DCX (xxxx) U

SMALL SIGNAL COMPLEMENTARY PRE-BIASED DUAL TRANSISTOR

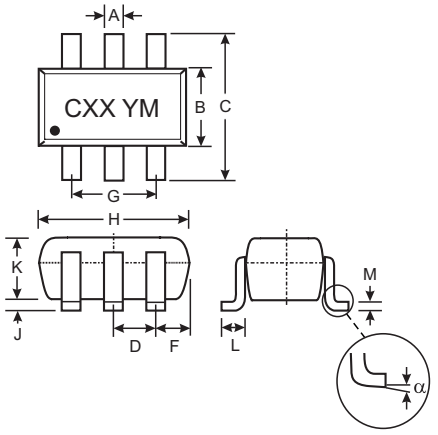
NEW PRODUCT

Features

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

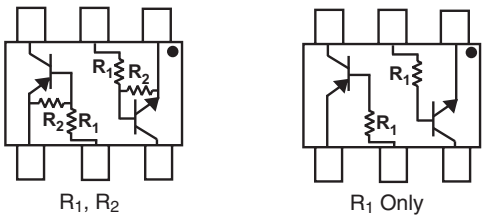
Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Page 4)
- Ordering Information (See Page 4)
- Weight: 0.006 grams (approx.)



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	22KΩ	22KΩ	C17
DCX144EU	47KΩ	47KΩ	C20
DCX114YU	10KΩ	47KΩ	C14
DCX123JU	2.2KΩ	47KΩ	C06
DCX114EU	10KΩ	10KΩ	C13
DCX143TU	4.7KΩ	-	C07
DCX143EU	4.7KΩ	4.7KΩ	C08
DCX114TU	10KΩ	-	C12



R_1, R_2 R_1 Only

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)	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX143EU DCX114TU	V_{IN}	-10 to +40 -10 to +40 -6 to +40 -5 to +12 -10 to +40 -5 Vmax -10 to +30 -5 Vmax	V
Output Current	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX143EU DCX114TU	I_O	30 30 70 100 50 100 100 100	mA
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)		$R_{\theta JA}$	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.
3. No purposefully added lead.

Maximum Ratings PNP 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)	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX143EU DCX114TU	V_{IN}	+10 to -40 +10 to -40 +6 to -40 +5 to -12 +10 to -40 +5 Vmax +10 to -30 +5 Vmax	V
Output Current	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143TU DCX143EU DCX114TU	I_O	-30 -30 -70 -100 -50 -100 -100 -100	mA
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)		$R_{\theta JA}$	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.

Electrical Characteristics NPN 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	$I_C = 50\mu A$
Collector-Emitter Breakdown Voltage	BV_{CEO}	50	—	—	V	$I_C = 1mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	5	—	––	V	$I_E = 50\mu A$
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	$I_C/I_B = 2.5mA / 0.25mA$ DCX143TU $I_C/I_B = 1mA / 0.1mA$ 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

Electrical Characteristics NPN Section (Continued) @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{I(off)}$	0.5 0.5 0.3 0.5 0.5 0.5	1.1 1.1 — — 1.1 1.16	—	V	V_{CC} = 5V, I_O = 100μA
	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{I(on)}$	—	1.9 1.9 — — 1.9 1.99	3.0 3.0 1.4 1.1 3.0 3.0		V_O = 0.3, I_O = 5mA V_O = 0.3, I_O = 2mA V_O = 0.3, I_O = 1mA V_O = 0.3, I_O = 5mA V_O = 0.3, I_O = 10mA V_O = 0.3, I_O = 20mA
Output Voltage	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{O(on)}$	—	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 I_O/I_I = 10mA / 0.5mA
Input Current	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	I_I	—	—	0.36 0.18 0.88 3.6 0.88 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 DCX143EU	G_I	56 68 68 80 30 50	—	—	—	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 V_O = 5V, I_O = 10mA
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

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 DCX143TU I_C/I_B = 1mA / 0.1mA 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

* Transistor - For Reference Only

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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{I(off)}$	-0.5 -0.5 -0.3 -0.5 -0.5 -0.5	-1.1 -1.1 — — -1.1 -1.16	—	V	V_{CC} = -5V, I_O = -100μA
	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{I(on)}$	—	-1.9 -1.9 — — -1.9 -2.5	-3.0 -3.0 -1.4 -1.1 -3.0 -3.0		V_O = -0.3, I_O = -5mA V_O = -0.3, I_O =- 2mA V_O = -0.3, I_O = -1mA V_O = -0.3, I_O = -5mA V_O = -0.3, I_O = -10mA V_O = -0.3, I_O = -20mA
Output Voltage	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{O(on)}$	—	-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 I_O/I_I = -10mA /- 0.5mA
Input Current	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	I_I	—	—	-0.36 -0.18 -0.88 -3.6 -0.88 -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 DCX143EU	G_I	56 68 68 80 30 40	—	—	—	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 V_O = -5V, I_O = -10mA
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

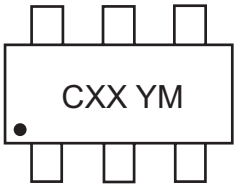
* Transistor - For Reference Only

Ordering Information (Note 4)

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
DCX143EU-7	SOT-363	3000/Tape & Reel
DCX114TU-7	SOT-363	3000/Tape & Reel

Notes: 4. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.

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

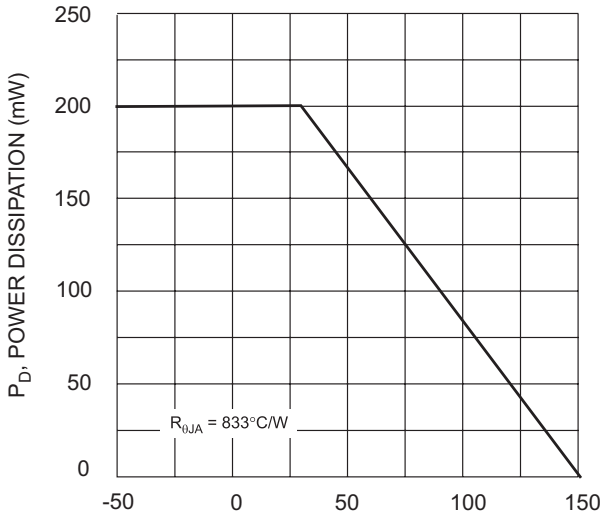


Fig. 1 Derating Curve

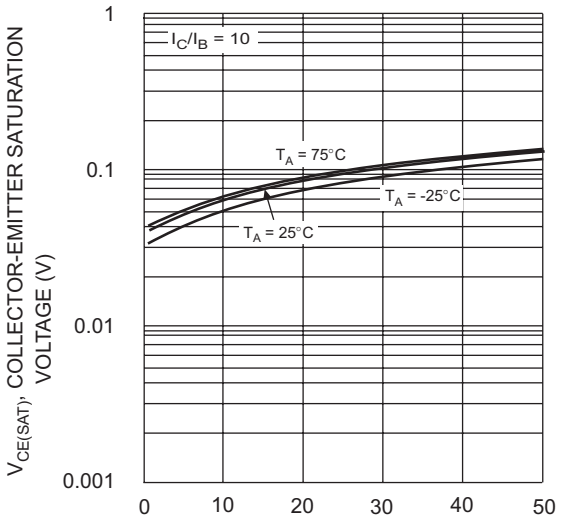


Fig. 2 $V_{CE(SAT)}$ vs. I_C

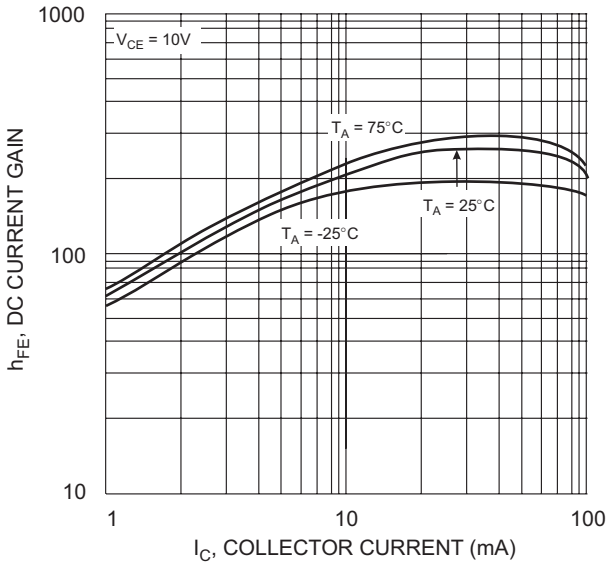


Fig. 3 DC Current Gain

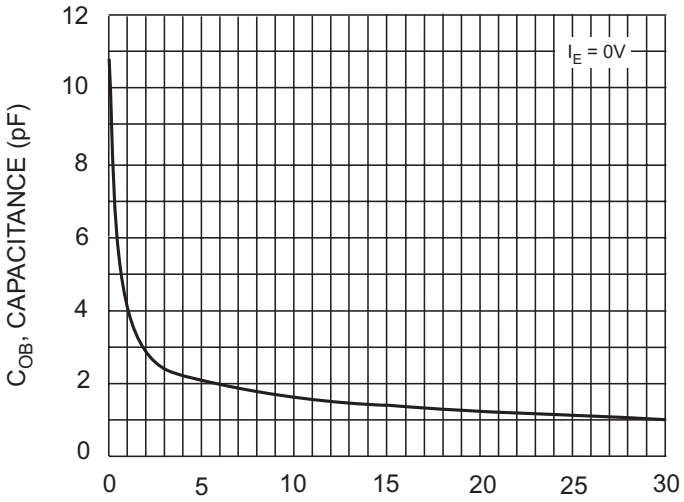


Fig. 4 Output Capacitance

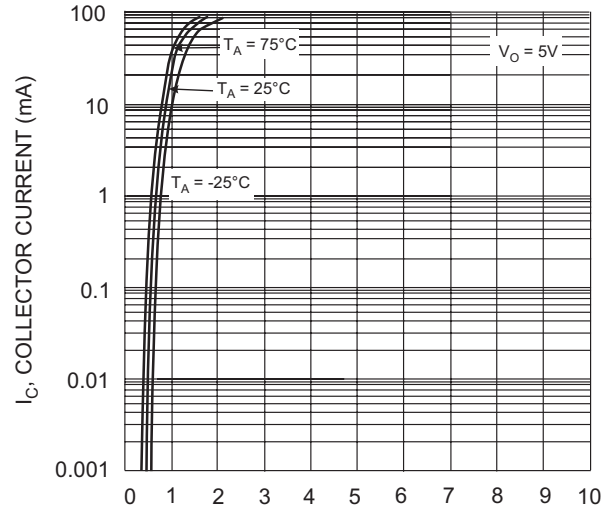


Fig. 5 Collector Current Vs. Input Voltage

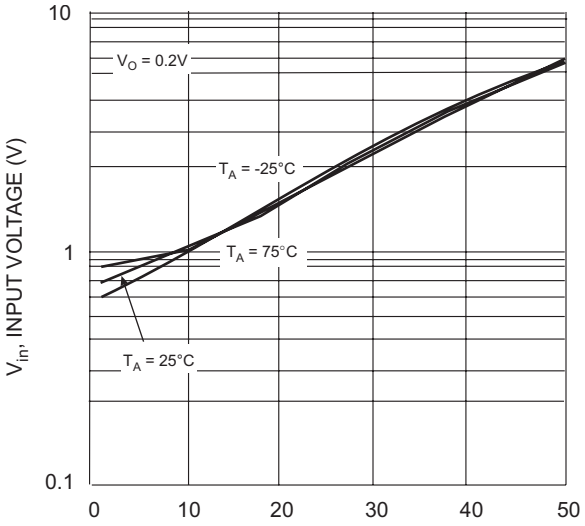


Fig. 6 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX123JU
NPN SECTION

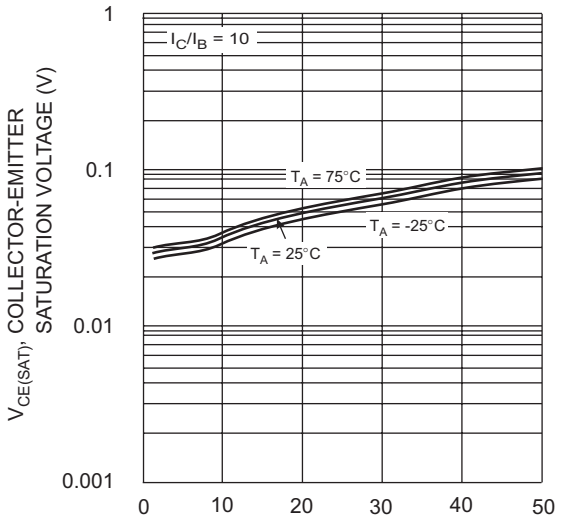


Fig. 7 $V_{CE(SAT)}$ vs. I_C

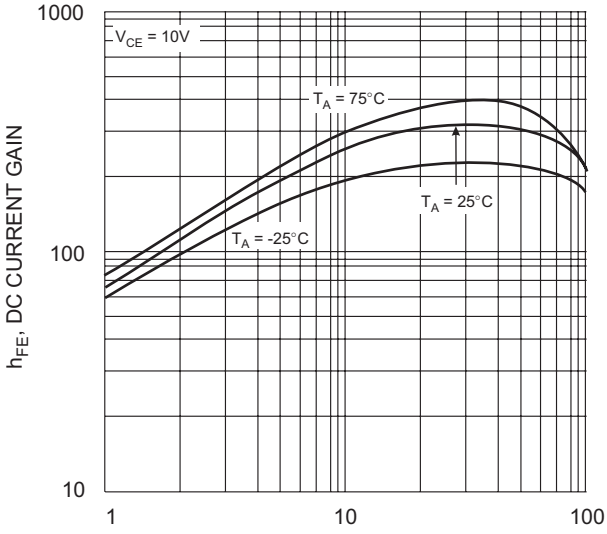


Fig. 8 DC Current Gain

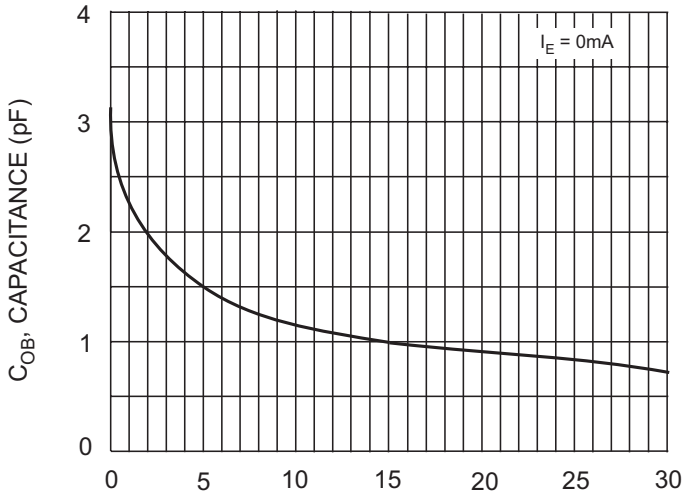


Fig. 9 Output Capacitance

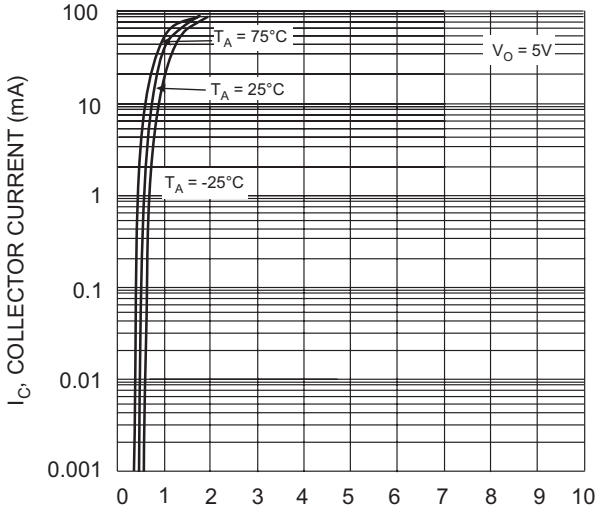


Fig. 10 Collector Current Vs. Input Voltage

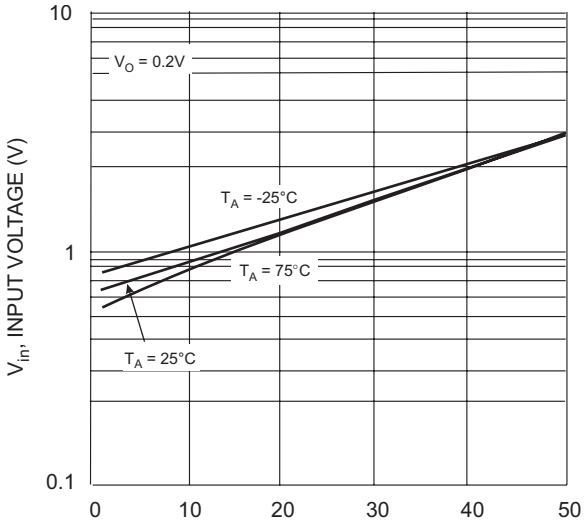


Fig. 11 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX143EU
PNP SECTION

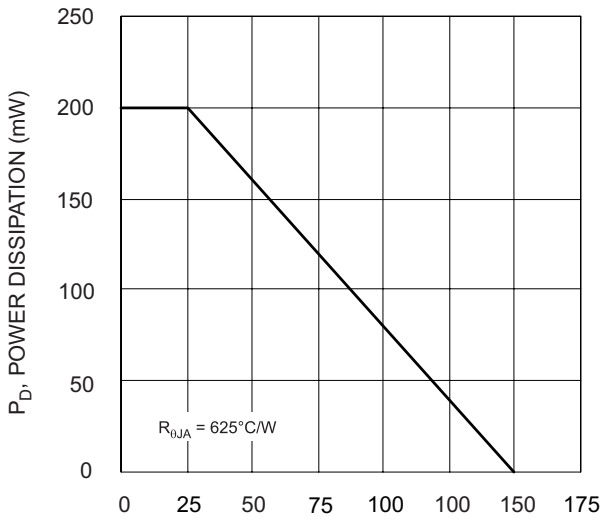


Fig. 12 Power Derating Curve

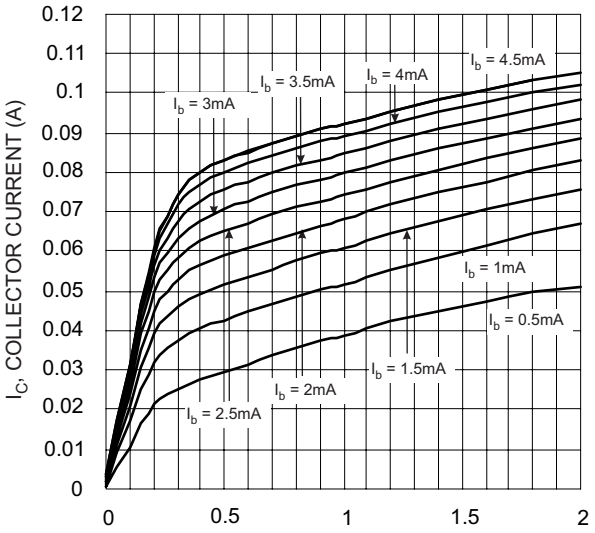


Fig. 13 V_{CE} vs I_C

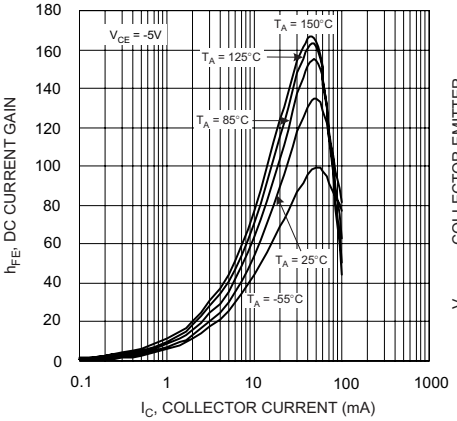


Fig. 14 DC Current Gain

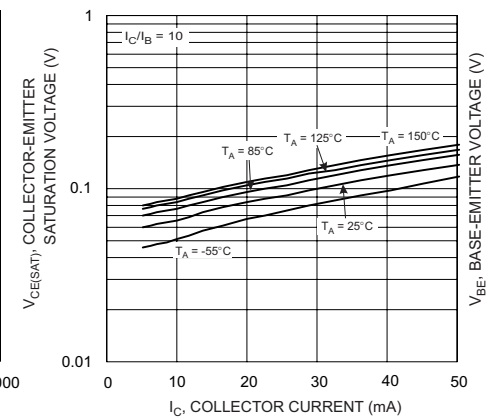


Fig. 15 $V_{CE(SAT)}$ vs I_C

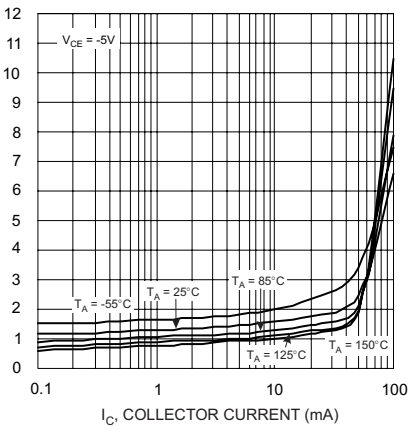


Fig. 16 V_{BE} vs I_C

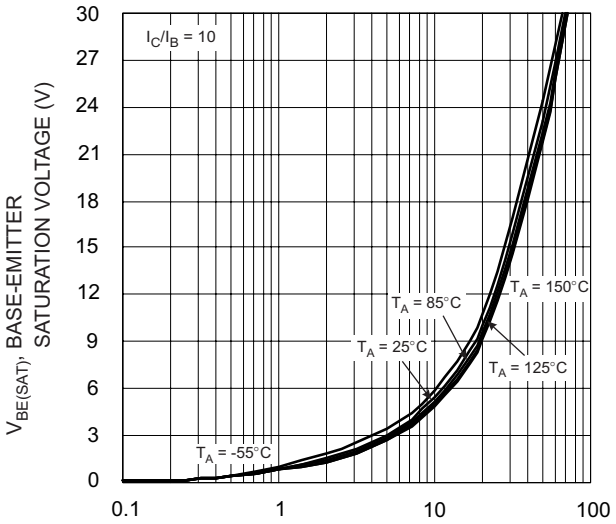


Fig. 17 $V_{BE(SAT)}$ vs I_C

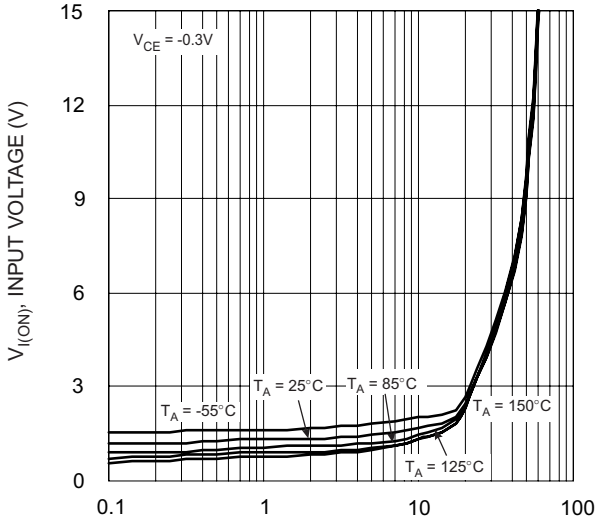


Fig. 18 $V_{I(ON)}$ vs I_C

TYPICAL CURVES - DCX143EU
NPN SECTION

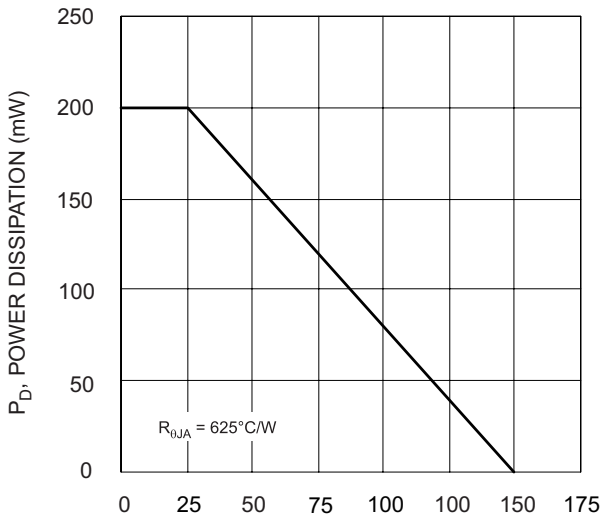


Fig. 19 Power Derating Curve

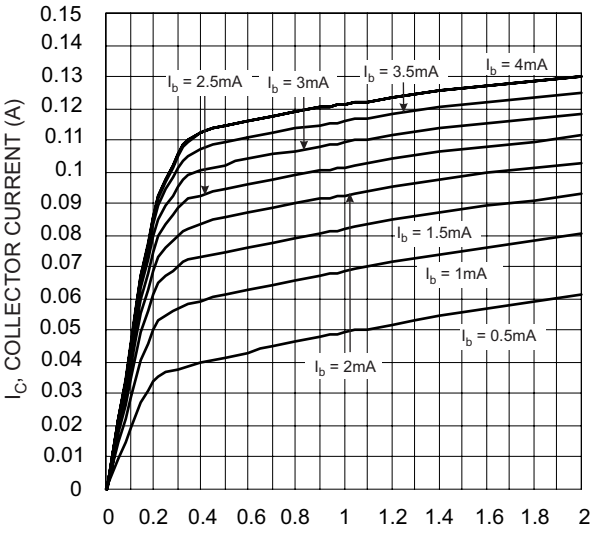


Fig. 20 V_{CE} vs I_C

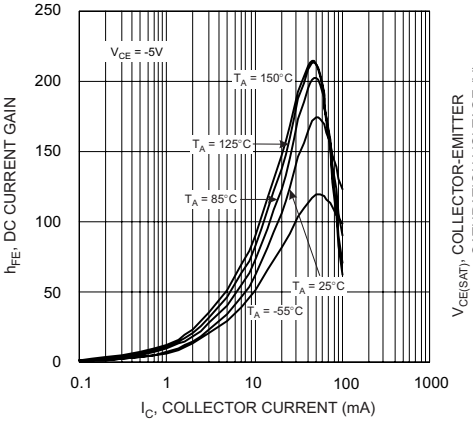


Fig. 21 DC Current Gain

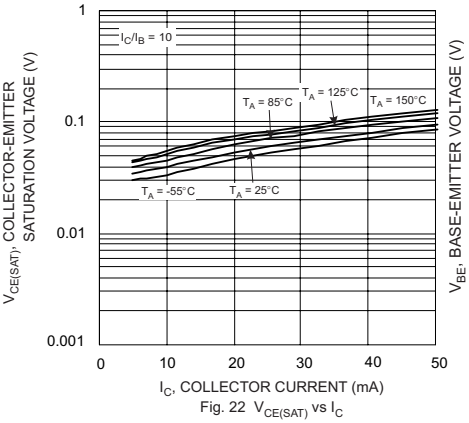


Fig. 22 $V_{CE(SAT)}$ vs I_C

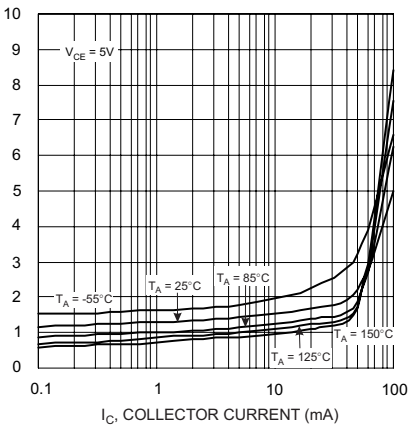


Fig. 23 V_{BE} vs I_C

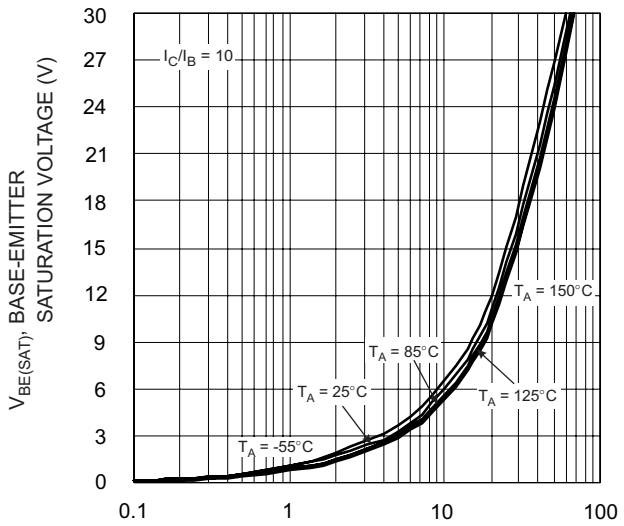


Fig. 24 $V_{BE(SAT)}$ vs I_C

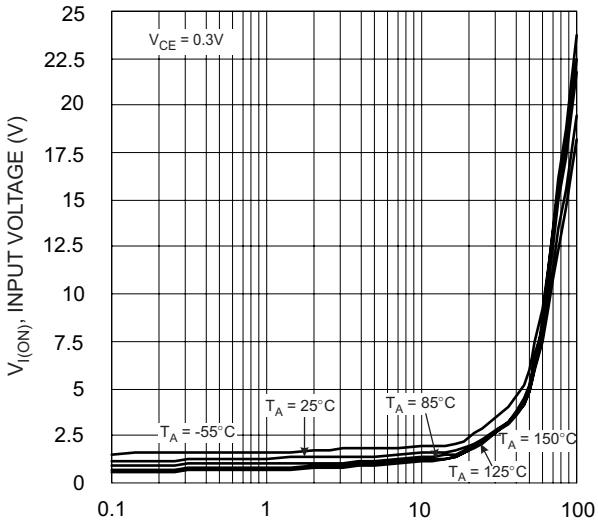


Fig. 25 $V_{I(ON)}$ vs I_C

TYPICAL CURVES - DCX114TU

PNP SECTION

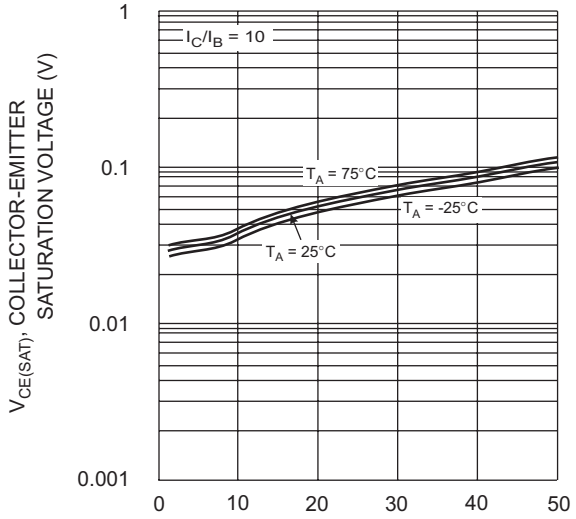


Fig. 26 $V_{CE(SAT)}$ vs. I_C

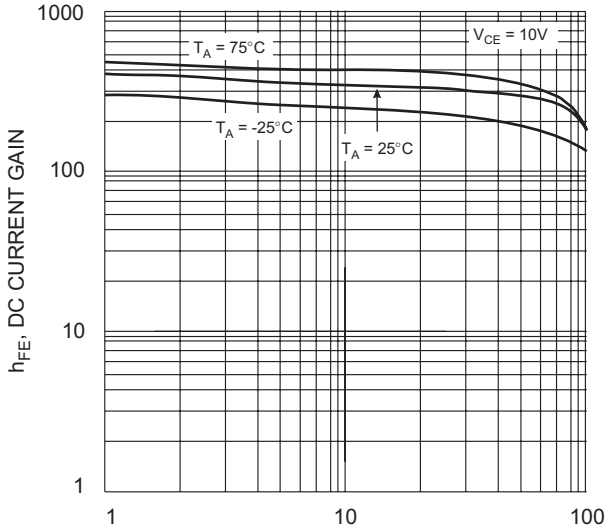


Fig. 27 DC Current Gain

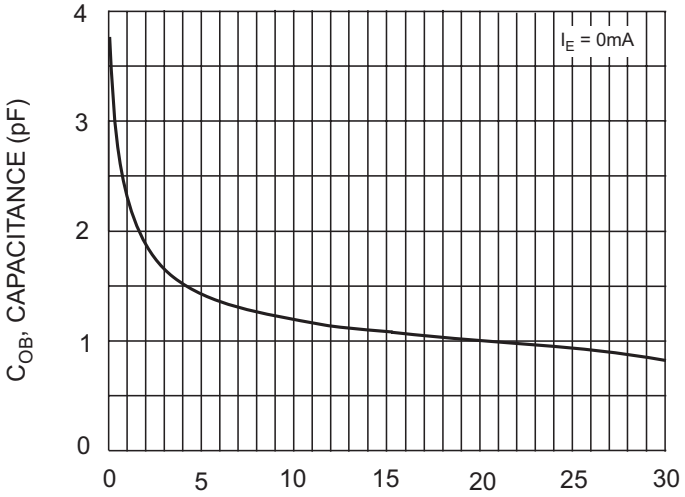


Fig. 28 Output Capacitance

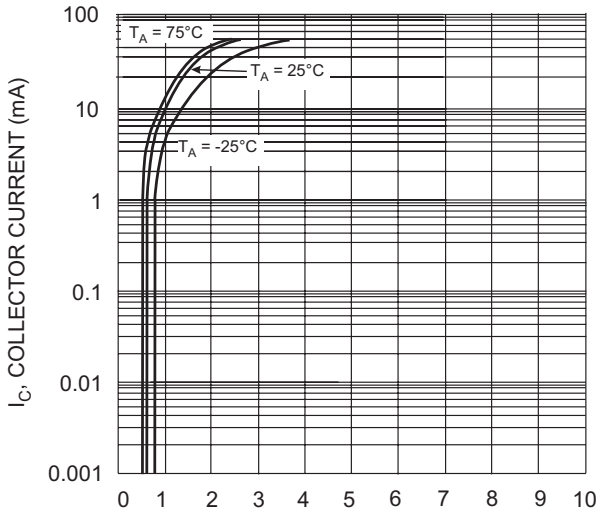


Fig. 29 Collector Current Vs. Input Voltage

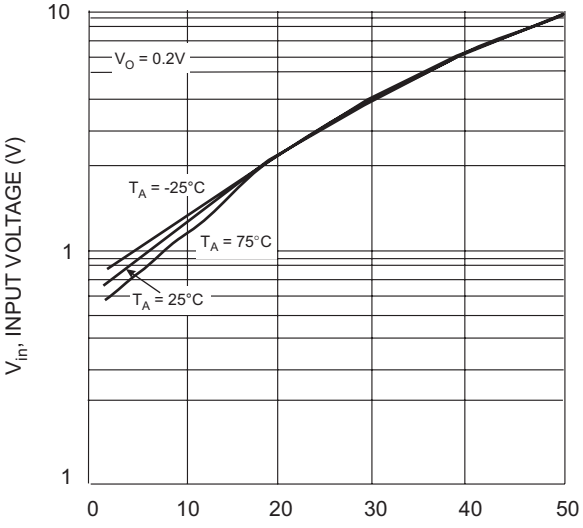


Fig. 30 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX114TU

NPN SECTION

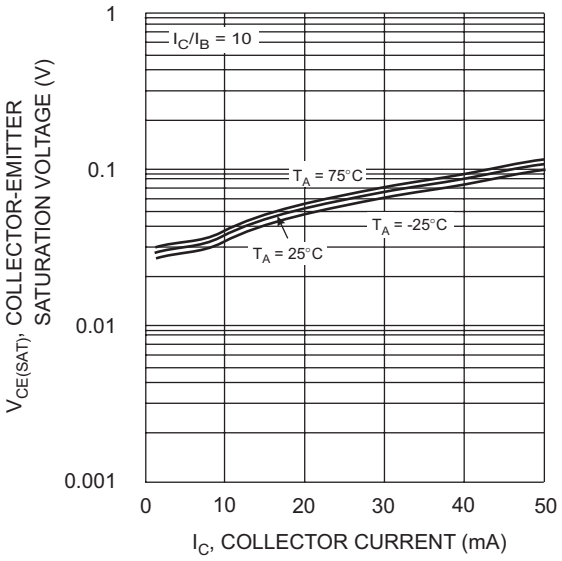


Fig. 31 $V_{CE(SAT)}$ vs. I_C

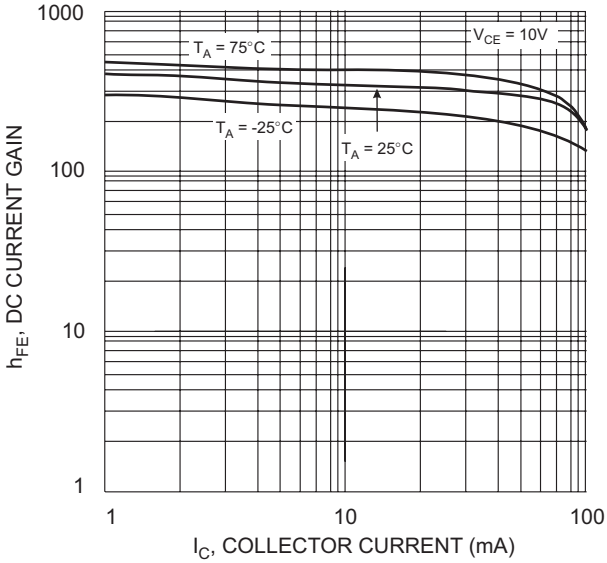


Fig. 32 DC Current Gain

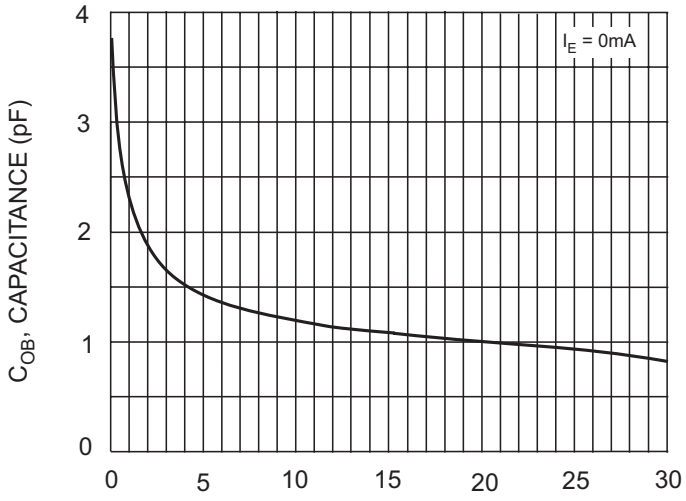


Fig. 33 Output Capacitance

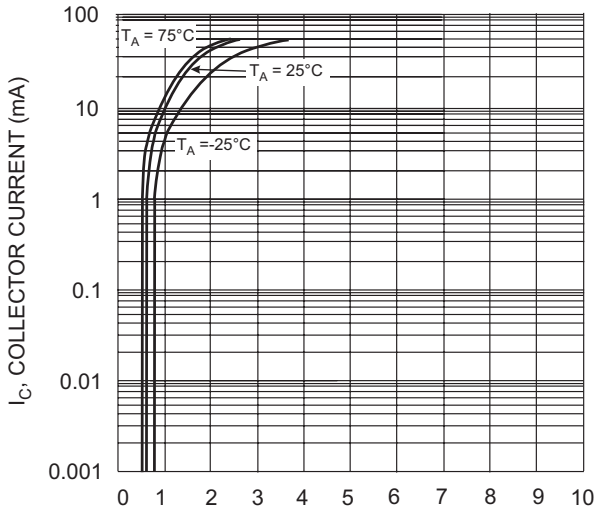


Fig. 34 Collector Current Vs. Input Voltage

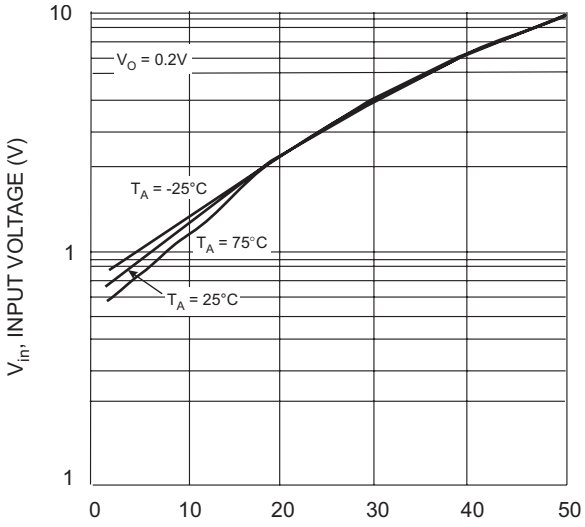


Fig. 35 Input Voltage vs. Collector Current

NEW PRODUCT

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