DDTC(R1-ONLY SERIES) CA

NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

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)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

Mechanical Data

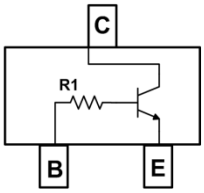
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (approximate)

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



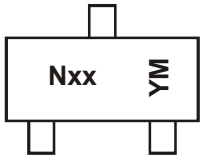
Device Schematic – Top View

Ordering Information (Notes 4 & 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
DDTC113TCA-7-F	AEC-Q101	N01	7	8	3,000
DDTC123TCA-7-F	AEC-Q101	N03	7	8	3,000
DDTC143TCA-7-F	AEC-Q101	N07	7	8	3,000
DDTC143TCAQ-7-F	Automotive	N07	7	8	3,000
DDTC143TCAQ-13-F	Automotive	N07	13	8	10,000
DDTC114TCA-7-F	AEC-Q101	N12	7	8	3,000
DDTC124TCA-7-F	AEC-Q101	N16	7	8	3,000
DDTC144TCA-7-F	AEC-Q101	N19	7	8	3,000
DDTC115TCA-7-F	AEC-Q101	N23	7	8	3,000
DDTC125TCA-7-F	AEC-Q101	N25	7	8	3,000

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_compliance_definitions/.
5. For packaging details, go to our website at http://www.diodes.com/products/packages.html.

Marking Information



NXX = Product Type Marking Code (See Table above)
YM = Date Code Marking
Y = Year (ex: X = 2010)
M = Month (ex: 9 = September)

Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Code	T	U	V	W	X	Y	Z	A	B	C

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 6)	P_D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	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 = .5mA/.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 7)	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz

Notes: 6. Mounted on FR4 PC Board with minimum recommended pad layout
7. Transistor - For Reference Only

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

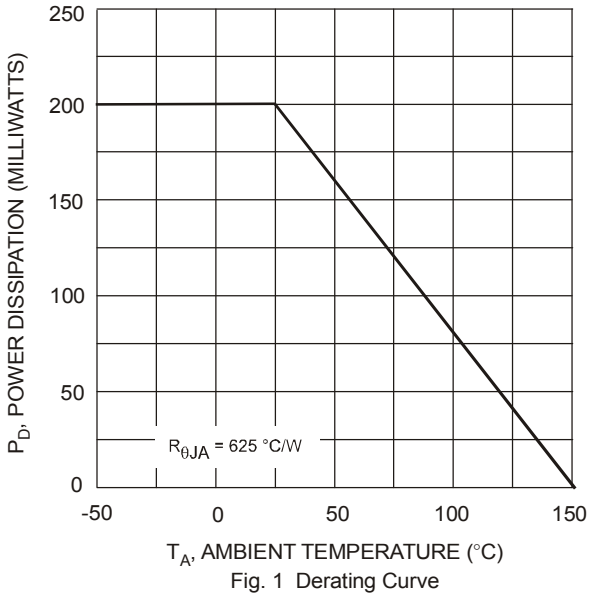


Fig. 1 Derating Curve

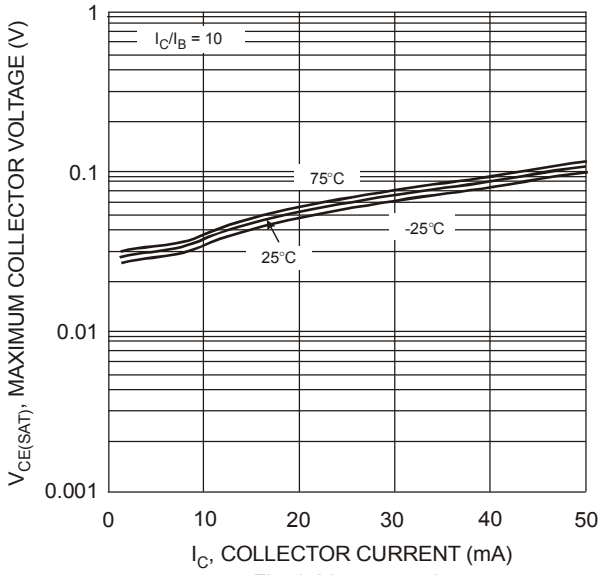


Fig. 2 $V_{CE(SAT)}$ vs. I_C

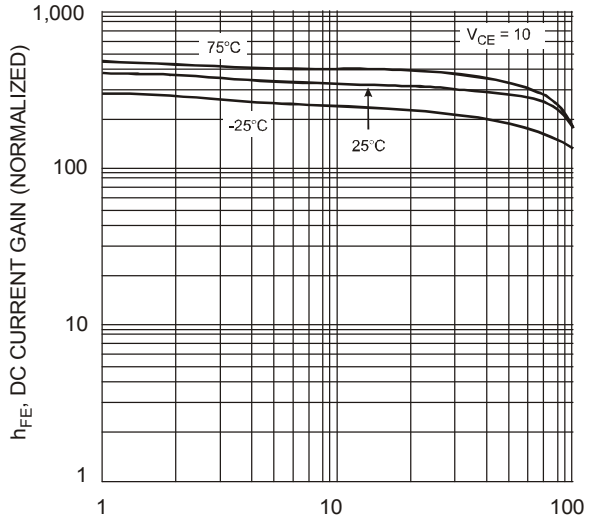


Fig. 3 DC Current Gain

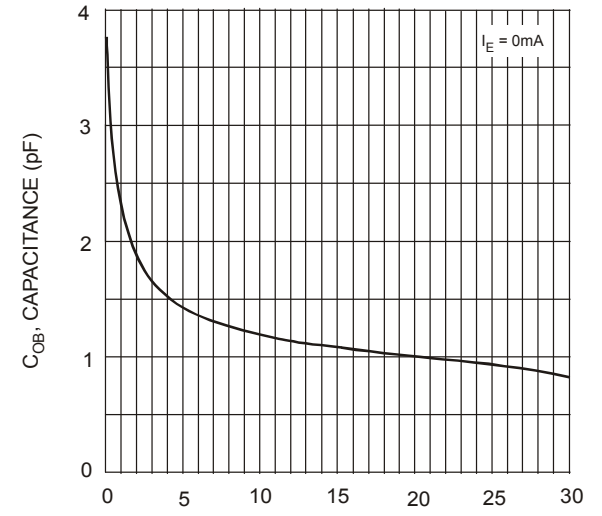


Fig. 4 Output Capacitance

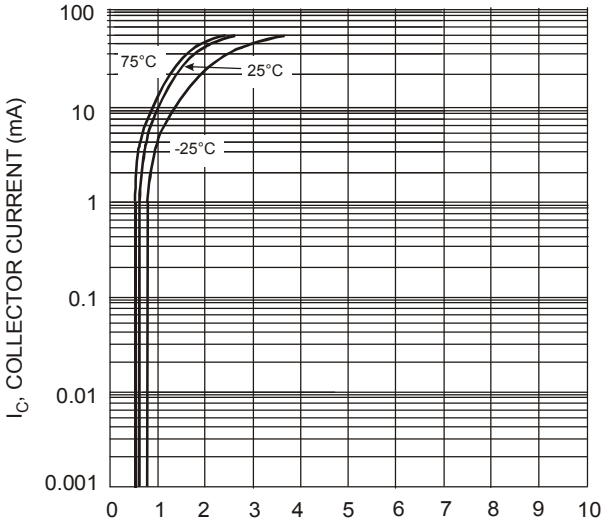


Fig. 5 Collector Current Vs. Input Voltage

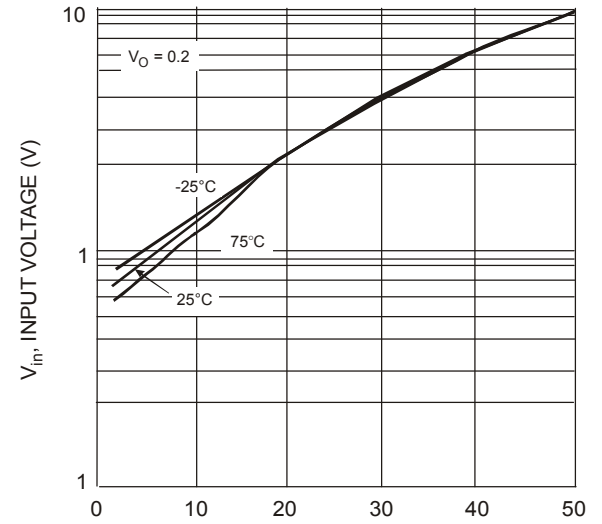
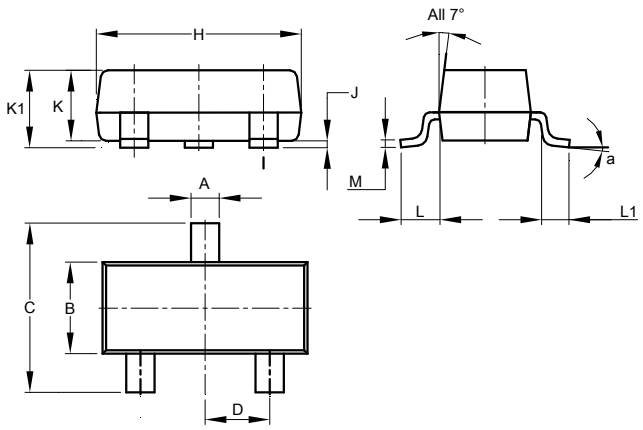


Fig. 6 Input Voltage vs. Collector Current

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Package Outline Dimensions

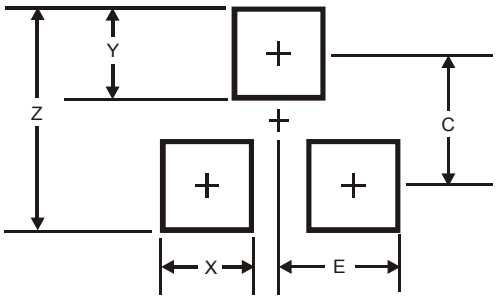
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



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	8°		
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



Dimensions	Value (in mm)
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

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