NPN PRE-BIASED 500mA SURFACE MOUNT TRANSISTOR

Features

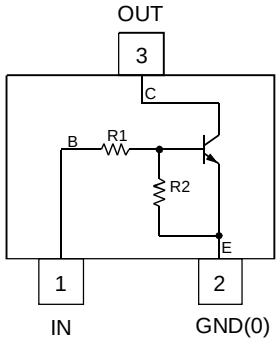
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDTB)
- Built-In Biasing Resistors, R1, R2
- **Lead, Halogen and Antimony Free, RoHS Compliant**
- **"Green" Device (Notes 2 and 3)**

Part Number	R1 (NOM)	R2 (NOM)	Marking
DDTD113EC	1K	1K	N60
DDTD123EC	2.2K	2.2K	N61
DDTD143EC	4.7K	4.7K	N62
DDTD114EC	10K	10K	N63
DDTD122JC	0.22K	4.7K	N64
DDTD113ZC	1K	10K	N65
DDTD123YC	2.2K	10K	N66
DDTD133HC	3.3K	10K	N67
DDTD123TC	2.2K	OPEN	N69
DDTD143TC	4.7K	OPEN	N70
DDTD114TC	10K	OPEN	N71
DDTD114GC	0	10K	N72

Top View

Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic, "Green" Molding Compound, Note 3. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminal Connections: See Diagram
- Terminals: Matte Tin Finish annealed over Alloy 42 leadframe (Lead Free Plating) Solderable per MIL-STD-202, Method 208
- Marking Information: See Table and Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)



Package Pin Out Configuration

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)	DDTD113EC	V_{IN}	-10 to +10	V
	DDTD123EC		-10 to +12	
	DDTD143EC		-10 to +30	
	DDTD114EC		-10 to +40	
	DDTD122JC		-5 to +5	
	DDTD113ZC		-5 to +10	
	DDTD123YC		-5 to +12	
	DDTD133HC		-6 to +20	
Input Voltage, (2) to (1)	DDTD123TC	$V_{EBO(MAX)}$	5	V
	DDTD143TC			
	DDTD114TC			
	DDTD114GC			
Output Current	All	I_C	500	mA

Thermal Characteristics

Characteristic	Symbol	Value	Unit
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 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 - R1, R2 Types @T_A = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DDTD113EC DDTD123EC DDTD143EC DDTD114EC DDTD122JC DDTD113ZC DDTD123YC DDTD133HC	$V_{I(OFF)}$	0.5 0.5 0.5 0.5 0.5 0.3 0.3 0.3	—	—	V	V_{CC} = 5V, I_O = 100μA
	DDTD113EC DDTD123EC DDTD143EC DDTD114EC DDTD122JC DDTD113ZC DDTD123YC DDTD133HC	$V_{I(ON)}$	—	—	3.0 3.0 3.0 3.0 3.0 2.0 2.0 2.0	V	V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 10mA V_O = 0.3V, I_O = 30mA V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 20mA V_O = 0.3V, I_O = 20mA
Output Voltage		$V_{O(ON)}$	—	—	0.3V	V	I_O/I_I = -50mA/-2.5mA
Input Current	DDTD113EC DDTD123EC DDTD143EC DDTD114EC DDTD122JC DDTD113ZC DDTD123YC DDTD133HC	I_I	—	—	7.2 3.8 1.8 0.88 28 7.2 3.6 2.4	mA	V_I = 5V
Output Current		$I_{O(OFF)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DDTD113EC DDTD123EC DDTD143EC DDTD114EC DDTD122JC DDTD113ZC DDTD123YC DDTD133HC	G_I	33 39 47 56 47 56 56 56	—	—	—	V_O = 5V, I_O = 50mA
Input Resistor Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		$\Delta(R_2/R_1)$	-20	—	+20	%	—
Gain-Bandwidth Product*		f_T	—	200	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

Electrical Characteristics - R1 Only, R2 Only Types @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}	40	—	—	V	I_C = 1mA
Emitter-Base Breakdown Voltage	DDTD123TC DDTD143TC DDTD114TC DDTD114GC	BV_{EBO}	5	—	—	V	I_E = 50μA I_E = 50μA I_E = 50μA I_E = 720μA
Collector Cutoff Current		I_{CBO}	—	—	0.5	μA	V_{CB} = 50V
Emitter Cutoff Current	DDTD123TC DDTD143TC DDTD114TC DDTD114GC	I_{EBO}	— — — 300	—	0.5 0.5 0.5 580	μA	V_{EB} = 4V
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	—	—	0.3	V	I_C = 50mA, I_B = 2.5mA
DC Current Transfer Ratio	DDTD123TC DDTD143TC DDTD114TC DDTD114GC	h_{FE}	100 100 100 56	250 250 250 —	600 600 600 —	—	I_C = 50mA, V_{CE} = 5V
Bias Resistor Tolerance		ΔR_1 or ΔR_2	-30	—	+30	%	—
Gain-Bandwidth Product*		f_T	—	200	—	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz

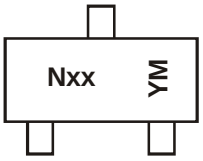
* Transistor - For Reference Only

Ordering Information (Note 4)

Part Number	Case	Packaging
DDTD113EC-7-F	SOT-23	3000/Tape & Reel
DDTD123EC-7-F	SOT-23	3000/Tape & Reel
DDTD143EC-7-F	SOT-23	3000/Tape & Reel
DDTD114EC-7-F	SOT-23	3000/Tape & Reel
DDTD122JC-7-F	SOT-23	3000/Tape & Reel
DDTD113ZC-7-F	SOT-23	3000/Tape & Reel
DDTD123YC-7-F	SOT-23	3000/Tape & Reel
DDTD133HC-7-F	SOT-23	3000/Tape & Reel
DDTD123TC-7-F	SOT-23	3000/Tape & Reel
DDTD143TC-7-F	SOT-23	3000/Tape & Reel
DDTD114TC-7-F	SOT-23	3000/Tape & Reel
DDTD114GC-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



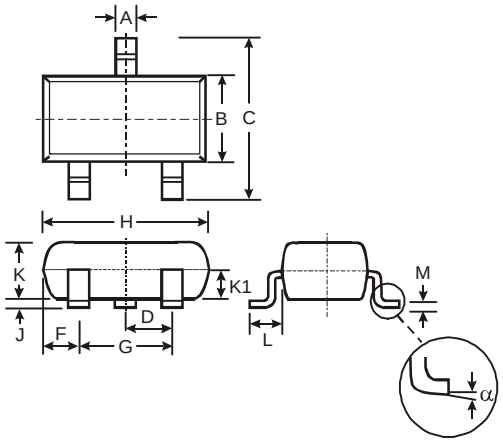
Nxx = Product Type Marking Code (See Page 1)
YM = Date Code Marking
Y = Year (ex: T = 2002)
M = Month (ex: 9 = September)

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Code	N	P	R	S	T	U	V	W	X	Y	Z	A	B	C

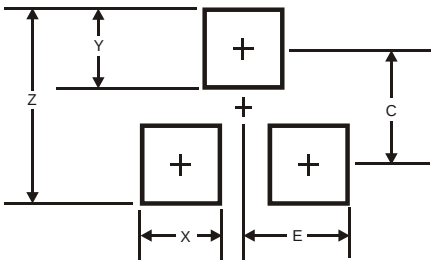
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Package Outline Dimensions



SOT-23			
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	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



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

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