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

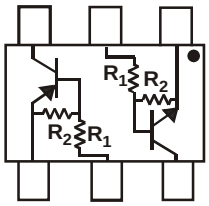
Features

- 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)**

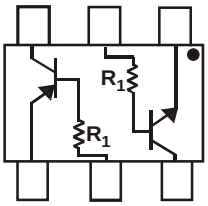
Part Number	R1	R2	Marking
DCX124EH	22kΩ	22kΩ	C17
DCX144EH	47kΩ	47kΩ	C20
DCX143EH	4.7kΩ	4.7kΩ	C08
DCX114YH	10kΩ	47kΩ	C14
DCX123JH	2.2kΩ	47kΩ	C06
DCX114EH	10kΩ	10kΩ	C13
DCX143TH	4.7kΩ	—	C07
DCX114TH	10kΩ	—	C12

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_1, R_2 Device Schematic
Top View



R_1 Only Device Schematic
Top View

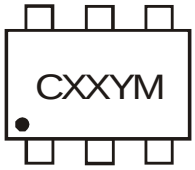
Ordering Information (Note 4)

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

SOT563



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°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	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°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°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	°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	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{I(OFF)}$	0.5 0.5 0.5 0.3 0.5 0.5	1.1 1.1 1.1 — — 1.1	—	V	V_{CC} = 5V, I_O = 100µA
	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{I(ON)}$	—	1.9 1.9 1.9 — — 1.9	3.0 3.0 3.0 1.4 1.1 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
Output Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{O(ON)}$	—	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
Input Current	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	I_I	—	—	0.36 0.18 1.8 0.88 3.6 0.88	mA	V_I = 5V
Output Current		$I_{O(OFF)}$	—	—	0.5	µA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	G_I	56 68 20 68 80 30	—	—	—	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

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	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{I(OFF)}$	-0.5 -0.5 -0.5 -0.3 -0.5 -0.5	-1.1 -1.1 -1.1 — — -1.1	—	V	V_{CC} = -5V, I_O = -100µA
	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{I(ON)}$	—	-1.9 -1.9 -1.9 — — -1.9	-3.0 -3.0 -3.0 -1.4 -1.1 -3.0		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
Output Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{O(ON)}$	—	-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
Input Current	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	I_I	—	—	-0.36 -0.18 -1.8 -0.88 -3.6 -0.88	mA	V_I = -5V
Output Current		$I_{O(OFF)}$	—	—	-0.5	µA	V_{CC} = -50V, V_I = 0V
DC Current Gain	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	G_I	56 68 20 68 80 30	—	—	—	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
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

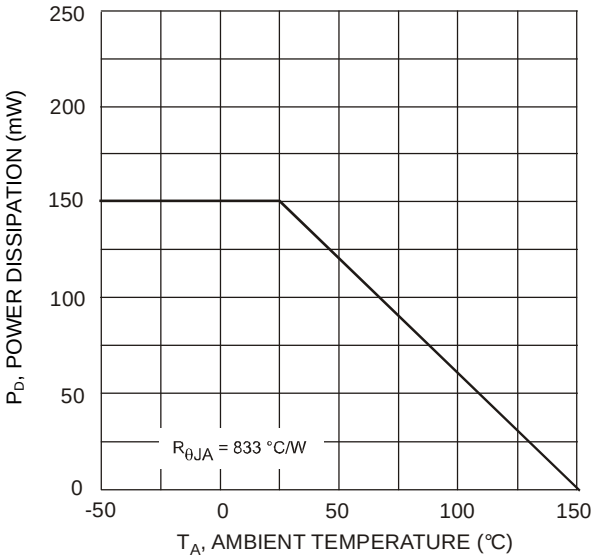


Fig. 1 Derating Curve - Total

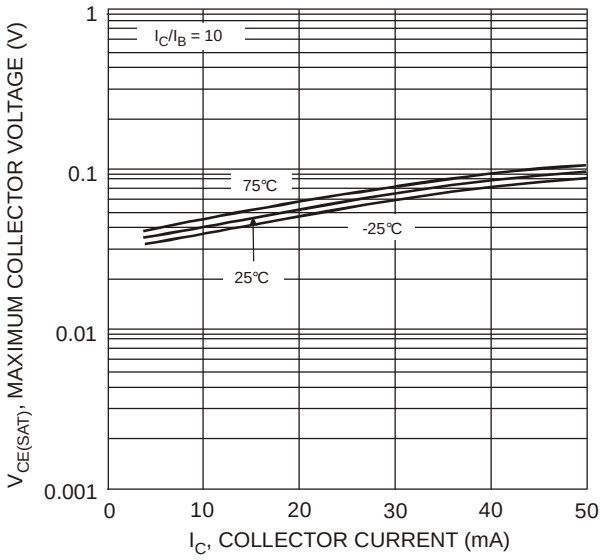


Fig. 2 $V_{CE(SAT)}$ vs. I_C

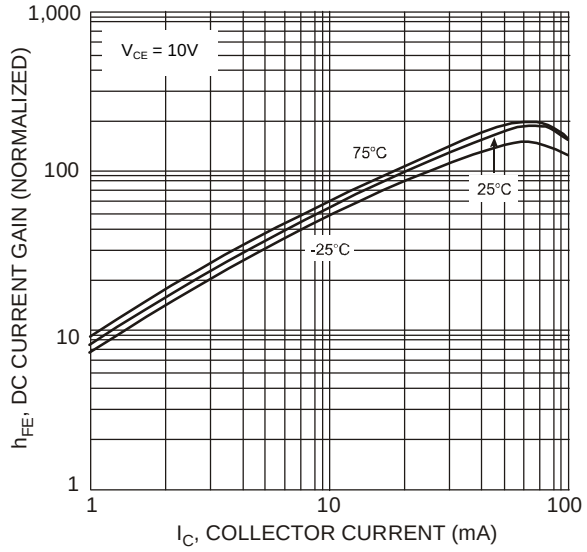


Fig. 3 DC Current Gain

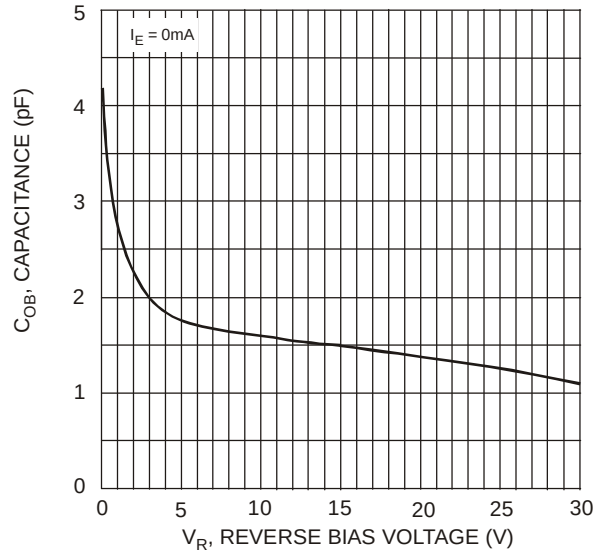


Fig. 4 Output Capacitance

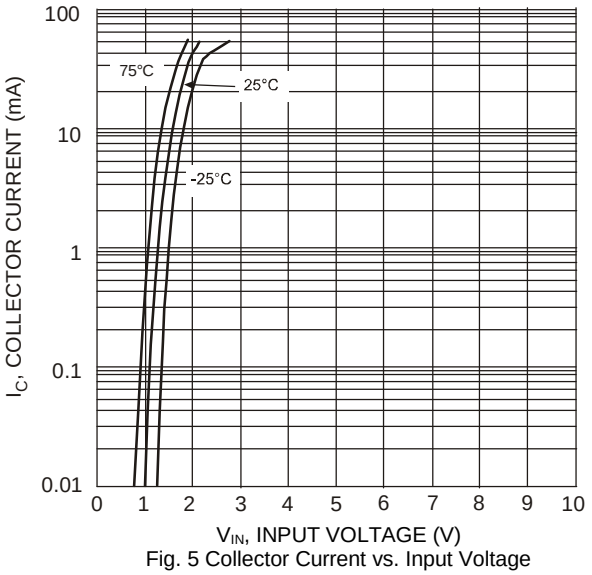


Fig. 5 Collector Current vs. Input Voltage

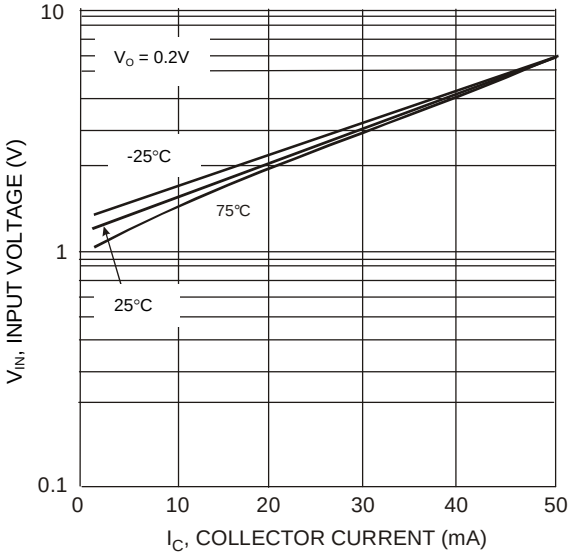


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DCX143EH PNP Section

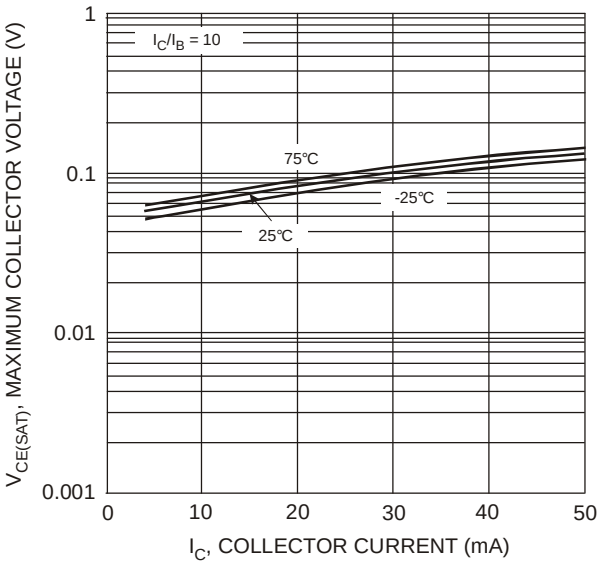


Fig. 7 $V_{CE(SAT)}$ vs. I_C

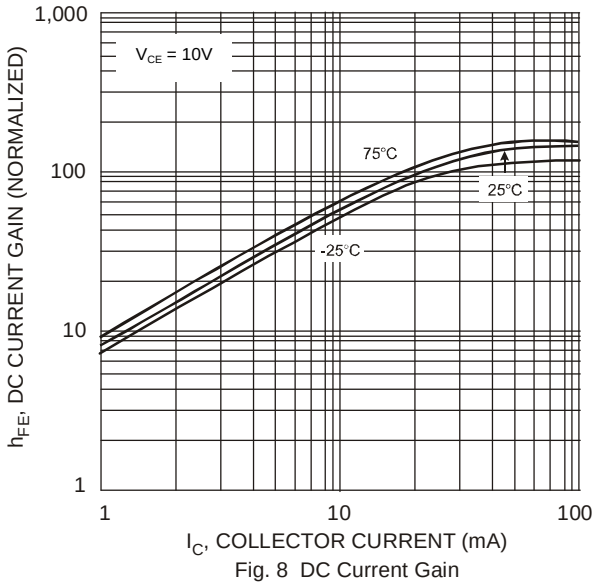


Fig. 8 DC Current Gain

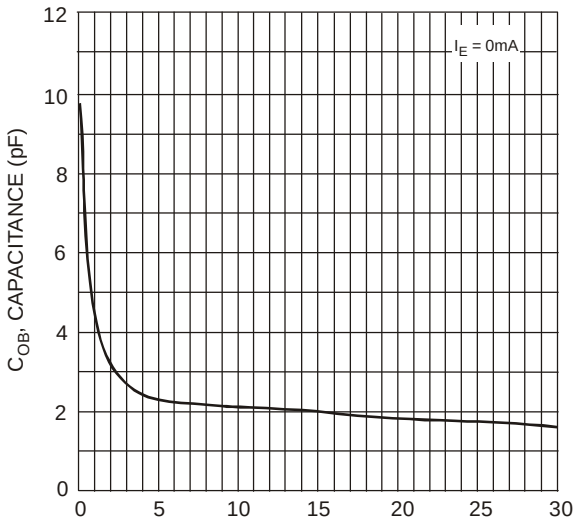


Fig. 9 Output Capacitance

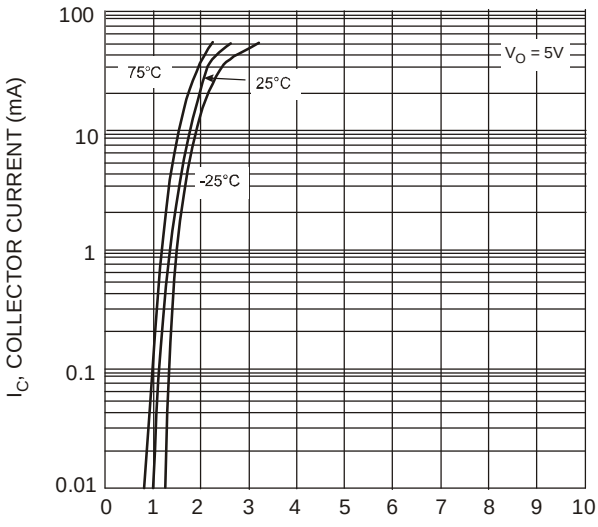


Fig. 10 Collector Current vs. Input Voltage

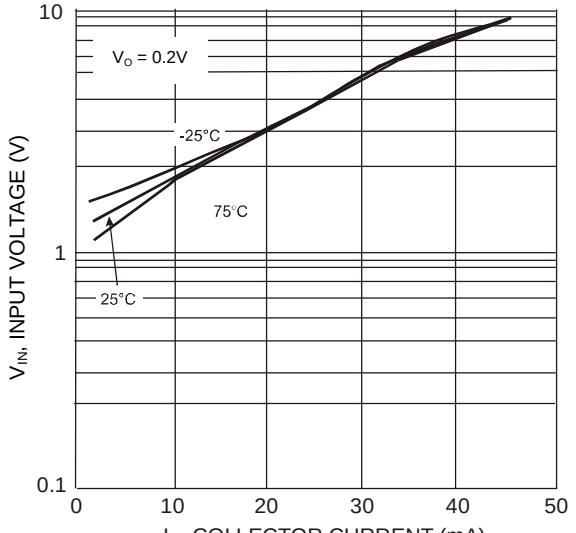
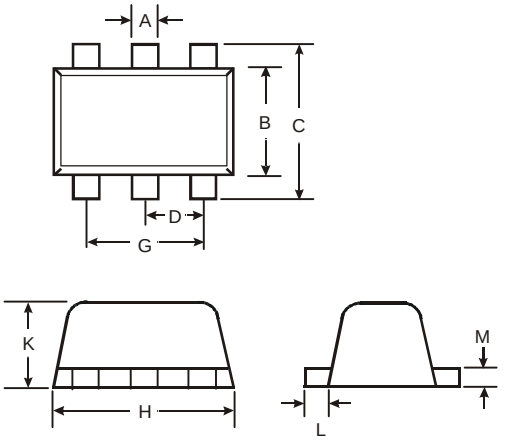


Fig. 11 Input Voltage vs. Collector Current

Package Outline Dimensions

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

SOT563

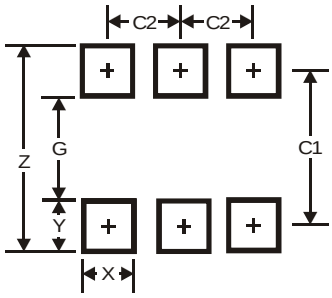


SOT563			
Dim	**Min**	**Max**	**Typ**
A	0.15	0.30	0.20
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	-	-	0.50
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

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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