

# DDTC (R1-ONLY SERIES) E

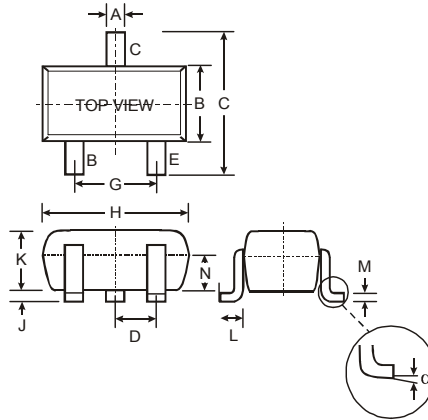
## NPN PRE-BIASED SMALL SIGNAL SURFACE MOUNT TRANSISTOR

### Features

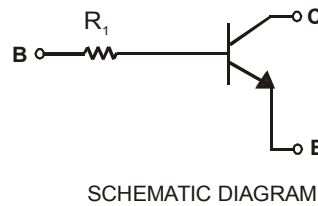
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTA)
- Built-In Biasing Resistor, R1 only
- **Lead Free/RoHS Compliant (Note 2)**
- **"Green" Device (Note 3 and 4)**

### 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 information: See Diagrams & Page 4
- Ordering Information: See Page 4
- Weight: 0.002 grams (approximate)



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
$\alpha$	0°	8°	—
All Dimensions in mm			



P/N	R1 (NOM)	Marking
DDTC113TE	1K $\Omega$	N01
DDTC123TE	2.2K $\Omega$	N03
DDTC143TE	4.7K $\Omega$	N07
DDTC114TE	10K $\Omega$	N12
DDTC124TE	22K $\Omega$	N16
DDTC144TE	47K $\Omega$	N19
DDTC115TE	100K $\Omega$	N23
DDTC125TE	200K $\Omega$	N25

### Maximum Ratings @ $T_A = 25^\circ\text{C}$ 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
Power Dissipation	$P_d$	150	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_j, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
1. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. No purposefully added lead.
  3. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  4. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb2O3 Fire Retardants.

## Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	50	—	—	V	$I_C = 50\text{mA}$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	50	—	—	V	$I_C = 1\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	5	—	—	V	$I_E = 50\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	—	0.5	$\mu\text{A}$	$V_{CB} = 50\text{V}$
Emitter Cutoff Current	$I_{EBO}$	—	—	0.5	$\mu\text{A}$	$V_{EB} = 4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.3	V	$I_C/I_B = 10\text{mA}/1\text{mA}$ DDTC113TE $I_C/I_B = 5\text{mA}/0.5\text{mA}$ DDTC123TE $I_C/I_B = 2.5\text{mA}/.25\text{mA}$ DDTC143TE $I_C/I_B = 1\text{mA}/.1\text{mA}$ DDTC114TE $I_C/I_B = 5\text{mA}/0.5\text{mA}$ DDTC124TE $I_C/I_B = 2.5\text{mA}/.25\text{mA}$ DDTC144TE $I_C/I_B = 1\text{mA}/0.1\text{mA}$ DDTC115TE $I_C/I_B = .5\text{mA}/.05\text{mA}$ DDTC125TE
DC Current Transfer Ratio	$h_{FE}$	100	250	600	—	$I_C = 1\text{mA}, V_{CE} = 5\text{V}$
Input Resistor ( $R_1$ ) Tolerance	$\Delta R_1$	-30	—	+30	%	—
Gain-Bandwidth Product*	$f_T$	—	250	—	MHZ	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

\* Transistor – For Reference Only

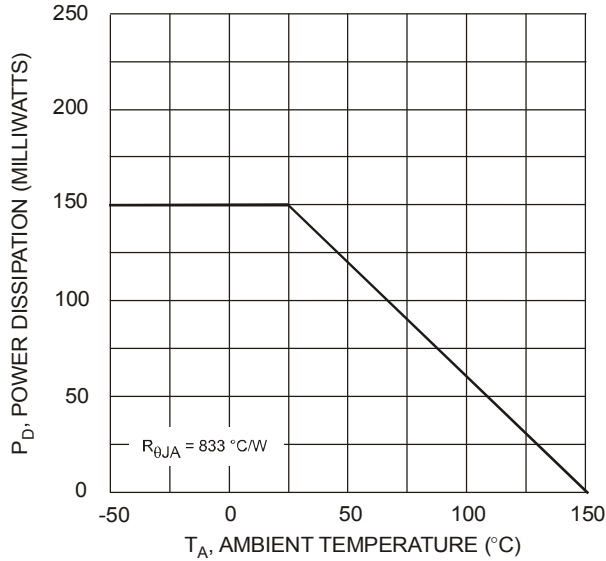


Fig. 1 Derating Curve

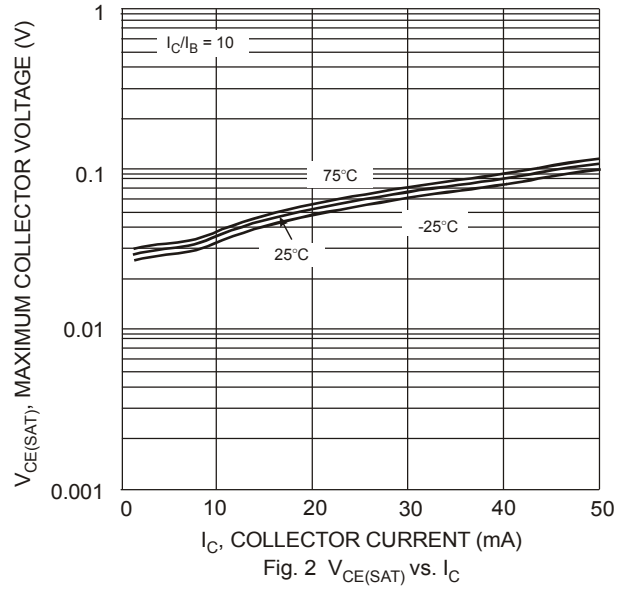


Fig. 2 V<sub>CE(SAT)</sub> vs. I<sub>C</sub>

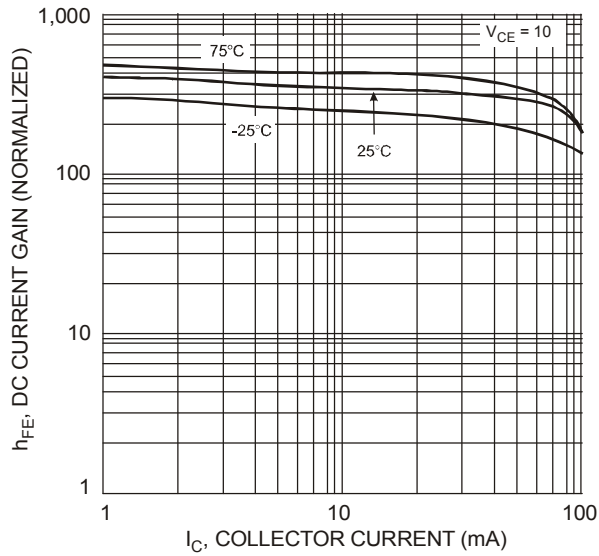


Fig. 3 DC Current Gain

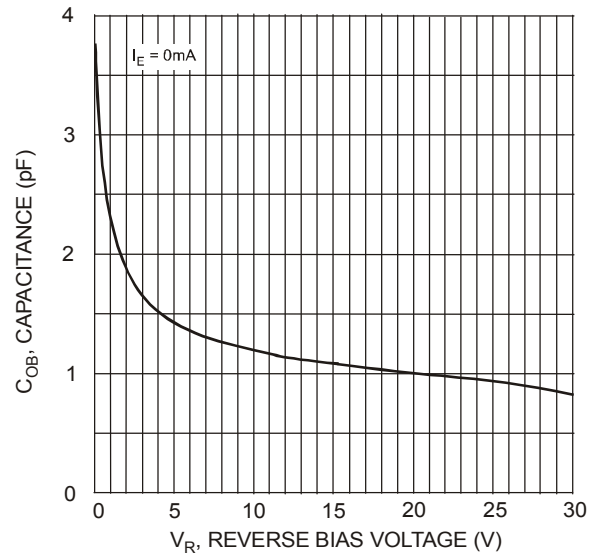


Fig. 4 Output Capacitance

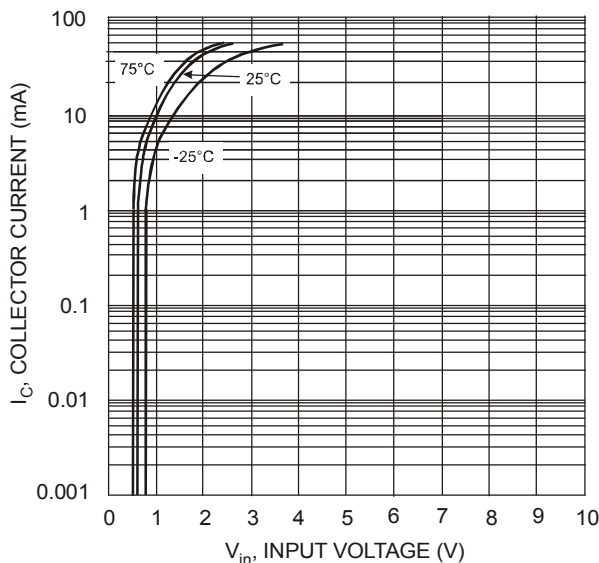


Fig. 5 Collector Current vs. Input Voltage

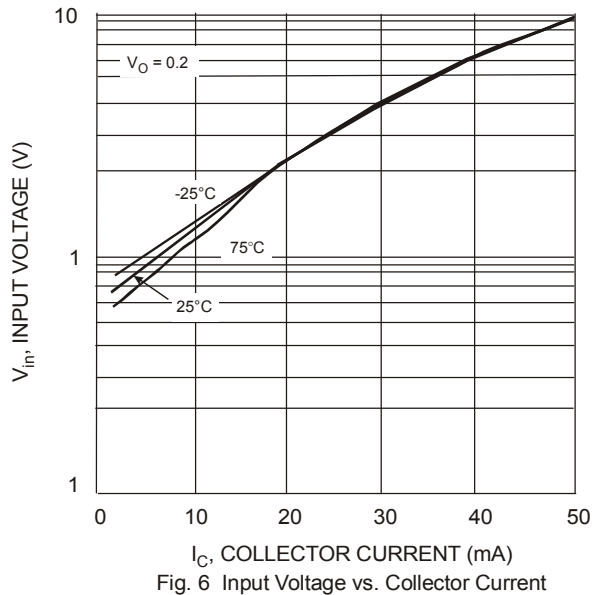


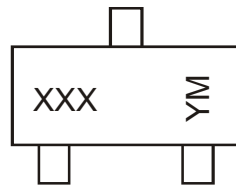
Fig. 6 Input Voltage vs. Collector Current

## Ordering Information (Note 5)

Device	Packaging	Shipping
DDTC113TE-7-F	SOT-523	3000/Tape & Reel
DDTC123TE-7-F	SOT-523	3000/Tape & Reel
DDTC143TE-7-F	SOT-523	3000/Tape & Reel
DDTC114TE-7-F	SOT-523	3000/Tape & Reel
DDTC124TE-7-F	SOT-523	3000/Tape & Reel
DDTC144TE-7-F	SOT-523	3000/Tape & Reel
DDTC115TE-7-F	SOT-523	3000/Tape & Reel
DDTC125TE-7-F	SOT-523	3000/Tape & Reel

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



Xxx = Product Type Marking Code  
See Page 1 Diagrams  
YM = Date Code Marking  
Y = Year ex: T = 2006  
M = Month ex: 9 = September

### Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012
Code	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

### IMPORTANT NOTICE

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

### LIFE SUPPORT

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.