

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

Features

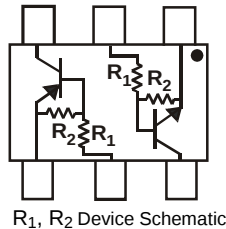
- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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

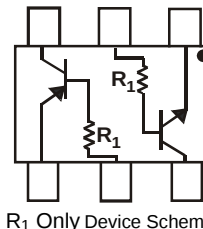
Mechanical Data

- 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



R₁, R₂ Device Schematic



R₁ Only Device Schematic

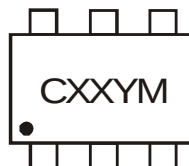
Ordering Information (Note 4)

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 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°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 _{θJA}	833	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°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°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 (DDC143TH & DDC114TH 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*		f _T	—	250	—	MHz	V _{CE} = 10V, I _E = -5mA, f = 100MHz
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EH	V _{I(off)}	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			
	DCX124EH	V _{I(on)}	—	1.9	3.0	—	V _O = 0.3V, I _O = 5mA
	DCX144EH			1.9	3.0		V _O = 0.3V, I _O = 2mA
	DCX143EH			1.9	3.0		V _O = 0.3V, I _O = 20mA
	DCX114YH			—	1.4		V _O = 0.3V, I _O = 1mA
	DCX123JH			—	1.1		V _O = 0.3V, I _O = 5mA
	DCX114EH			1.9	3.0		V _O = 0.3V, I _O = 10mA
Output Voltage	DCX124EH	V _{O(on)}	—	0.1	0.3	V	I _O /I _I = 10mA / 0.5mA
	DCX144EH						I _O /I _I = 10mA / 0.5mA
	DCX143EH						I _O /I _I = 10mA / 0.5mA
	DCX114YH						I _O /I _I = 5mA / 0.25mA
	DCX123JH						I _O /I _I = 5mA / 0.25mA
	DCX114EH						I _O /I _I = 10mA / 0.5mA
Input Current	DCX124EH	I _I	—	—	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	DCX124EH	G _I	56	—	—	—	V _O = 5V, I _O = 5mA
	DCX144EH		68				V _O = 5V, I _O = 5mA
	DCX143EH		20				V _O = 5V, I _O = 10mA
	DCX114YH		68				V _O = 5V, I _O = 10mA
	DCX123JH		80				V _O = 5V, I _O = 10mA
	DCX114EH		30				V _O = 5V, I _O = 10mA
	DCX114EH		30				V _O = 5V, I _O = 5mA

* 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*	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 _{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*		f _T	—	250	—	MHz V _{CE} = -10V, I _E = -5mA, f = 100MHz

* Transistor - For Reference Only

Typical Curves – DCX143EH NPN Section

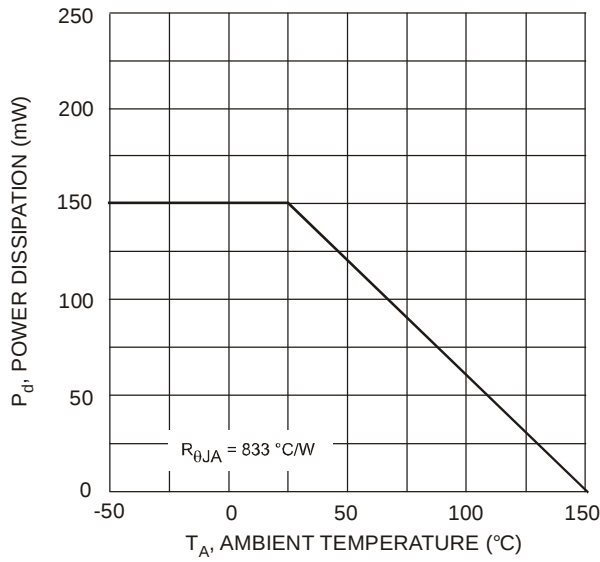


Fig. 1 Derating Curve - Total

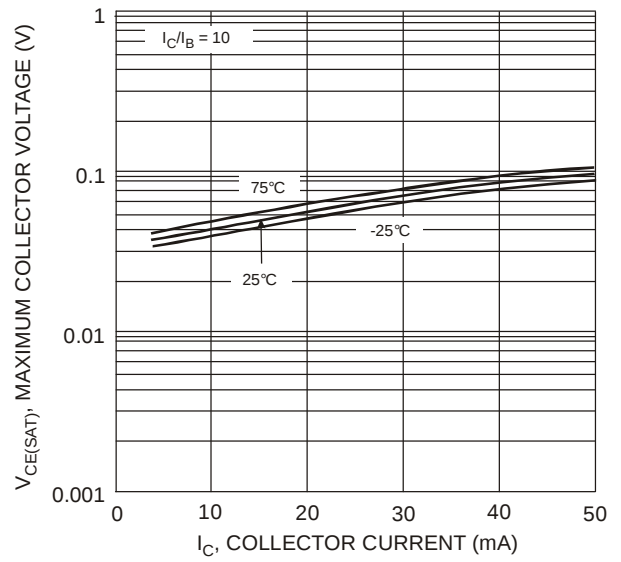


Fig. 2 $V_{CE(SAT)}$ vs. I_C

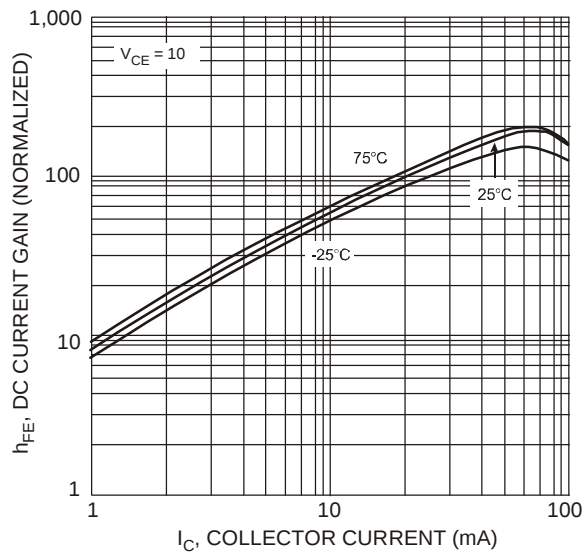


Fig. 3 DC Current Gain

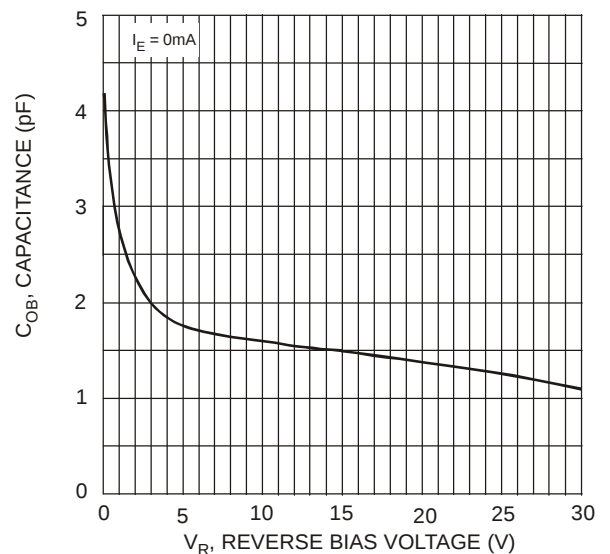


Fig. 4 Output Capacitance

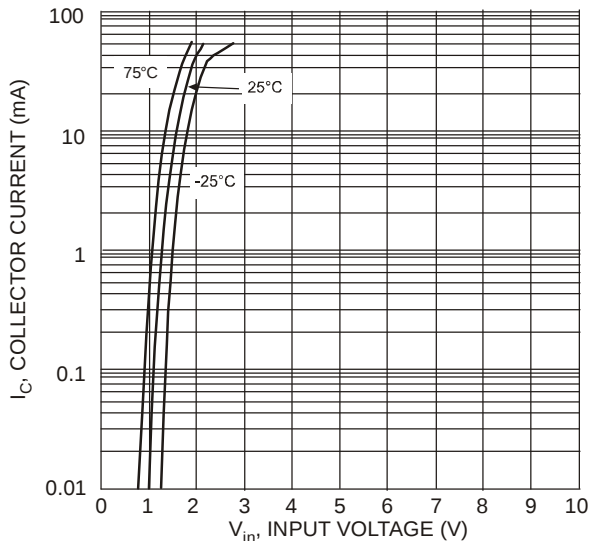


Fig. 5 Collector Current vs. Input Voltage

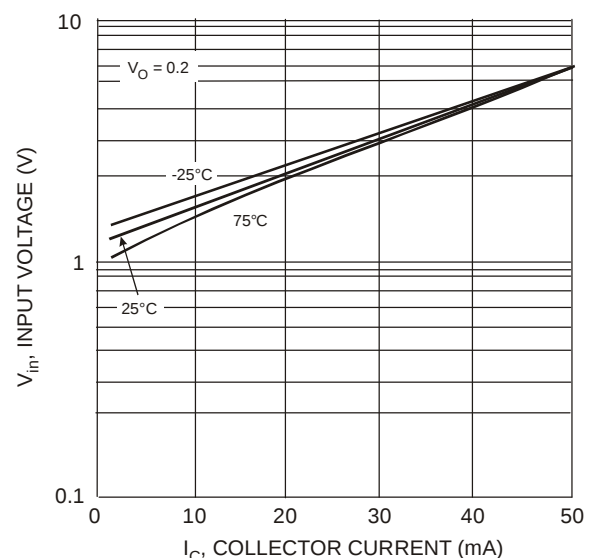


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DCX143EH PNP Section

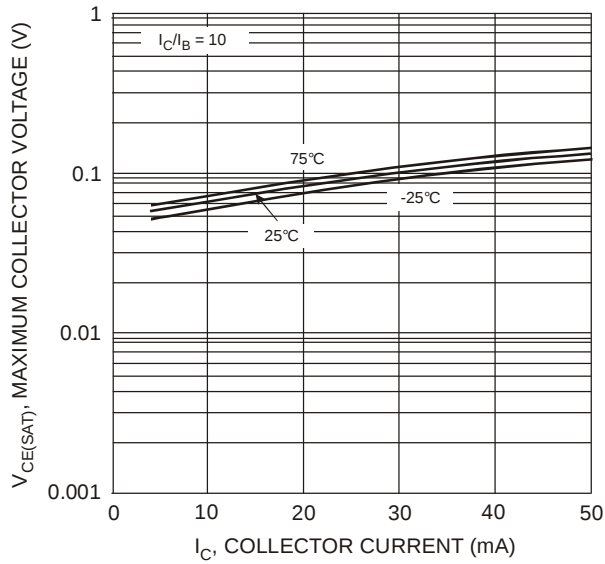


Fig. 7 $V_{CE(SAT)}$ vs. I_C

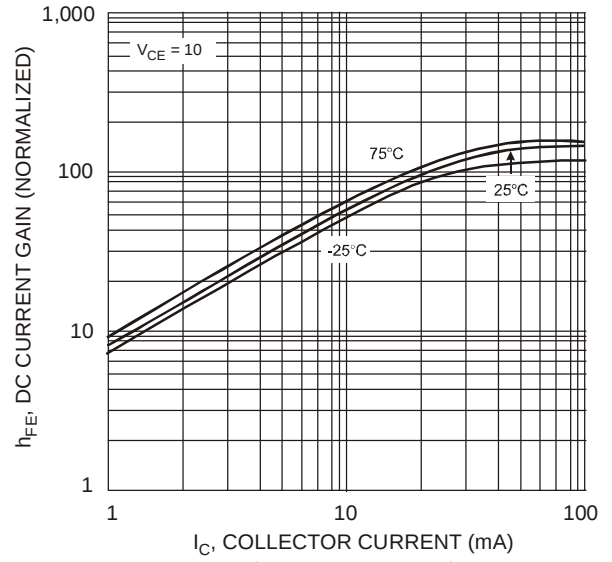


Fig. 8 DC Current Gain

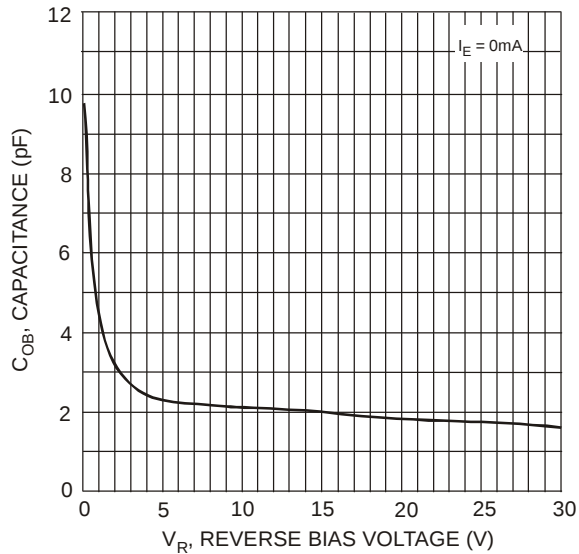


Fig. 9 Output Capacitance

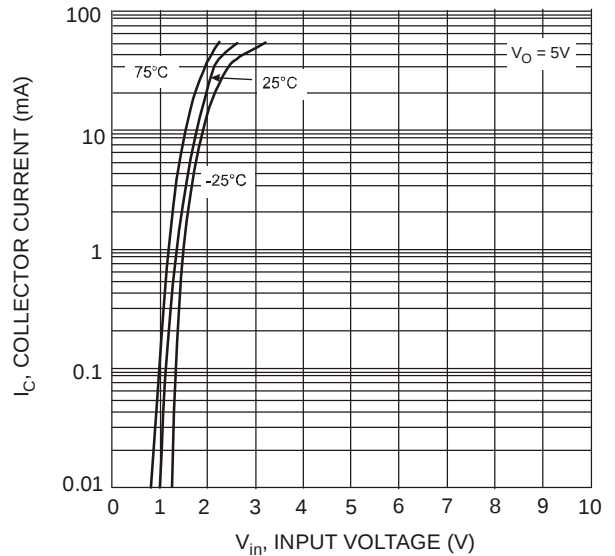


Fig. 10 Collector Current vs. Input Voltage

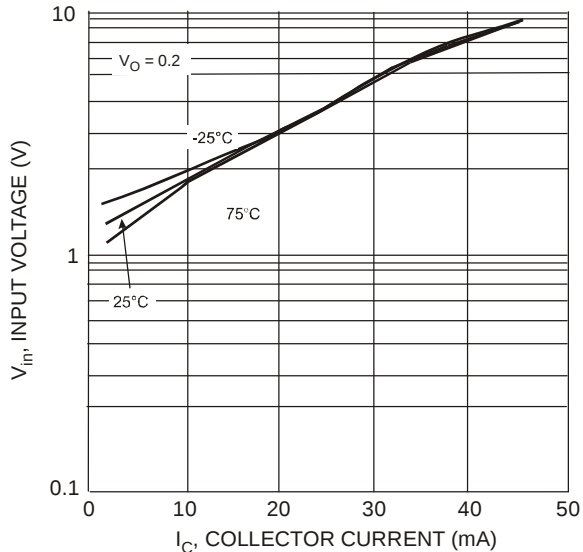
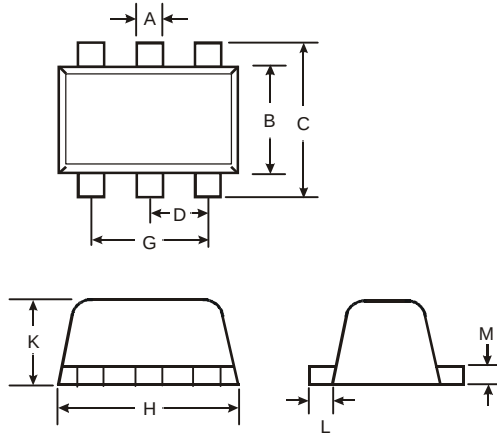


Fig. 11 Input Voltage vs. Collector Current

Package Outline Dimensions

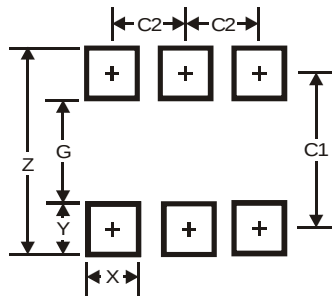
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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