

**COMPLEMENTARY NPN/PNP PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR**

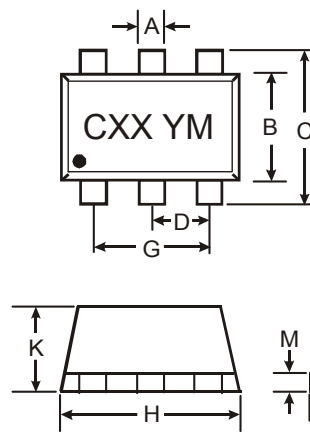
NEW PRODUCT

**Features**

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- Lead Free By Design/RoHS Compliant (Note 2)
- "Green" Device (Note 3 and 4)

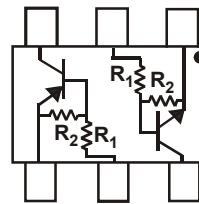
**Mechanical Data**

- Case: SOT-563
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.005 grams (approximate)

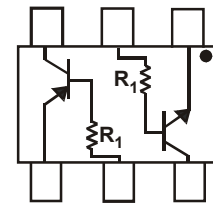


SOT-563			
Dim	Min	Max	Typ
A	0.15	0.30	0.25
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	0.50		
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.56	0.60	0.60
L	0.15	0.25	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

P/N	R1	R2	MARKING
DCX124EH	22KΩ	22KΩ	C17
DCX144EH	47KΩ	47KΩ	C20
DCX143EH	4.7KΩ	4.7KΩ	C08
DCX114YH	10KΩ	47KΩ	C14
DCX123JH	2.2KΩ	47KΩ	C06
DCX114EH	10KΩ	10KΩ	C13
DCX143TH	4.7KΩ	—	C07
DCX114TH	10KΩ	—	C12



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



R<sub>1</sub> Only

SCHEMATIC DIAGRAM, TOP VIEW

**Maximum Ratings NPN Section**

@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>	DCX124EH: -10 to +40 DCX144EH: -10 to +40 DCX143EH: -10 to +30 DCX114YH: -6 to +40 DCX123JH: -5 to +12 DCX114EH: -10 to +40 DCX143TH: -5V max DCX114TH: -5V max	V
Output Current	I <sub>O</sub>	DCX124EH: 30 DCX144EH: 30 DCX143EH: 100 DCX114YH: 70 DCX123JH: 100 DCX114EH: 50 DCX143TH: 100 DCX114TH: 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	R <sub>θJA</sub>	833	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
1. Mounted on FR4 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.

## Maximum Ratings PNP Section @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 (Total)	P <sub>d</sub>	150	mW
Operating and Storage Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	°C

## Electrical Characteristics NPN Section @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic (DDC143TH & DDC114TH only)	Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	50	—	—	V	I <sub>C</sub> = 50μA	
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	50	—	—	V	I <sub>C</sub> = 1mA	
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	5	—	—	V	I <sub>E</sub> = 50μA	
Collector Cutoff Current	I <sub>CBO</sub>	—	—	0.5	μA	V <sub>CB</sub> = 50V	
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	0.5	μA	V <sub>EB</sub> = 4V	
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	0.3	V	I <sub>O</sub> /I <sub>B</sub> = 2.5mA / 0.25mA DCX143TH I <sub>O</sub> /I <sub>B</sub> = 1mA / 0.1mA DCX114TH	
DC Current Transfer Ratio	h <sub>FE</sub>	100	250	600	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V	
Gain-Bandwidth Product*	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA, f = 100MHz	
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Input Voltage	V <sub>I(off)</sub>	DCX124EH	0.5	1.1	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
		DCX144EH	0.5	1.1	—		
DCX143EH		0.5	1.1	—			
DCX114YH		0.3	—	—			
DCX123JH		0.5	—	—			
DCX114EH		0.5	1.1	—			
Input Voltage	V <sub>I(on)</sub>	DCX124EH	—	1.9	3.0	V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA
		DCX144EH	—	1.9	3.0		
		DCX143EH	—	1.9	3.0		
		DCX114YH	—	—	1.4		
		DCX123JH	—	—	1.1		
		DCX114EH	—	1.9	3.0		
Output Voltage	V <sub>O(on)</sub>	DCX124EH	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA
		DCX144EH	—	0.1	0.3		
		DCX143EH	—	0.1	0.3		
		DCX114YH	—	0.1	0.3		
		DCX123JH	—	0.1	0.3		
		DCX114EH	—	0.1	0.3		
Input Current	I <sub>I</sub>	DCX124EH	—	—	0.36	mA	V <sub>I</sub> = 5V
		DCX144EH	—	—	0.18		
		DCX143EH	—	—	1.8		
		DCX114YH	—	—	0.88		
		DCX123JH	—	—	3.6		
		DCX114EH	—	—	0.88		
Output Current	I <sub>O(off)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V	
DC Current Gain	G <sub>I</sub>	DCX124EH	56	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
		DCX144EH	68	—	—		
		DCX143EH	20	—	—		
		DCX114YH	68	—	—		
		DCX123JH	80	—	—		
		DCX114EH	30	—	—		

\* Transistor - For Reference Only

**Electrical Characteristics PNP Section** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic (DCX143TH & DCX114TH only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-50	—	—	V	I <sub>C</sub> = -50μA
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	-50	—	—	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	—	—	V	I <sub>E</sub> = -50μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	-0.5	μA	V <sub>CB</sub> = -50V
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	-0.5	μA	V <sub>EB</sub> = -4V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	-0.3	V	I <sub>C</sub> /I <sub>B</sub> = 2.5mA / 0.25mA DCX143TH I <sub>C</sub> /I <sub>B</sub> = 1mA / 0.1mA DCX114TH
DC Current Transfer Ratio	h <sub>FE</sub>	100	250	600	—	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V
Gain-Bandwidth Product*	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Input Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	-0.5 -0.5 -0.5 -0.3 -0.5 -0.5	-1.1 -1.1 — — — -1.1	—	—	V	V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA
	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	—	-1.9 -1.9 — — -1.9	-3.0 -3.0 -1.4 -1.1 -3.0	—	V	V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA V <sub>O</sub> = -0.3V, I <sub>O</sub> = -1mA V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA V <sub>O</sub> = -0.3V, I <sub>O</sub> = -10mA
Output Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	—	-0.1	-0.3	V	I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA	
Input Current	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	—	—	-0.36 -0.18 -1.8 -0.88 -3.6 -0.88	mA	V <sub>I</sub> = -5V	
Output Current	I <sub>O(off)</sub>	—	—	-0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V	
DC Current Gain	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	56 68 20 68 80 30	—	—	—	V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA	
Gain-Bandwidth Product*	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz	

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## Typical Curves – DCX143EH NPN Section

NEW PRODUCT



Fig. 1 Derating Curve - Total

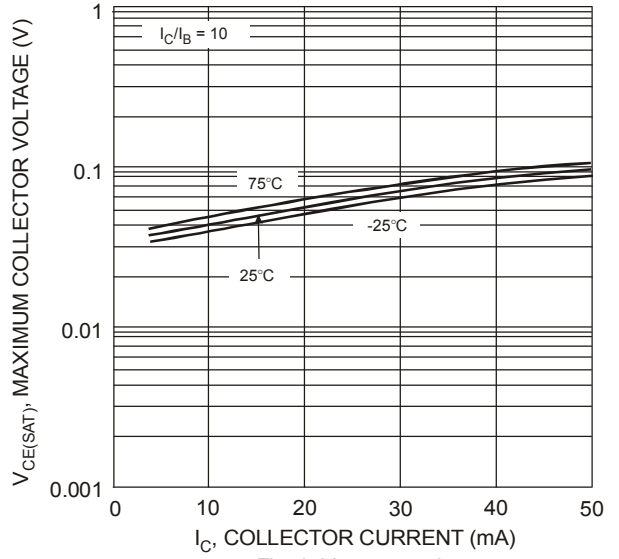


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$



Fig. 3 DC Current Gain

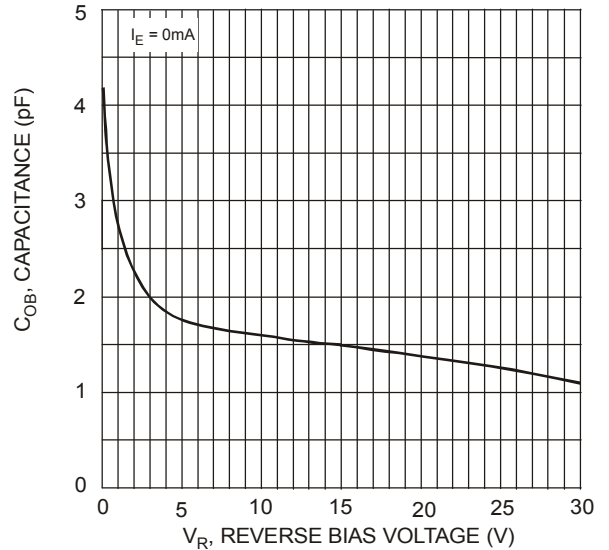


Fig. 4 Output Capacitance

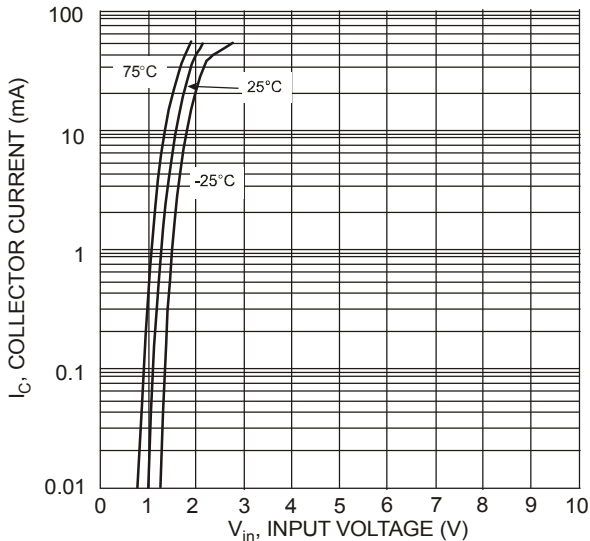


Fig. 5 Collector Current vs. Input Voltage



Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DCX143EH PNP Section

NEW PRODUCT

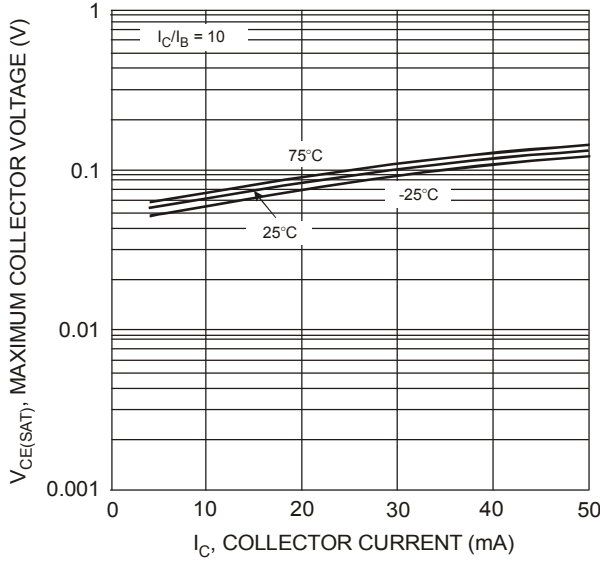


Fig. 7  $V_{CE(SAT)}$  vs.  $I_C$



Fig. 8 DC Current Gain

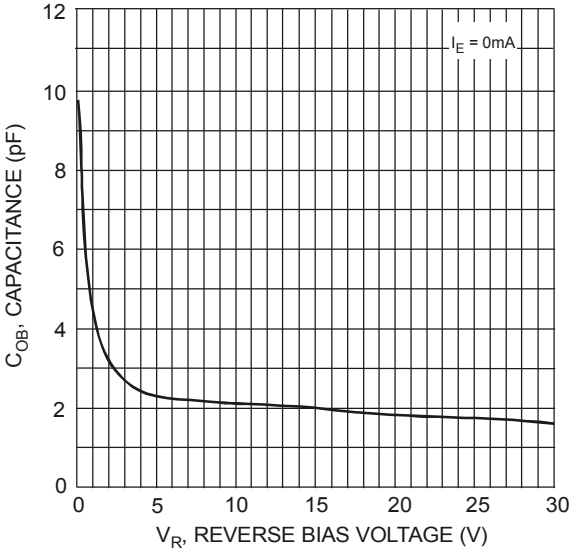


Fig. 9 Output Capacitance

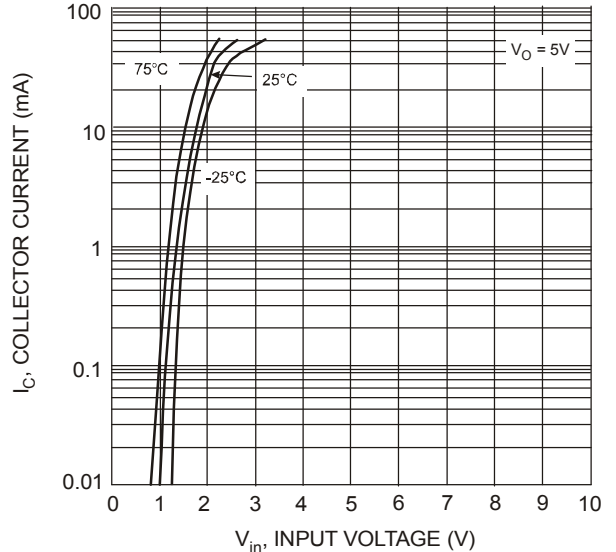


Fig. 10 Collector Current vs. Input Voltage

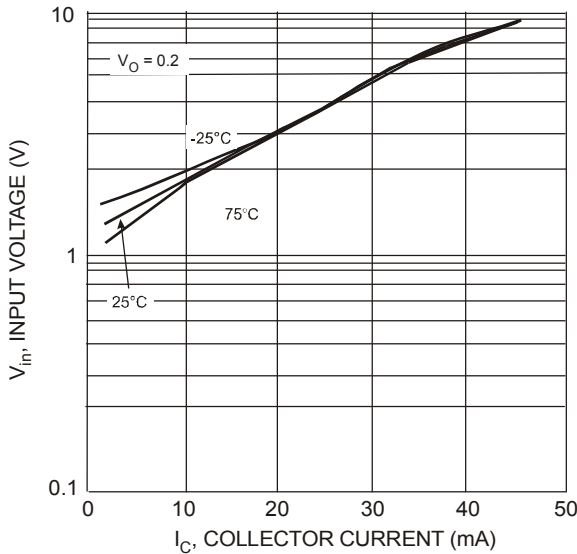


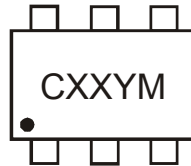
Fig. 11 Input Voltage vs. Collector Current

## Ordering Information (Note 5)

Device	Packaging	Shipping
DCX124EH-7	SOT-563	3000/Tape & Reel
DCX144EH-7	SOT-563	3000/Tape & Reel
DCX143EH-7	SOT-563	3000/Tape & Reel
DCX114YH-7	SOT-563	3000/Tape & Reel
DCX123JH-7	SOT-563	3000/Tape & Reel
DCX114EH-7	SOT-563	3000/Tape & Reel
DCX143TH-7	SOT-563	3000/Tape & Reel
DCX114TH-7	SOT-563	3000/Tape & Reel

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

## Marking Information



CXX = 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	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

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