

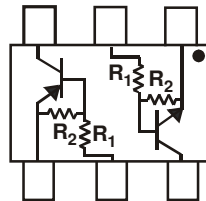
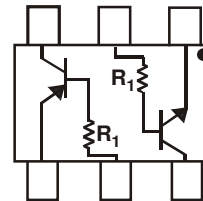
**COMPLEMENTARY NPN/PNP PRE-BIASED
SMALL SIGNAL TRANSISTORS in SOT563**
Features

- 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

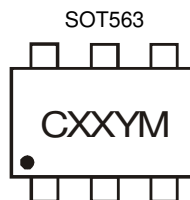
- Case: SOT563
- Case Material: Molded Plastic "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)


 R₁, R₂ Device Schematic
Top View

 R₁ 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 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	$^\circ\text{C}/\text{W}$
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 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_A = +25°C, unless otherwise specified.)

Characteristic (DCX143TH & DCX114TH Only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	50	—	—	V	I _C = 50μA
Collector-Emitter Breakdown Voltage	BV _{CEO}	50	—	—	V	I _C = 1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	5	—	—	V	I _E = 50μA
Collector Cut-Off Current	I _{CBO}	—	—	0.5	μA	V _{CB} = 50V
Emitter Cut-Off Current	I _{EBO}	—	—	0.5	μA	V _{EB} = 4V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	0.3	V	I _C /I _B = 2.5mA / 0.25mA DCX143TH I _C /I _B = 1mA / 0.1mA DCX114TH
DC Current Transfer Ratio	h _{FE}	100	250	600	—	I _C = 1mA, V _{CE} = 5V
Gain-Bandwidth Product (Note 6)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = 5mA, f = 100MHz

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Input Voltage	V _{I(OFF)}	DCX124EH	0.5	1.1	—	V	V _{CC} = 5V, I _O = 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 _{I(ON)}	DCX124EH	—	1.9	—	V	V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 2mA V _O = 0.3V, I _O = 20mA V _O = 0.3V, I _O = 1mA V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 10mA
		DCX144EH	—	1.9			
		DCX143EH	—	1.9			
		DCX114YH	—	1.4			
		DCX123JH	—	1.1			
		DCX114EH	—	1.9			
Output Voltage	V _{O(ON)}	DCX124EH	—	0.1	0.3	V	I _O /I _I = 10mA / 0.5mA I _O /I _I = 10mA / 0.5mA I _O /I _I = 10mA / 0.5mA I _O /I _I = 5mA / 0.25mA I _O /I _I = 5mA / 0.25mA I _O /I _I = 10mA / 0.5mA
		DCX144EH	—				
		DCX143EH	—				
		DCX114YH	—				
		DCX123JH	—				
		DCX114EH	—				
Input Current	I _I	DCX124EH	—	—	0.36	mA	V _I = 5V
		DCX144EH	—	—	0.18		
		DCX143EH	—	—	1.8		
		DCX114YH	—	—	0.88		
		DCX123JH	—	—	3.6		
		DCX114EH	—	—	0.88		
Output Current	I _{O(OFF)}	—	—	0.5	μA	V _{CC} = 50V, V _I = 0V	
DC Current Gain	G _I	DCX124EH	56	—	—	—	V _O = 5V, I _O = 5mA V _O = 5V, I _O = 5mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 10mA V _O = 5V, I _O = 5mA
		DCX144EH	68				
		DCX143EH	20				
		DCX114YH	68				
		DCX123JH	80				
		DCX114EH	30				

Note: 6. Transistor - For Reference Only.

Electrical Characteristics PNP Section (@T_A = +25°C, unless otherwise specified.)

Characteristic (DCX143TH & DCX114TH Only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-50	—	—	V	I _C = -50μA
Collector-Emitter Breakdown Voltage	BV _{CEO}	-50	—	—	V	I _C = -1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-5	—	—	V	I _E = -50μA
Collector Cut-Off Current	I _{CBO}	—	—	-0.5	μA	V _{CB} = -50V
Emitter Cut-Off Current	I _{EBO}	—	—	-0.5	μA	V _{EB} = -4V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	—	-0.3	V	I _C /I _B = -2.5mA / -0.25mA DCX143TH I _C /I _B = -1mA / -0.1mA DCX114TH
DC Current Transfer Ratio	h _{FE}	100	250	600	—	I _C = -1mA, V _{CE} = -5V
Gain-Bandwidth Product (Note 6)	f _T	—	250	—	MHz	V _{CE} = -10V, I _E = -5mA, f = 100MHz

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	V _{I(OFF)}	-0.5	-1.1	—	V	V _{CC} = -5V, I _O = -100μA
		-0.5	-1.1	—		
-0.5		-1.1	—			
-0.3		—	—			
-0.5		—	—			
-0.5		-1.1	—			
Input Voltage	V _{I(ON)}	—	-1.9	-3.0	V	V _O = -0.3V, I _O = -5mA V _O = -0.3V, I _O = -2mA V _O = -0.3V, I _O = -20mA V _O = -0.3V, I _O = -1mA V _O = -0.3V, I _O = -5mA V _O = -0.3V, I _O = -10mA
		—	-1.9	-3.0		
		—	-1.9	-3.0		
		—	-1.4	-3.0		
		—	-1.1	-3.0		
		—	-1.9	-3.0		
Output Voltage	V _{O(ON)}	—	-0.1	-0.3	V	I _O /I _I = -10mA / -0.5mA I _O /I _I = -10mA / -0.5mA I _O /I _I = -10mA / -0.5mA I _O /I _I = -5mA / -0.25mA I _O /I _I = -5mA / -0.25mA I _O /I _I = -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 _I	—	—	-0.36	mA	V _I = -5V
		—	—	-0.18		
		—	—	-1.8		
		—	—	-0.88		
		—	—	-3.6		
		—	—	-0.88		
Output Current	I _{O(OFF)}	—	—	-0.5	μA	V _{CC} = -50V, V _I = 0V
DC Current Gain	G _I	56	—	—	—	V _O = -5V, I _O = -5mA V _O = -5V, I _O = -5mA V _O = -5V, I _O = -10mA V _O = -5V, I _O = -10mA V _O = -5V, I _O = -10mA V _O = -5V, I _O = -5mA
		68	—	—		
		20	—	—		
		68	—	—		
		80	—	—		
		30	—	—		
Gain-Bandwidth Product (Note 6)	f _T	—	250	—	MHz	V _{CE} = -10V, I _E = -5mA, f = 100MHz

Note: 6. Transistor - For Reference Only.

Typical Curves – DCX143EH NPN Section

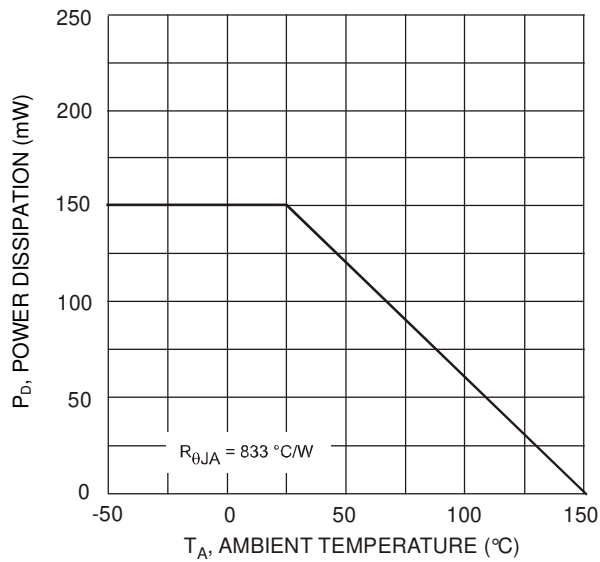


Fig. 1 Derating Curve - Total

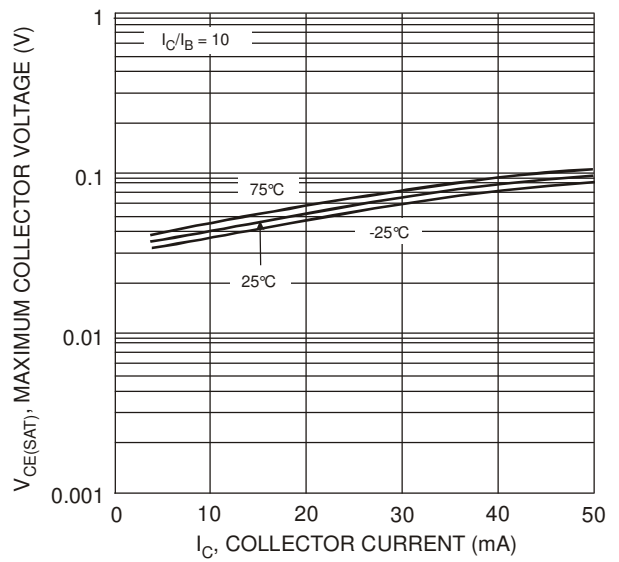


Fig. 2 $V_{CE(SAT)}$ vs. I_C

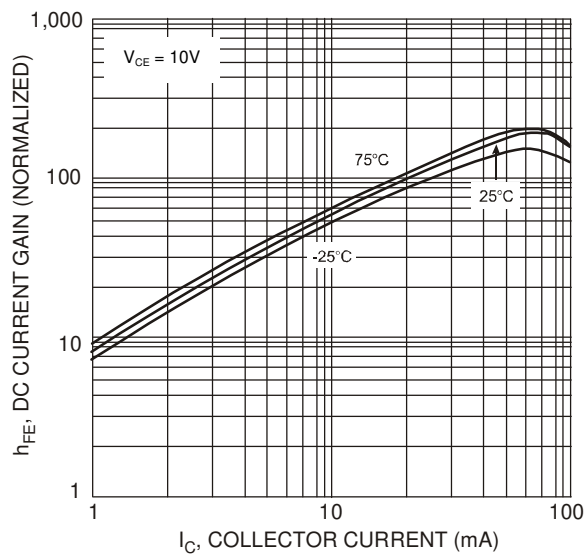


Fig. 3 DC Current Gain

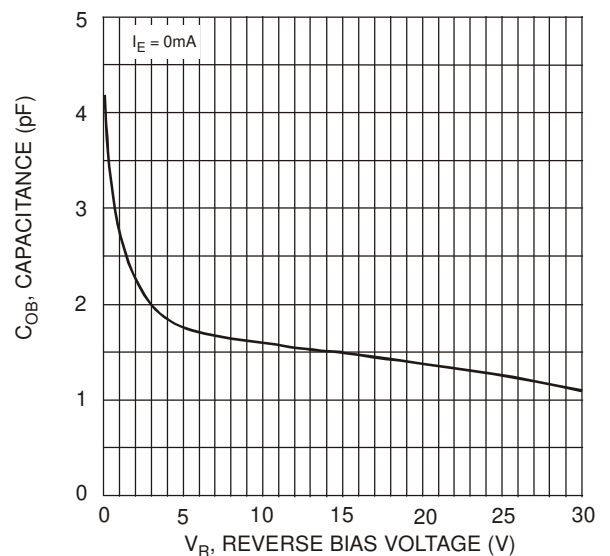


Fig. 4 Output Capacitance

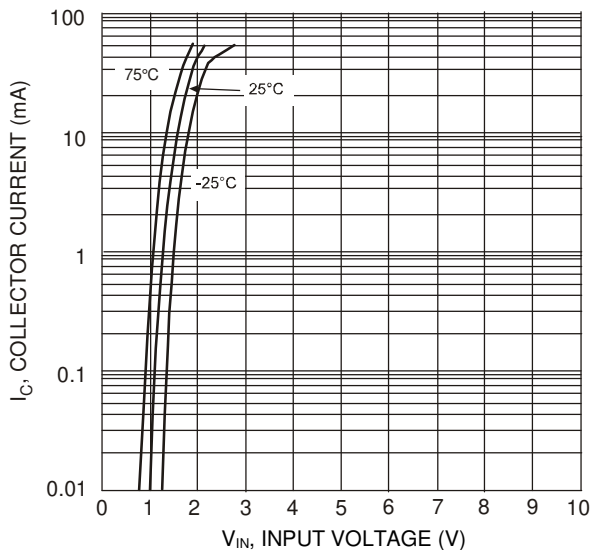


Fig. 5 Collector Current vs. Input Voltage

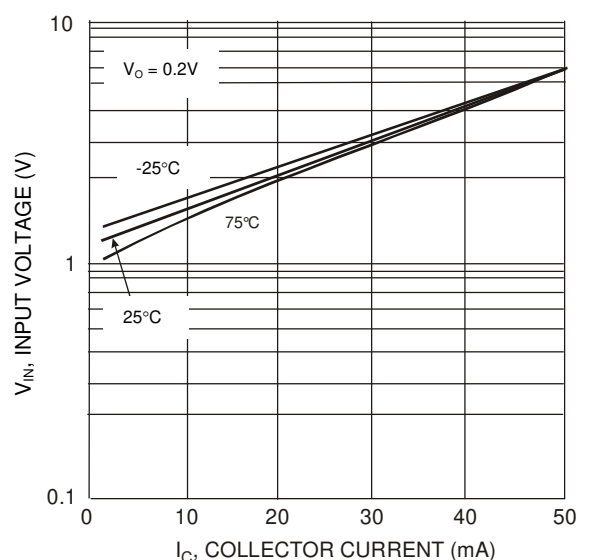


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DCX143EH PNP Section

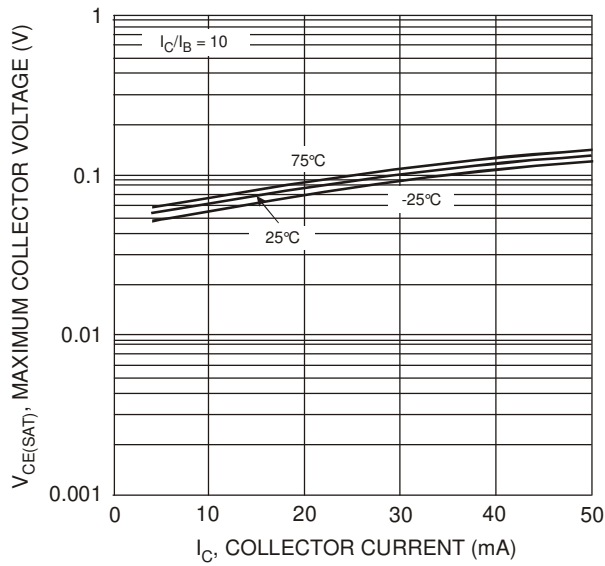


Fig. 7 $V_{CE(SAT)}$ vs. I_C

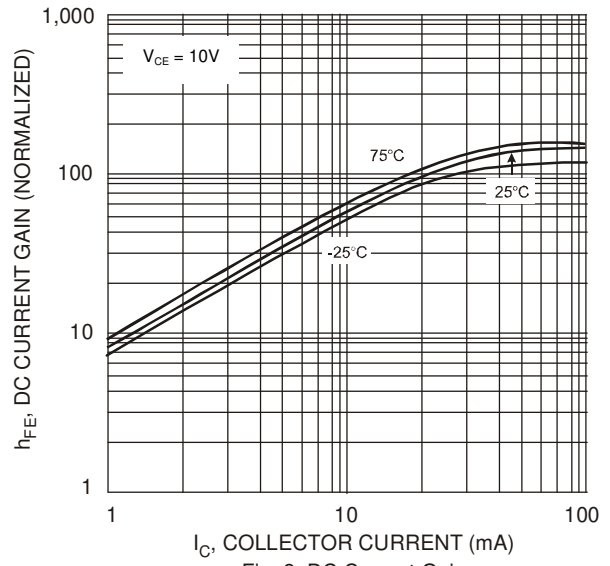


Fig. 8 DC Current Gain

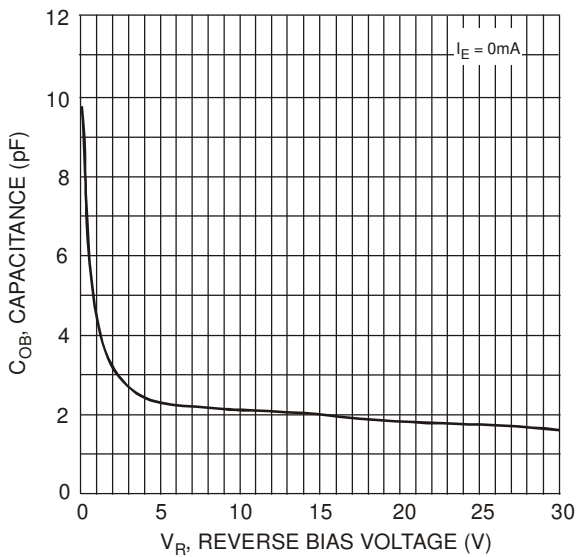


Fig. 9 Output Capacitance

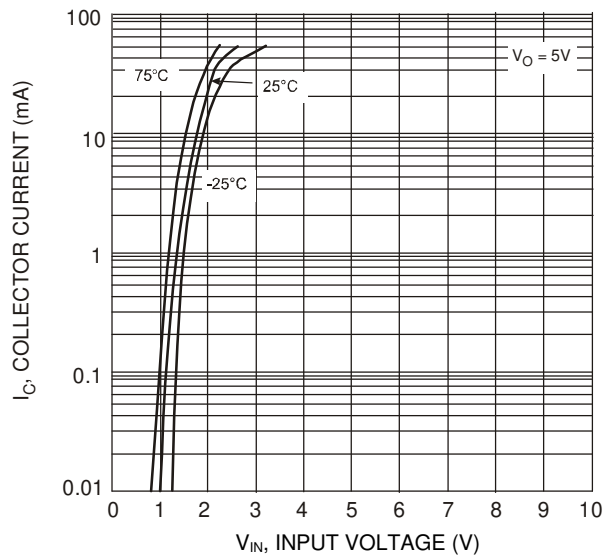


Fig. 10 Collector Current vs. Input Voltage

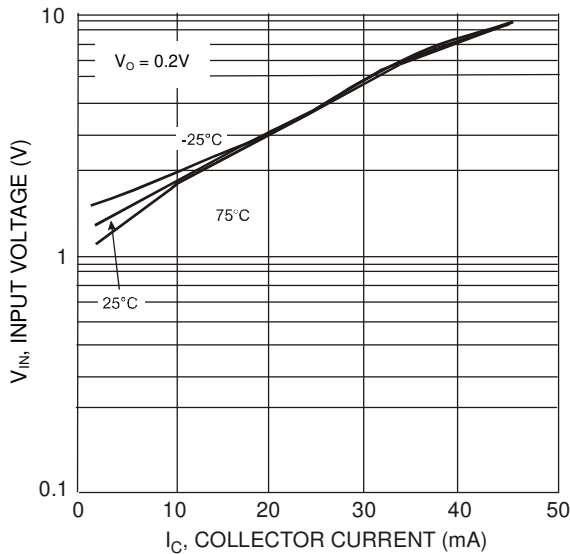
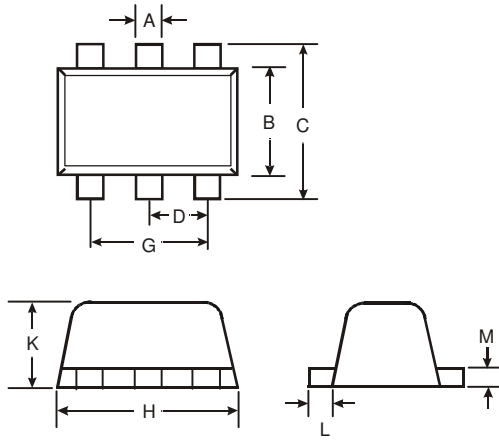


Fig. 11 Input Voltage vs. Collector Current

Package Outline Dimensions

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

SOT563

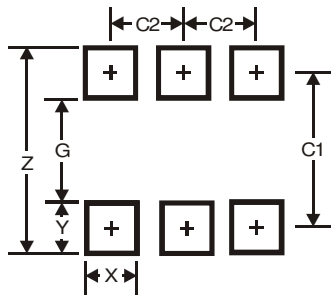


SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

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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2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

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