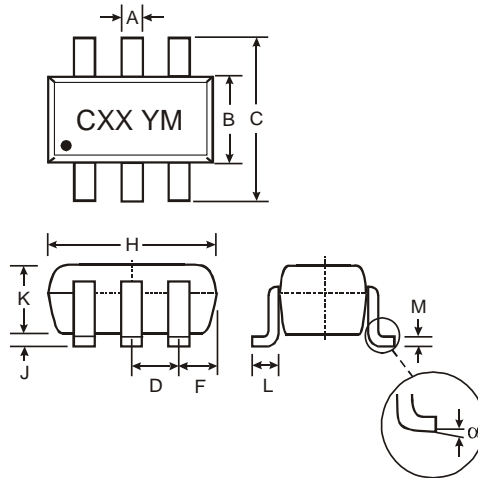


Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- Surface Mount Package Suited for Automated Assembly
- **Lead Free/RoHS Compliant (Note 3)**
- **"Green" Device (Note 4 and 5)**

Mechanical Data

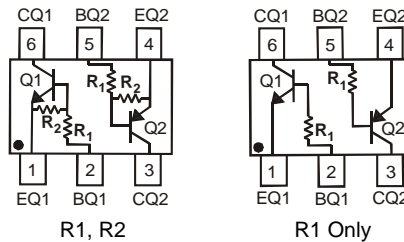
- Case: SOT-363
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020D
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking Information: See Page 11
- Ordering Information: See Page 11
- Weight: 0.006 grams (approximate)



SOT-363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
F	0.30	0.40
H	1.80	2.20
J	—	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.25
α	0°	8°

All Dimensions in mm

P/N	R1	R2	MARKING
DCX124EU	22K Ω	22K Ω	C17
DCX144EU	47K Ω	47K Ω	C20
DCX114YU	10K Ω	47K Ω	C14
DCX123JU	2.2K Ω	47K Ω	C06
DCX114EU	10K Ω	10K Ω	C13
DCX143TU	4.7K Ω	-	C07
DCX143EU	4.7K Ω	4.7K Ω	C08
DCX114TU	10K Ω	-	C12



Q1: NPN Transistor
Q2: PNP Transistor

SCHEMATIC DIAGRAM

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

Characteristic	Symbol	Value	Unit	
Supply Voltage, (6) to (1)	V _{CC}	50	V	
Input Voltage, (2) to (1)	V _{IN}	DCX124EU	-10 to +40	
		DCX144EU	-10 to +40	
		DCX114YU	-6 to +40	
		DCX123JU	-5 to +12	
		DCX114EU	-10 to +40	
		DCX143TU	-5V max	
		DCX143EU	-10 to +30	
Output Current	I _O	DCX124EU	30	
		DCX144EU	30	
		DCX114YU	70	
		DCX123JU	100	
		DCX114EU	50	
		DCX143TU	100	
		DCX143EU	100	
Output Current	All	I _C (Max)	100	mA
Power Dissipation (Total)	(Note 2)	P _D	200	mW
Thermal Resistance, Junction to Ambient Air	(Note 1)	R _{θJA}	625	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

- Notes:
1. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.
 2. 150mW per element must not be exceeded.
 3. No purposefully added lead.
 4. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 5. Product manufactured with Date Code UO (week 40, 2007) and newer are built with Green Molding Compound. Product manufactured prior to Date Code UO are built with Non-Green Molding Compound and may contain Halogens or Sb₂O₃ Fire Retardants.

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

Characteristic	Symbol	Value	Unit
Supply Voltage, (4) to (3)	V _{CC}	50	V
Input Voltage, (5) to (4)	V _{IN}	+10 to -40 +10 to -40 +6 to -40 +5 to -12 +10 to -40 +5V max +10 to -30 +5V max	V
Output Current	I _O	-30 -30 -70 -100 -50 -100 -100 -100	mA
Output Current	I _C (Max)	-100	mA
Power Dissipation (Total)	P _D	200	mW
Thermal Resistance, Junction to Ambient Air	R _{θJA}	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
R1 Only (DCX143TU & DCX114TU)							
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	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA}$ DCX143TU $I_C/I_B = 1\text{mA} / 0.1\text{mA}$ DCX114TU
DC Current Transfer Ratio		h_{FE}	100	250	600	—	$I_C = 1\text{mA}$, $V_{CE} = 5\text{V}$
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Gain-Bandwidth Product		f_T	—	250	—	MHz	$V_{CE} = 10\text{V}$, $I_E = -5\text{mA}$, $f = 100\text{MHz}$
R1/R2 Only							
Input Voltage	DCX124EU	$V_{I(off)}$	0.5	1.1	—	V	$V_{CC} = 5\text{V}$, $I_O = 100\mu\text{A}$
	DCX144EU		0.5	1.1			
DCX114YU	0.3		—				
DCX123JU	0.5		—				
DCX114EU	0.5		1.1				
DCX143EU	0.5		1.16				
Input Voltage	DCX124EU	$V_{I(on)}$	—	1.9	3.0	V	$V_O = 0.3$, $I_O = 5\text{mA}$
	DCX144EU		—	1.9	3.0		$V_O = 0.3$, $I_O = 2\text{mA}$
	DCX114YU		—	—	1.4		$V_O = 0.3$, $I_O = 1\text{mA}$
	DCX123JU		—	—	1.1		$V_O = 0.3$, $I_O = 5\text{mA}$
	DCX114EU		—	1.9	3.0		$V_O = 0.3$, $I_O = 10\text{mA}$
	DCX143EU		—	1.99	3.0		$V_O = 0.3$, $I_O = 20\text{mA}$
Output Voltage	DCX124EU	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX144EU		—				$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX114YU		—				$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
	DCX123JU		—				$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
	DCX114EU		—				$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX143EU		—				$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
Input Current	DCX124EU	I_I	—	—	0.36	mA	$V_I = 5\text{V}$
	DCX144EU		—	—	0.18		
	DCX114YU		—	—	0.88		
	DCX123JU		—	—	3.6		
	DCX114EU		—	—	0.88		
	DCX143EU		—	—	0.88		
Output Current		$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50\text{V}$, $V_I = 0\text{V}$
DC Current Gain	DCX124EU	G_I	56	—	—	—	$V_O = 5\text{V}$, $I_O = 5\text{mA}$
	DCX144EU		68				$V_O = 5\text{V}$, $I_O = 5\text{mA}$
	DCX114YU		68				$V_O = 5\text{V}$, $I_O = 10\text{mA}$
	DCX123JU		80				$V_O = 5\text{V}$, $I_O = 10\text{mA}$
	DCX114EU		30				$V_O = 5\text{V}$, $I_O = 5\text{mA}$
	DCX143EU		50				$V_O = 5\text{V}$, $I_O = 10\text{mA}$
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		R_2/R_1	-20	—	+20	%	—
Gain-Bandwidth Product		f_T	—	250	—	MHz	$V_{CE} = 10\text{V}$, $I_E = 5\text{mA}$, $f = 100\text{MHz}$

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
R1 Only (DCX143TU & DCX114TU)							
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	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA}$ DCX143TU $I_C/I_B = 1\text{mA} / 0.1\text{mA}$ DCX114TU
DC Current Transfer Ratio		h_{FE}	100	250	600	—	$I_C = -1\text{mA}$, $V_{CE} = -5\text{V}$
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Gain-Bandwidth Product		f_T	—	250	—	MHz	$V_{CE} = -10\text{V}$, $I_E = 5\text{mA}$, $f = 100\text{MHz}$
R1/R2 Only							
Input Voltage	DCX124EU	$V_{I(off)}$	-0.5	-1.1	—	V	$V_{CC} = -5\text{V}$, $I_O = -100\mu\text{A}$
	DCX144EU		-0.5	-1.1			
	DCX114YU		-0.3	—			
	DCX123JU		-0.5	—			
	DCX114EU		-0.5	-1.1			
	DCX143EU		-0.5	-1.16			
Input Voltage	DCX124EU	$V_{I(on)}$	—	-1.9	-3.0	V	$V_O = -0.3$, $I_O = -5\text{mA}$
	DCX144EU		—	-1.9	-3.0		$V_O = -0.3$, $I_O = -2\text{mA}$
	DCX114YU		—	—	-1.4		$V_O = -0.3$, $I_O = -1\text{mA}$
	DCX123JU		—	—	-1.1		$V_O = -0.3$, $I_O = -5\text{mA}$
	DCX114EU		—	-1.9	-3.0		$V_O = -0.3$, $I_O = -10\text{mA}$
	DCX143EU		—	-2.5	-3.0		$V_O = -0.3$, $I_O = -20\text{mA}$
Output Voltage	DCX124EU	$V_{O(on)}$	—	-0.1	-0.3	V	$I_O/I_I = -10\text{mA} / -0.5\text{mA}$
	DCX144EU		—	-0.1	-0.3		$I_O/I_I = -10\text{mA} / -0.5\text{mA}$
	DCX114YU		—	-0.1	-0.3		$I_O/I_I = -5\text{mA} / -0.25\text{mA}$
	DCX123JU		—	-0.1	-0.3		$I_O/I_I = -5\text{mA} / -0.25\text{mA}$
	DCX114EU		—	-0.1	-0.3		$I_O/I_I = -10\text{mA} / -0.5\text{mA}$
	DCX143EU		—	-0.1	-0.3		$I_O/I_I = -10\text{mA} / -0.5\text{mA}$
Input Current	DCX124EU	I_I	—	—	-0.36	mA	$V_I = -5\text{V}$
	DCX144EU		—	—	-0.18		
	DCX114YU		—	—	-0.88		
	DCX123JU		—	—	-3.6		
	DCX114EU		—	—	-0.88		
	DCX143EU		—	—	-0.88		
Output Current		$I_{O(off)}$	—	—	-0.5	μA	$V_{CC} = 50\text{V}$, $V_I = 0\text{V}$
DC Current Gain	DCX124EU	G_I	56	—	—	—	$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX144EU		68	—	—		$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX114YU		68	—	—		$V_O = -5\text{V}$, $I_O = -10\text{mA}$
	DCX123JU		80	—	—		$V_O = -5\text{V}$, $I_O = -10\text{mA}$
	DCX114EU		30	—	—		$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX143EU		40	—	—		$V_O = -5\text{V}$, $I_O = -10\text{mA}$
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—
Resistance Ratio Tolerance		R_2/R_1	-20	—	+20	%	—
Gain-Bandwidth Product		f_T	—	250	—	MHz	$V_{CE} = -10\text{V}$, $I_E = -5\text{mA}$, $f = 100\text{MHz}$

Typical Curves – Total Device

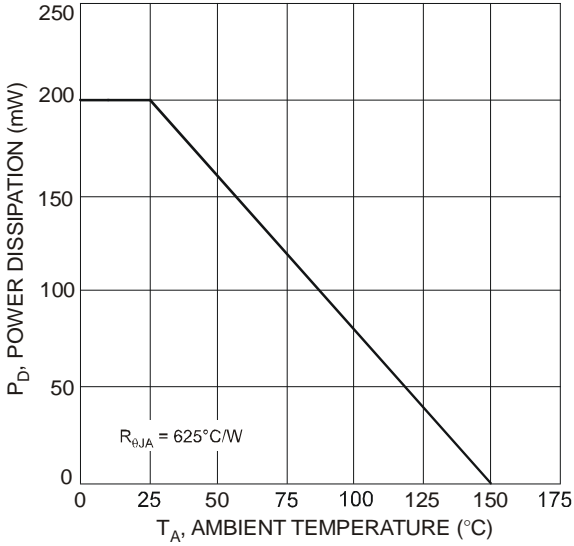


Fig. 1 Power Derating Curve

Typical Curves – DCX123JU PNP Section

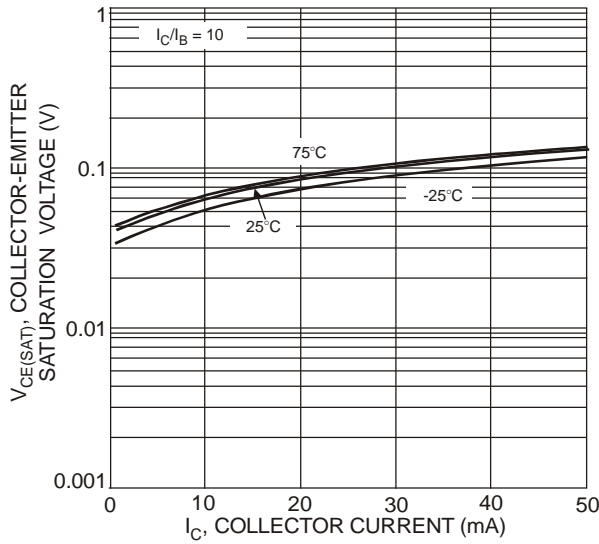


Fig. 2 Typical $V_{CE(SAT)}$ vs. I_C

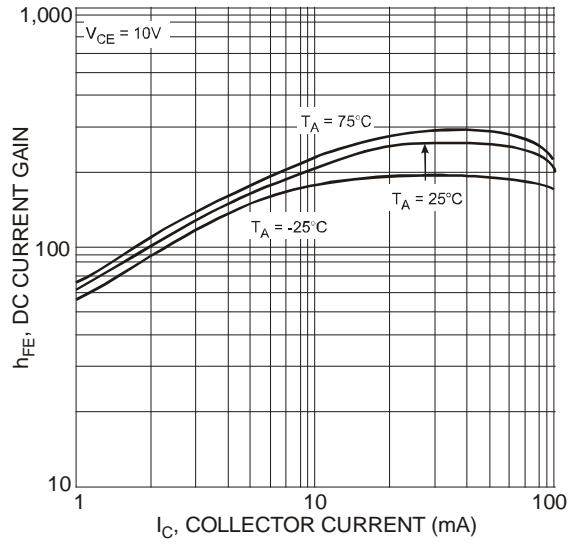


Fig. 3 Typical DC Current Gain

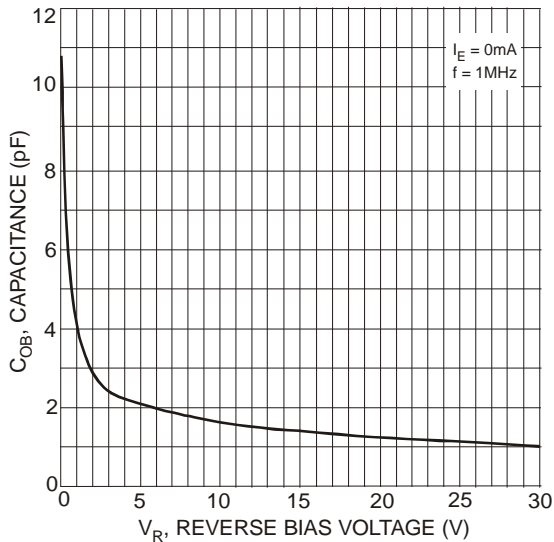


Fig. 4 Typical Output Capacitance

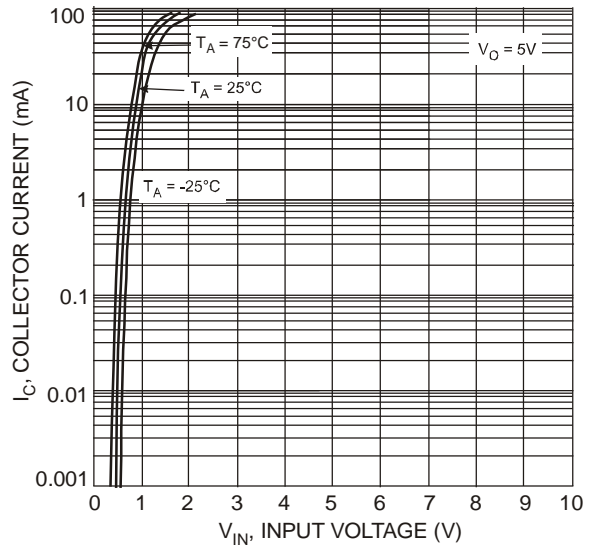


Fig. 5 Typical Collector Current vs. Input Voltage

Typical Curves – DCX123JU PNP Section (Continued)

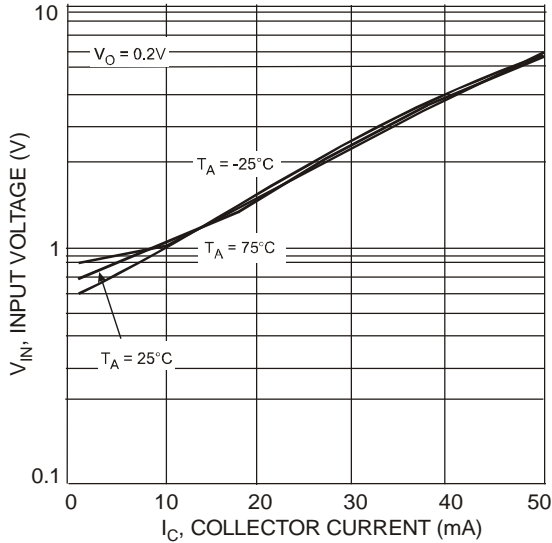


Fig. 6 Typical Input Voltage vs. Collector Current

Typical Curves – DCX123JU NPN Section

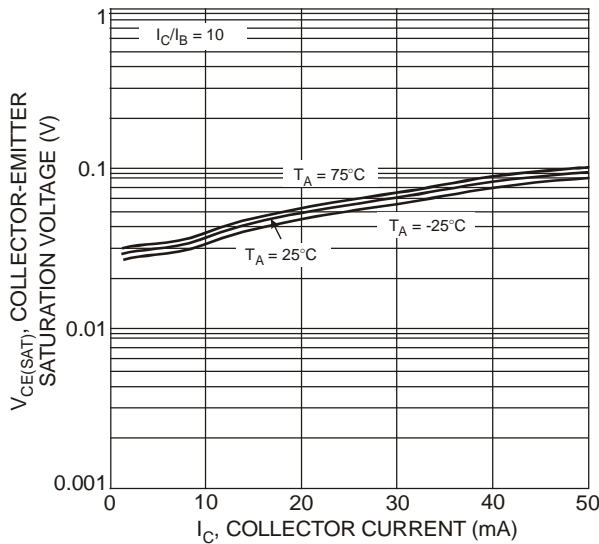


Fig. 7 Typical $V_{CE(SAT)}$ vs. I_C

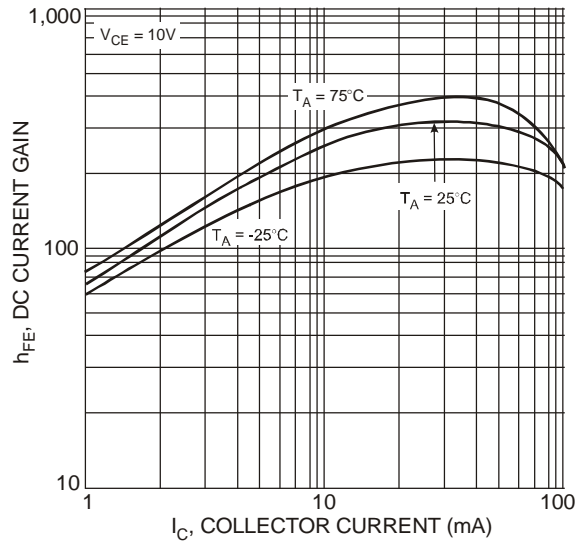


Fig. 8 Typical DC Current Gain

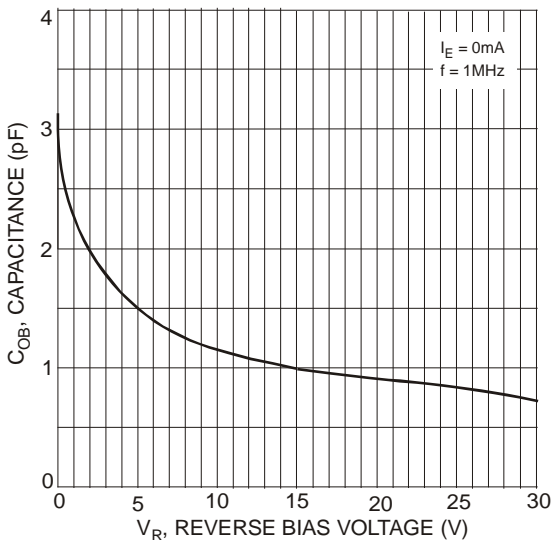


Fig. 9 Typical Output Capacitance

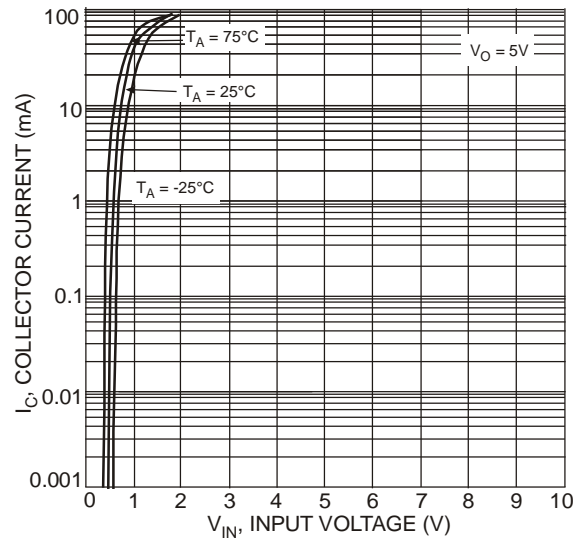


Fig. 10 Typical Collector Current vs. Input Voltage

Typical Curves – DCX123JU NPN Section (Continued)

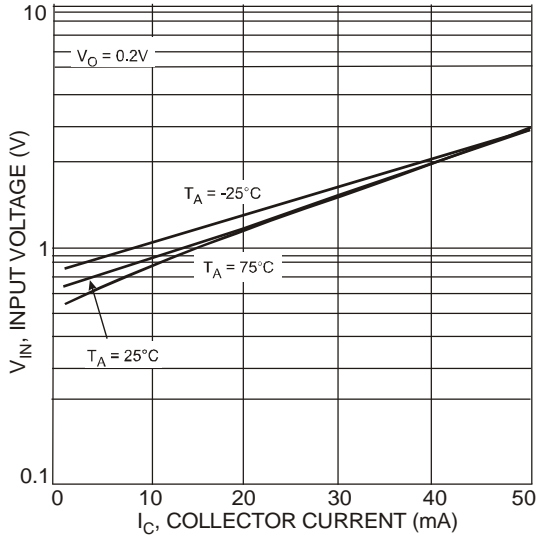


Fig. 11 Typical Input Voltage vs. Collector Current

Typical Curves – DCX143EU PNP Section

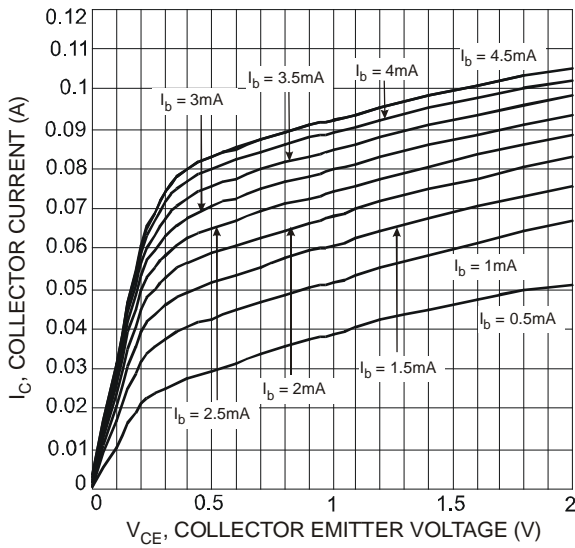


Fig. 12 Typical V_{CE} vs. I_C

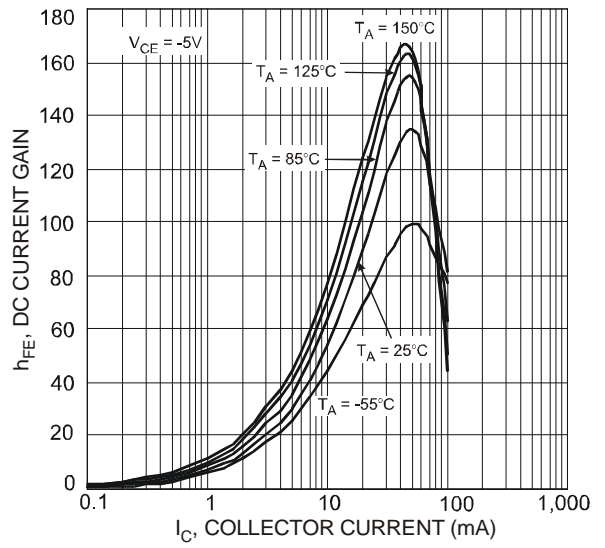


Fig. 13 Typical DC Current Gain

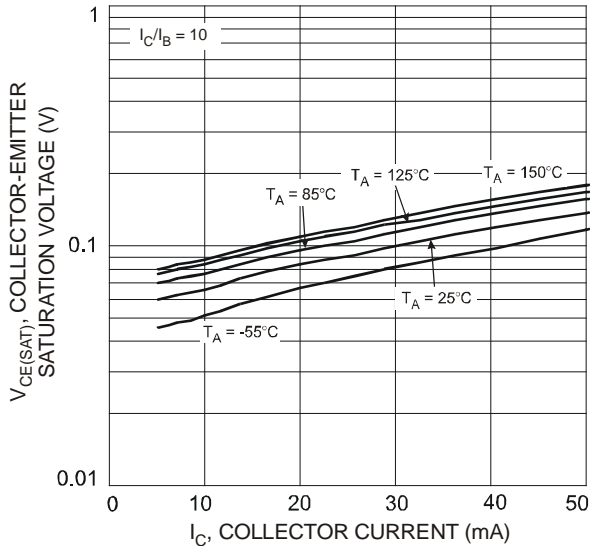


Fig. 14 Typical $V_{CE(SAT)}$ vs. I_C

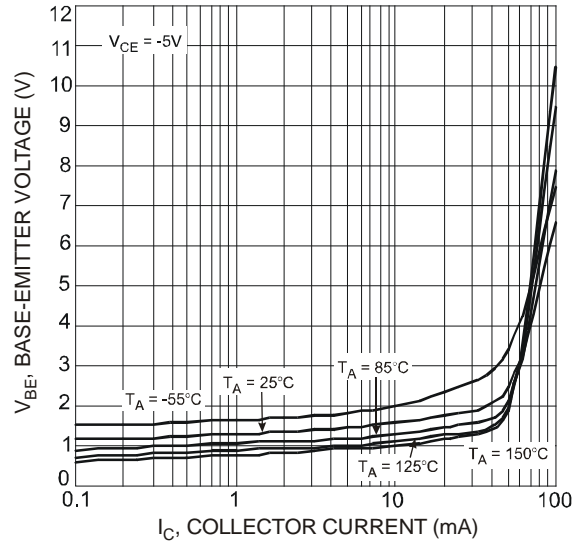


Fig. 15 Typical V_{BE} vs. I_C

Typical Curves – DCX143EU PNP Section (Continued)

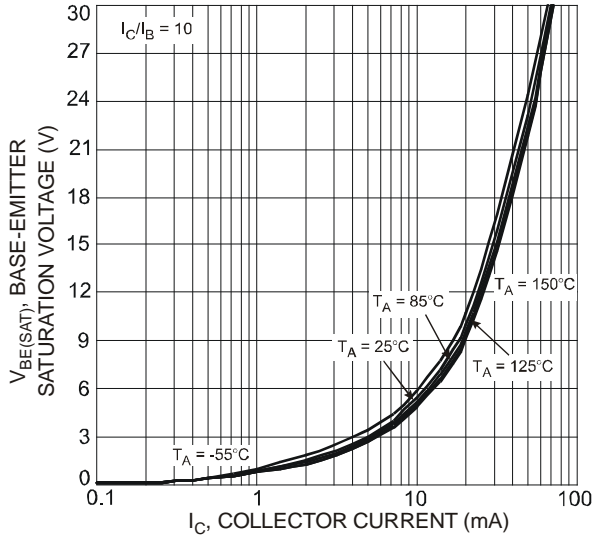


Fig. 16 Typical $V_{BE(SAT)}$ vs. I_C

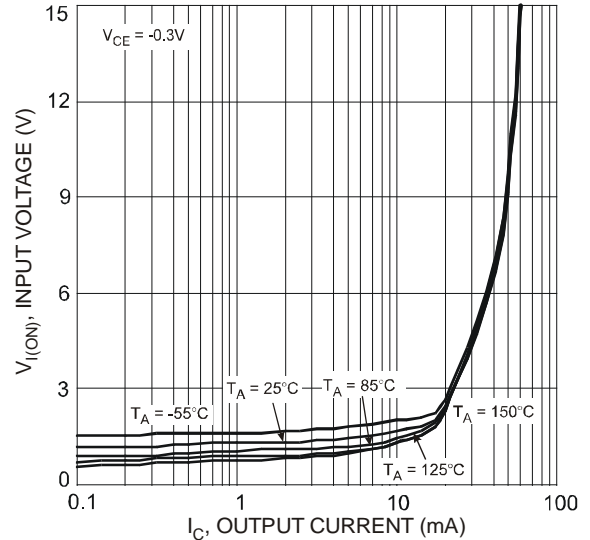


Fig. 17 Typical $V_{I(ON)}$ vs. I_C

Typical Curves – DCX143EU NPN Section

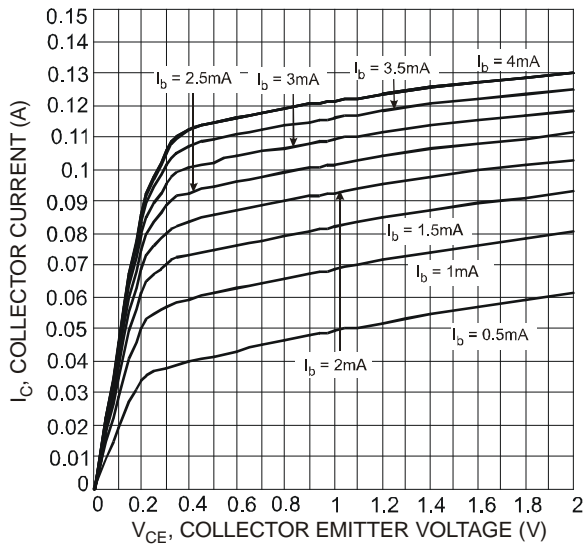


Fig. 18 Typical V_{CE} vs. I_C

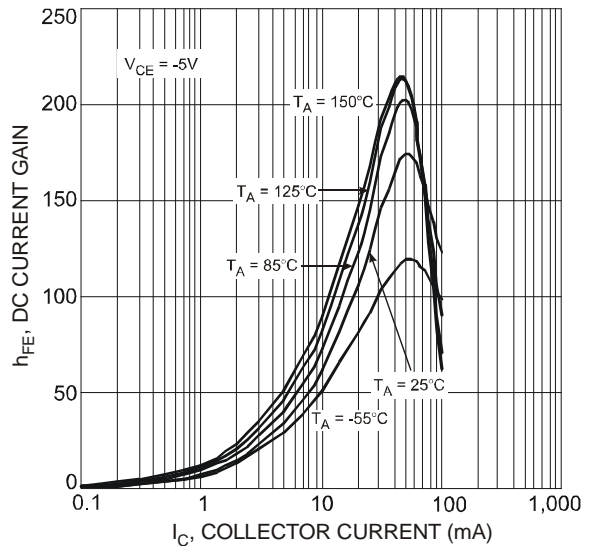


Fig. 19 Typical DC Current Gain

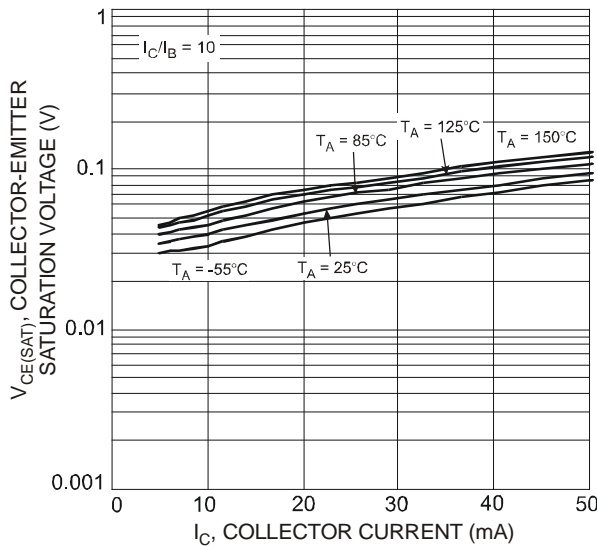


Fig. 20 Typical $V_{CE(SAT)}$ vs. I_C

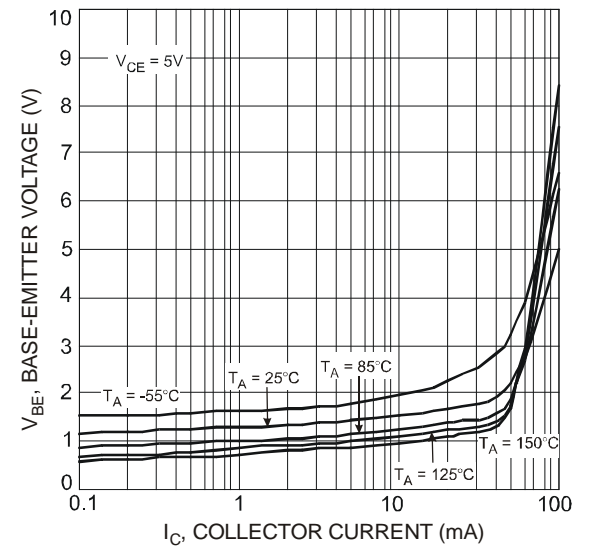


Fig. 21 Typical V_{BE} vs. I_C

Typical Curves – DCX143EU NPN Section (Continued)

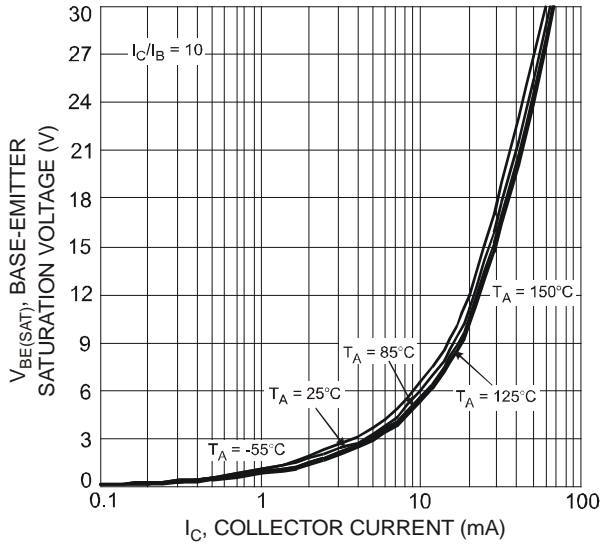


Fig. 22 Typical $V_{BE(SAT)}$ vs. I_C

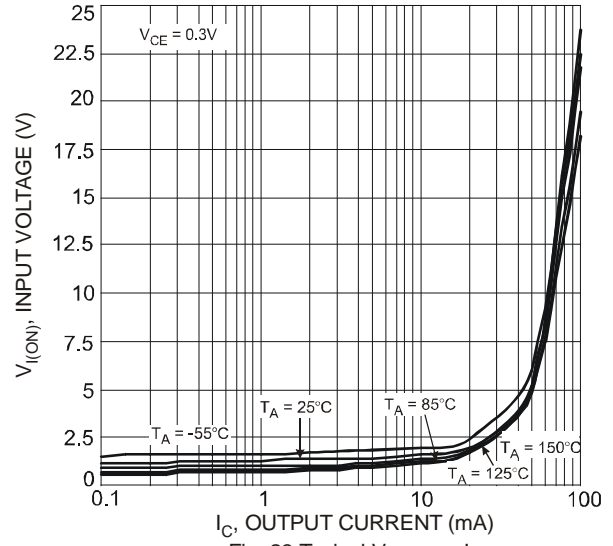


Fig. 23 Typical $V_{I(ON)}$ vs. I_C

Typical Curves – DCX114TU PNP Section

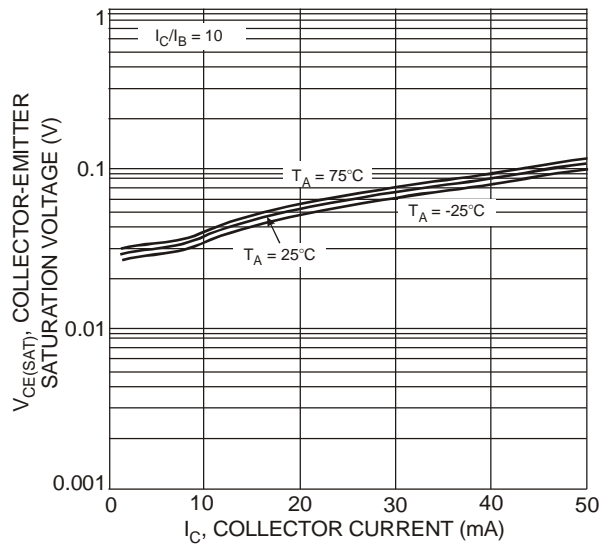


Fig. 24 Typical $V_{CE(SAT)}$ vs. I_C

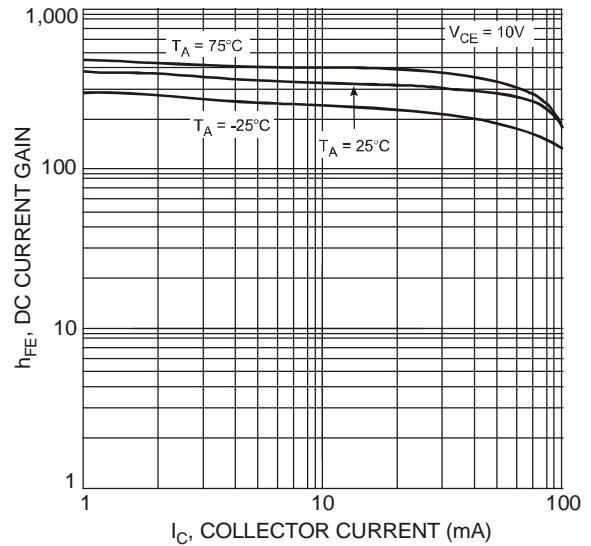


Fig. 25 Typical DC Current Gain

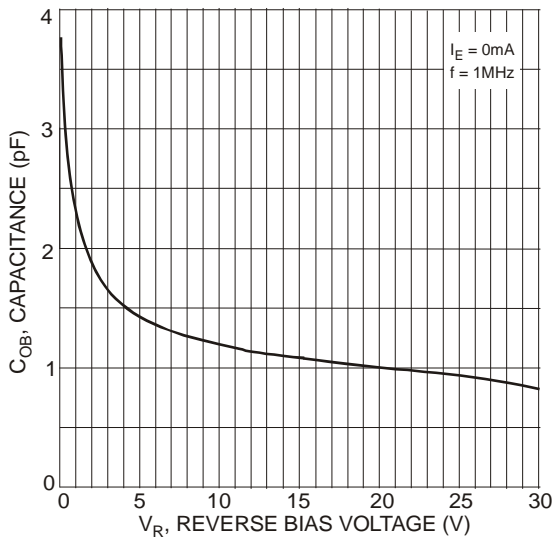


Fig. 26 Typical Output Capacitance

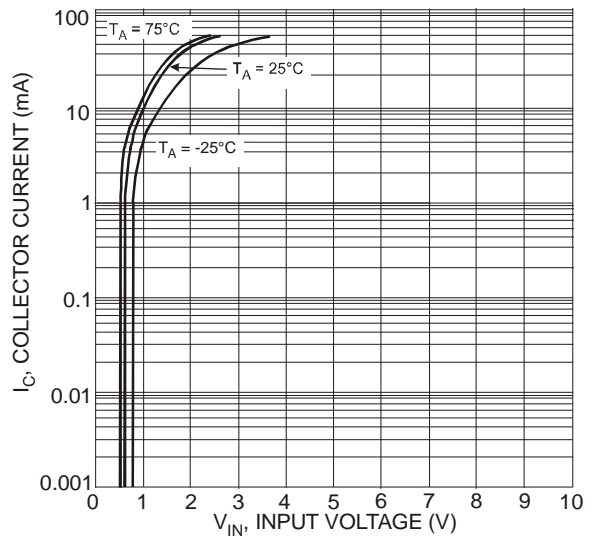


Fig. 27 Typical Collector Current vs. Input Voltage

Typical Curves – DCX114TU PNP Section (Continued)

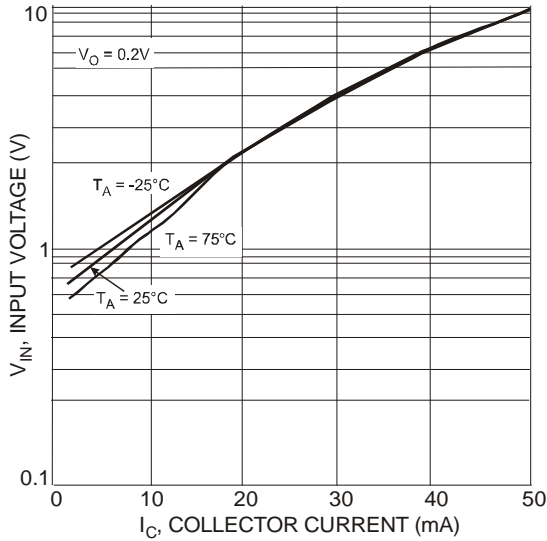


Fig. 28 Typical Input Voltage vs. Collector Current

Typical Curves – DCX114TU NPN Section

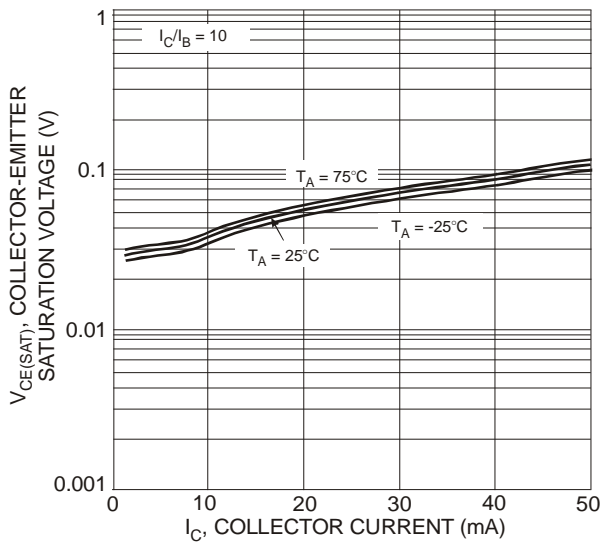


Fig. 29 Typical $V_{CE(SAT)}$ vs. I_C

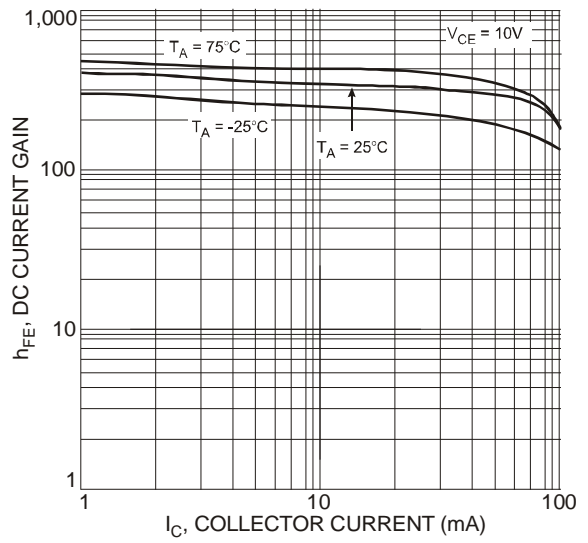


Fig. 30 Typical DC Current Gain

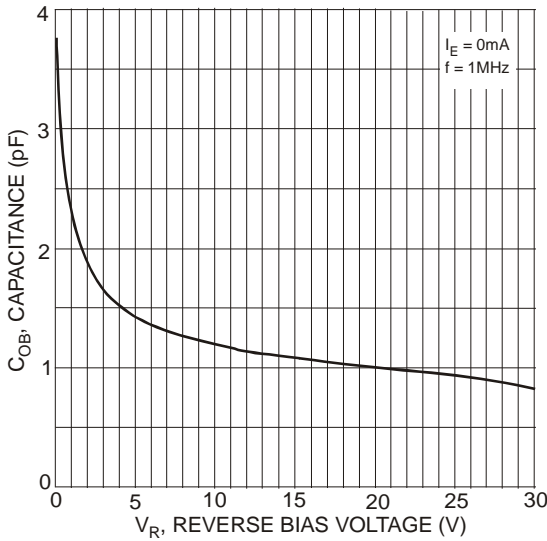


Fig. 31 Typical Output Capacitance

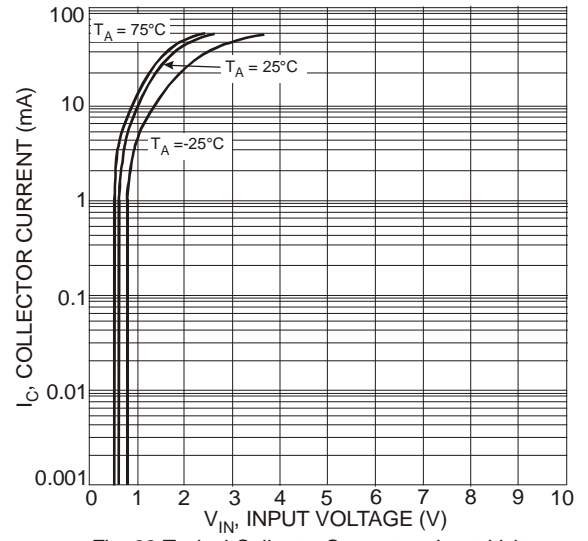


Fig. 32 Typical Collector Current vs. Input Voltage

Typical Curves – DCX114TU NPN Section (Continued)

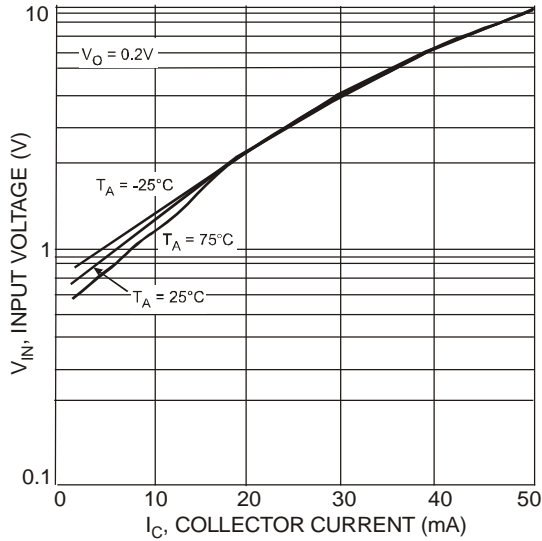


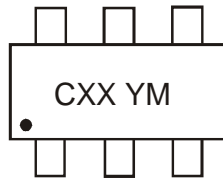
Fig. 33 Typical Input Voltage vs. Collector Current

Ordering Information (Note 6)

Device	Packaging	Shipping
DCX124EU-7-F	SOT-363	3000/Tape & Reel
DCX144EU-7-F	SOT-363	3000/Tape & Reel
DCX114YU-7-F	SOT-363	3000/Tape & Reel
DCX123JU-7-F	SOT-363	3000/Tape & Reel
DCX114EU-7-F	SOT-363	3000/Tape & Reel
DCX143TU-7-F	SOT-363	3000/Tape & Reel
DCX143EU-7-F	SOT-363	3000/Tape & Reel
DCX114TU-7-F	SOT-363	3000/Tape & Reel

Notes: 6. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



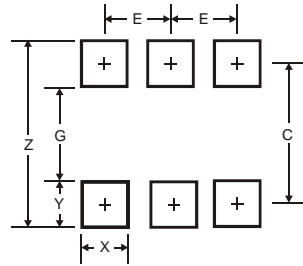
CXX = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: T = 2006
 M = Month ex: 9 = September

Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Code	T	U	V	W	X	Y	Z	A	B	C

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

Suggested Pad Layout



Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C	1.9
E	0.65

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