DCX (xxxx) U

SMALL SIGNAL COMPLEMENTARY PRE-BIASED DUAL TRANSISTOR

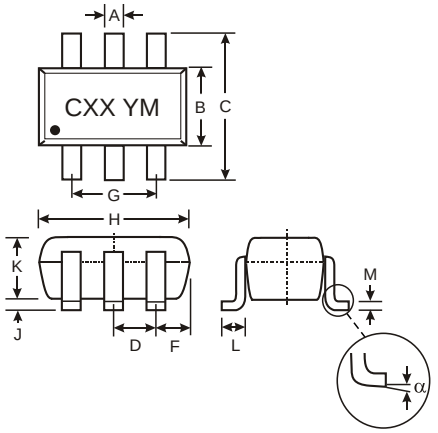
NEW PRODUCT

Features

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

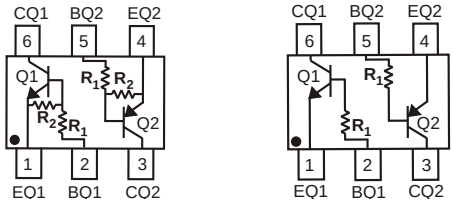
Mechanical Data

- 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 (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	¾	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



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) and (4) to (3)		V_{CC}	50	V
Input Voltage, (2) to (1) and (4) to (5)	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)	(Page 1: Note 2)	P_d	200	mW
Thermal Resistance, Junction to Ambient Air (Page 1: Note 1)		$R_{\theta JA}$	625	°C/W
Operating and Storage and Temperature Range		T_j, T_{STG}	-55 to +150	°C

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	¾	¾	V	I_C = 50µA
Collector-Emitter Breakdown Voltage	BV_{CEO}	50	¾	¾	V	I_C = 1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	5	¾	––	V	I_E = 50µA
Collector Cutoff Current	I_{CBO}	¾	¾	0.5	µA	V_{CB} = 50V
Emitter Cutoff Current	I_{EBO}	¾	¾	0.5	µA	V_{EB} = 4V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	¾	¾	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	¾	I_C = 1mA, V_{CE} = 5V
Input Resistor (R_1) Tolerance	ΔR_1	-30	¾	+30	%	¾
Gain-Bandwidth Product	f_T	¾	250	¾	MHz	V_{CE} = 10V, I_E = -5mA, f = 100MHz

NEW PRODUCT

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 ¾ ¾ 1.1 1.16	¾	V	V_{CC} = 5V, I_O = 100µA
	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{I(on)}$	¾	1.9 1.9 ¾ ¾ 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	$V_{O(on)}$	¾	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	¾	¾	0.36 0.18 0.88 3.6 0.88 0.88	mA	V_I = 5V
Output Current		$I_{O(off)}$	¾	¾	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	¾	¾	¾	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	¾	+30	%	¾
Resistance Ratio Tolerance		R_2/R_1	-20	¾	+20	%	¾
Gain-Bandwidth Product		f_T	¾	250	¾	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	¾	¾	V	I_C = -50µA
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	¾	¾	V	I_C = -1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	¾	¾	V	I_E = -50µA
Collector Cutoff Current	I_{CBO}	¾	¾	-0.5	µA	V_{CB} = -50V
Emitter Cutoff Current	I_{EBO}	¾	¾	-0.5	µA	V_{EB} = -4V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	¾	¾	-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	¾	I_C = -1mA, V_{CE} = -5V
Input Resistor (R_1) Tolerance	ΔR_1	-30	¾	+30	%	¾
Gain-Bandwidth Product	f_T	¾	250	¾	MHz	V_{CE} = -10V, I_E = 5mA, f = 100MHz

NEW PRODUCT

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

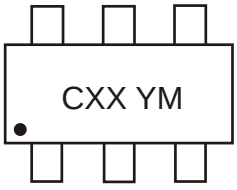
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{I(off)}$	-0.5 -0.5 -0.3 -0.5 -0.5 -0.5	-1.1 -1.1 ¾ ¾ -1.1 -1.16	¾	V	V_{CC} = -5V, I_O = -100µA
	DCX124EU DCX144EU DCX114YU DCX123JU DCX114EU DCX143EU	$V_{I(on)}$	¾	-1.9 -1.9 ¾ ¾ -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	$V_{O(on)}$	¾	-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	¾	¾	-0.36 -0.18 -0.88 -3.6 -0.88 -0.88	mA	V_I = -5V
Output Current		$I_{O(off)}$	¾	¾	-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	¾	¾	¾	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	¾	+30	%	¾
Resistance Ratio Tolerance		R_2/R_1	-20	¾	+20	%	¾
Gain-Bandwidth Product		f_T	¾	250	¾	MHz	V_{CE} = -10V, I_E = -5mA, f = 100MHz

Ordering Information (Note 4)

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: 4. 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
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

NEW PRODUCT

TYPICAL CURVES - DCX123JU

PNP SECTION

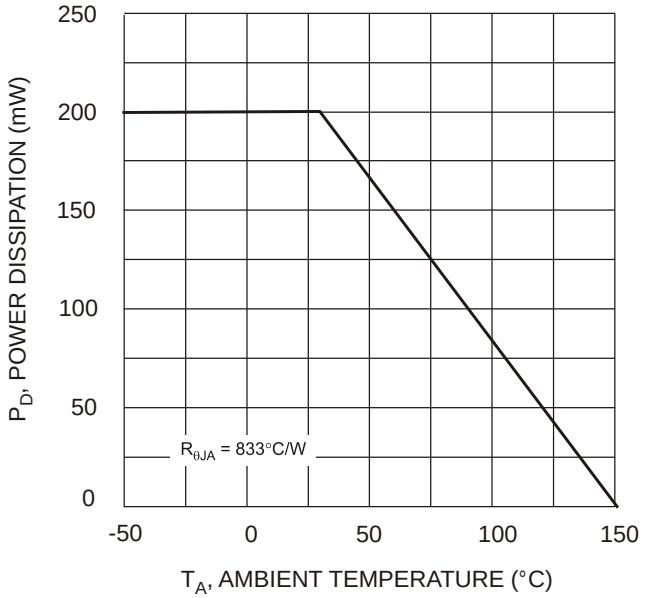


Fig. 1 Derating Curve

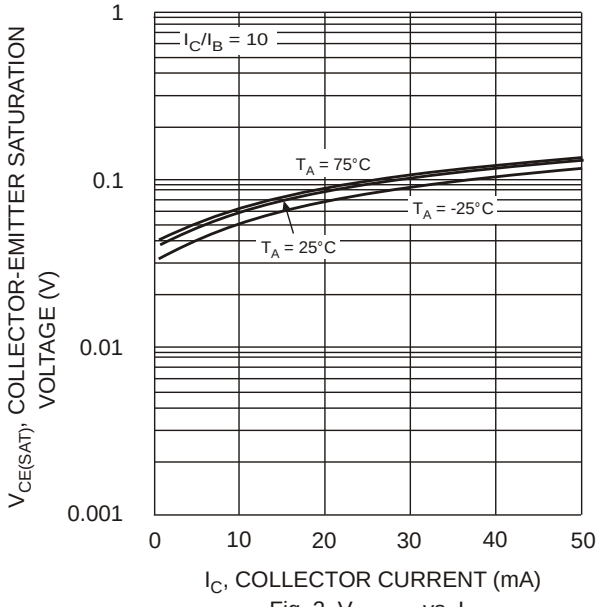


Fig. 2 $V_{CE(SAT)}$ vs. I_C

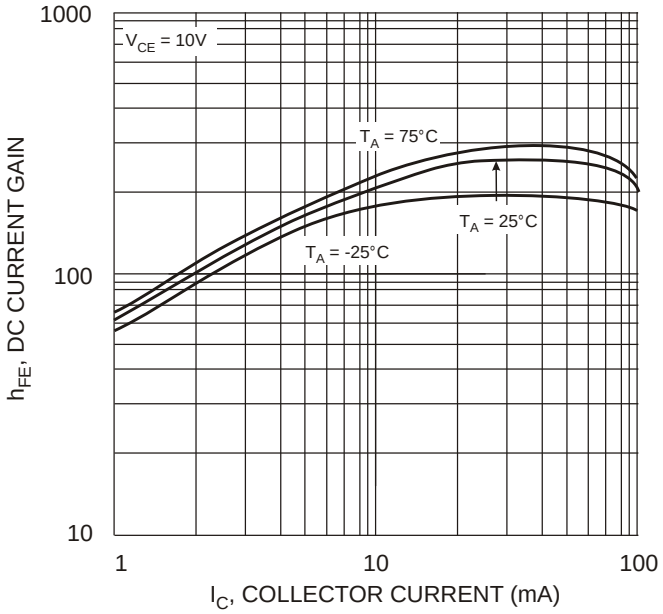


Fig. 3 DC Current Gain

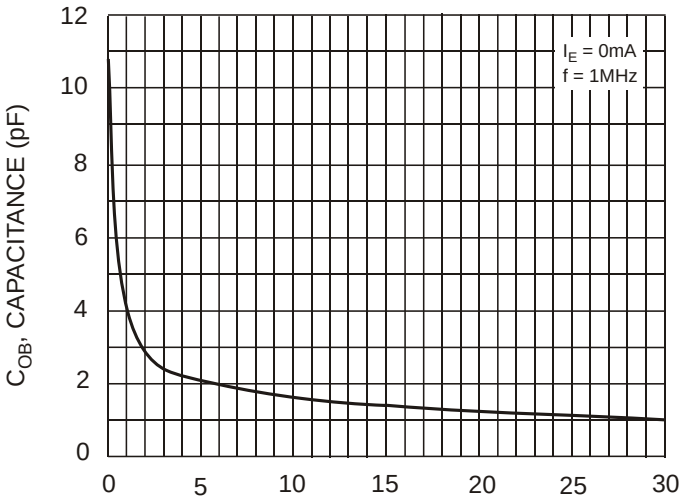


Fig. 4 Output Capacitance

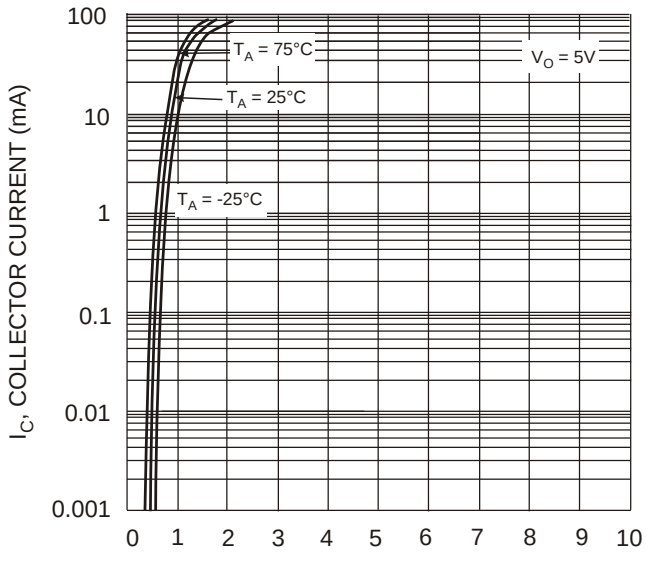


Fig. 5 Collector Current Vs. Input Voltage

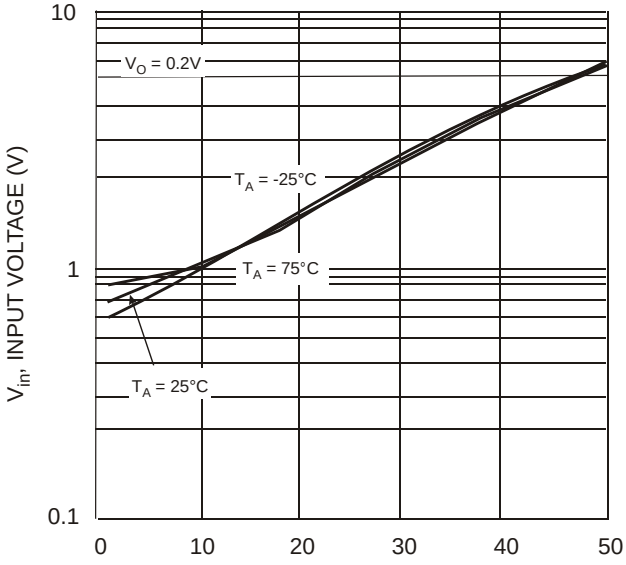


Fig. 6 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX123JU

NPN SECTION

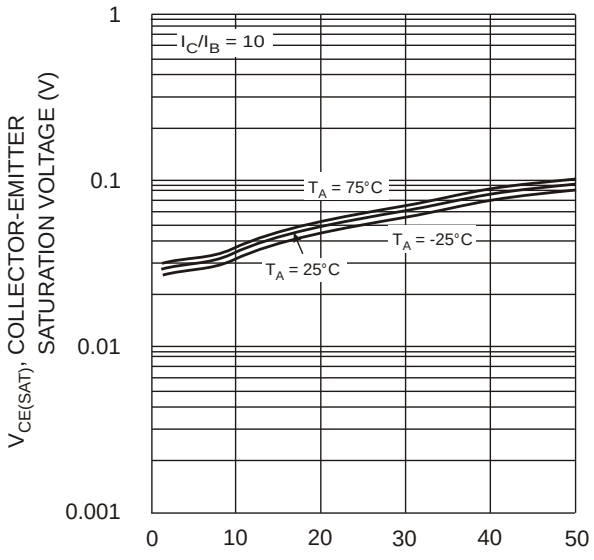


Fig. 7 $V_{CE(SAT)}$ vs. I_C

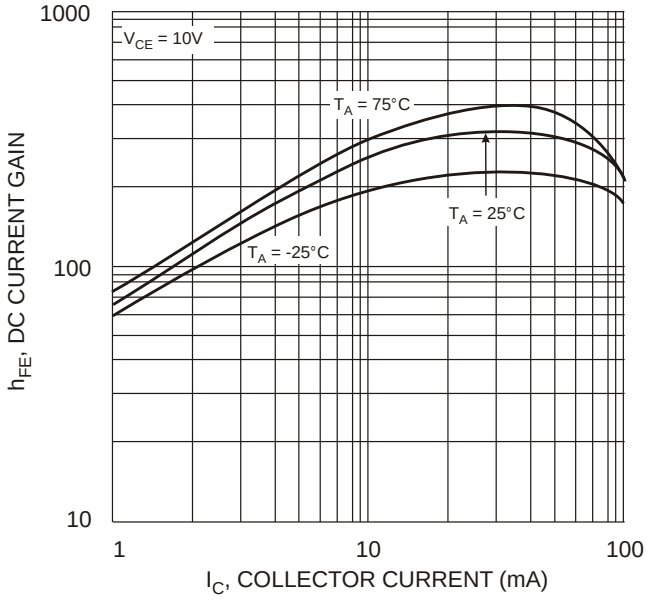


Fig. 8 DC Current Gain

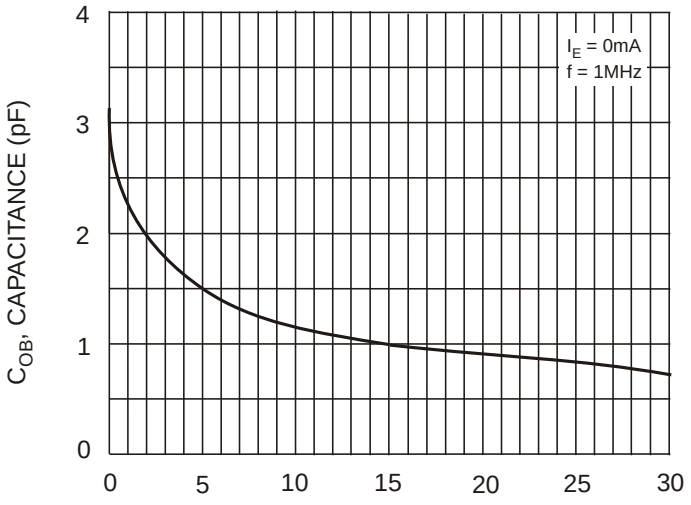


Fig. 9 Output Capacitance

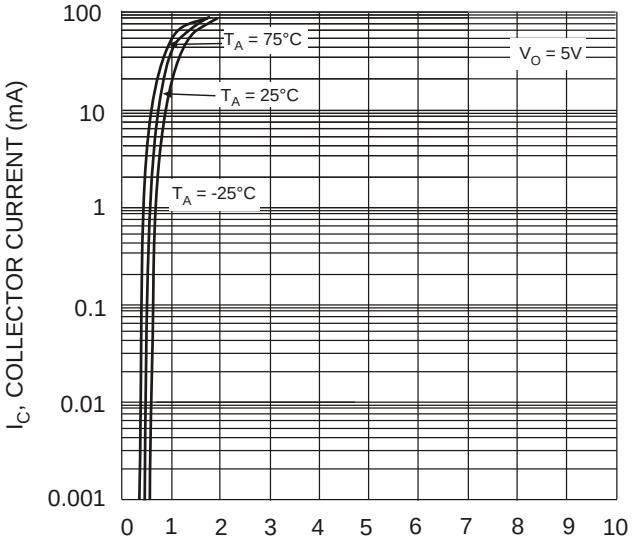


Fig. 10 Collector Current Vs. Input Voltage

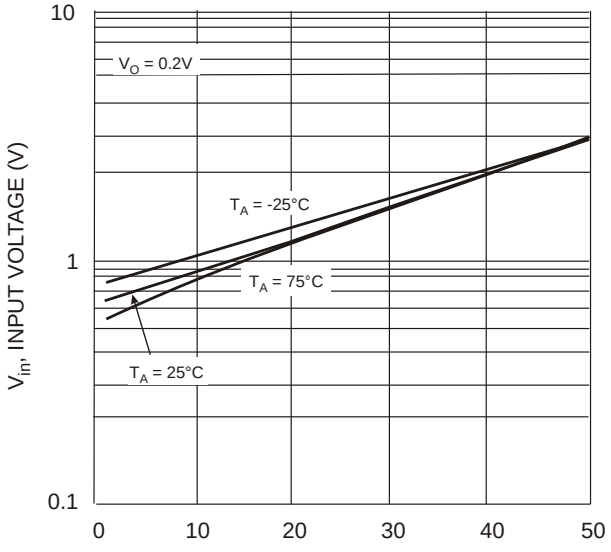


Fig. 11 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX143EU
PNP SECTION

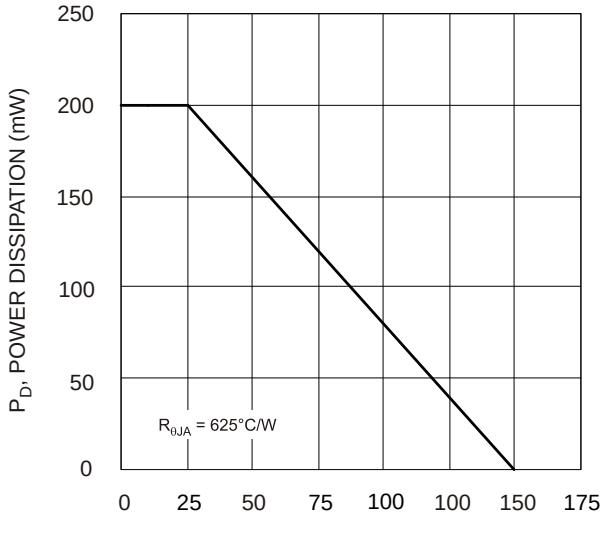


Fig. 12 Power Derating Curve

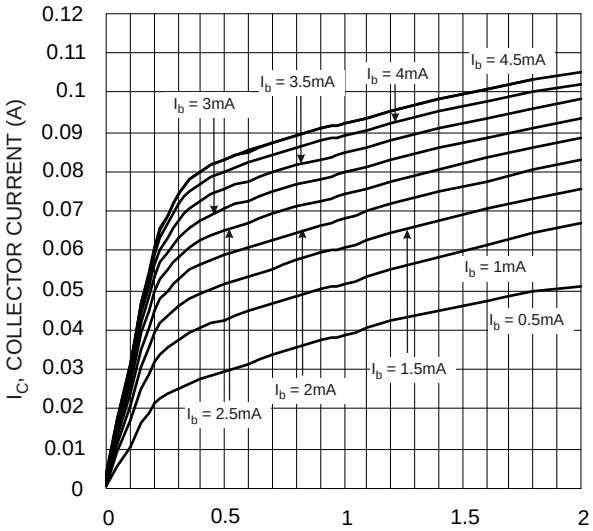


Fig. 13 V_{CE} vs I_C

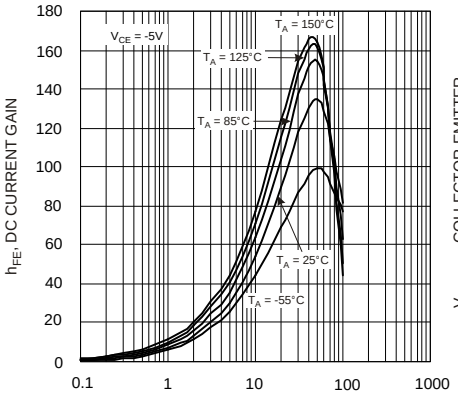


Fig. 14 DC Current Gain

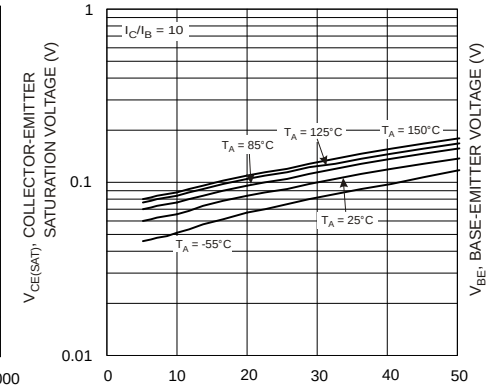


Fig. 15 $V_{CE(SAT)}$ vs I_C

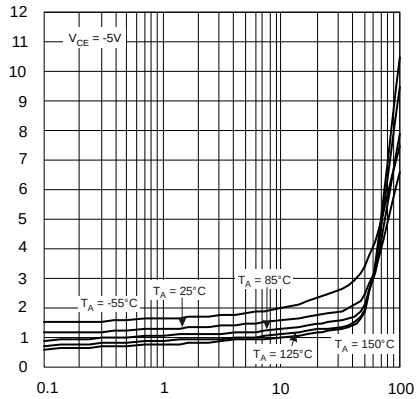


Fig. 16 V_{BE} vs I_C

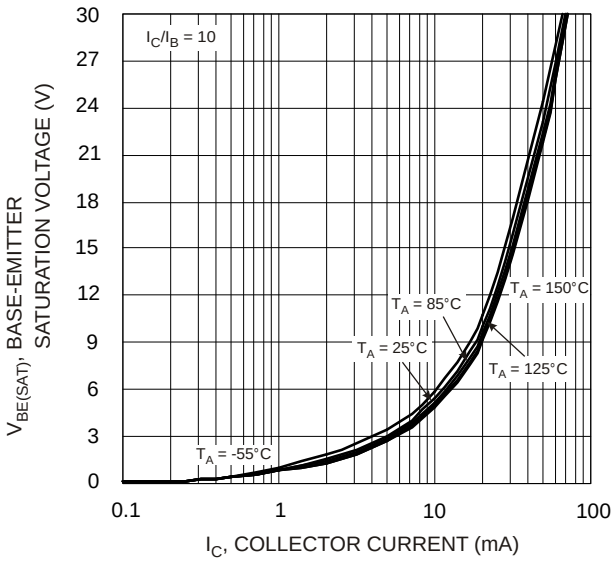


Fig. 17 $V_{BE(SAT)}$ vs I_C

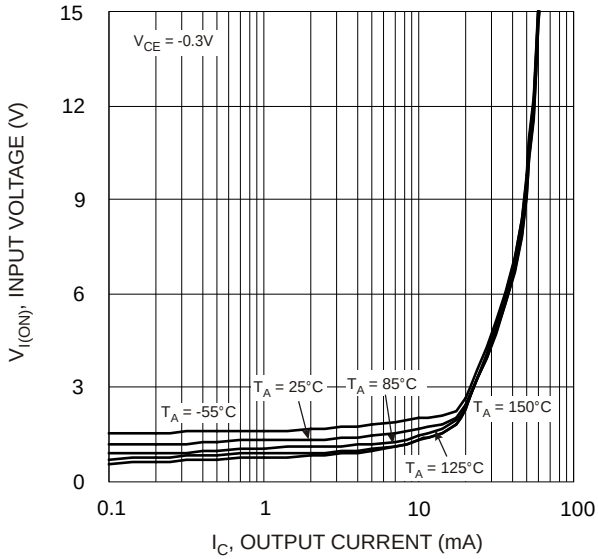


Fig. 18 $V_{I(ON)}$ vs I_C

TYPICAL CURVES - DCX143EU

NPN SECTION

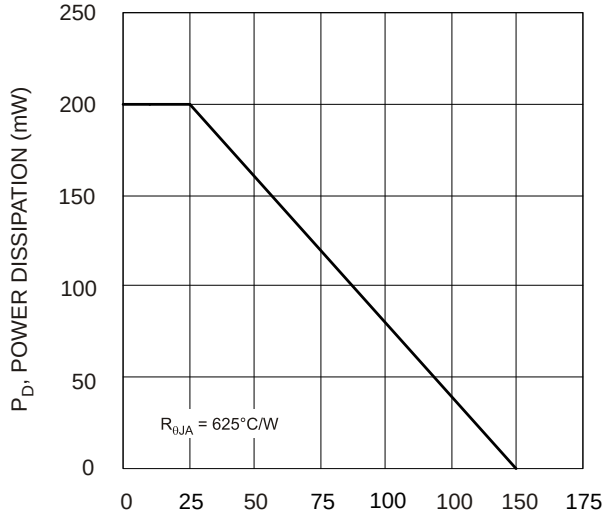


Fig. 19 Power Derating Curve

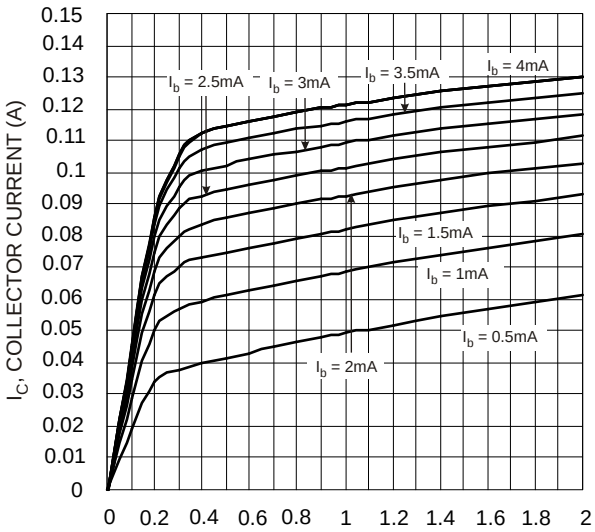


Fig. 20 V_{CE} vs I_C

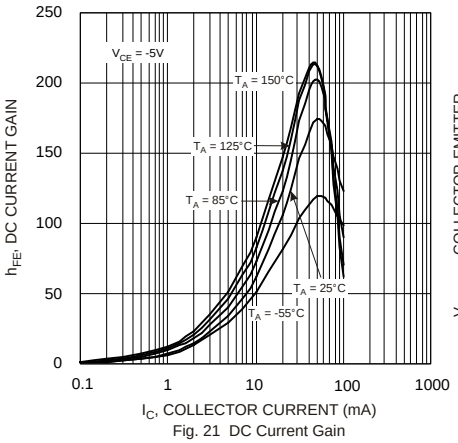


Fig. 21 DC Current Gain

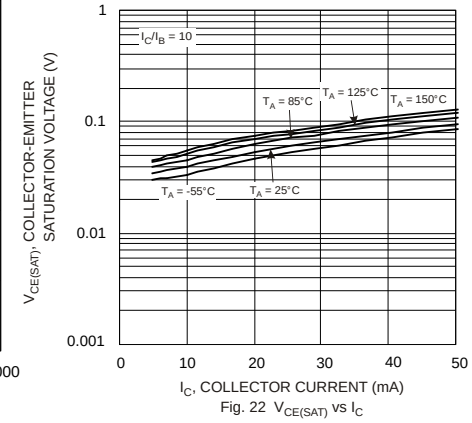


Fig. 22 $V_{CE(SAT)}$ vs I_C

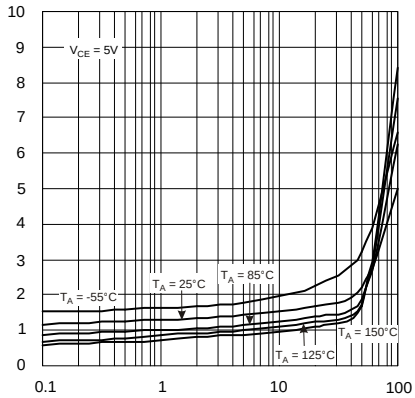


Fig. 23 V_{BE} vs I_C

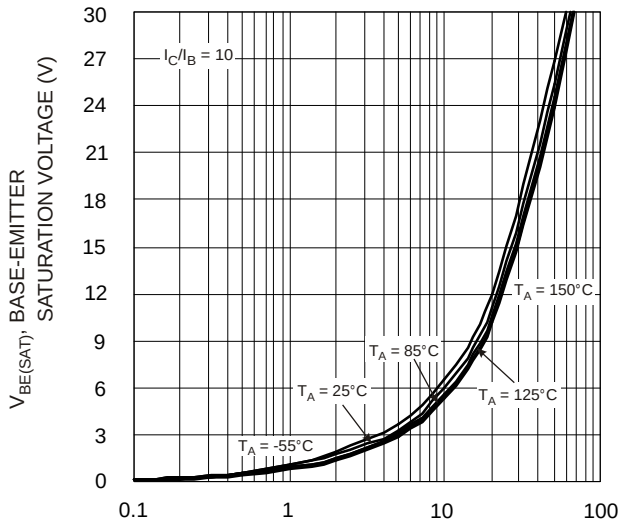


Fig. 24 $V_{BE(SAT)}$ vs I_C

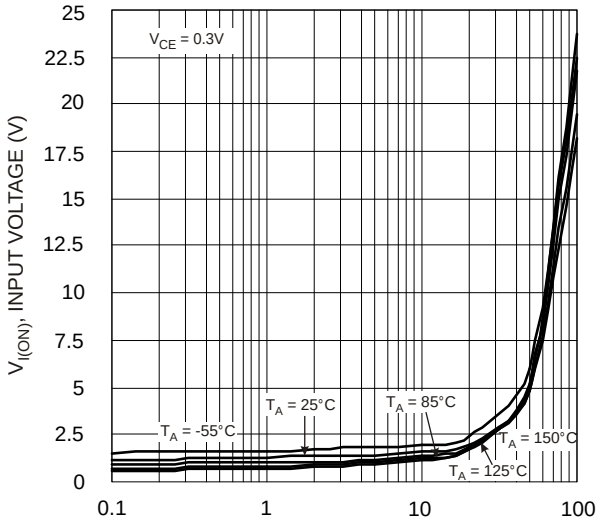


Fig. 25 $V_{I(ON)}$ vs I_C

TYPICAL CURVES - DCX114TU
PNP SECTION

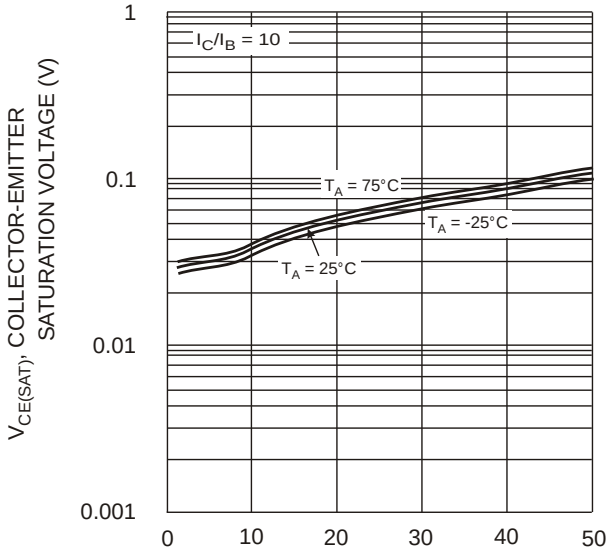


Fig. 26 $V_{CE(SAT)}$ vs. I_C

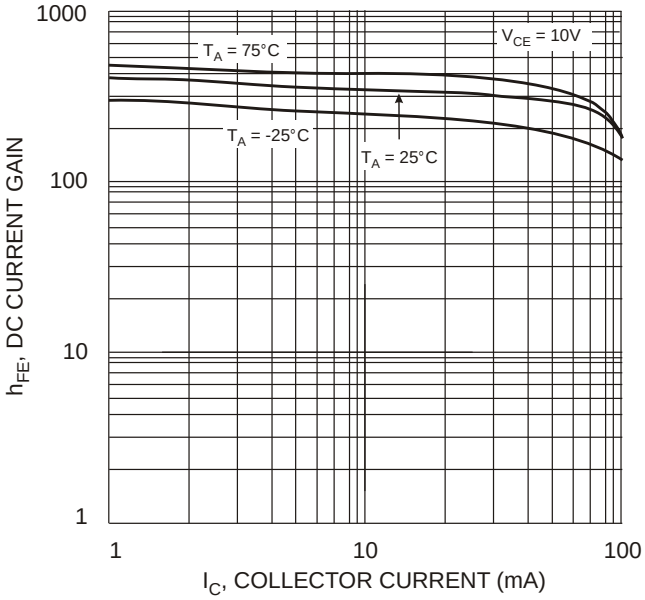


Fig. 27 DC Current Gain

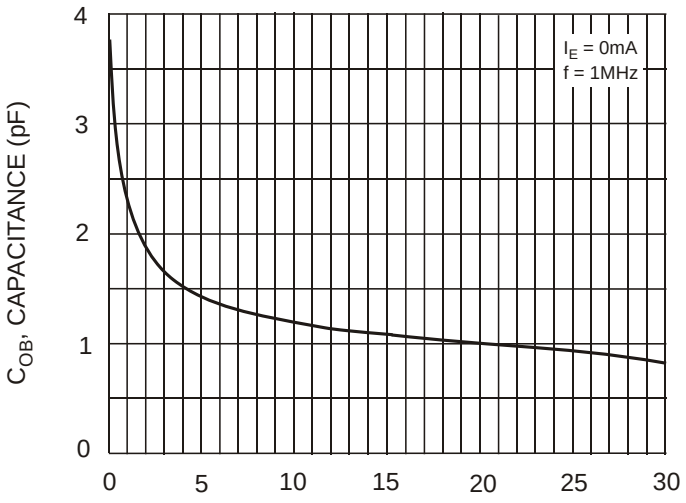


Fig. 28 Output Capacitance

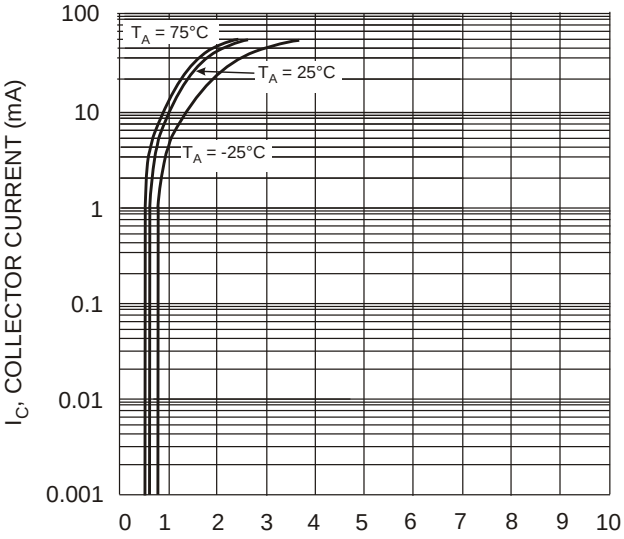


Fig. 29 Collector Current Vs. Input Voltage

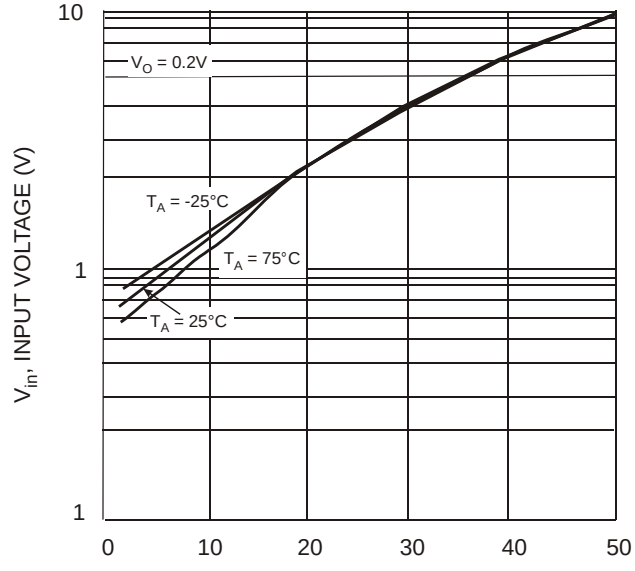


Fig. 30 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX114TU

NPN SECTION

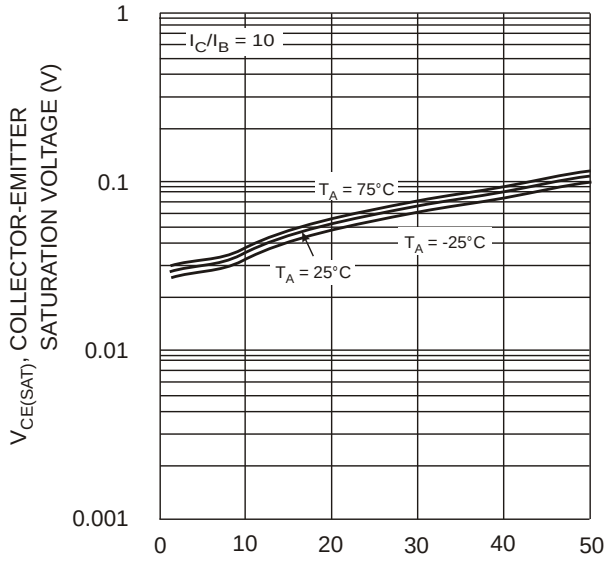


Fig. 31 $V_{CE(SAT)}$ vs. I_C

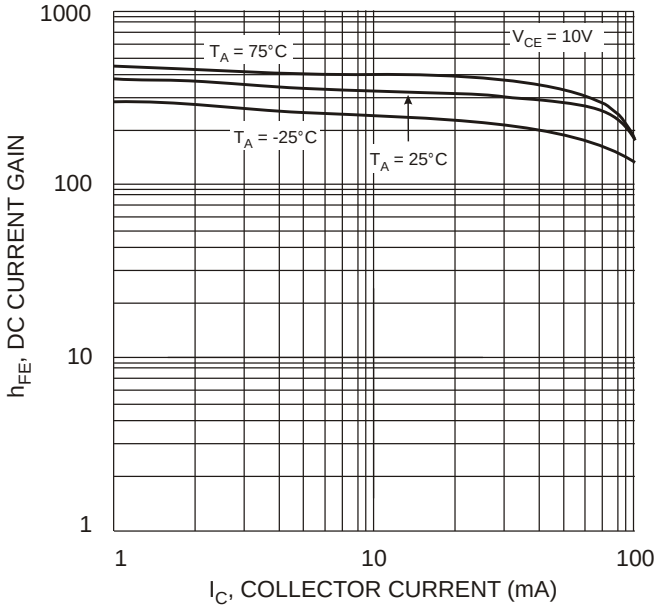


Fig. 32 DC Current Gain

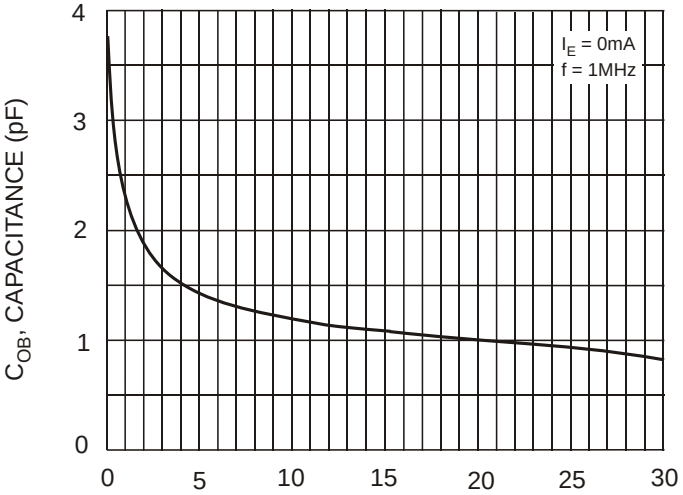


Fig. 33 Output Capacitance

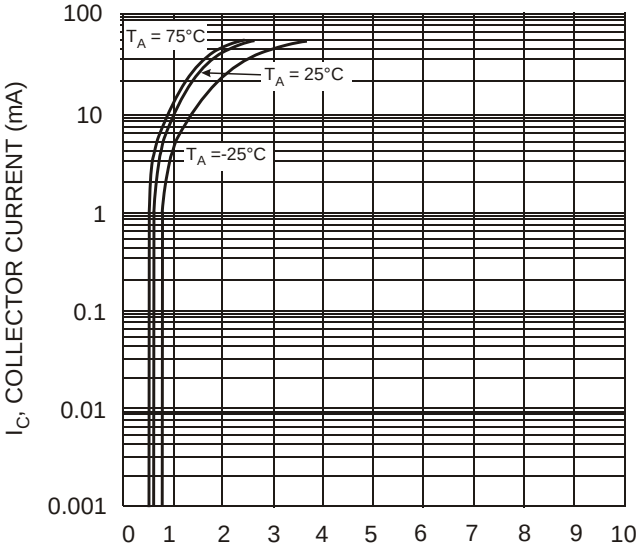


Fig. 34 Collector Current Vs. Input Voltage

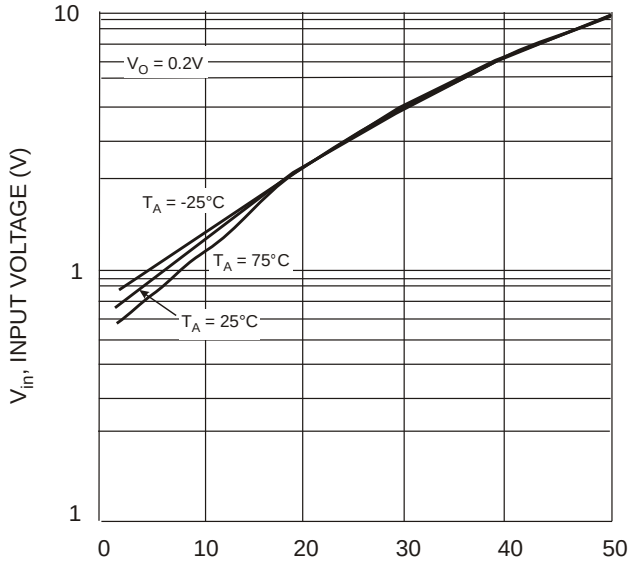


Fig. 35 Input Voltage vs. Collector Current

NEW PRODUCT

IMPORTANT NOTICE

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to any product herein. Diodes Incorporated does not assume any liability arising out of the application or use of any product described herein; neither does it convey any license under its patent rights, nor the rights of others. The user of products in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on our website, harmless against all damages.

LIFE SUPPORT

Diodes Incorporated products are not authorized for use as critical components in life support devices or systems without the expressed written approval of the President of Diodes Incorporated.