



**THE DATASHEET OF  
DDC114TH-7**



**NPN PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR**
**Features**

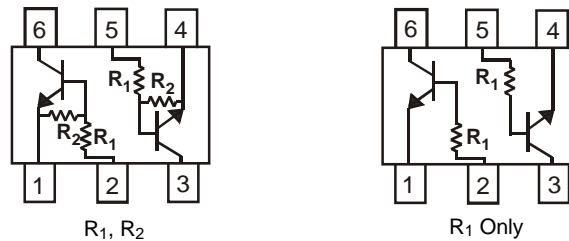
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDA)
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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

**Mechanical Data**

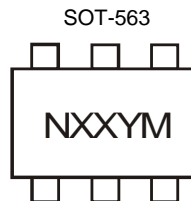
- Case: SOT-563
- Case Material: Molded Plastic; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 <sup>Ⓔ3</sup>
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)

SCHEMATIC DIAGRAM, TOP VIEW


**Ordering Information (Note 4)**

Device	Packaging	Shipping
DDC124EH-7	SOT-563	3,000/Tape & Reel
DDC144EH-7	SOT-563	3,000/Tape & Reel
DDC143EH-7	SOT-563	3,000/Tape & Reel
DDC114YH-7	SOT-563	3,000/Tape & Reel
DDC123JH-7	SOT-563	3,000/Tape & Reel
DDC114EH-7	SOT-563	3,000/Tape & Reel
DDC143TH-7	SOT-563	3,000/Tape & Reel
DDC114TH-7	SOT-563	3,000/Tape & Reel

- 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](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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

**Marking Information**


Nxx = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: T = 2006  
 M = Month ex: 9 = September

## Date Code Key

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	P	R	S	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

**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 -5V max -5V max	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 5)	R <sub>θJA</sub>	833	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Note: 5. 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 Cut-Off Current	$I_{CBO}$	—	—	0.5	$\mu\text{A}$	$V_{CB} = 50\text{V}$
Emitter Cut-Off 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	$V_{I(off)}$	DDC124EH	0.5	1.1	—	V	$V_{CC} = 5\text{V}$ , $I_O = 100\mu\text{A}$
		DDC144EH	0.5	1.1			
DDC143EH		0.5	1.1				
DDC114YH		0.3	—				
DDC123JH		0.5	—				
DDC114EH		0.5	1.1				
Input Voltage	$V_{I(on)}$	DDC124EH	—	1.9	3.0	V	$V_O = 0.3\text{V}$ , $I_O = 5\text{mA}$ $V_O = 0.3\text{V}$ , $I_O = 2\text{mA}$ $V_O = 0.3\text{V}$ , $I_O = 20\text{mA}$ $V_O = 0.3\text{V}$ , $I_O = 1\text{mA}$ $V_O = 0.3\text{V}$ , $I_O = 5\text{mA}$ $V_O = 0.3\text{V}$ , $I_O = 10\text{mA}$
		DDC144EH	—	1.9	3.0		
		DDC143EH	—	1.9	3.0		
		DDC114YH	—	—	1.4		
		DDC123JH	—	—	1.1		
		DDC114EH	—	1.9	3.0		
Output Voltage	$V_{O(on)}$	—	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	$I_I$	—	—	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	$G_I$	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

**Typical Curves – DDC143EH**

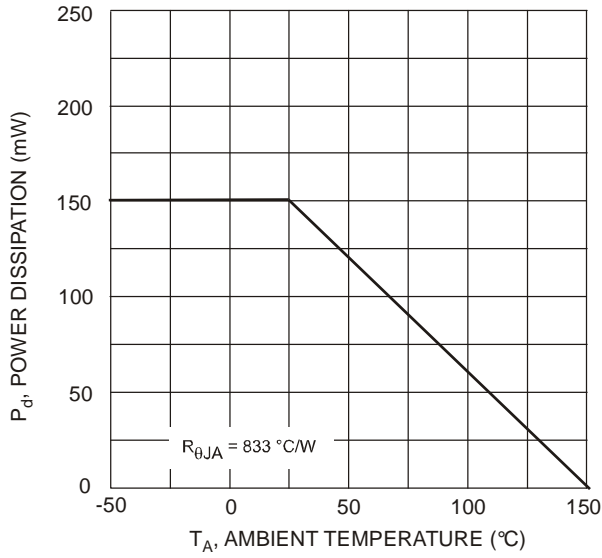


Fig. 1 Derating Curve

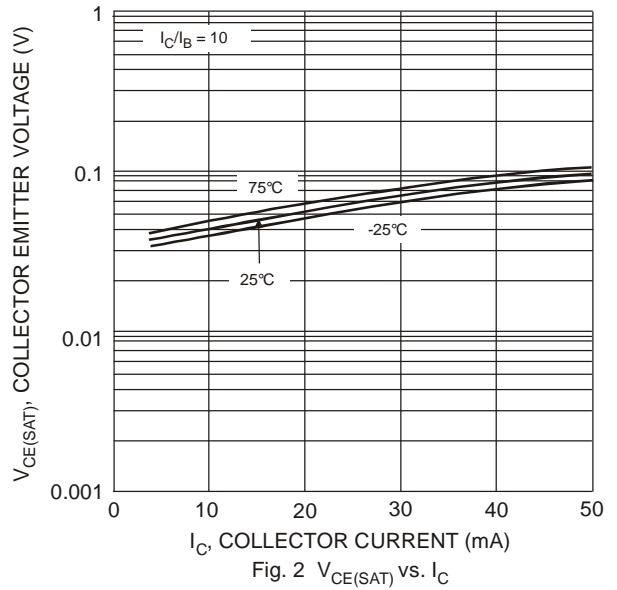


Fig. 2 V<sub>CE(SAT)</sub> vs. I<sub>C</sub>

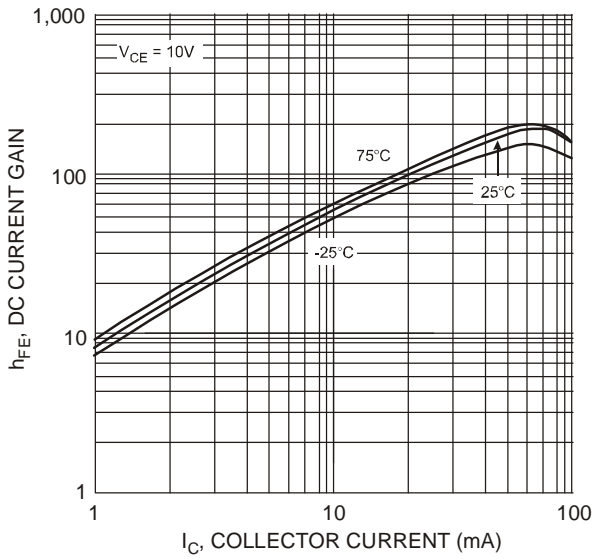


Fig. 3 DC Current Gain

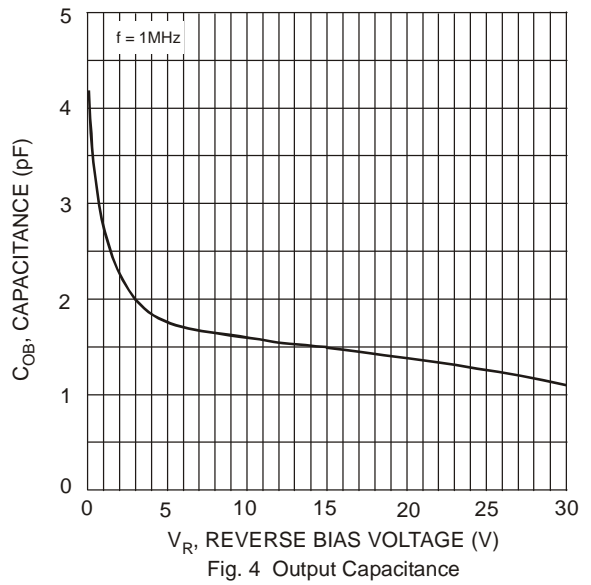


Fig. 4 Output Capacitance

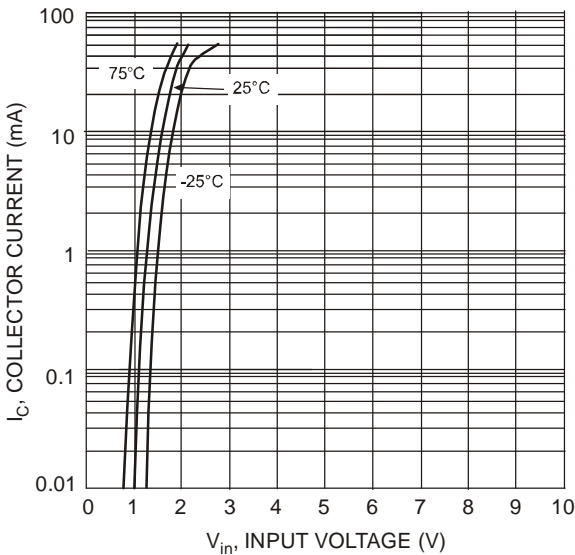


Fig. 5 Collector Current vs. Input Voltage

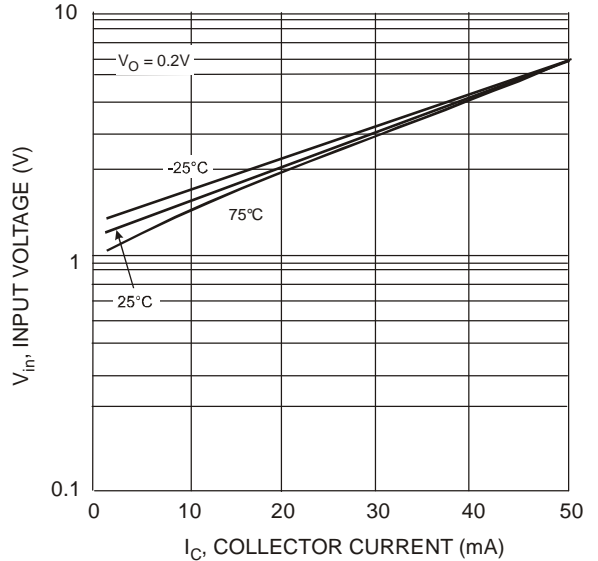
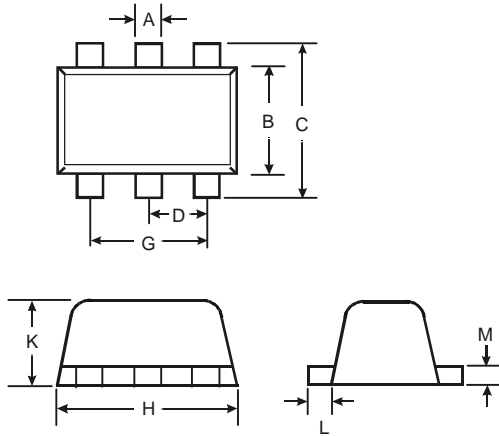


Fig. 6 Input Voltage vs. Collector Current

**Package Outline Dimensions**

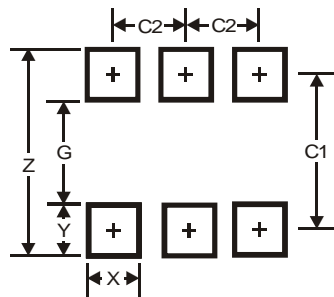
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
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	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
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	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

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