

## NPN PRE-BIASED SMALL SIGNAL SOT-563 DUAL SURFACE MOUNT TRANSISTOR

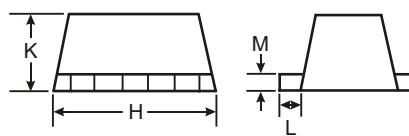
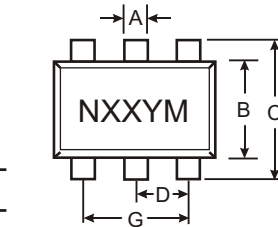
NEW PRODUCT

### Features

- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDA)
- Built-In Biasing Resistors
- Lead-Free Device

### Mechanical Data

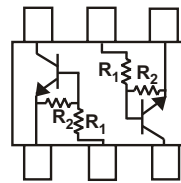
- Case: SOT-563, Molded Plastic
- Case material - UL Flammability Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208 (Note 2)
- Terminal Connections: See Diagram
- Weight: 0.005 grams (approx.)



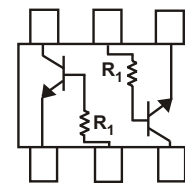
SEE NOTE 1

SOT-563			
Dim	Min	Max	Typ
A	0.15	0.30	0.25
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	0.50		
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.56	0.60	0.60
L	0.15	0.25	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

P/N	R1	R2	MARKING
DDC124EH	22K $\Omega$	22K $\Omega$	N17
DDC144EH	47K $\Omega$	47K $\Omega$	N20
DDC143EH	4.7K $\Omega$	4.7K $\Omega$	N08
DDC114YH	10K $\Omega$	47K $\Omega$	N14
DDC123JH	2.2K $\Omega$	47K $\Omega$	N06
DDC114EH	10K $\Omega$	10K $\Omega$	N13
DDC143TH	4.7K $\Omega$	-	N07
DDC114TH	10K $\Omega$	-	N12



R<sub>1</sub>, R<sub>2</sub>



R<sub>1</sub> Only

SCHEMATIC DIAGRAM, TOP VIEW

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	50	V
Input Voltage	V <sub>IN</sub>	-10 to +40 -10 to +40 -10 to +30 -6 to +40 -5 to +12 -10 to +40 -5 V <sub>max</sub> -5 V <sub>max</sub>	V
Output Current	I <sub>O</sub>	30 30 100 70 100 50 100 100	mA
Output Current	I <sub>C</sub> (Max)	100	mA
Power Dissipation	P <sub>d</sub>	150	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	R <sub>θJA</sub>	833	°C/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Note:
1. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).
  2. If lead-bearing terminal plating is required, please contact your Diodes Inc. sales representative for availability and minimum order details.
  3. Mounted on FR4 Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.

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

Characteristic (DDC143TH & DDC114TH only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	50	—	—	V	$I_C = 50\mu\text{A}$
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	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA}$ DDC143TH $I_C/I_B = 1\text{mA} / 0.1\text{mA}$ DDC114TH
DC Current Transfer Ratio	$h_{FE}$	100	250	600	—	$I_C = 1\text{mA}, V_{CE} = 5\text{V}$
Gain-Bandwidth Product*	$f_T$	—	250	—	MHz	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Input Voltage	DDC124EH DDC144EH DDC143EH DDC114YH DDC123JH DDC114EH	$V_{I(off)}$	0.5	1.1	—	V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
	0.5		1.1				
Input Voltage	DDC124EH DDC144EH DDC143EH DDC114YH DDC123JH DDC114EH	$V_{I(on)}$	—	1.9	3.0	V	$V_O = 0.3\text{V}, I_O = 5\text{mA}$ $V_O = 0.3\text{V}, I_O = 2\text{mA}$ $V_O = 0.3\text{V}, I_O = 20\text{mA}$ $V_O = 0.3\text{V}, I_O = 1\text{mA}$ $V_O = 0.3\text{V}, I_O = 5\text{mA}$ $V_O = 0.3\text{V}, I_O = 10\text{mA}$
	—		1.9	3.0			
Output Voltage	DDC124EH DDC144EH DDC143EH DDC114YH DDC123JH DDC114EH	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	—						
Input Current	DDC124EH DDC144EH DDC143EH DDC114YH DDC123JH DDC114EH	$I_I$	—	—	0.36 0.18 1.8 0.88 3.6 0.88	mA	$V_I = 5\text{V}$
Output Current		$I_{O(off)}$	—	—	0.5	$\mu\text{A}$	$V_{CC} = 50\text{V}, V_I = 0\text{V}$
DC Current Gain	DDC124EH DDC144EH DDC143EH DDC114YH DDC123JH DDC114EH	$G_I$	56 68 20 68 80 30	—	—	—	$V_O = 5\text{V}, I_O = 5\text{mA}$ $V_O = 5\text{V}, I_O = 5\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 5\text{mA}$
Gain-Bandwidth Product*		$f_T$	—	250	—	MHz	$V_{CE} = 10\text{V}, I_E = 5\text{mA}, f = 100\text{MHz}$

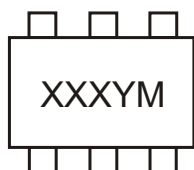
\* Transistor - For Reference Only

**Ordering Information** (Note 4)

Device	Packaging	Shipping
DDC124EH-7	SOT-563	3000/Tape & Reel
DDC144EH-7	SOT-563	3000/Tape & Reel
DDC143EH-7	SOT-563	3000/Tape & Reel
DDC114YH-7	SOT-563	3000/Tape & Reel
DDC123JH-7	SOT-563	3000/Tape & Reel
DDC114EH-7	SOT-563	3000/Tape & Reel
DDC143TH-7	SOT-563	3000/Tape & Reel
DDC114TH-7	SOT-563	3000/Tape & Reel

Notes: 4. 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)  
 YM = Date Code Marking  
 Y = Year ex: P = 2003  
 M = Month ex: 9 = September

Date Code Key

Year	2003	2004	2005	2006	2007	2008	2009
Code	P	R	S	T	U	V	W

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

**TYPICAL CURVES - DDC143EH**

**NEW PRODUCT**

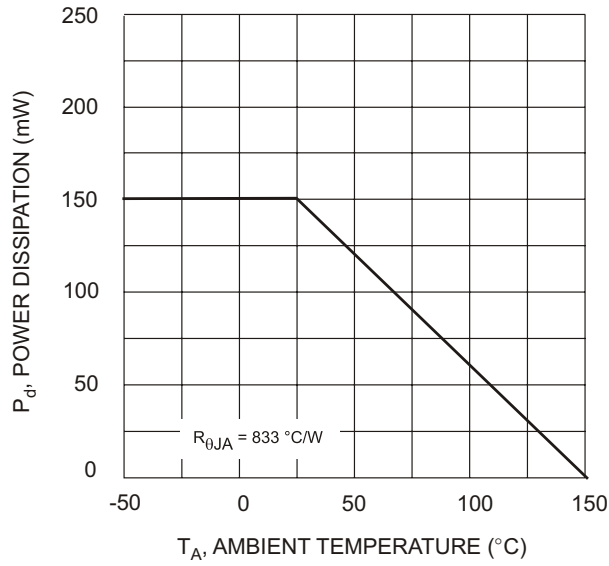


Fig. 1 Derating Curve

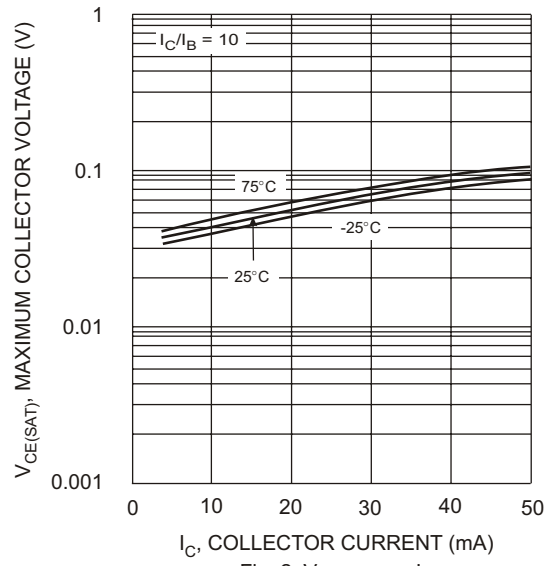


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

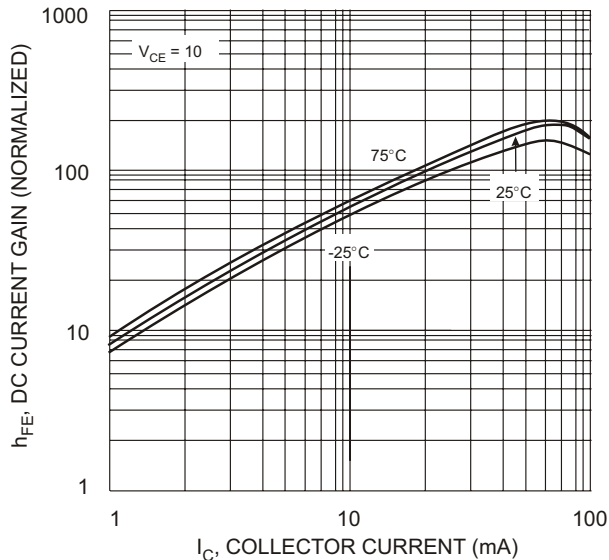


Fig. 3 DC Current Gain

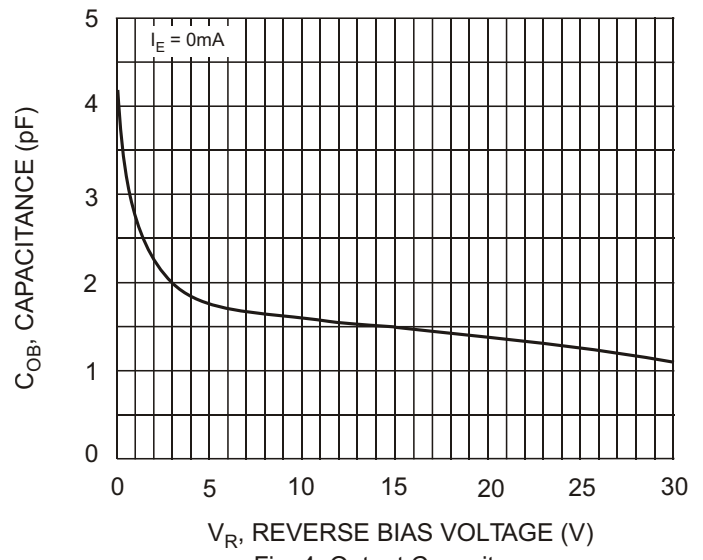


Fig. 4 Output Capacitance

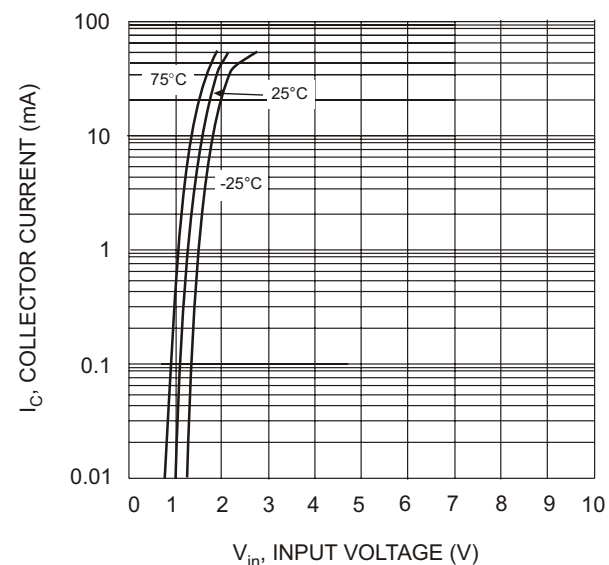


Fig. 5 Collector Current Vs. Input Voltage

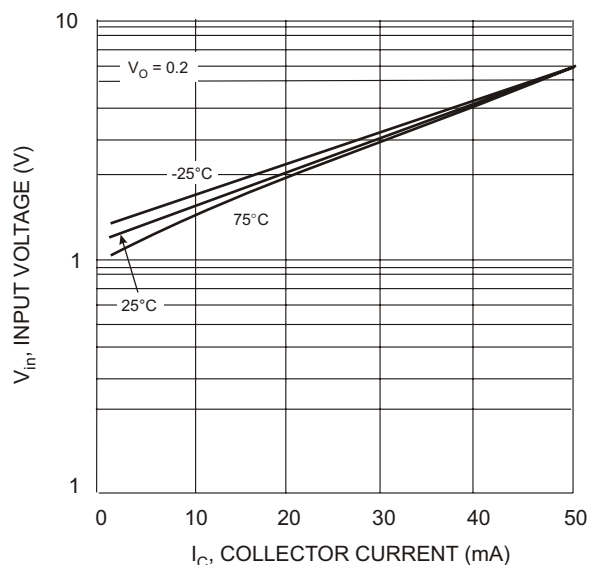


Fig. 6 Input Voltage vs. Collector Current