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

Features

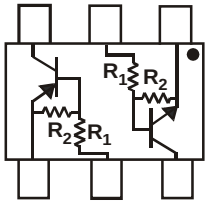
- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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

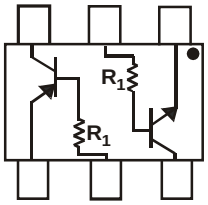
Mechanical Data

- 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 208 e3
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)

SCHEMATIC DIAGRAM, TOP VIEW



R_1, R_2 Device Schematic



R_1 Only Device Schematic

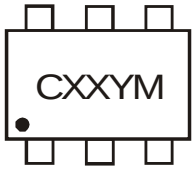
Ordering Information (Note 4)

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)	$R_{\theta JA}$	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 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

* 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	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

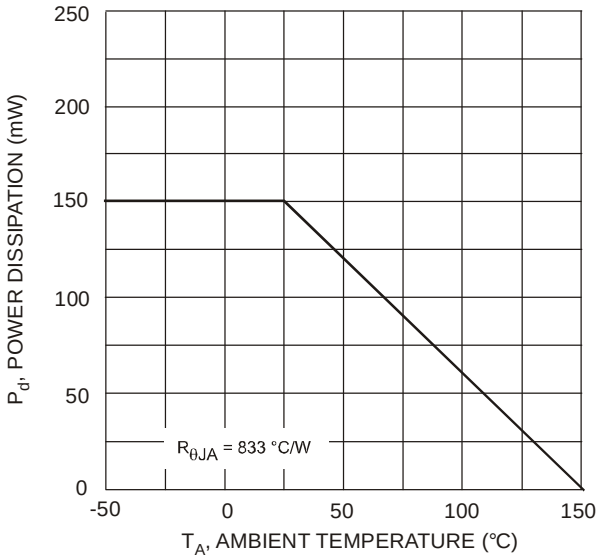


Fig. 1 Derating Curve - Total

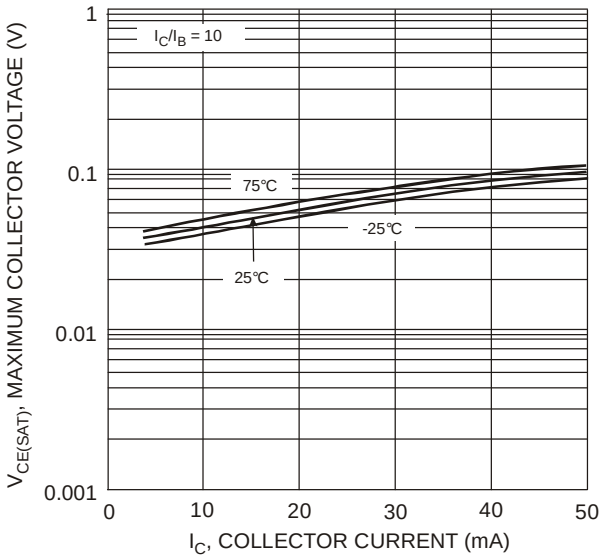


Fig. 2 $V_{CE(SAT)}$ vs. I_C

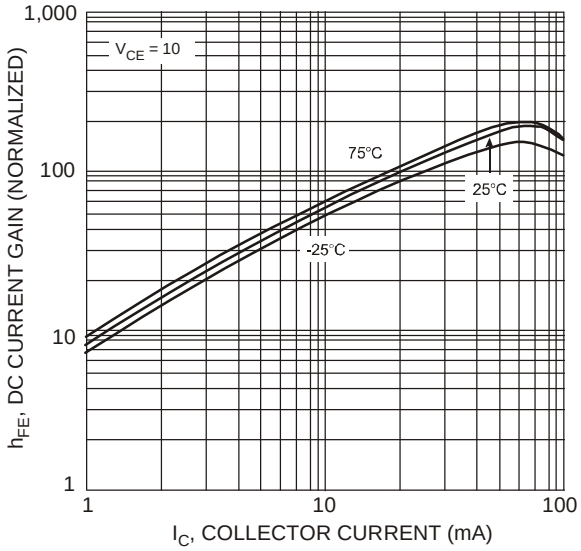


Fig. 3 DC Current Gain

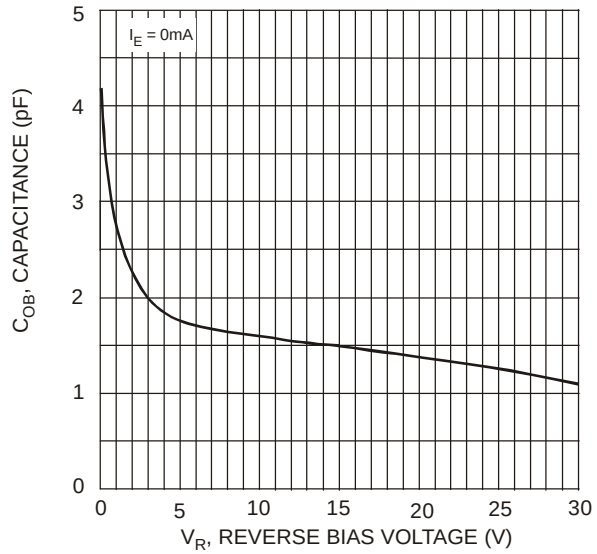


Fig. 4 Output Capacitance

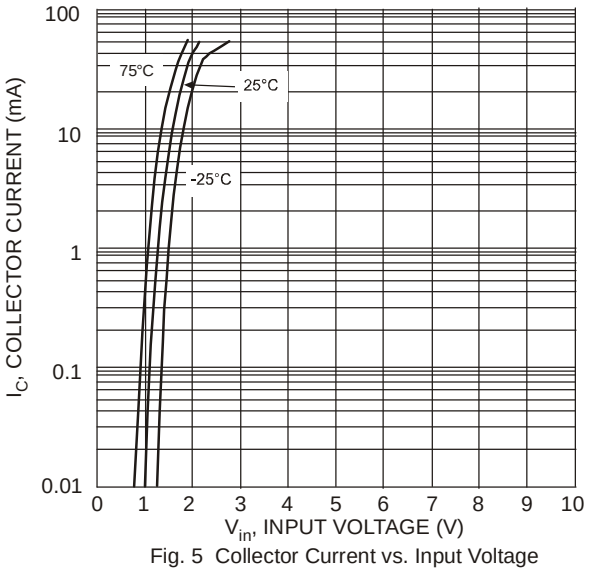


Fig. 5 Collector Current vs. Input Voltage

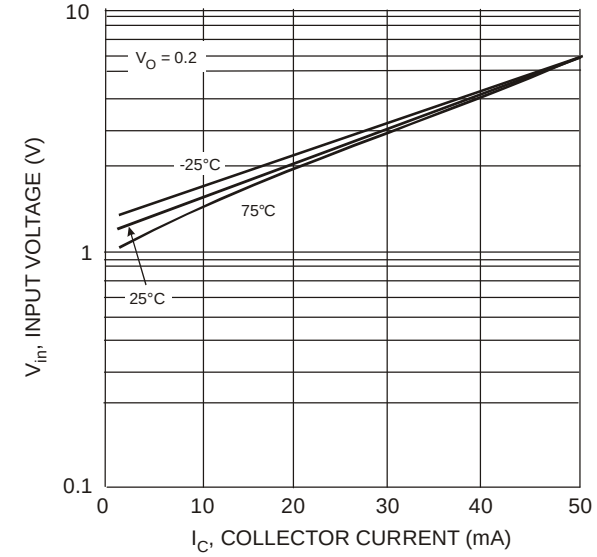


Fig. 6 Input Voltage vs. Collector Current

Typical Curves – DCX143EH PNP Section

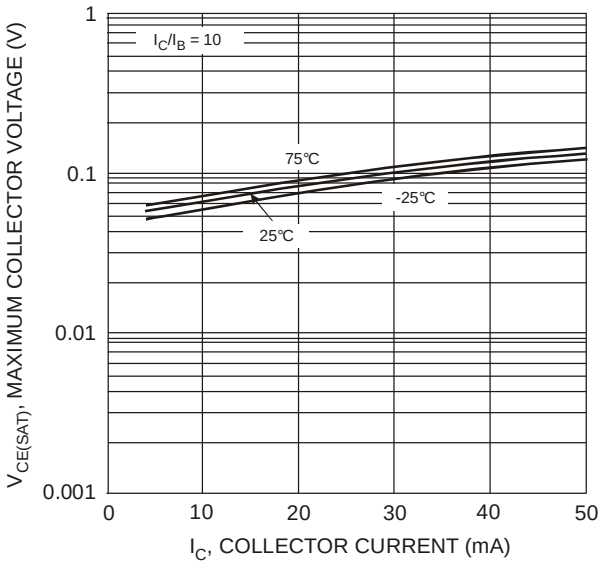


Fig. 7 $V_{CE(SAT)}$ vs. I_C

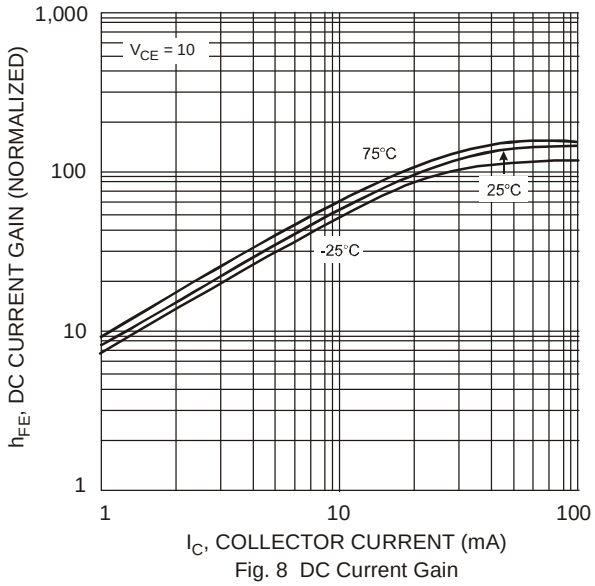


Fig. 8 DC Current Gain

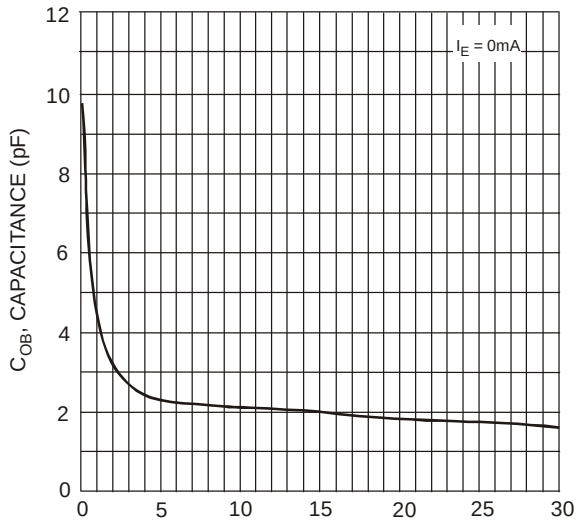


Fig. 9 Output Capacitance

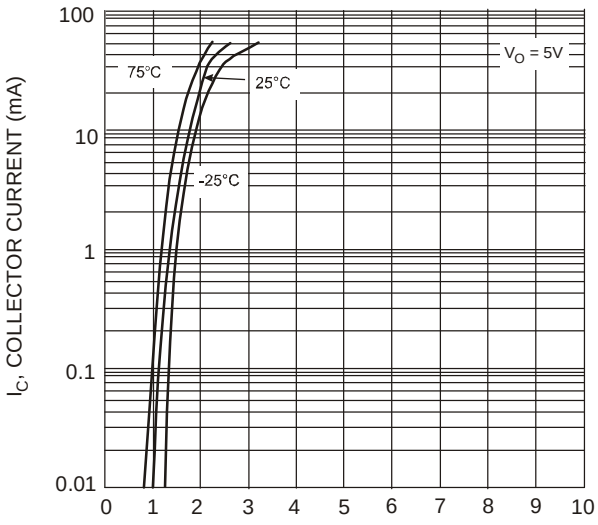


Fig. 10 Collector Current vs. Input Voltage

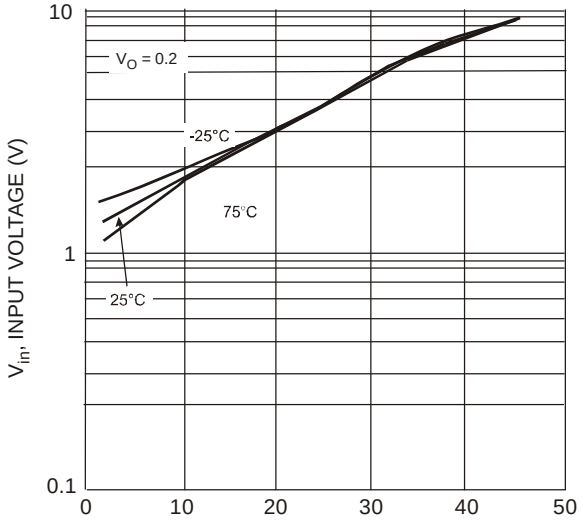
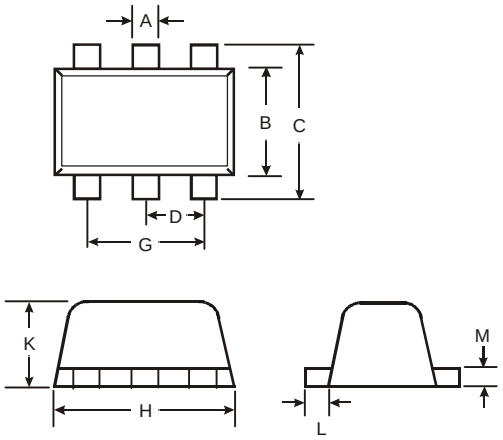


Fig. 11 Input Voltage vs. Collector Current

Package Outline Dimensions

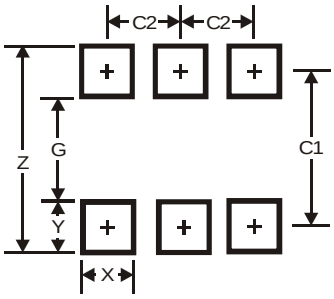
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.



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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