

COMPLEMENTARY NPN/PNP PRE-BIASED SMALL SIGNAL SOT-363 DUAL SURFACE MOUNT TRANSISTOR

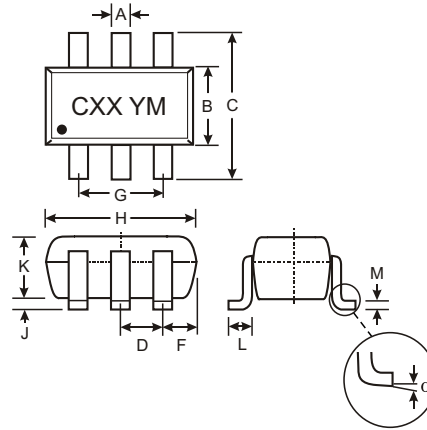
NEW PRODUCT

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- Also Available in Lead Free Version

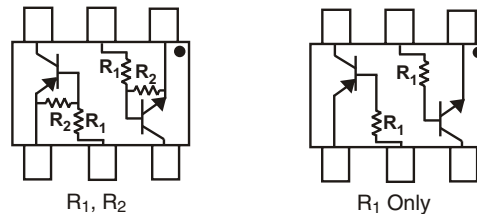
Mechanical Data

- Case: SOT-363, Molded Plastic
- Case material - UL Flammability Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020A
- Terminals: Solderable per MIL-STD-202, Method 208
- Also Available in Lead Free Plating (Matte Tin Finish). Please see Ordering Information, Note 4, on Page 3
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Diagrams & Page 4)
- Weight: 0.006 grams (approx.)
- Ordering Information (See Page 3)



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
DCX114TU	10K Ω	-	C12



SCHEMATIC DIAGRAM

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

Characteristic	Symbol	Value	Unit
Supply Voltage, (3) to (1)	V _{CC}	50	V
Input Voltage, (2) to (1)	V _{IN}	-10 to +40 -10 to +40 -6 to +40 -5 to +12 -10 to +40 -5 V _{max} -5 V _{max}	V
Output Current	I _O	30 30 70 100 100 50 100 100	mA
Output Current	I _C (Max)	100	mA
Power Dissipation (Total)	P _d	200	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	R _{θJA}	625	°C/W
Operating and Storage and Temperature Range	T _J , T _{STG}	-55 to +150	°C

- Note: 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.

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

Characteristic	Symbol	Value	Unit
Supply Voltage, (3) to (1)	V_{CC}	50	V
Input Voltage, (2) to (1) DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX114TU	V_{IN}	+10 to -40 +10 to -40 +6 to -40 +5 to -12 +10 to -40 +5 V_{max} +5 V_{max}	V
Output Current DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX114TU	I_O	-30 -30 -70 -100 -50 -100 -100	mA
Output Current All	I_C (Max)	-100	mA
Power Dissipation (Total)	P_d	200	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
Operating and Storage and Temperature Range	T_j, T_{STG}	-55 to +150	$^\circ\text{C}$

Note: 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.

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

Characteristic (DCX143TU & DCX114TU 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	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA}$ 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	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	$V_{I(off)}$	0.5	1.1	—	V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
		0.5	1.1	—		
Input Voltage DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	$V_{I(on)}$	—	1.9	3.0	V	$V_O = 0.3, I_O = 5\text{mA}$ $V_O = 0.3, I_O = 2\text{mA}$ $V_O = 0.3, I_O = 1\text{mA}$ $V_O = 0.3, I_O = 5\text{mA}$ $V_O = 0.3, I_O = 10\text{mA}$
		—	1.9	3.0		
Output Voltage DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	$V_{O(on)}$	—	0.1	0.3	V	$I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 5\text{mA} / 0.25\text{mA}$ $I_O/I_I = 10\text{mA} / 0.5\text{mA}$
Input Current DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	I_I	—	—	0.36 0.18 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 DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	G_I	56 68 68 80 30	—	—	—	$V_O = 5\text{V}, I_O = 5\text{mA}$ $V_O = 5\text{V}, I_O = 5\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 10\text{mA}$ $V_O = 5\text{V}, I_O = 5\text{mA}$
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	$V_{CE} = 10\text{V}, I_E = 5\text{mA}, f = 100\text{MHz}$

* Transistor - For Reference Only

Electrical Characteristics PNP Section @ T_A = 25°C unless otherwise specified

Characteristic (DCX143TU & DCX114TU 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 Cutoff Current	I _{CBO}	—	—	-0.5	μA	V _{CB} = -50V
Emitter Cutoff 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 I _C /I _B = 1mA / 0.1mA DCX143TU DCX114TU
DC Current Transfer Ratio	h _{FE}	100	250	600	—	I _C = -1mA, V _{CE} = -5V
Input Resistor (R ₁) Tolerance	ΔR ₁	-30	—	+30	%	—
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	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	V _{I(off)}	-0.5 -0.5 -0.3 -0.5 -0.5	-1.1 -1.1 — — -1.1	—	V	V _{CC} = -5V, I _O = -100μA
	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	V _{I(on)}	—	-1.9 -1.9 — — -1.9	-3.0 -3.0 -1.4 -1.1 -3.0		
Output Voltage	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	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 = -5mA / -0.25mA I _O /I _I = -5mA / -0.25mA I _O /I _I = -10mA / -0.5mA
Input Current	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	I _I	—	—	-0.36 -0.18 -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	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU	G _I	56 68 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 = -5mA
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} = -10V, I _E = -5mA, f = 100MHz

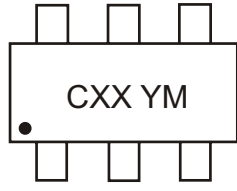
* Transistor - For Reference Only

Ordering Information (Note 3)

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

- Notes: 3. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.
4. For Lead Free version (with Lead Free terminal finish) part number, please add "-F" suffix to part number above.
Example: DCX114TU-7-F.

Marking Information



CXX = Product Type Marking Code
See Sheet 1 Diagrams
YM = Date Code Marking
Y = Year ex: N = 2002
M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009
Code	N	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 - DCX123JU
PNP SECTION

NEW PRODUCT

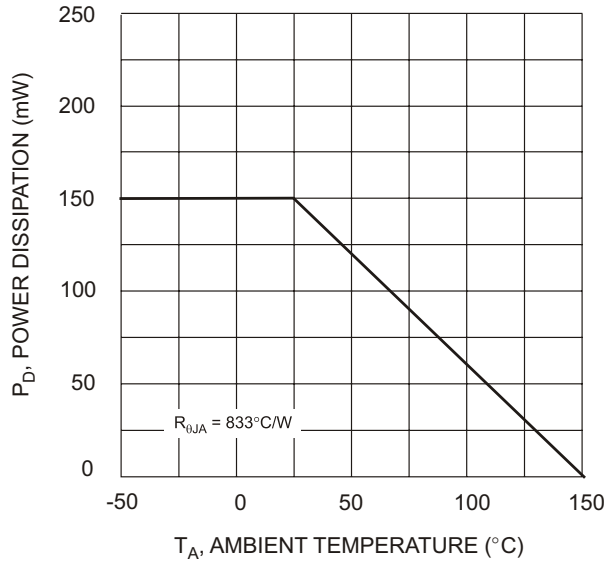


Fig. 1 Derating Curve

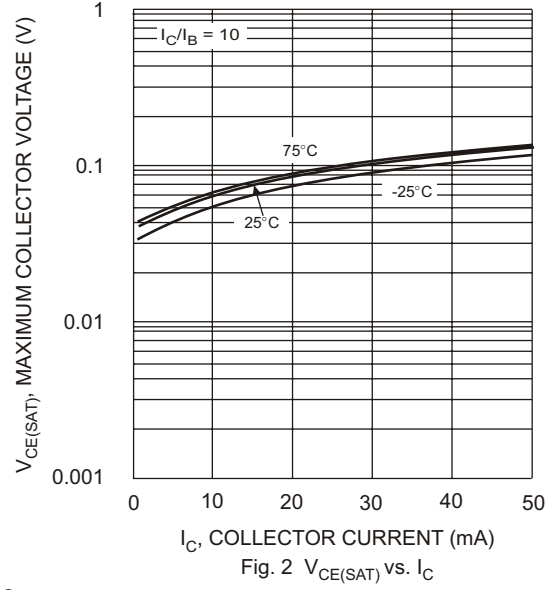


Fig. 2 $V_{CE(SAT)}$ vs. I_C

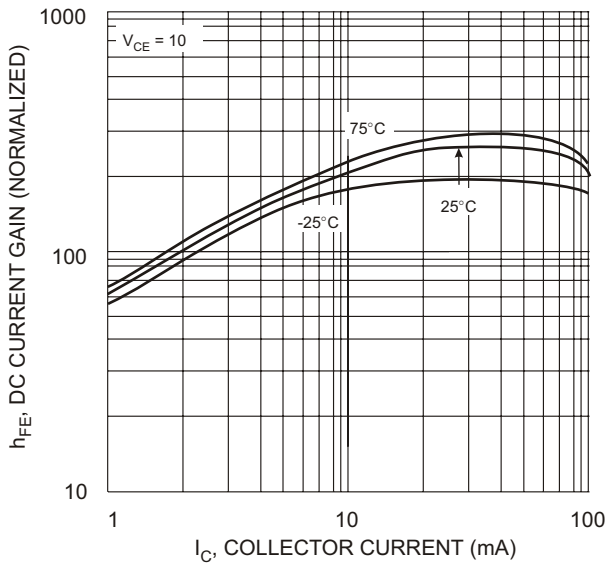


Fig. 3 DC Current Gain

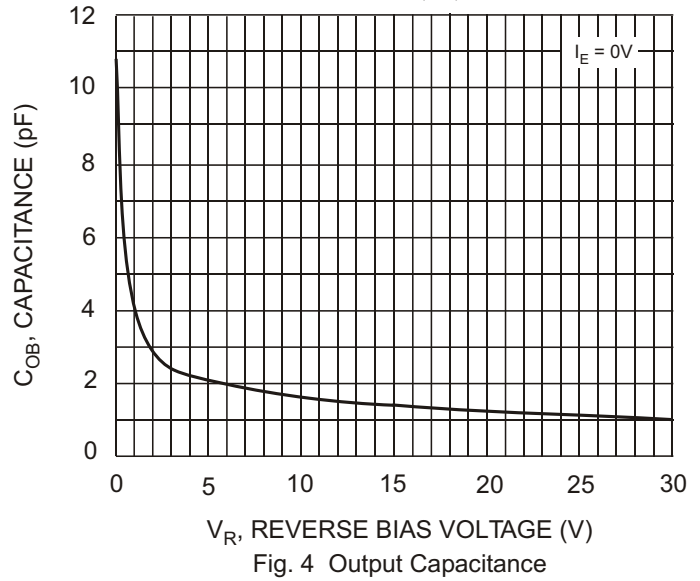


Fig. 4 Output Capacitance

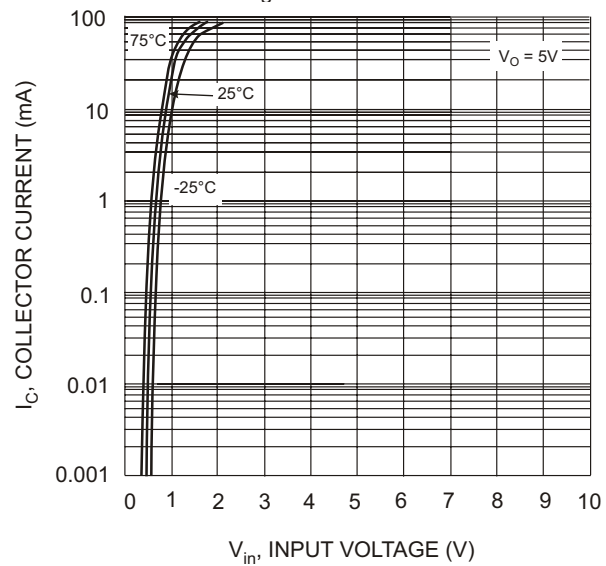


Fig. 5 Collector Current Vs. Input Voltage

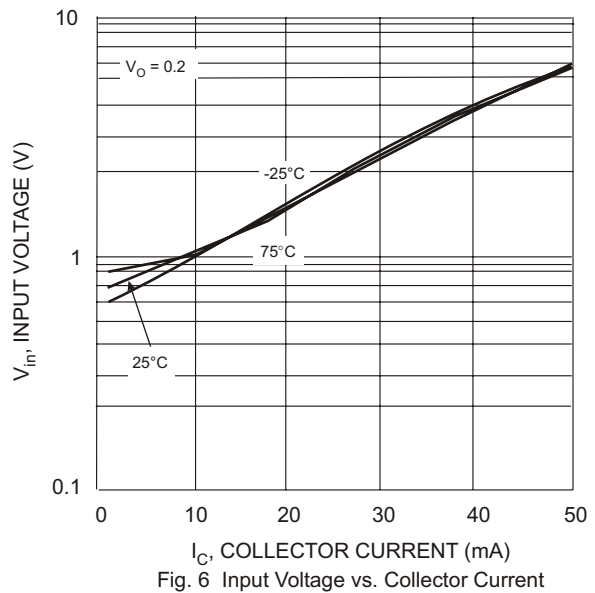


Fig. 6 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX123JU
NPN SECTION

NEW PRODUCT

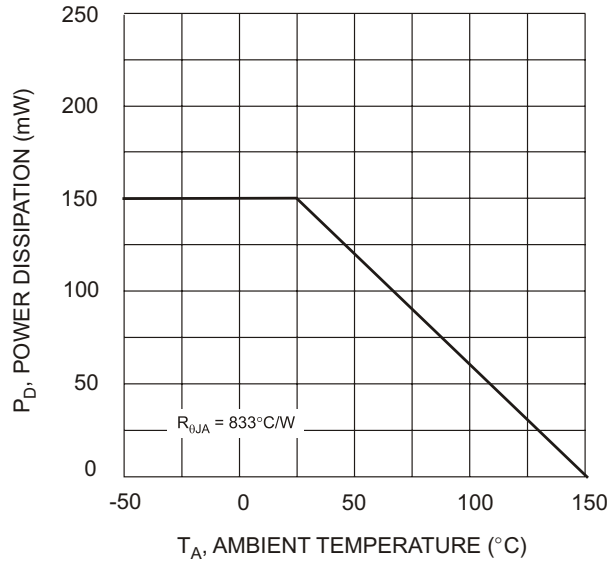


Fig. 1 Derating Curve

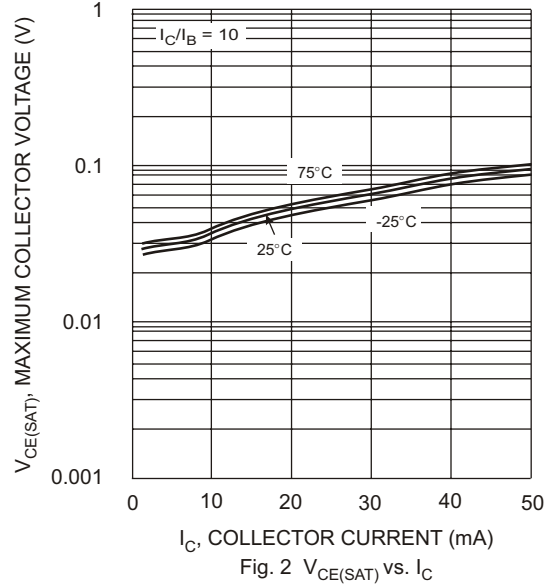


Fig. 2 $V_{CE(SAT)}$ vs. I_C

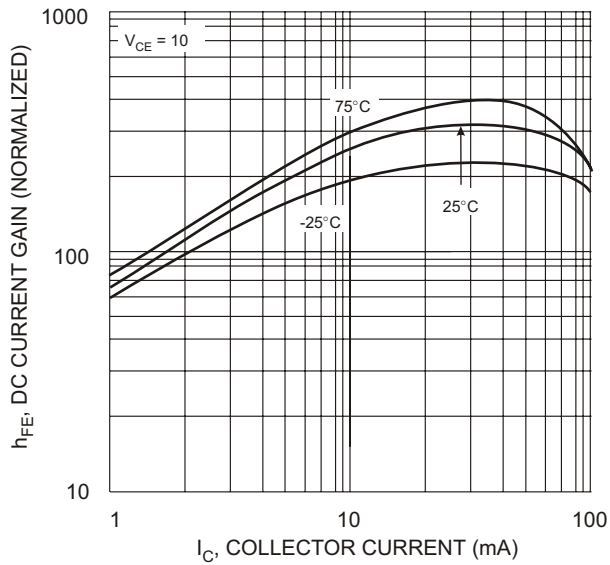


Fig. 3 DC Current Gain

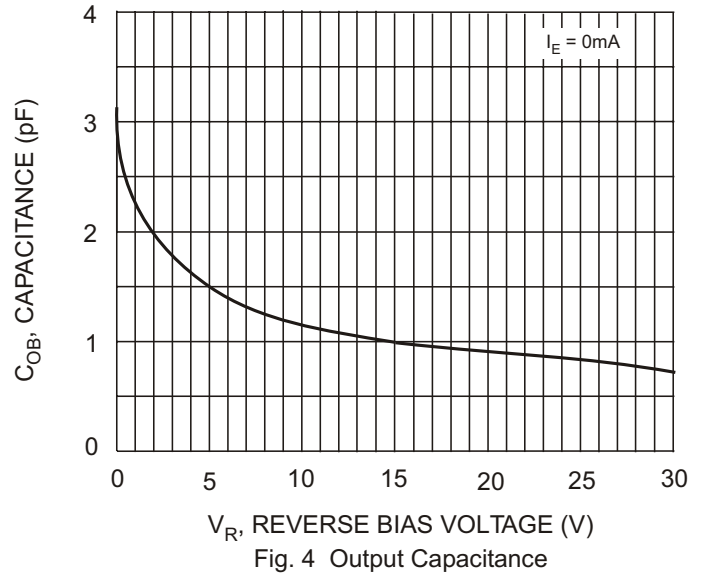


Fig. 4 Output Capacitance

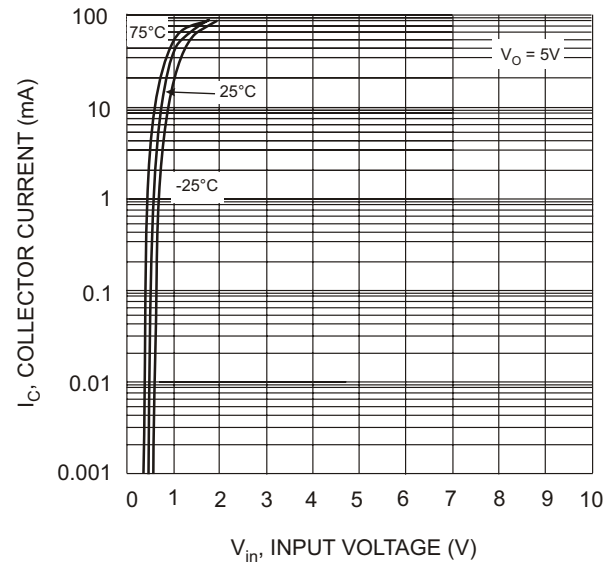


Fig. 5 Collector Current Vs. Input Voltage

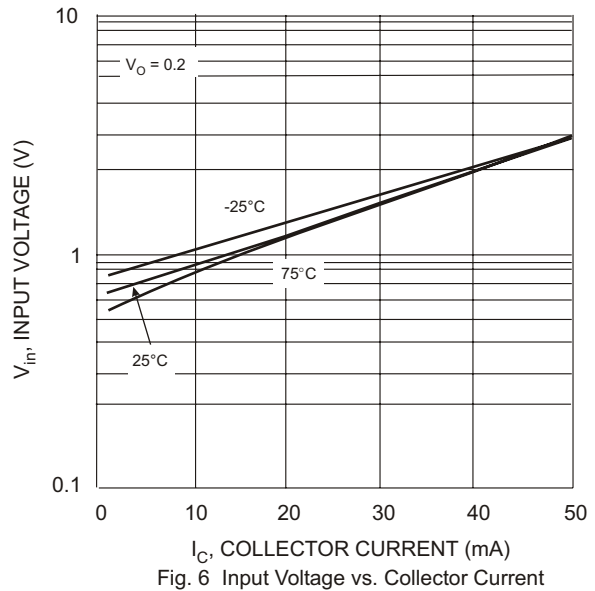


Fig. 6 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX114TU
PNP SECTION

NEW PRODUCT

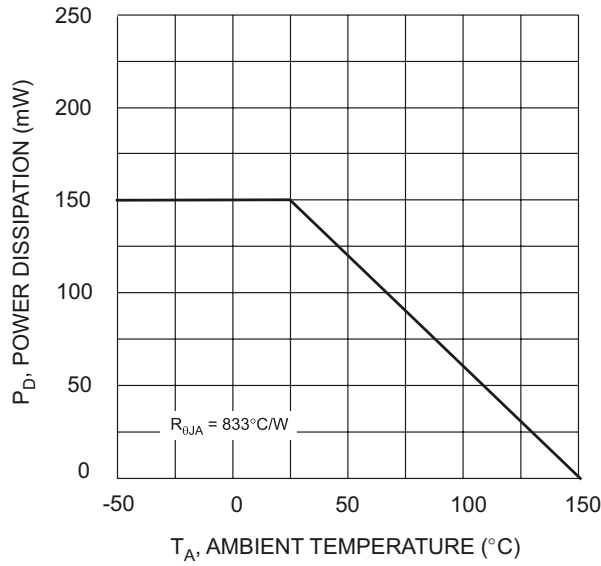


Fig. 1 Derating Curve

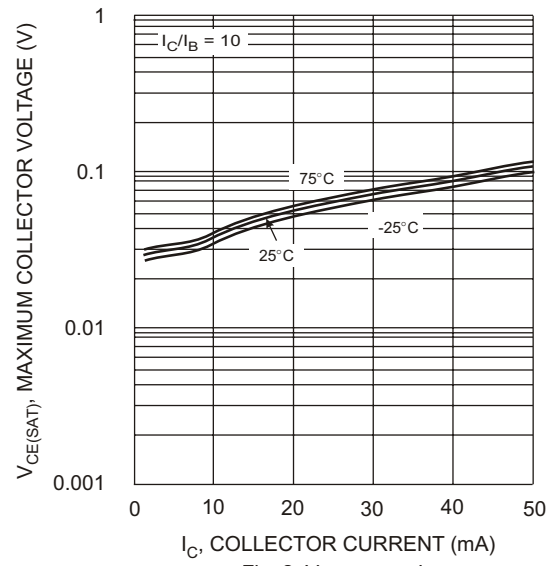


Fig. 2 $V_{CE(SAT)}$ vs. I_C

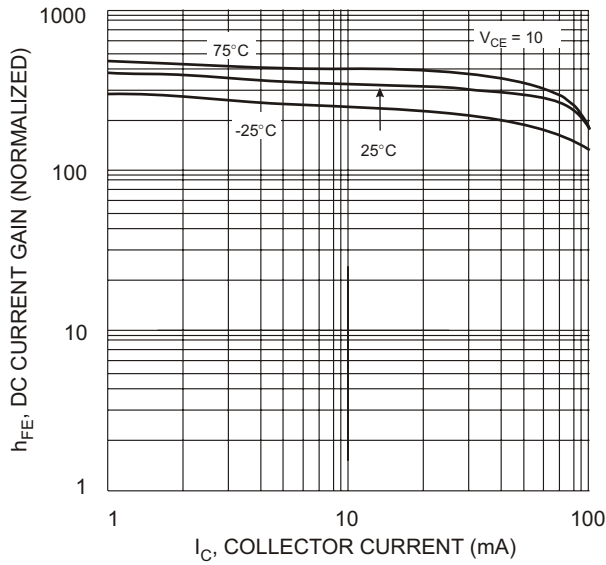


Fig. 3 DC Current Gain

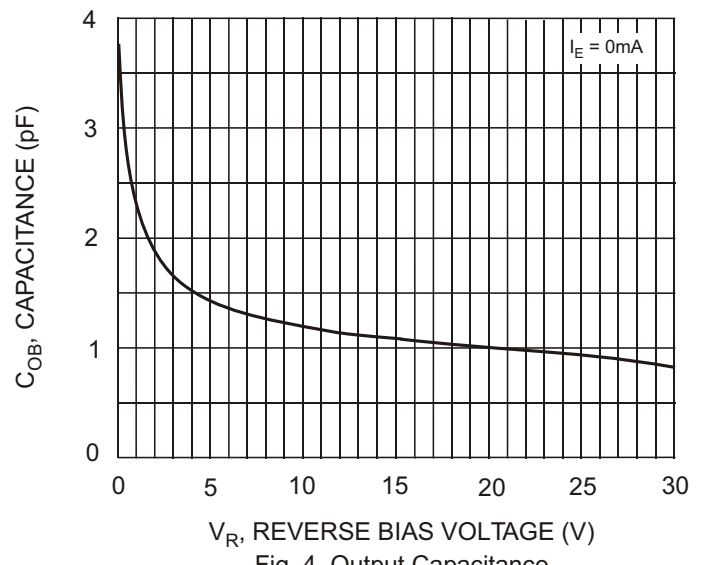


Fig. 4 Output Capacitance

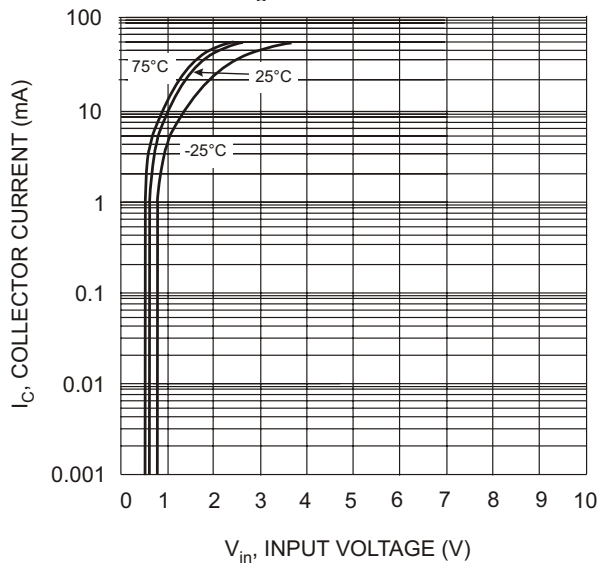


Fig. 5 Collector Current Vs. Input Voltage

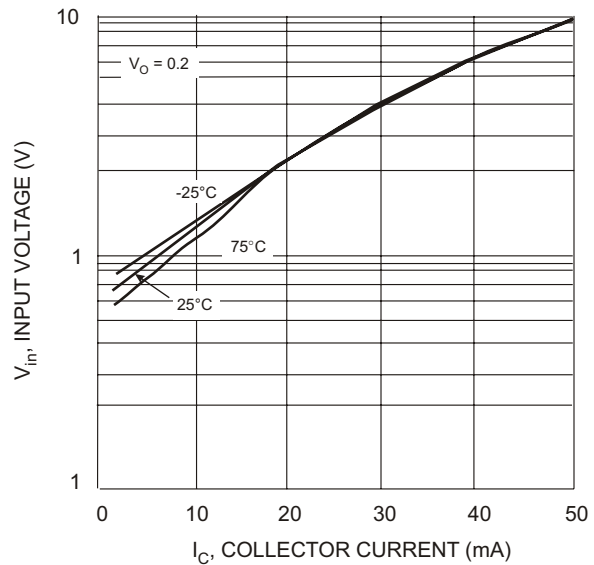


Fig. 6 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX114TU

NPN SECTION

NEW PRODUCT

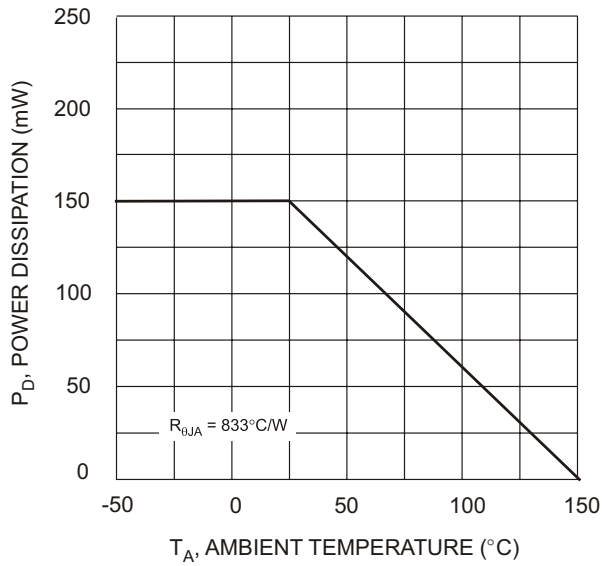


Fig. 1 Derating Curve

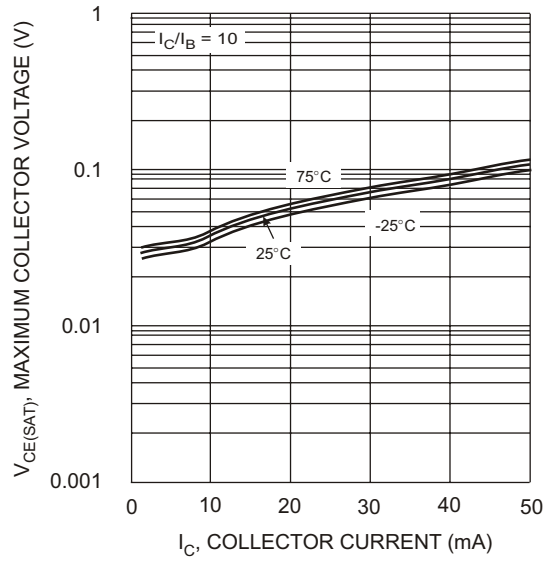


Fig. 2 $V_{CE(SAT)}$ vs. I_C

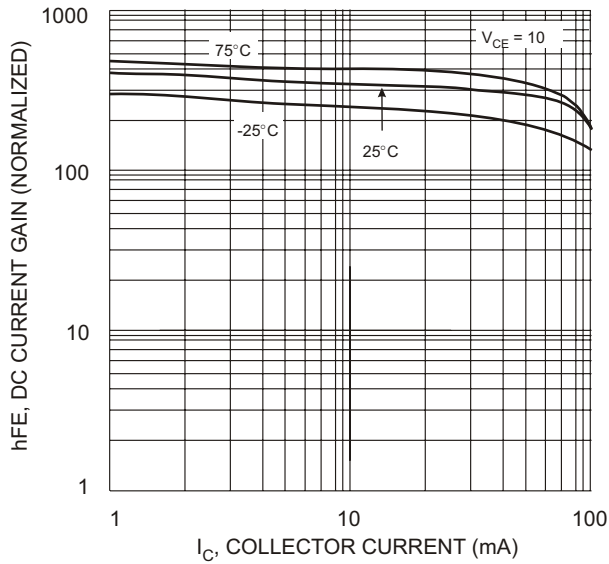


Fig. 3 DC Current Gain

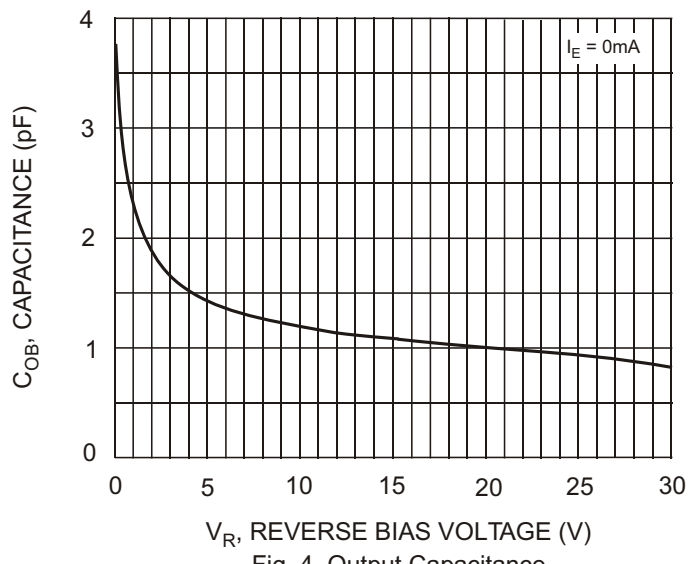


Fig. 4 Output Capacitance

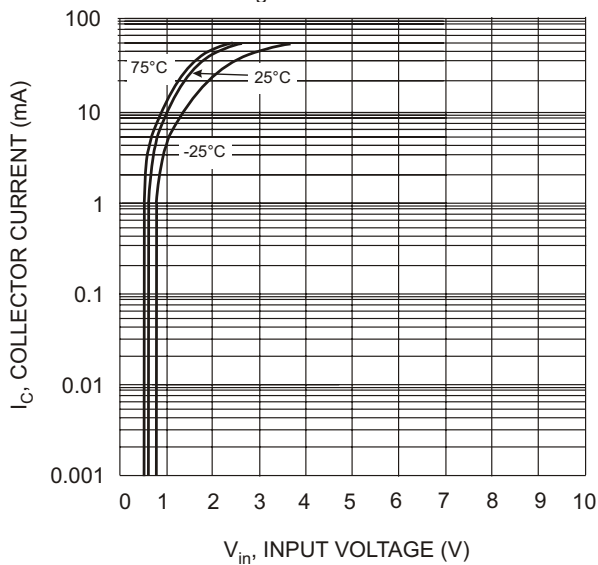


Fig. 5 Collector Current Vs. Input Voltage

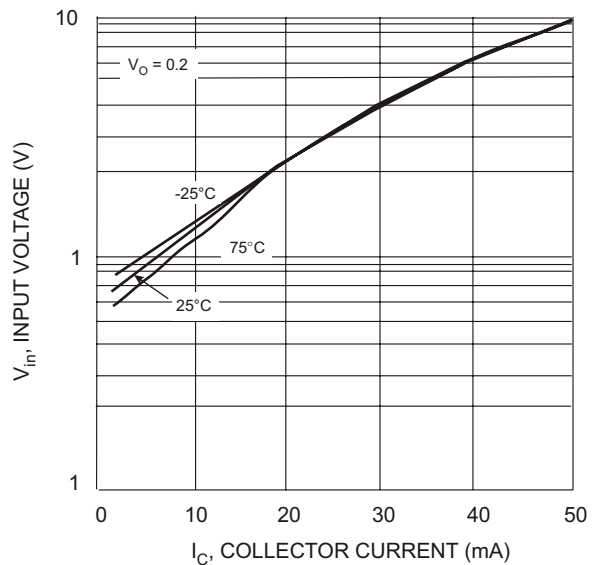


Fig. 6 Input Voltage vs. Collector Current