

NPN PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR
Features

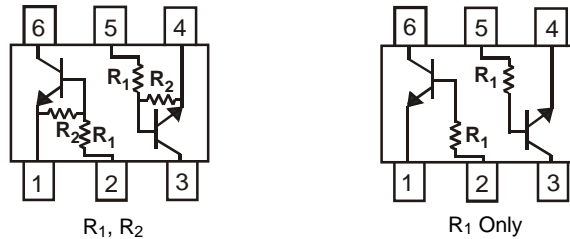
- Epitaxial Planar Die Construction
- Complementary PNP Types Available (DDA)
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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

Mechanical Data

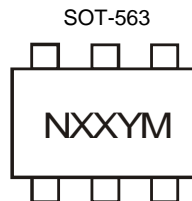
- Case: SOT-563
- Case Material: Molded Plastic; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ^{Ⓔ3}
- Terminal Connections: See Diagram
- Weight: 0.005 grams (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 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage		V_{CC}	50	V
Input Voltage	DDC124EH DDC144EH DDC143EH DDC114YH DDC123JH DDC114EH DDC143TH DDC114TH	V_{IN}	-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	DDC124EH DDC144EH DDC143EH DDC114YH DDC123JH DDC114EH DDC143TH DDC114TH	I_O	30 30 100 70 100 50 100 100	mA
Output Current	All	I_C (Max)	100	mA
Power Dissipation		P_d	150	mW
Thermal Resistance, Junction to Ambient Air	(Note 5)	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage Temperature Range		T_j, T_{STG}	-55 to +150	$^\circ\text{C}$

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	μA	$V_{CB} = 50\text{V}$
Emitter Cut-Off Current	I_{EBO}	—	—	0.5	μA	$V_{EB} = 4\text{V}$
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			
		DDC143EH	—	1.9			
		DDC114YH	—	1.4			
		DDC123JH	—	1.1			
		DDC114EH	—	1.9			
Output Voltage	$V_{O(on)}$	DDC124EH	—	0.1	0.3	V	$I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$
		DDC144EH	—				
		DDC143EH	—				
		DDC114YH	—				
		DDC123JH	—				
		DDC114EH	—				
Input Current	I_I	DDC124EH	—	—	0.36	mA	$V_I = 5\text{V}$
		DDC144EH	—	—	0.18		
		DDC143EH	—	—	1.8		
		DDC114YH	—	—	0.88		
		DDC123JH	—	—	3.6		
		DDC114EH	—	—	0.88		
Output Current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50\text{V}$, $V_I = 0\text{V}$	
DC Current Gain	G_I	DDC124EH	56	—	—	—	$V_O = 5\text{V}$, $I_O = 5\text{mA}$ $V_O = 5\text{V}$, $I_O = 5\text{mA}$ $V_O = 5\text{V}$, $I_O = 10\text{mA}$ $V_O = 5\text{V}$, $I_O = 10\text{mA}$ $V_O = 5\text{V}$, $I_O = 10\text{mA}$ $V_O = 5\text{V}$, $I_O = 5\text{mA}$
		DDC144EH	68				
		DDC143EH	20				
		DDC114YH	68				
		DDC123JH	80				
		DDC114EH	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

Typical Curves – DDC143EH

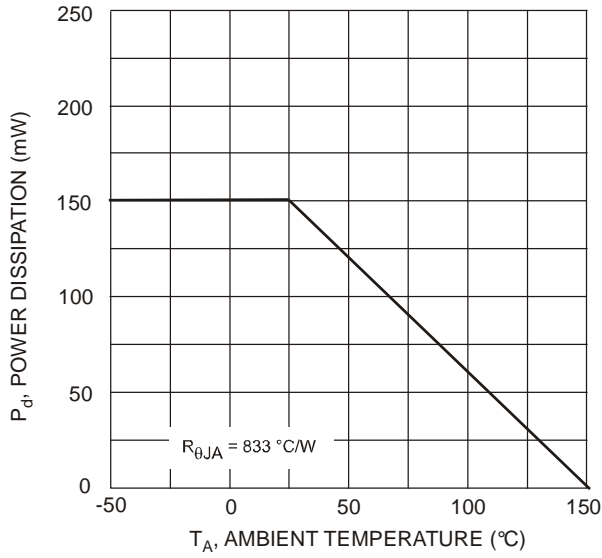


Fig. 1 Derating Curve

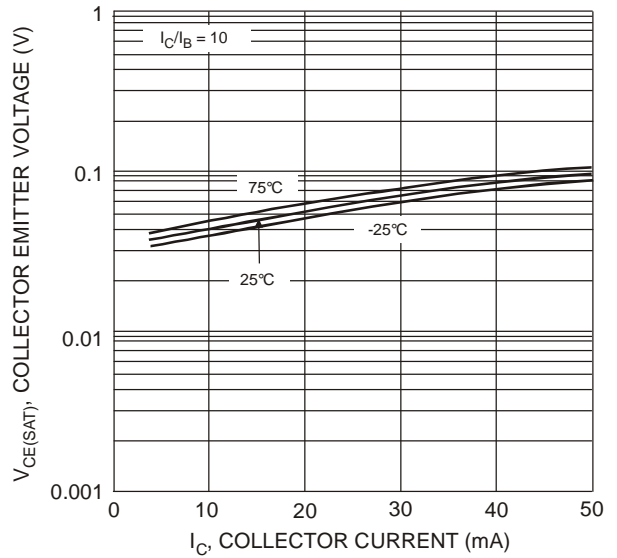


Fig. 2 $V_{CE(SAT)}$ vs. I_C

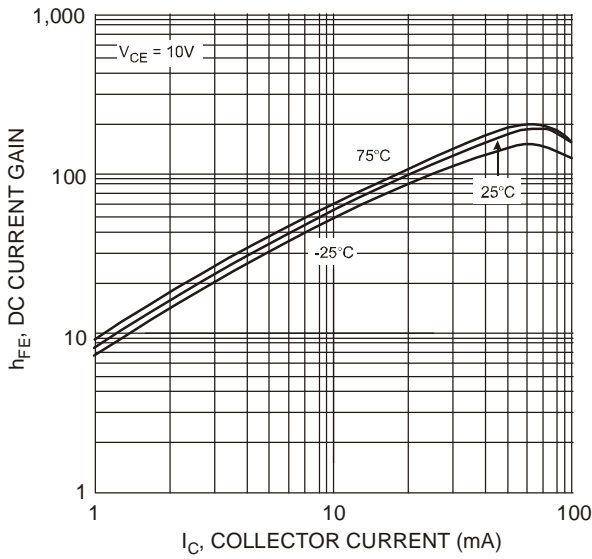


Fig. 3 DC Current Gain

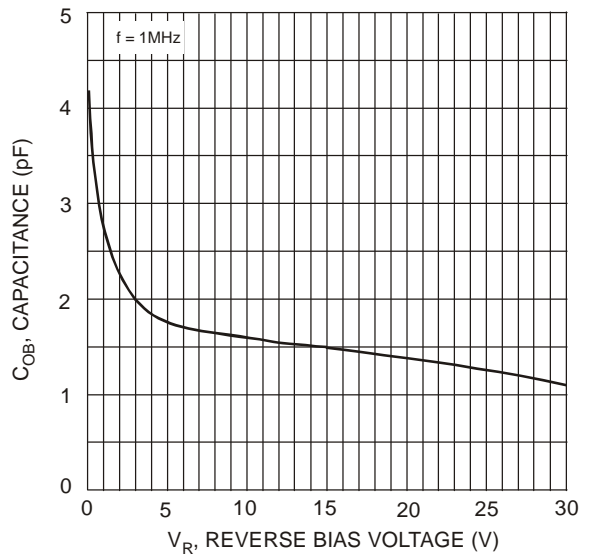


Fig. 4 Output Capacitance

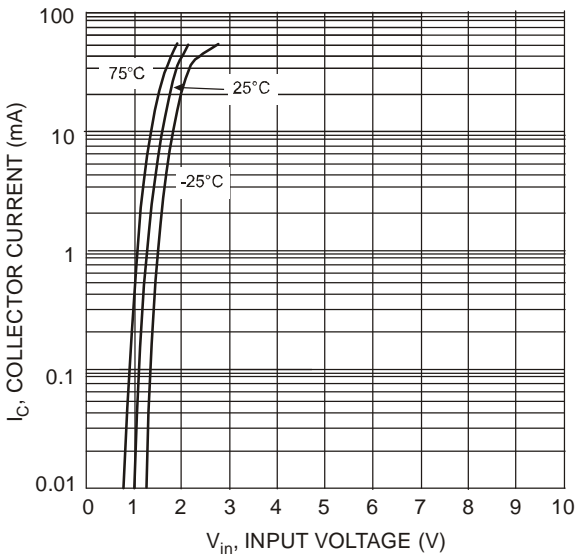


Fig. 5 Collector Current vs. Input Voltage

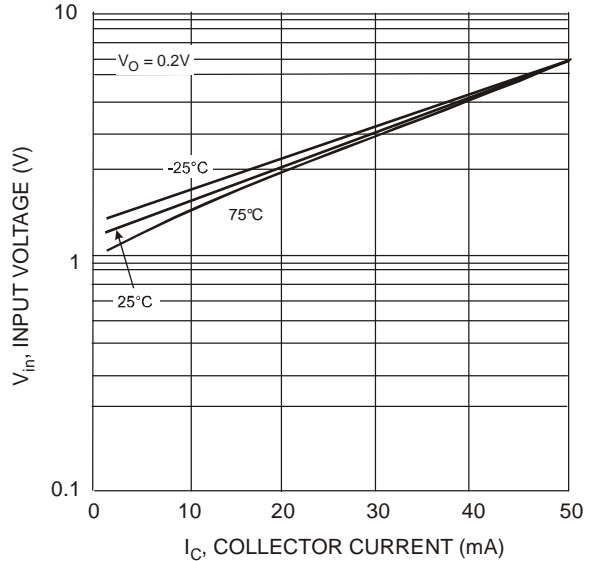
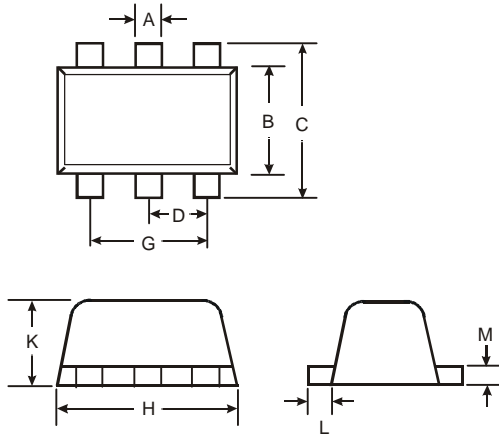


Fig. 6 Input Voltage vs. Collector Current

Package Outline Dimensions

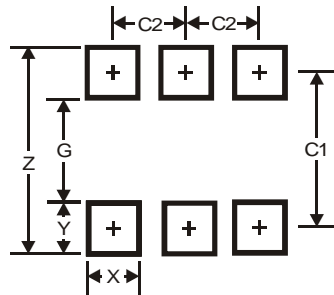
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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