

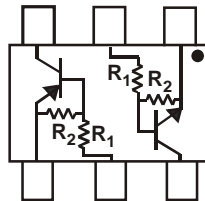
**COMPLEMENTARY NPN/PNP PRE-BIASED  
SMALL SIGNAL TRANSISTORS in SOT563**
**Features**

- 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)**

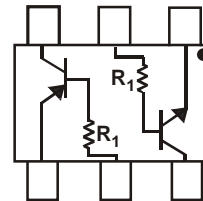
Part Number	R1	R2	Marking
DCX124EH	22kΩ	22kΩ	C17
DCX144EH	47kΩ	47kΩ	C20
DCX143EH	4.7kΩ	4.7kΩ	C08
DCX114YH	10kΩ	47kΩ	C14
DCX123JH	2.2kΩ	47kΩ	C06
DCX114EH	10kΩ	10kΩ	C13
DCX143TH	4.7kΩ	—	C07
DCX114TH	10kΩ	—	C12

**Mechanical Data**

- Case: SOT563
- 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 208 (E3)
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)



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

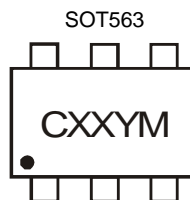


R<sub>1</sub> Only Device Schematic  
Top View

**Ordering Information (Note 4)**

Part Number	Packaging	Shipping
DCX124EH-7	SOT563	3,000/Tape & Reel
DCX144EH-7	SOT563	3,000/Tape & Reel
DCX143EH-7	SOT563	3,000/Tape & Reel
DCX114YH-7	SOT563	3,000/Tape & Reel
DCX123JH-7	SOT563	3,000/Tape & Reel
DCX114EH-7	SOT563	3,000/Tape & Reel
DCX143TH-7	SOT563	3,000/Tape & Reel
DCX114TH-7	SOT563	3,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**


CXX = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: F = 2018  
 M = Month ex: 9 = September

**Date Code Key**

Year	2018	2019	2020	2021	2022	2023	2024
Code	F	G	H	I	J	K	L

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	$V_{IN}$	-10 to +40	V
	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		
Output Current	DCX124EH	$I_O$	30	mA
	DCX144EH		30	
	DCX143EH		100	
	DCX114YH		70	
	DCX123JH		100	
	DCX114EH		50	
	DCX143TH		100	
	DCX114TH	100		
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 FR-4 Board with recommended pad layout at <http://www.diodes.com/package-outlines.html>.

**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	$V_{IN}$	+10 to -40	V
	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		
Output Current	DCX124EH	$I_O$	-30	mA
	DCX144EH		-30	
	DCX143EH		-100	
	DCX114YH		-70	
	DCX123JH		-100	
	DCX114EH		-50	
	DCX143TH		-100	
	DCX114TH	-100		
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 (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 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 (Note 6)	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	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	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	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	—	—	—		
	DCX123JH	—	—	—		
	DCX114EH	—	0.1	0.3		
Input Current	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	DCX124EH	56	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DCX144EH	68	—	—		
	DCX143EH	20	—	—		
	DCX114YH	68	—	—		
	DCX123JH	80	—	—		
	DCX114EH	30	—	—		

Note: 6. 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 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 (Note 6)	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
		-0.5	-1.1	—		
-0.5		-1.1	—			
-0.3		—	—			
-0.5		—	—			
-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
		—	-1.9	-3.0		
		—	-1.9	-3.0		
		—	-1.4	-3.0		
		—	-1.1	-3.0		
		—	-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
		—	-0.1	-0.3		
		—	-0.1	-0.3		
		—	-0.1	-0.3		
		—	-0.1	-0.3		
		—	-0.1	-0.3		
Input Current	I <sub>I</sub>	—	—	-0.36	mA	V <sub>I</sub> = -5V
		—	—	-0.18		
		—	—	-1.8		
		—	—	-0.88		
		—	—	-3.6		
		—	—	-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
		68	—	—		
		20	—	—		
		68	—	—		
		80	—	—		
		30	—	—		
Gain-Bandwidth Product (Note 6)	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz

Note: 6. Transistor - For Reference Only.

**Typical Curves – DCX143EH NPN Section**

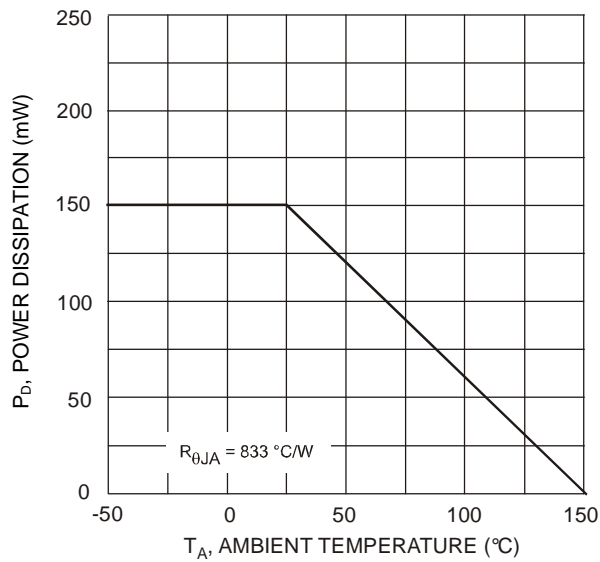


Fig. 1 Derating Curve - Total

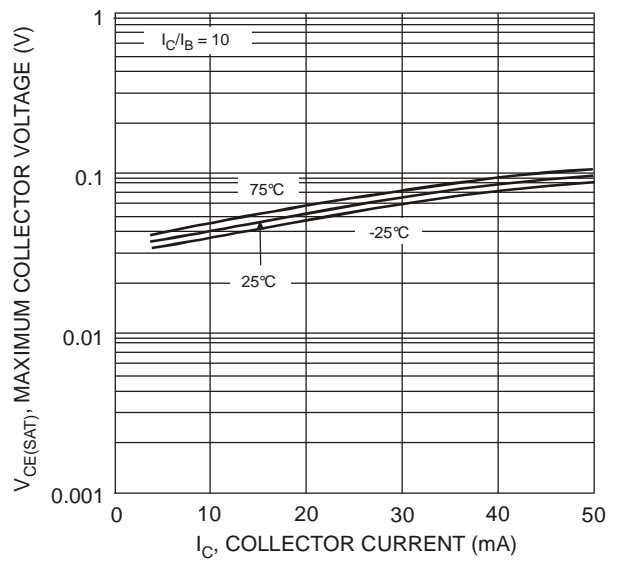


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

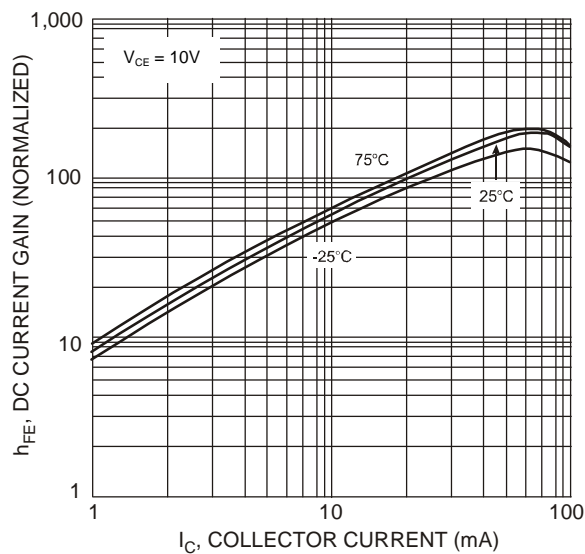


Fig. 3 DC Current Gain

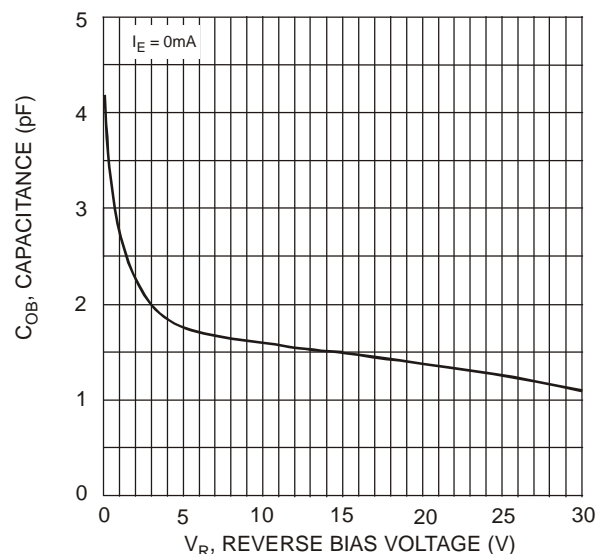


Fig. 4 Output Capacitance

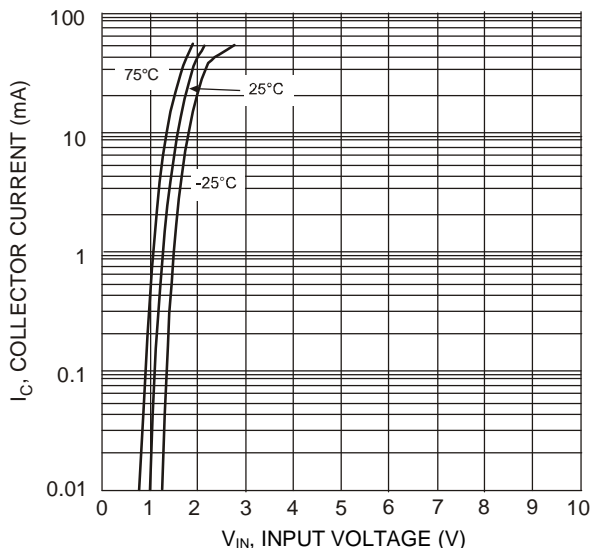


Fig. 5 Collector Current vs. Input Voltage

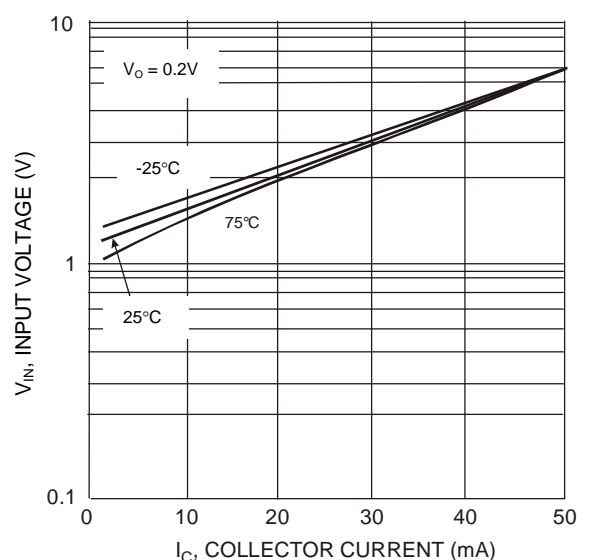


Fig. 6 Input Voltage vs. Collector Current

**Typical Curves – DCX143EH PNP Section**

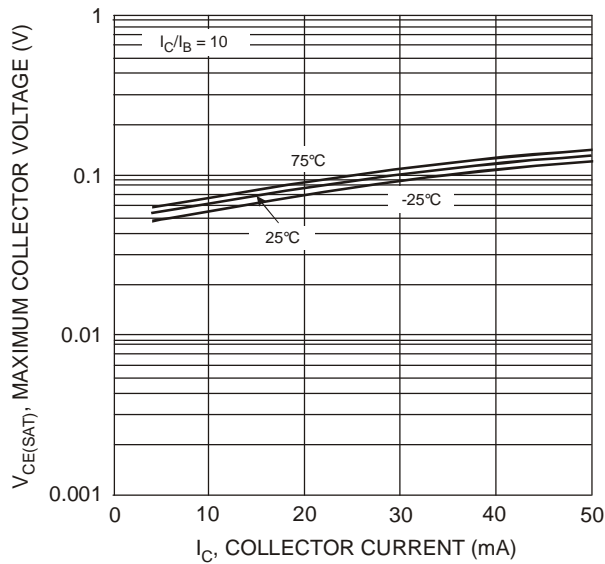


Fig. 7  $V_{CE(SAT)}$  vs.  $I_C$

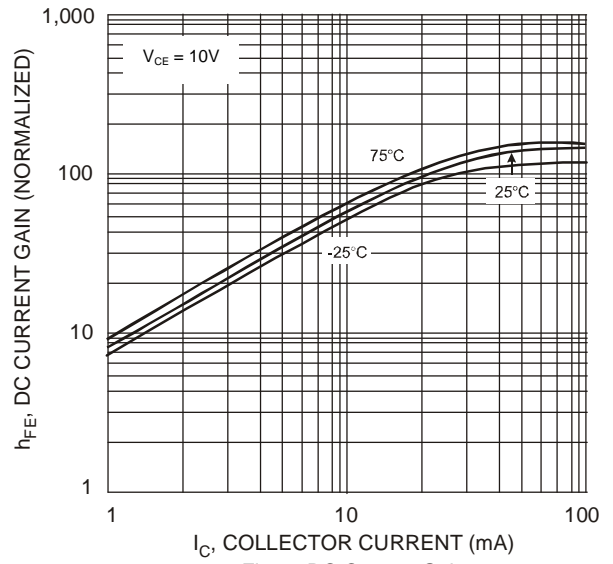


Fig. 8 DC Current Gain

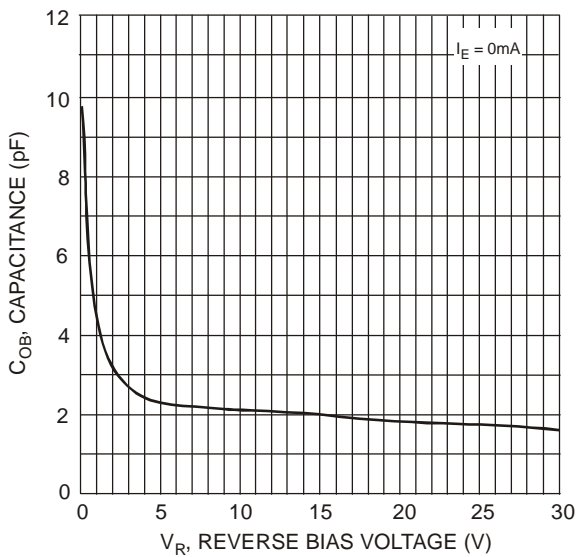


Fig. 9 Output Capacitance

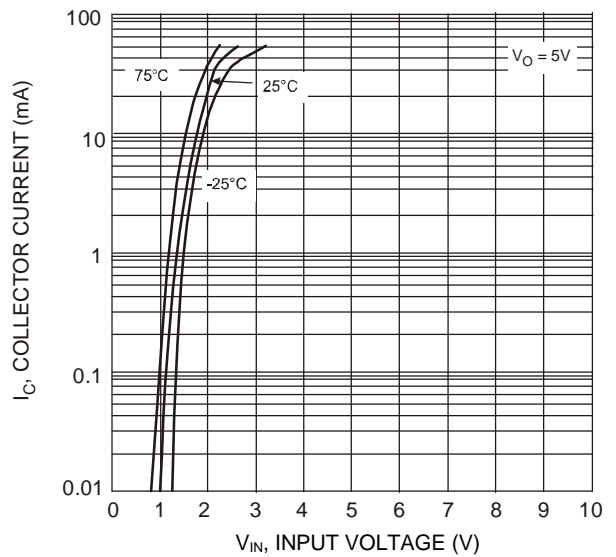


Fig. 10 Collector Current vs. Input Voltage

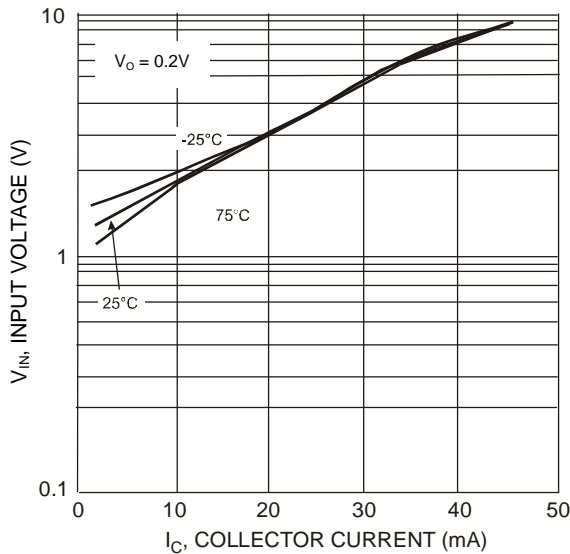
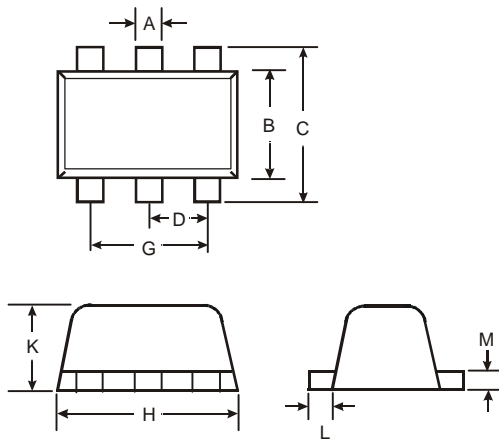


Fig. 11 Input Voltage vs. Collector Current

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT563**

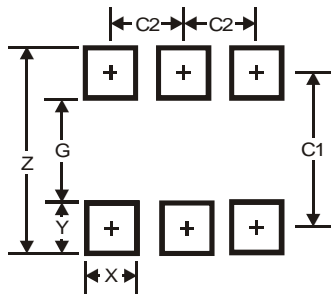


SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**SOT563**



Dimensions	SOT563
Z	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

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