

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

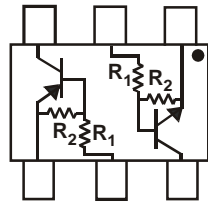
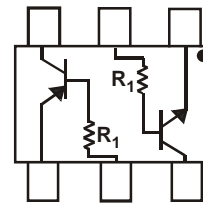
- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

P/N	R1	R2	MARKING
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

**Mechanical Data**

- Case: SOT-563
- Case Material: Molded Plastic "Green" Molding Compound; 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 208③
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)

SCHEMATIC DIAGRAM, TOP VIEW


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

 R<sub>1</sub> Only Device Schematic

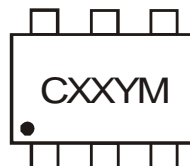
**Ordering Information (Note 4)**

Device	Packaging	Shipping
DCX124EH-7	SOT-563	3,000/Tape & Reel
DCX144EH-7	SOT-563	3,000/Tape & Reel
DCX143EH-7	SOT-563	3,000/Tape & Reel
DCX114YH-7	SOT-563	3,000/Tape & Reel
DCX123JH-7	SOT-563	3,000/Tape & Reel
DCX114EH-7	SOT-563	3,000/Tape & Reel
DCX143TH-7	SOT-563	3,000/Tape & Reel
DCX114TH-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**

SOT-563



CXX = Product Type Marking Code  
 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

**Maximum Ratings NPN Section** (@ $T_A = +25^\circ\text{C}$  unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage		$V_{CC}$	50	V
Input Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH	$V_{IN}$	-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	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH	$I_O$	30 30 100 70 100 50 100 100	mA
Output Current	All	$I_C$ (Max)	100	mA
Power Dissipation	(Total)	$P_d$	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>.

**Maximum Ratings PNP Section** (@ $T_A = +25^\circ\text{C}$  unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage		$V_{CC}$	50	V
Input Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH	$V_{IN}$	+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	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH	$I_O$	-30 -30 -100 -70 -100 -50 -100 -100	mA
Output Current	All	$I_C$ (Max)	-100	mA
Power Dissipation (Total)		$P_d$	150	mW
Operating and Storage Temperature Range		$T_j, T_{STG}$	-55 to +150	$^\circ\text{C}$

**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>CB0</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>EB0</sub>	5	—	—	V	I <sub>E</sub> = 50μA	
Collector Cut-Off Current	I <sub>CB0</sub>	—	—	0.5	μA	V <sub>CB</sub> = 50V	
Emitter Cut-Off Current	I <sub>EB0</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	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	—	—	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA
		DCX144EH	—	1.9			
		DCX143EH	—	1.9			
		DCX114YH	—	1.4			
		DCX123JH	—	1.1			
		DCX114EH	—	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					I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA
		DCX143EH					I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA
		DCX114YH					I <sub>O</sub> /I <sub>I</sub> = 5mA / 0.25mA
		DCX123JH					I <sub>O</sub> /I <sub>I</sub> = 5mA / 0.25mA
		DCX114EH					I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA
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>CB0</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 Cut-Off Current	I <sub>CBO</sub>	—	—	-0.5	μA	V <sub>CB</sub> = -50V
Emitter Cut-Off 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	V <sub>I(off)</sub>	-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>	—	-1.9	-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	
		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>	—	-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	
		DCX144EH	—	-0.1			-0.3
		DCX143EH	—	-0.1			-0.3
		DCX114YH	—	—			—
		DCX123JH	—	—			—
		DCX114EH	—	-0.1			-0.3
Input Current	I <sub>I</sub>	—	—	-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>	56	—	—	—	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	
		DCX144EH	68	—			—
		DCX143EH	20	—			—
		DCX114YH	68	—			—
		DCX123JH	80	—			—
		DCX114EH	30	—			—
Gain-Bandwidth Product*	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz	

\* Transistor - For Reference Only

Typical Curves – DCX143EH NPN Section

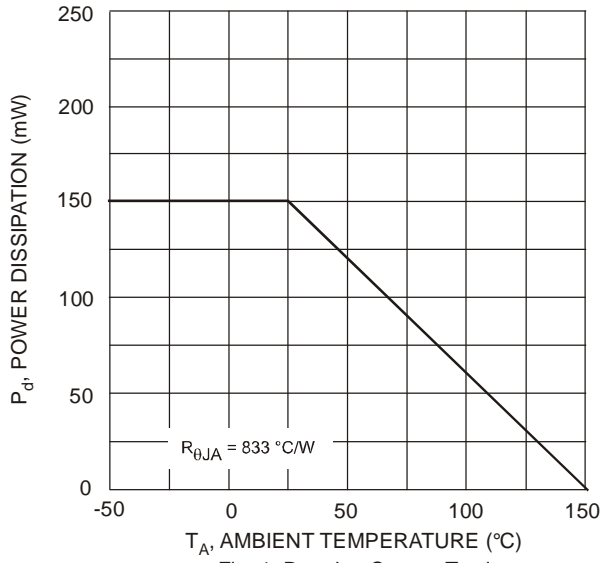


Fig. 1 Derating Curve - Total

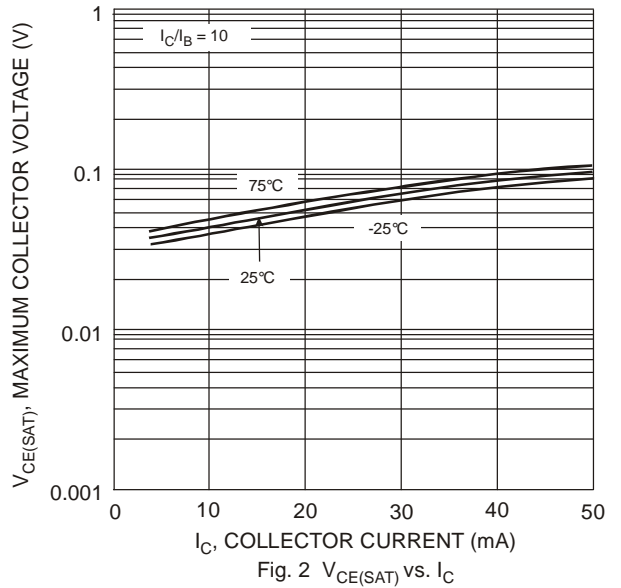


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

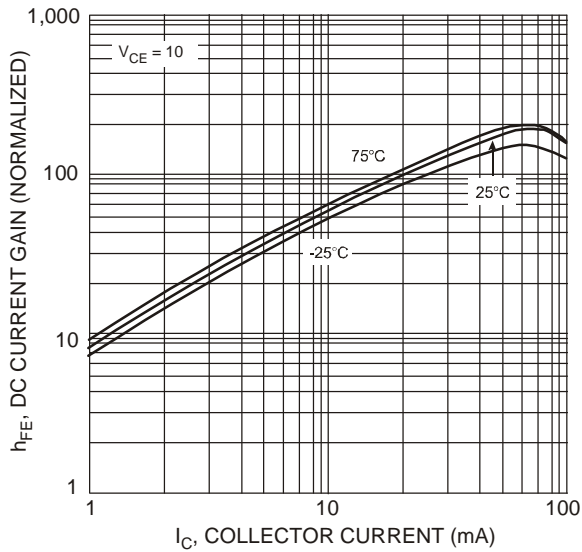


Fig. 3 DC Current Gain

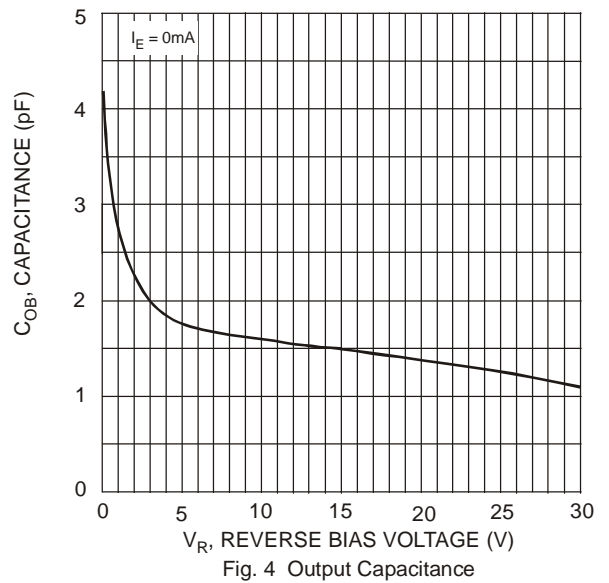


Fig. 4 Output Capacitance

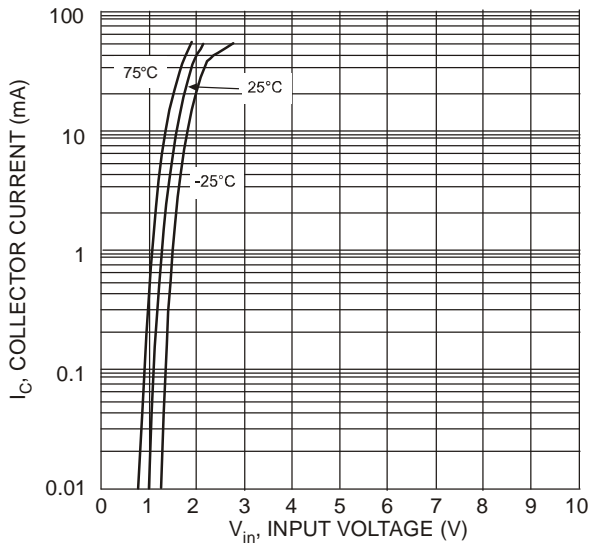


Fig. 5 Collector Current vs. Input Voltage

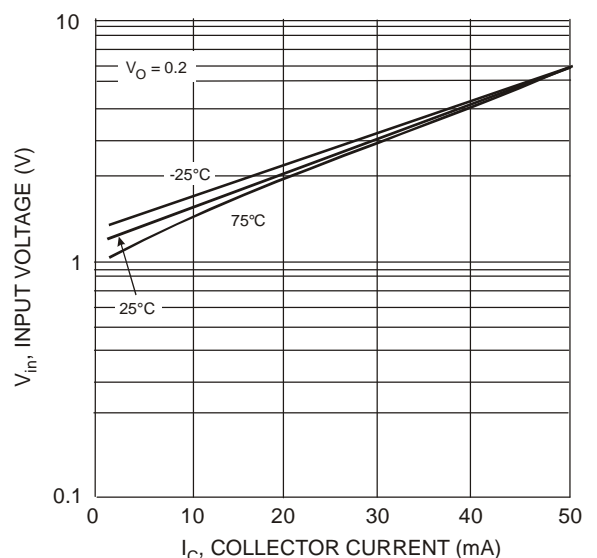
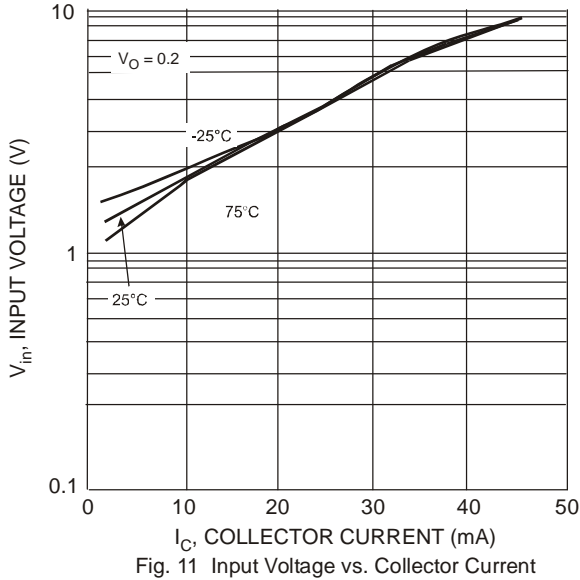
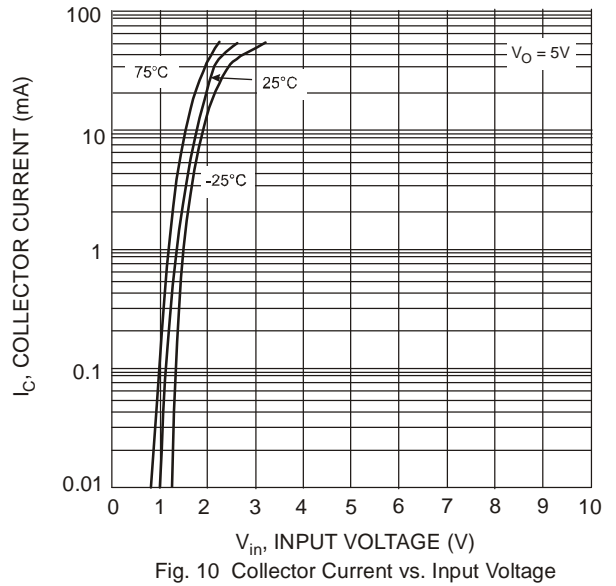
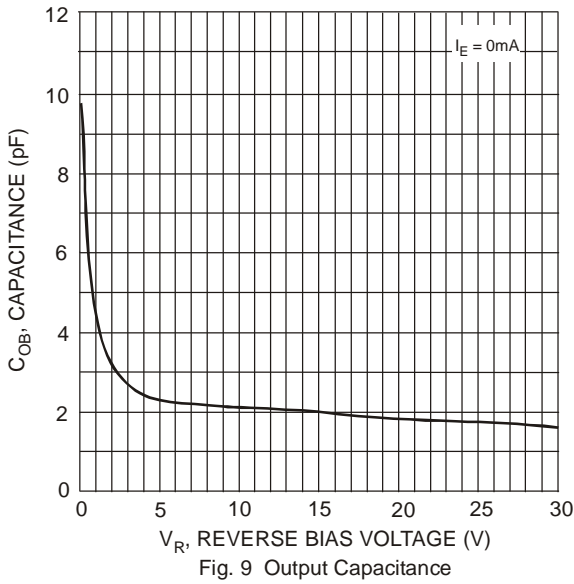
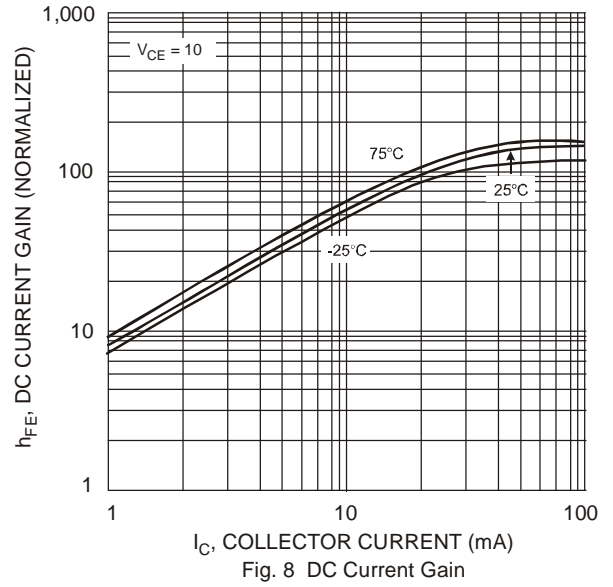
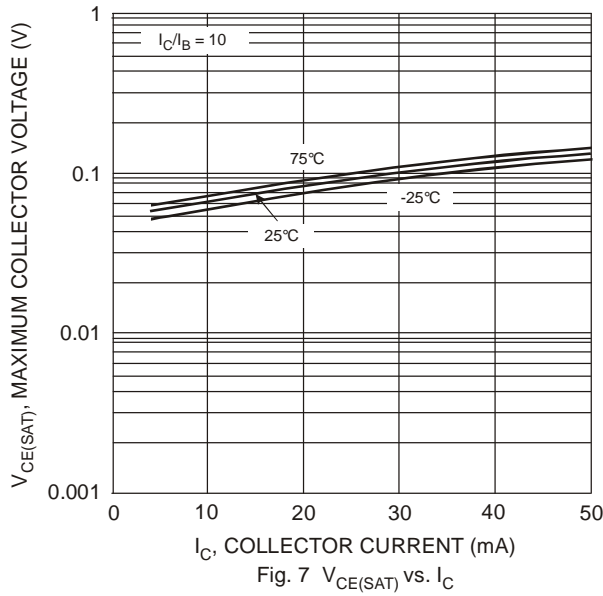


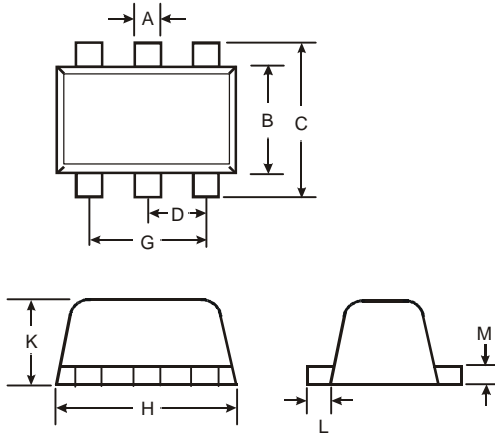
Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DCX143EH PNP Section



**Package Outline Dimensions**

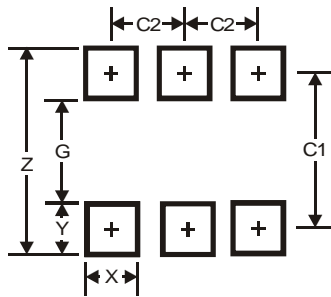
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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 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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