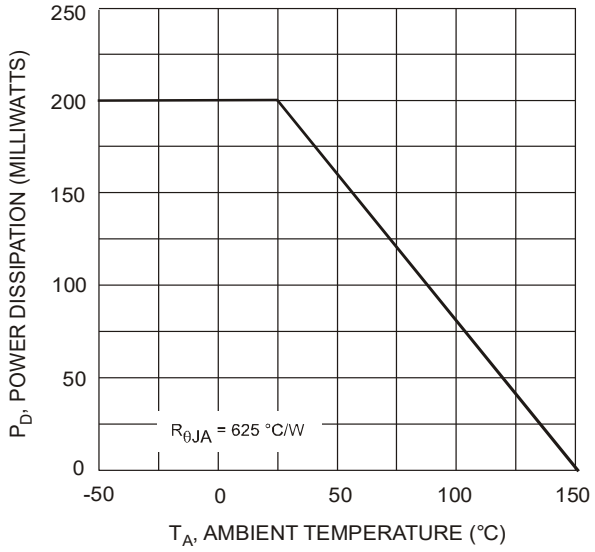


Fig. 1 Derating Curve

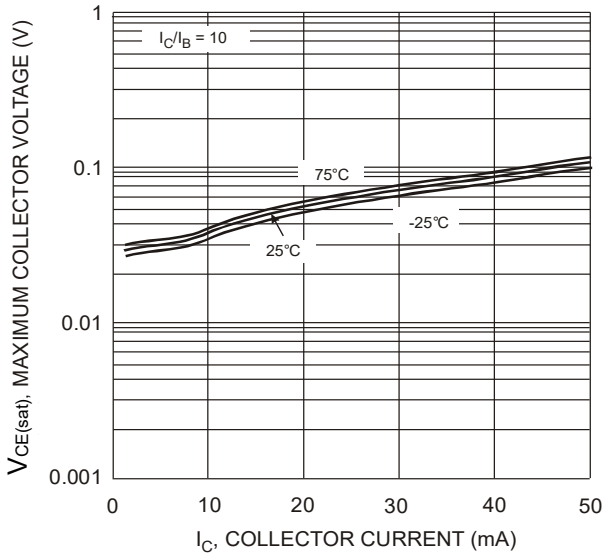


Fig. 2 $V_{CE(sat)}$ vs. I_C

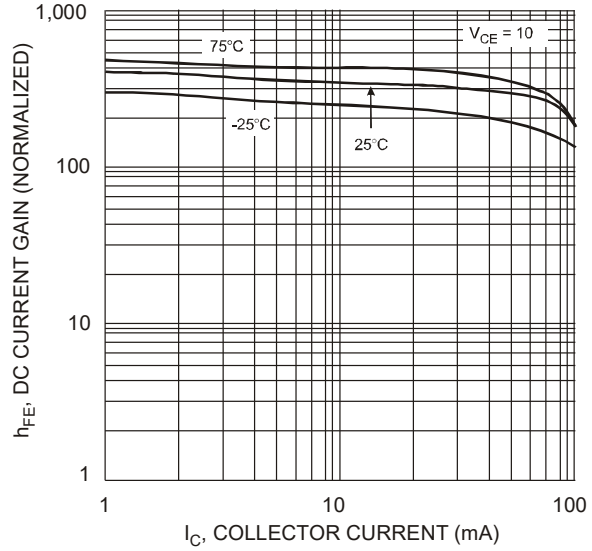


Fig. 3 DC Current Gain

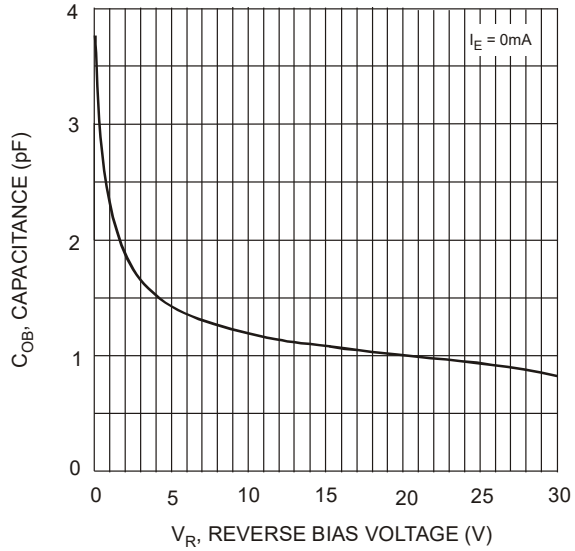


Fig. 4 Output Capacitance

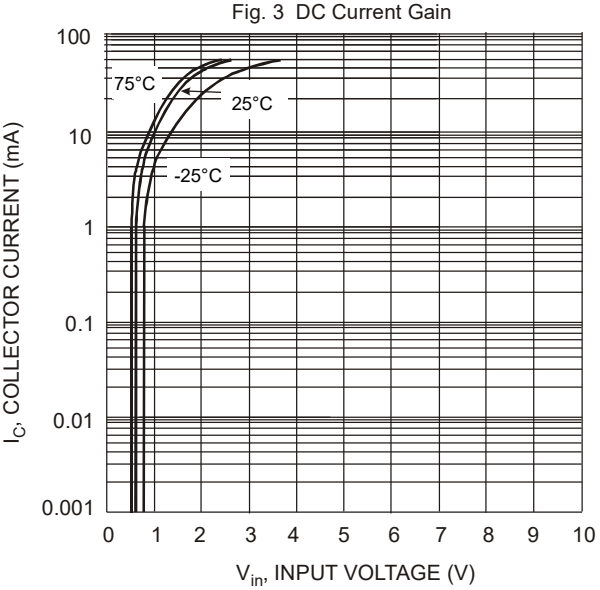


Fig. 5 Collector Current Vs. Input Voltage

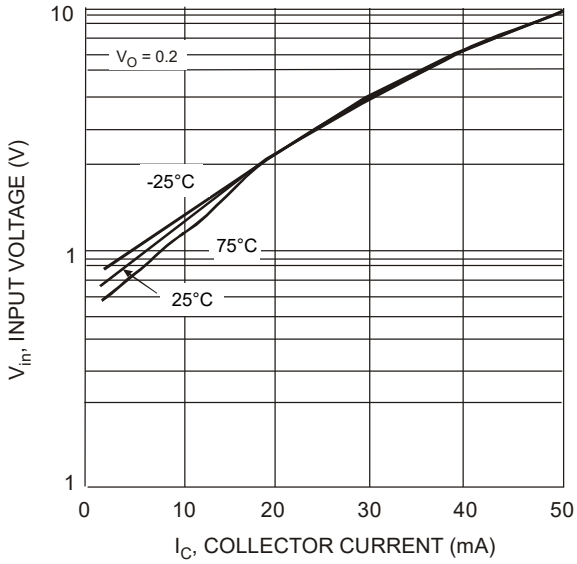


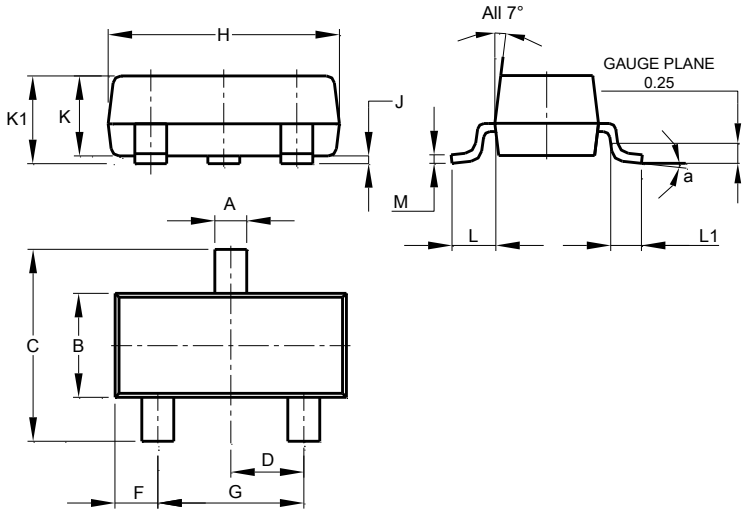
Fig. 6 Input Voltage vs. Collector Current

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Package Outline Dimensions

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

SOT23

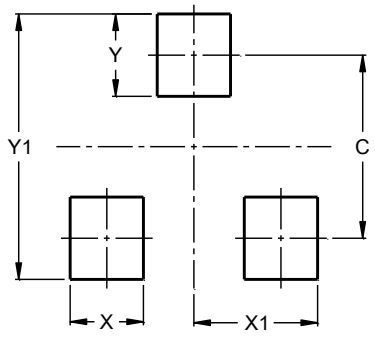


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

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

SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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