

COMPLEMENTARY NPN/PNP PRE-BIASED SMALL SIGNAL SOT-563 DUAL SURFACE MOUNT TRANSISTOR

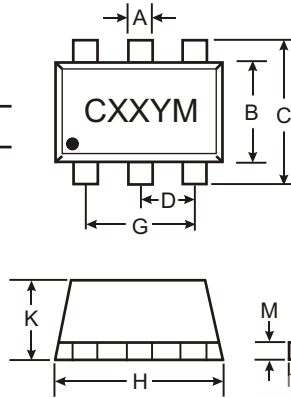
NEW PRODUCT

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Lead Free By Design/RoHS Compliant (Note 2)**

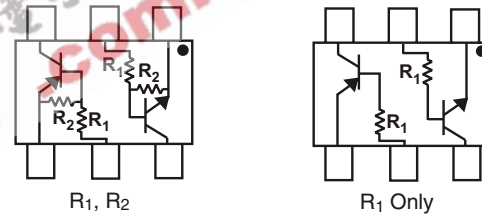
Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.005 grams (approx.)



SOT-563			
Dim	Min	Max	Typ
A	0.15	0.30	0.25
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	0.56	0.60	0.60
L	0.15	0.25	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

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



SCHEMATIC DIAGRAM, TOP VIEW

Maximum Ratings NPN Section @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V _{CC}	50	V
Input Voltage	V _{IN}	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH -10 to +40 -10 to +40 -10 to +30 -6 to +40 -5 to +12 -10 to +40 -5 V _{max} -5 V _{max}	V
Output Current	I _O	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH DCX143TH DCX114TH 30 30 100 70 100 50 100 100	mA
Output Current	I _C (Max)	All	100 mA
Power Dissipation (Total)	P _d	150	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	R _{θJA}	833	°C/W
Operating and Storage and Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 1. Mounted on FR4 Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.
2. No purposefully added lead.

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	V_{IN}	+10 to -40 +10 to -40 +10 to -30 +6 to -40 +5 to -12 +10 to -40 +5 Vmax +5 Vmax	V
Output Current	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 and Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics NPN Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic (DCX143TH & DCX114TH only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	—	—	V	$I_C = 50\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CEO}	50	—	—	V	$I_C = 1\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	—	V	$I_E = 50\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	—	0.5	μA	$V_{CB} = 50\text{V}$
Emitter Cutoff Current	I_{EBO}	—	—	0.5	μA	$V_{EB} = 4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.3	V	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA}$ DCX143TH $I_C/I_B = 1\text{mA} / 0.1\text{mA}$ DCX114TH
DC Current Transfer Ratio	h_{FE}	100	250	600	—	$I_C = 1\text{mA}, V_{CE} = 5\text{V}$
Gain-Bandwidth Product*	f_T	—	250	—	MHz	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	$V_{I(off)}$	0.5 0.5 0.5 0.3 0.5 0.5	1.1 1.1 1.1 — — 1.1	—	V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
Input Voltage	$V_{I(on)}$	—	1.9 1.9 1.9 — — 1.9	3.0 3.0 3.0 1.4 1.1 3.0	V	$V_O = 0.3\text{V}, I_O = 5\text{mA}$ $V_O = 0.3\text{V}, I_O = 2\text{mA}$ $V_O = 0.3\text{V}, I_O = 20\text{mA}$ $V_O = 0.3\text{V}, I_O = 1\text{mA}$ $V_O = 0.3\text{V}, I_O = 5\text{mA}$ $V_O = 0.3\text{V}, I_O = 10\text{mA}$
Output Voltage	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$
Input Current	I_I	—	—	0.36 0.18 1.8 0.88 3.6 0.88	mA	$V_I = 5\text{V}$
Output Current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50\text{V}, V_I = 0\text{V}$
DC Current Gain	G_I	56 68 20 68 80 30	—	—	—	$V_O = 5\text{V}, I_O = 5\text{mA}$ $V_O = 5\text{V}, I_O = 5\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 5\text{mA}$

* Transistor - For Reference Only

Electrical Characteristics PNP Section @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic (DCX143TH & DCX114TH only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	$I_C = -50\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	—	—	V	$I_C = -1\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	$I_E = -50\mu\text{A}$
Collector Cutoff Current	I_{CBO}	—	—	-0.5	μA	$V_{CB} = -50\text{V}$
Emitter Cutoff Current	I_{EBO}	—	—	-0.5	μA	$V_{EB} = -4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	-0.3	V	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA}$ DCX143TH $I_C/I_B = 1\text{mA} / 0.1\text{mA}$ DCX114TH
DC Current Transfer Ratio	h_{FE}	100	250	600	—	$I_C = -1\text{mA}$, $V_{CE} = -5\text{V}$
Gain-Bandwidth Product*	f_T	—	250	—	MHz	$V_{CE} = -10\text{V}$, $I_E = 5\text{mA}$, $f = 100\text{MHz}$

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	$V_{CC} = -5\text{V}$, $I_O = -100\mu\text{A}$
	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{I(on)}$	—	-1.9 -1.9 -1.9 — -1.4 -1.9	-3.0 -3.0 -3.0 — -1.1 -3.0	V	$V_O = -0.3\text{V}$, $I_O = -5\text{mA}$ $V_O = -0.3\text{V}$, $I_O = -2\text{mA}$ $V_O = -0.3\text{V}$, $I_O = -20\text{mA}$ $V_O = -0.3\text{V}$, $I_O = -1\text{mA}$ $V_O = -0.3\text{V}$, $I_O = -5\text{mA}$ $V_O = -0.3\text{V}$, $I_O = -10\text{mA}$
Output Voltage	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	$V_{O(on)}$	—	-0.1	-0.3	V	$I_O/I_I = -10\text{mA} / -0.5\text{mA}$ $I_O/I_I = -10\text{mA} / -0.5\text{mA}$ $I_O/I_I = -10\text{mA} / -0.5\text{mA}$ $I_O/I_I = -5\text{mA} / -0.25\text{mA}$ $I_O/I_I = -5\text{mA} / -0.25\text{mA}$ $I_O/I_I = -10\text{mA} / -0.5\text{mA}$
Input Current	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	I_I	—	—	-0.36 -0.18 -1.8 -0.88 -3.6 -0.88	mA	$V_I = -5\text{V}$
Output Current		$I_{O(off)}$	—	—	-0.5	μA	$V_{CC} = 50\text{V}$, $V_I = 0\text{V}$
DC Current Gain	DCX124EH DCX144EH DCX143EH DCX114YH DCX123JH DCX114EH	G_I	56 68 20 68 80 30	—	—	—	$V_O = -5\text{V}$, $I_O = -5\text{mA}$ $V_O = -5\text{V}$, $I_O = -5\text{mA}$ $V_O = -5\text{V}$, $I_O = -10\text{mA}$ $V_O = -5\text{V}$, $I_O = -10\text{mA}$ $V_O = -5\text{V}$, $I_O = -10\text{mA}$ $V_O = -5\text{V}$, $I_O = -5\text{mA}$
Gain-Bandwidth Product*		f_T	—	250	—	MHz	$V_{CE} = -10\text{V}$, $I_E = -5\text{mA}$, $f = 100\text{MHz}$

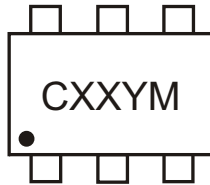
* Transistor - For Reference Only

Ordering Information (Note 3)

Device	Packaging	Shipping
DCX124EH-7	SOT-563	3000/Tape & Reel
DCX144EH-7	SOT-563	3000/Tape & Reel
DCX143EH-7	SOT-563	3000/Tape & Reel
DCX114YH-7	SOT-563	3000/Tape & Reel
DCX123JH-7	SOT-563	3000/Tape & Reel
DCX114EH-7	SOT-563	3000/Tape & Reel
DCX143TH-7	SOT-563	3000/Tape & Reel
DCX114TH-7	SOT-563	3000/Tape & Reel

Notes: 3. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



CXX = Product Type Marking Code (See Page 1)
 YM = Date Code Marking
 Y = Year ex: P = 2003
 M = Month ex: 9 = September

Date Code Key

Year	2003	2004	2005	2006	2007	2008	2009
Code	P	R	S	T	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

TYPICAL CURVES - DCX143EH NPN SECTION

NEW PRODUCT

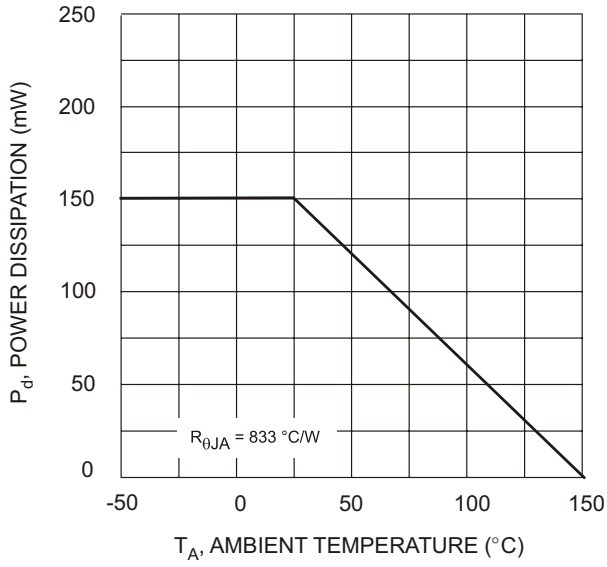


Fig. 1 Derating Curve - Total

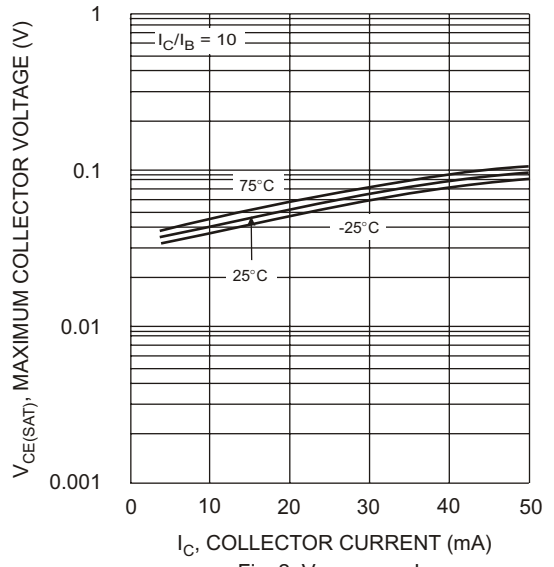


Fig. 2 $V_{CE(SAT)}$ vs. I_C

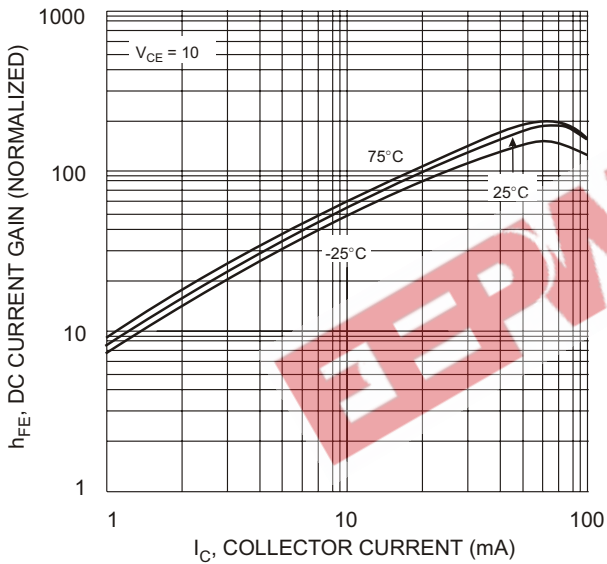


Fig. 3 DC CURRENT GAIN

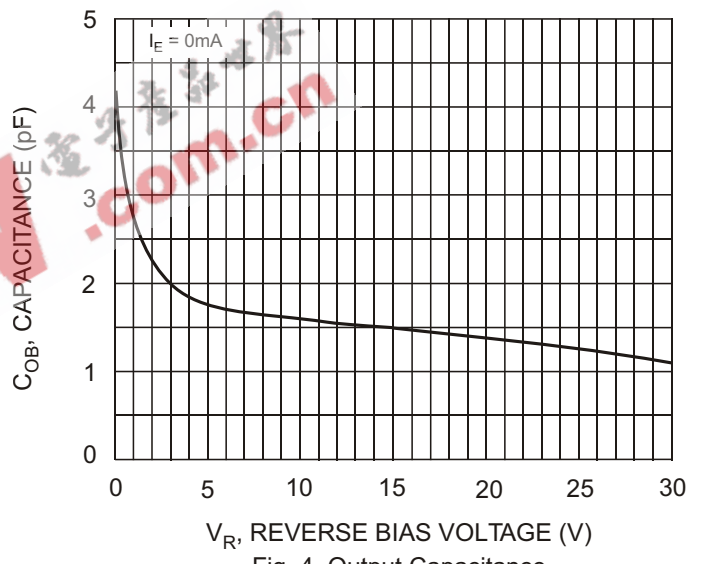


Fig. 4 Output Capacitance

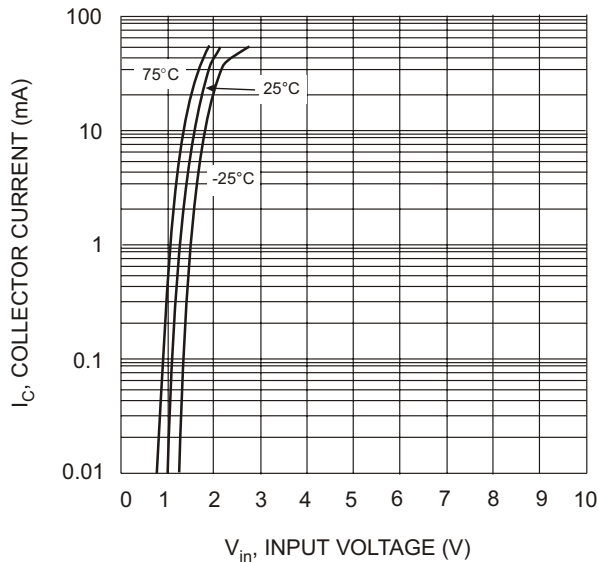


Fig. 5 Collector Current Vs. Input Voltage

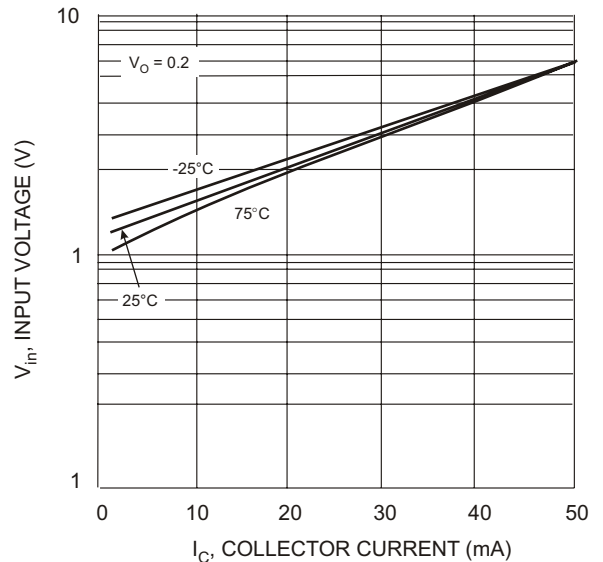


Fig. 6 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX143EH PNP SECTION

NEW PRODUCT

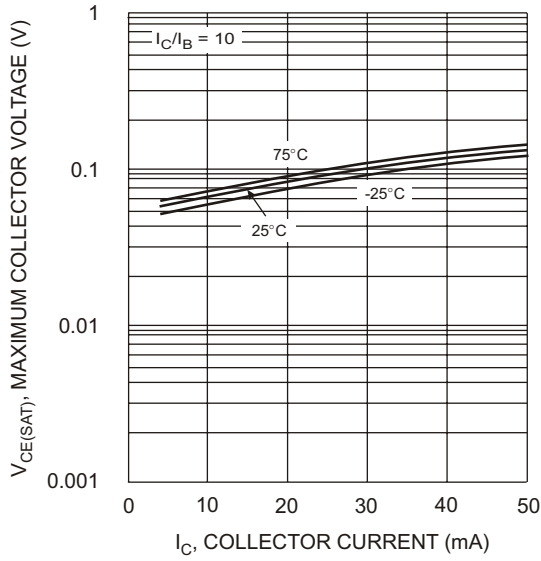


Fig. 7 $V_{CE(SAT)}$ vs. I_C

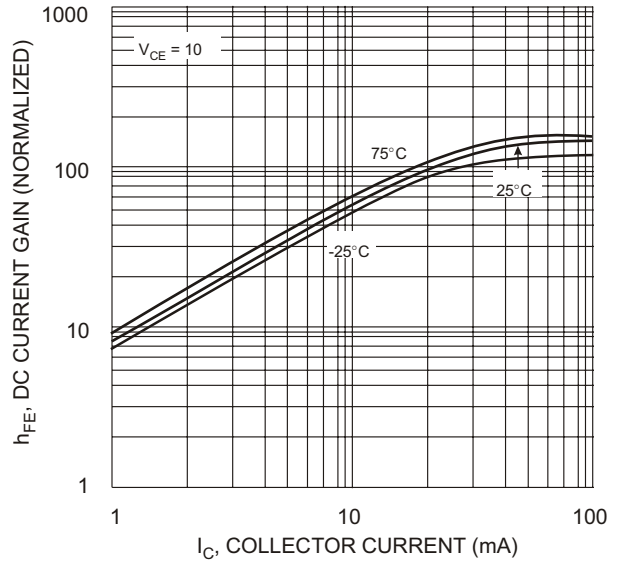


Fig. 8 DC Current Gain

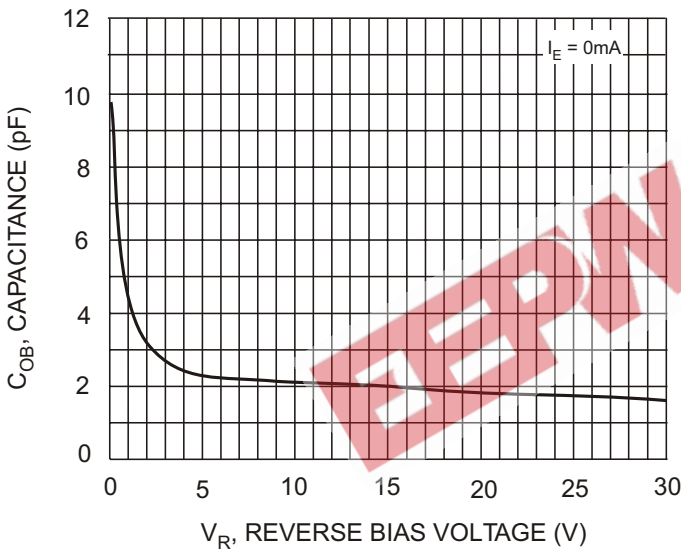


Fig. 9 Output Capacitance

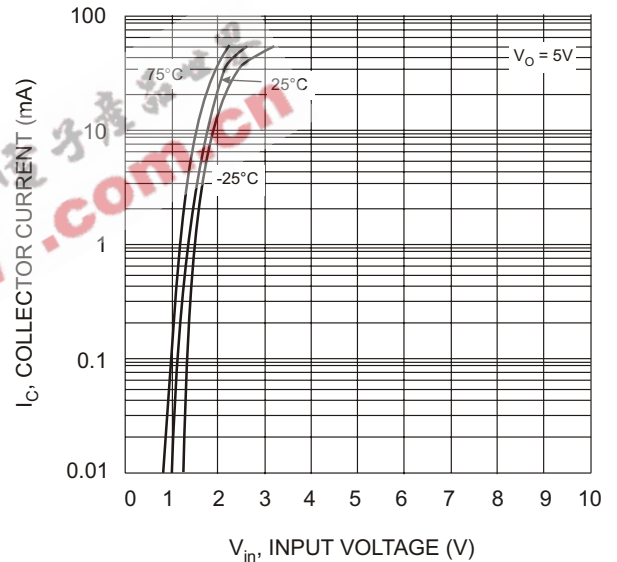


Fig. 10 Collector Current Vs. Input Voltage

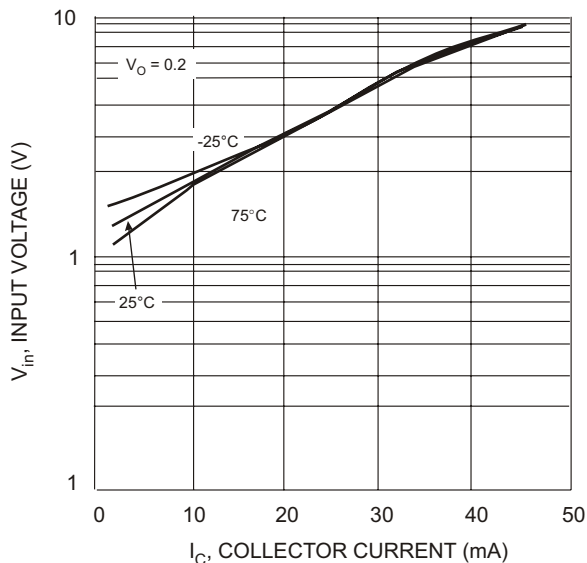


Fig. 11 Input Voltage vs. Collector Current