NEW PRODUCT

DCX (xxxx) K

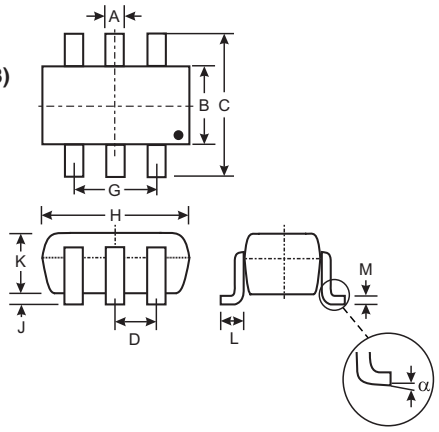
COMPLEMENTARY NPN/PNP PRE-BIASED SMALL SIGNAL SC-74R DUAL SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Available in Lead Free/RoHS Compliant Version (Note 3)**

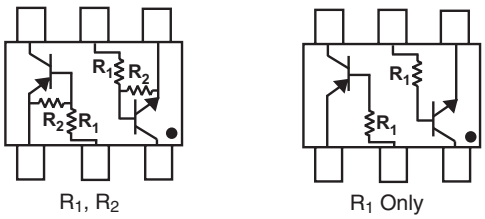
Mechanical Data

- Case: SC-74R (Note 4)
- 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
- Also Available in Lead Free Plating (Matte Tin Finish annealed over Copper leadframe). Please see Ordering Information, Note 5, on Page 3
- Terminal Connections: See Diagram
- Marking: Date Code and Marking Code (See Diagrams & Page 4)
- Ordering Information (See Page 3)
- Weight: 0.015 grams (approximate)



SC-74R (Note 4)			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D		0.95	
G		1.90	
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
α	0°	8°	—
All Dimensions in mm			

P/N	R1	R2	MARKING
DCX124EK	22KΩ	22KΩ	C17
DCX144EK	47KΩ	47KΩ	C20
DCX114YK	10KΩ	47KΩ	C14
DCX123JK	2.2KΩ	47KΩ	C06
DCX114EK	10KΩ	10KΩ	C13
DCX143TK	4.7KΩ	-	C07
DCX114TK	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)	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX143TK DCX114TK	V_{IN}	-10 to +40 -10 to +40 -6 to +40 -5 to +12 -10 to +40 -5 Vmax -5 Vmax	V
Output Current	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX143TK DCX114TK	I_O	30 30 70 100 50 100 100	mA
Output Current	All	I_C (Max)	100	mA
Power Dissipation (Total) (Note 2)		P_d	300	mW
Thermal Resistance, Junction to Ambient Air (Note 1)		$R_{\theta JA}$	417	°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. 200mW per element must not be exceeded.
3. No purposefully added lead.
4. SC-74R and SOT-26 have identical dimensions and the only difference is the location of the pin one indicator. Please see the individual device datasheets for exact details regarding the location of the pin one indicator.

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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)	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX143TK DCX114TK	V_{IN}	+10 to -40 +10 to -40 +6 to -40 +5 to -12 +10 to -40 +5 Vmax +5 Vmax	V
Output Current	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX143TK DCX114TK	I_O	-30 -30 -70 -100 -50 -100 -100	mA
Output Current	All	I_C (Max)	-100	mA
Power Dissipation (Total) (Note 2)		P_d	300	mW
Thermal Resistance, Junction to Ambient Air (Note 1)		$R_{\theta JA}$	833	°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. 200mW per element must not be exceeded.

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

Characteristic (DDC143TK & DDC114TK 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	$I_C/I_B = 2.5mA / 0.25mA$ DCX143TK $I_C/I_B = 1mA / 0.1mA$ DCX114TK
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	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	$V_{I(off)}$	0.5 0.5 0.3 0.5 0.5	1.16 1.1 — — 1.1	—	V	$V_{CC} = 5V$, $I_O = 100\mu A$
	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	$V_{I(on)}$	—	1.65 1.9 — — 1.9	3.0 3.0 1.4 1.1 3.0	V	$V_O = 0.3$, $I_O = 5mA$ $V_O = 0.3$, $I_O = 2mA$ $V_O = 0.3$, $I_O = 1mA$ $V_O = 0.3$, $I_O = 5mA$ $V_O = 0.3$, $I_O = 10mA$
Output Voltage	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	$V_{O(on)}$	—	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	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	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	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	G_I	80 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

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

Characteristic (DCX143TK & DCX114TK 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 DCX143TK I_C/I_B = 1mA / 0.1mA DCX114TK
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	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	$V_{I(off)}$	-0.5 -0.5 -0.3 -0.5 -0.5	-1.16 -1.1 — — –1.1	—	V	V_{CC} = -5V, I_O = -100μA
	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	$V_{I(on)}$	—	-1.9 -1.9 — — -1.9	-3.0 -3.0 -1.4 -1.1 -3.0	V	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
Output Voltage	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	$V_{O(on)}$	—	-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	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	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	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK	G_I	80 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

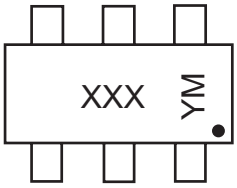
* Transistor - For Reference Only

Ordering Information (Note 5)

Device	Packaging	Shipping
DCX124EK-7	SC-74R	3000/Tape & Reel
DCX144EK-7	SC-74R	3000/Tape & Reel
DCX114YK-7	SC-74R	3000/Tape & Reel
DCX123JK-7	SC-74R	3000/Tape & Reel
DCX114EK-7	SC-74R	3000/Tape & Reel
DCX143TK-7	SC-74R	3000/Tape & Reel
DCX114TK-7	SC-74R	3000/Tape & Reel

Notes: 5. For Packaging Details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf.
6. For Lead Free/RoHS Compliant version part numbers, please add "-F" suffix to the part numbers above. Example: DCX114TK-7-F.

Marking Information



XXX = Product Type Marking Code
See Sheet 1 Diagrams
YM = Date Code Marking
Y = Year ex: T = 2006
M = Month ex: 9 = September

Date Code Key

Year	2006	2007	2008	2009
Code	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 - DCX124EK
PNP SECTION

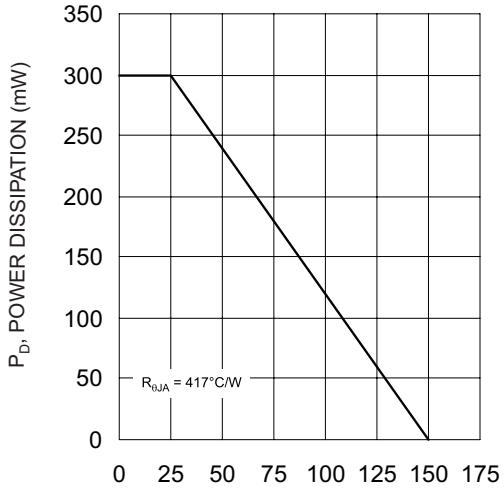


Fig. 1 Power Derating Curve

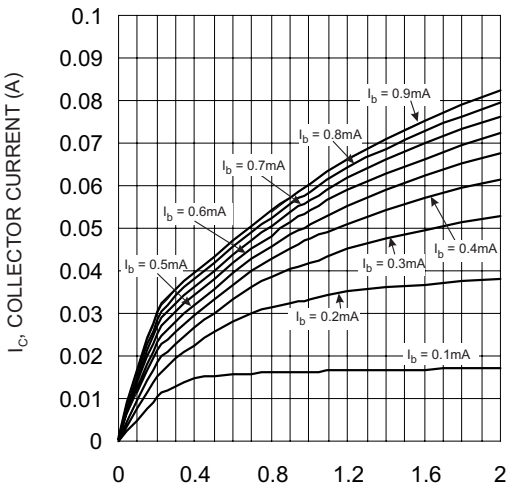


Fig. 2 V_{CE} vs. I_C

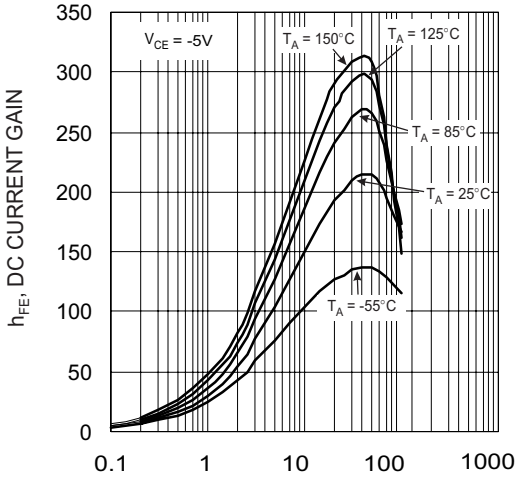


Fig. 3 DC Current Gain

TYPICAL CURVES - DCX124EK
PNP SECTION

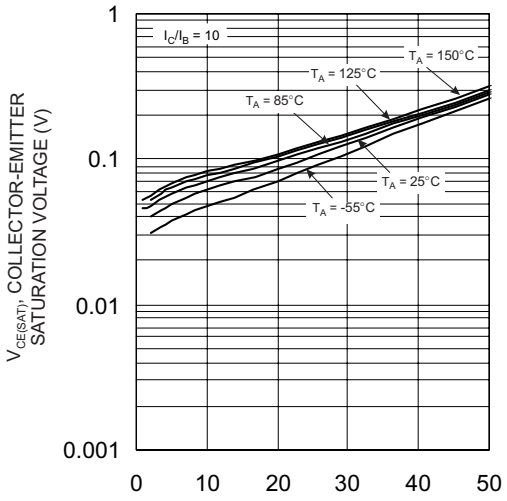


Fig. 4 $V_{CE(SAT)}$ vs I_C

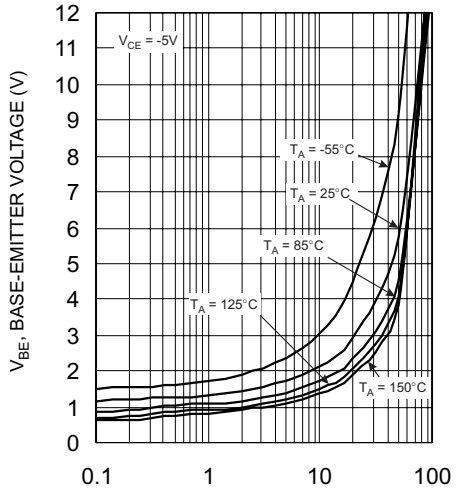


Fig. 5 V_{BE} vs. I_C

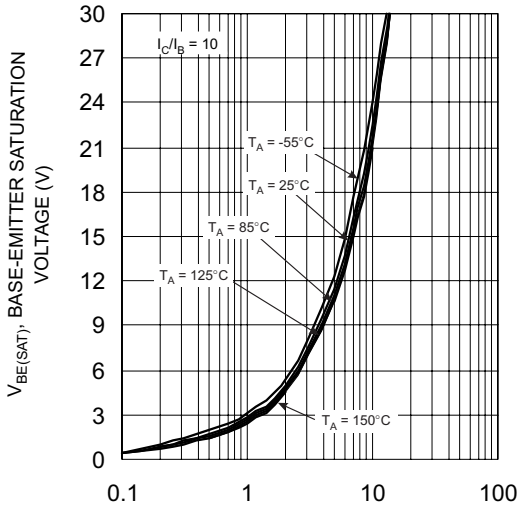


Fig. 6 $V_{BE(SAT)}$ vs. I_C

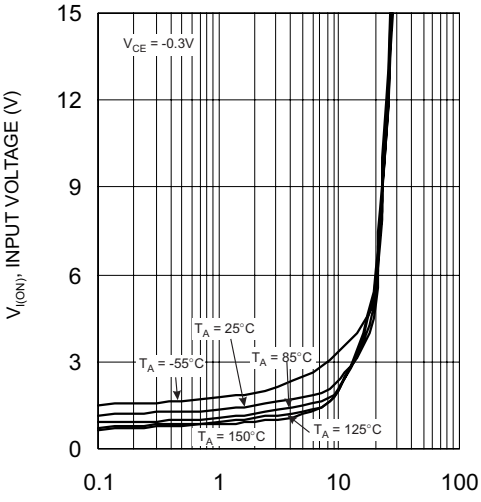


Fig. 7 $V_{I(ON)}$ vs. I_C

TYPICAL CURVES - DCX124EK
NPN SECTION

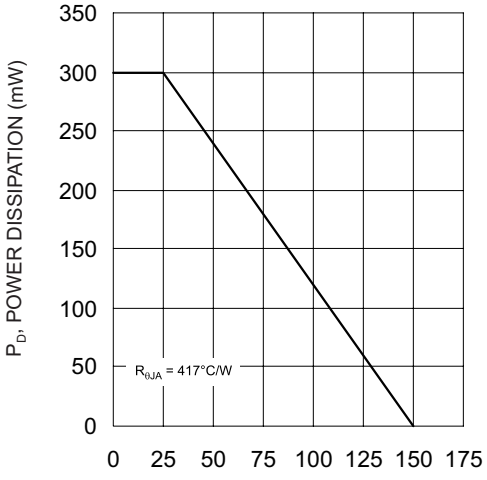


Fig. 8 Power Derating Curve

TYPICAL CURVES - DCX124EK
NPN SECTION

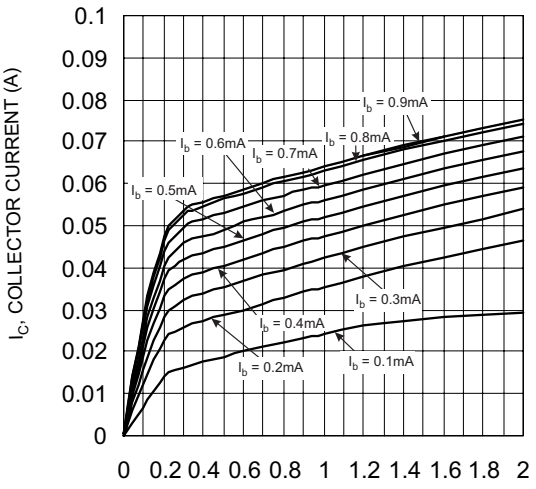


Fig. 9 V_{CE} vs. I_C

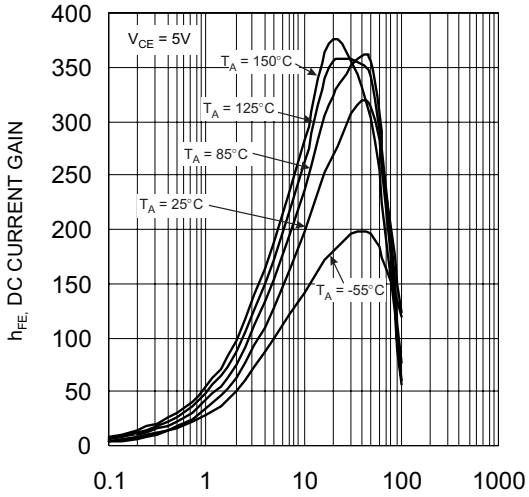


Fig. 10 DC Current Gain

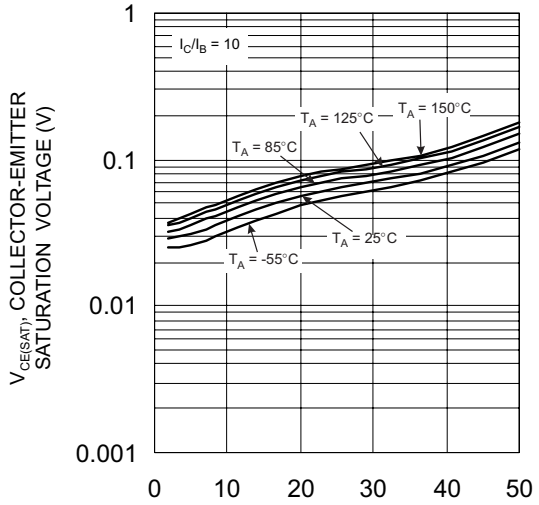


Fig. 11 $V_{CE(SAT)}$ vs. I_C

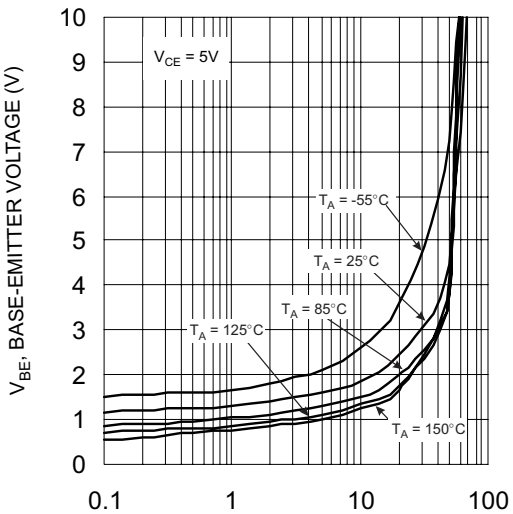


Fig. 12 V_{BE} vs. I_C

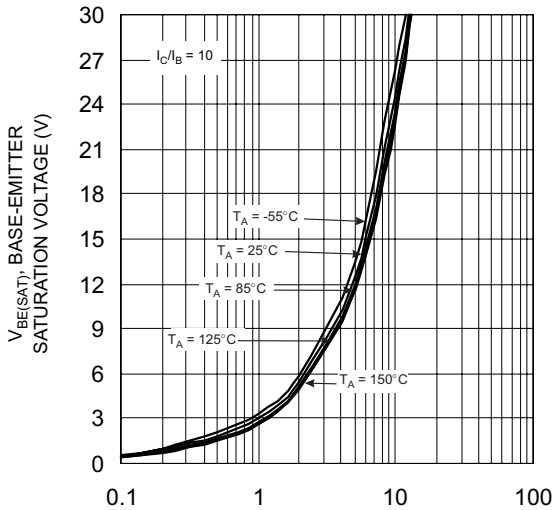


Fig. 13 $V_{BE(SAT)}$ vs. I_C

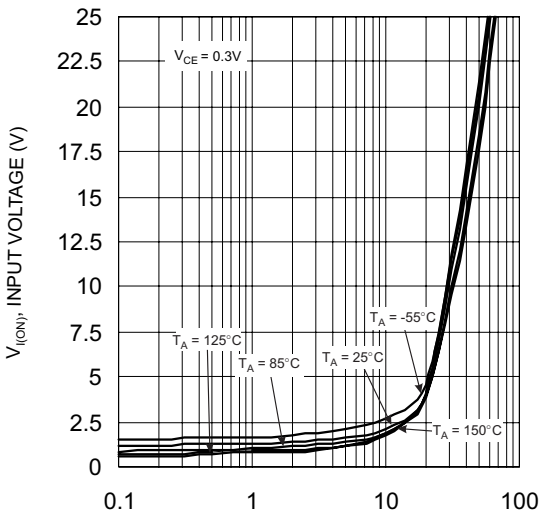


Fig. 14 $V_{I(ON)}$ vs. I_C

TYPICAL CURVES - DCX123JK
PNP SECTION

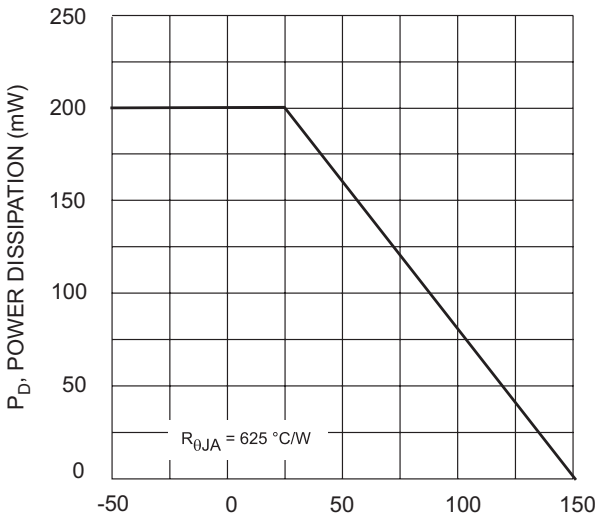


Fig. 15 Derating Curve

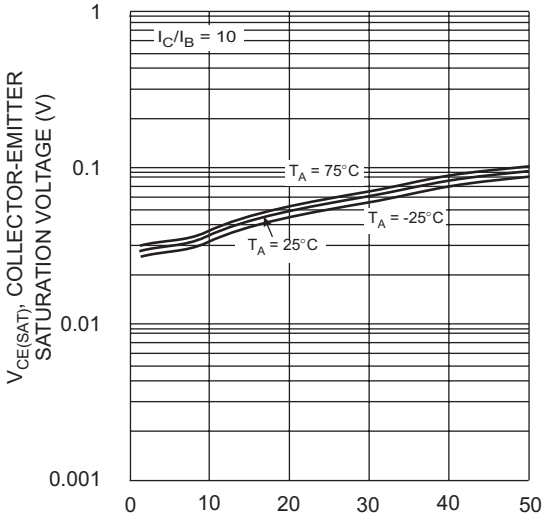


Fig. 16 $V_{CE(SAT)}$ vs. I_C

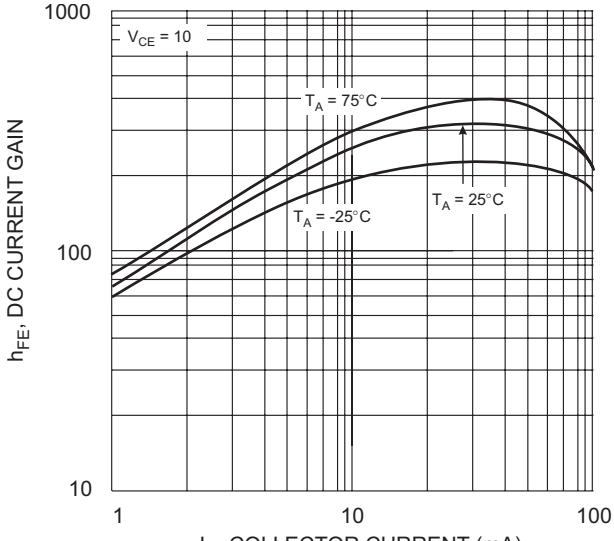


Fig. 17 DC Current Gain

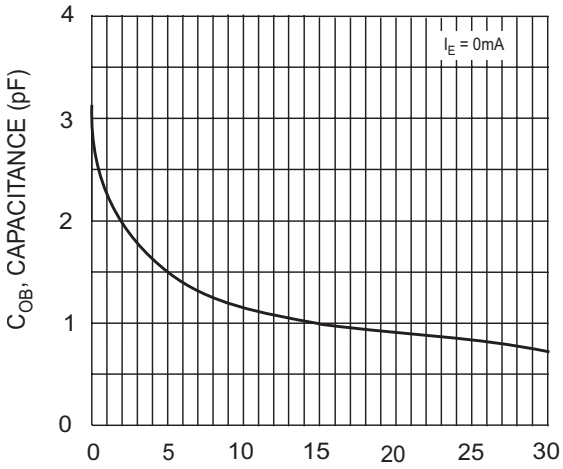


Fig. 18 Output Capacitance

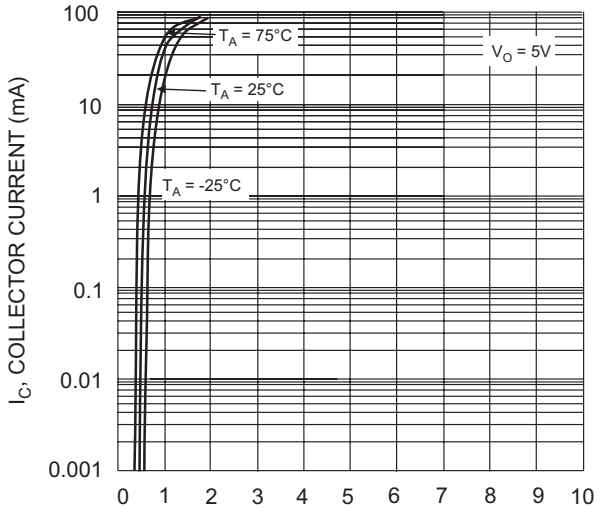


Fig. 19 Collector Current Vs. Input Voltage

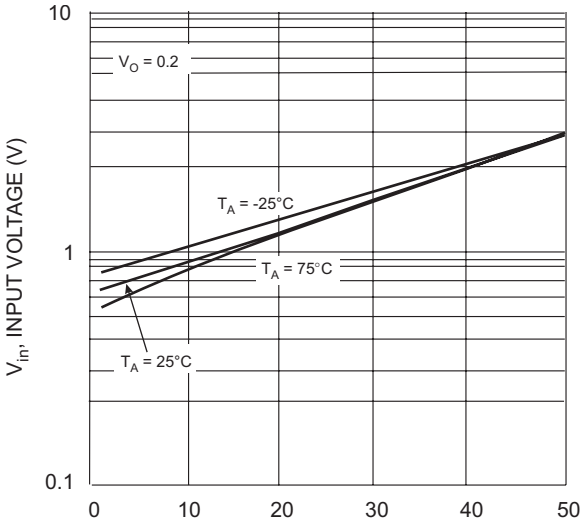


Fig. 20 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX123JK
NPN SECTION

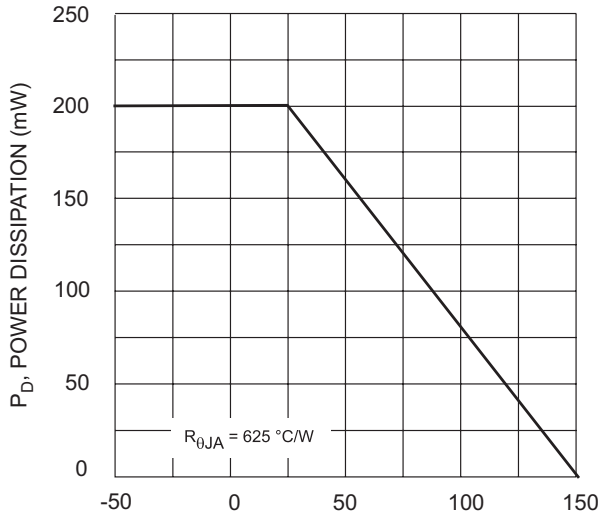


Fig. 21 Derating Curve

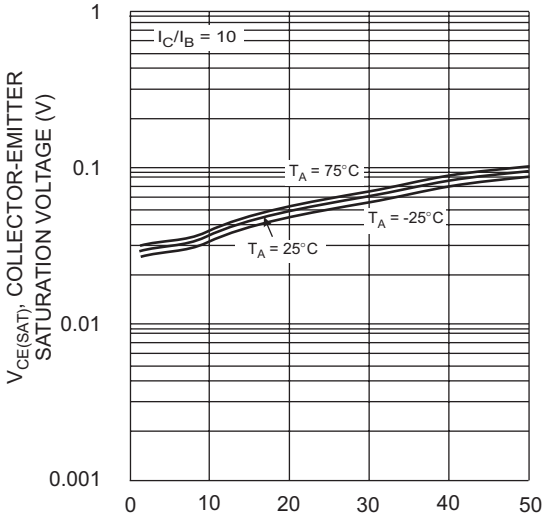


Fig. 22 $V_{CE(SAT)}$ vs. I_C

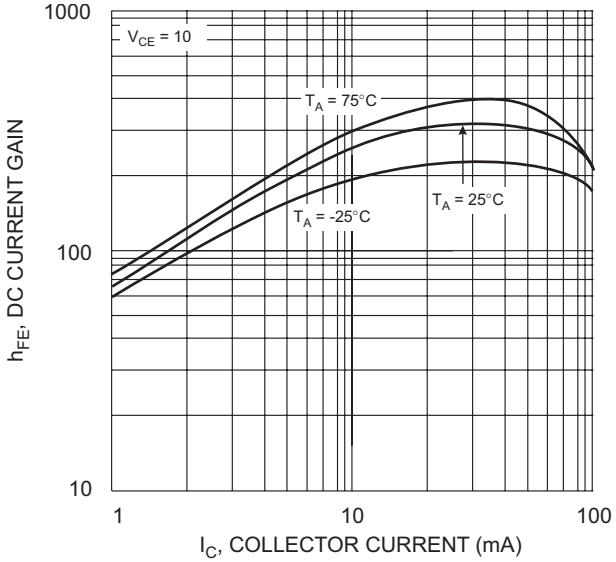


Fig. 23 DC Current Gain

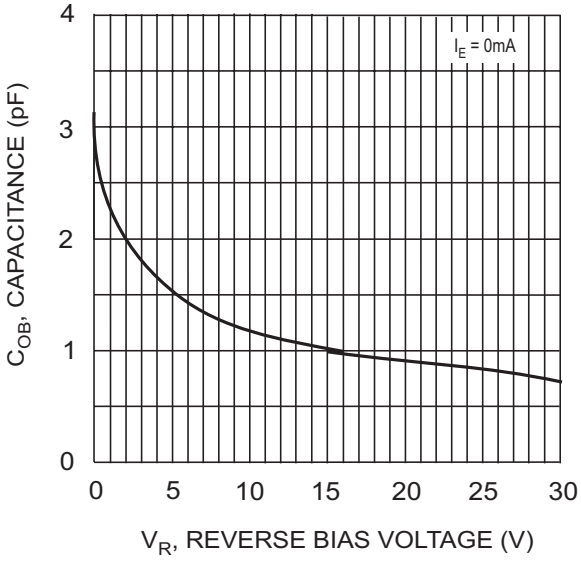


Fig. 24 Output Capacitance

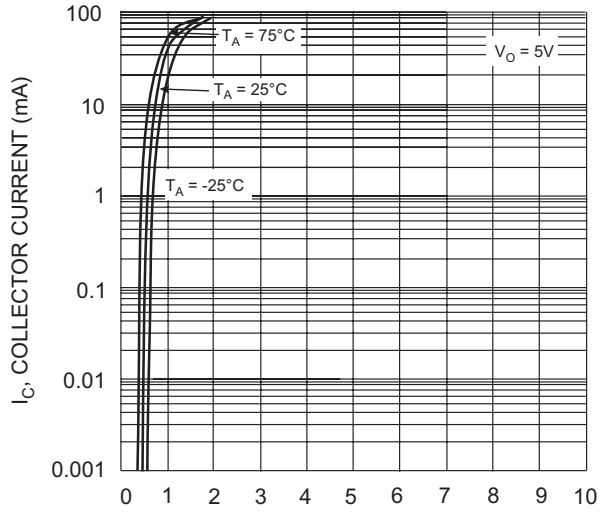


Fig. 25 Collector Current Vs. Input Voltage

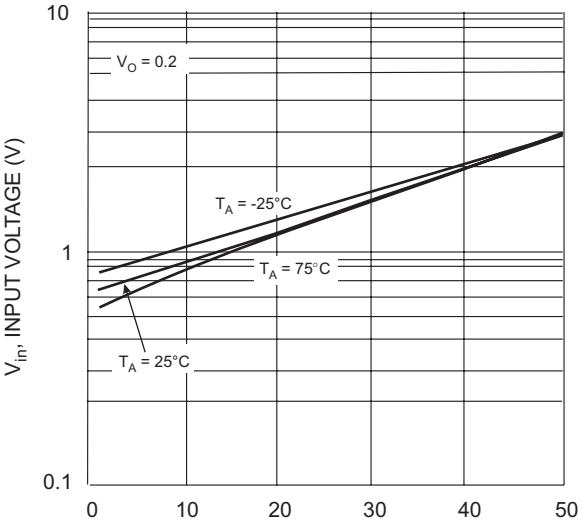


Fig. 26 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX114TK

PNP SECTION

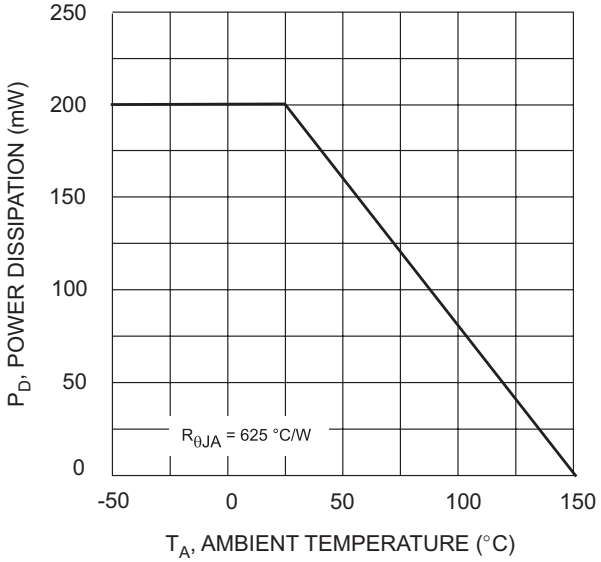


Fig. 27 Derating Curve

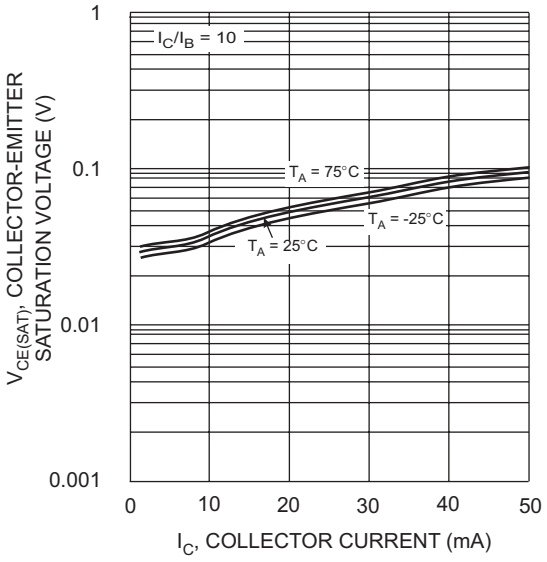


Fig. 28 $V_{CE(SAT)}$ vs. I_C

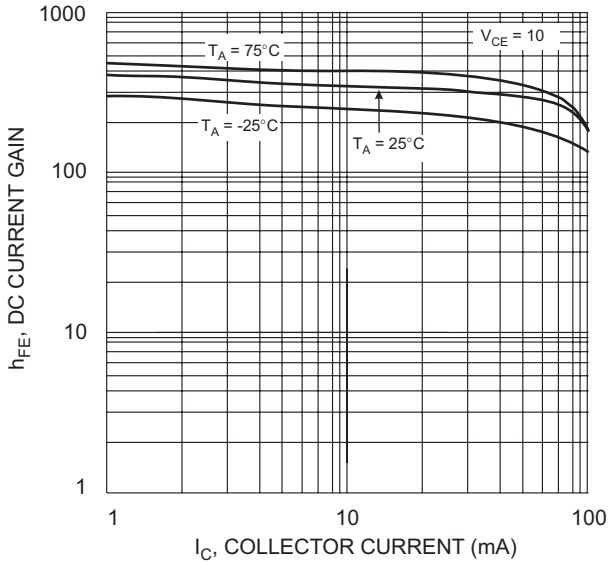


Fig. 29 DC Current Gain

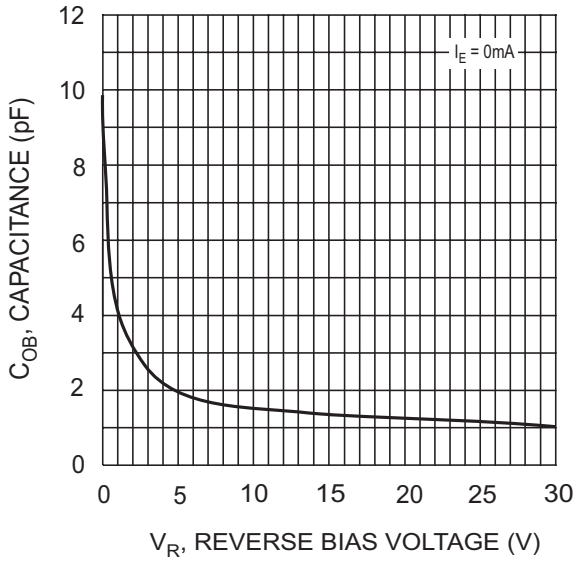


Fig. 30 Output Capacitance

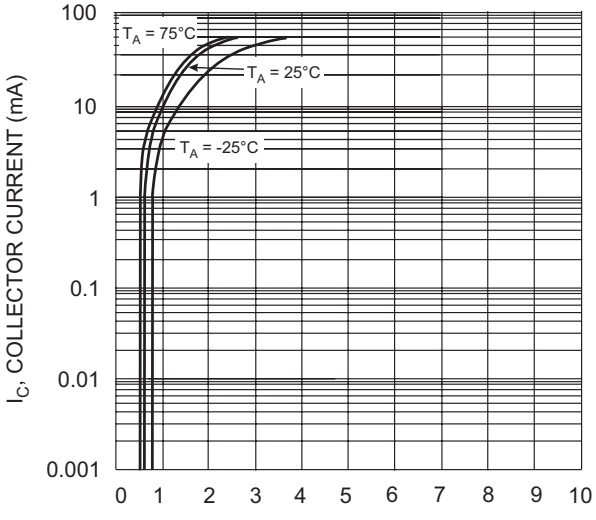


Fig. 31 Collector Current Vs. Input Voltage

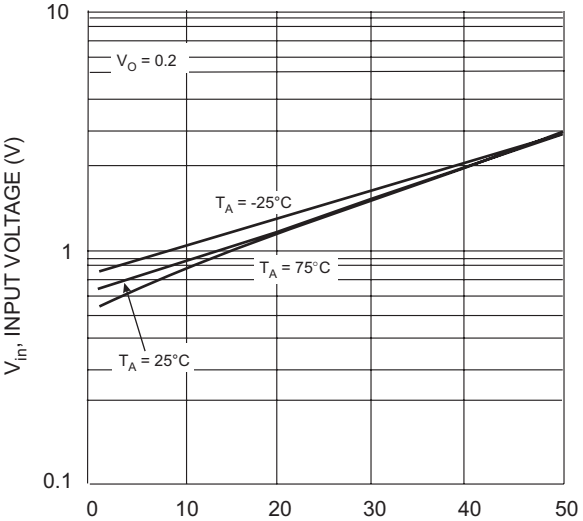


Fig. 32 Input Voltage vs. Collector Current

TYPICAL CURVES - DCX114TK

NPN SECTION

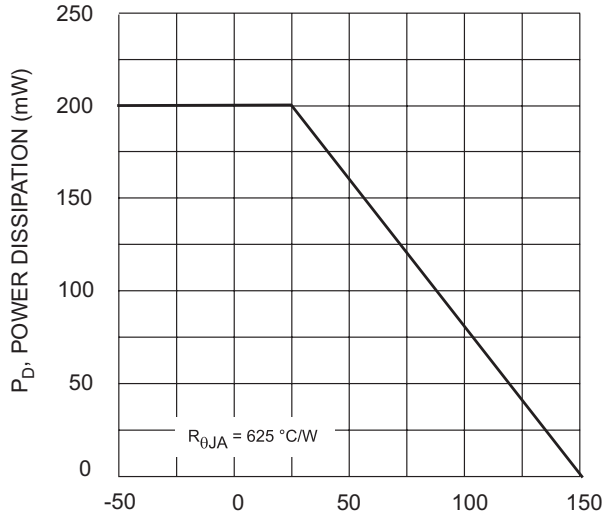


Fig. 33 Derating Curve

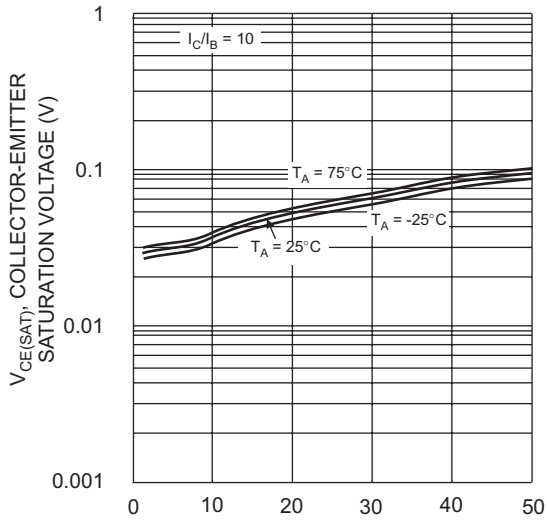


Fig. 34 $V_{CE(SAT)}$ vs. I_C

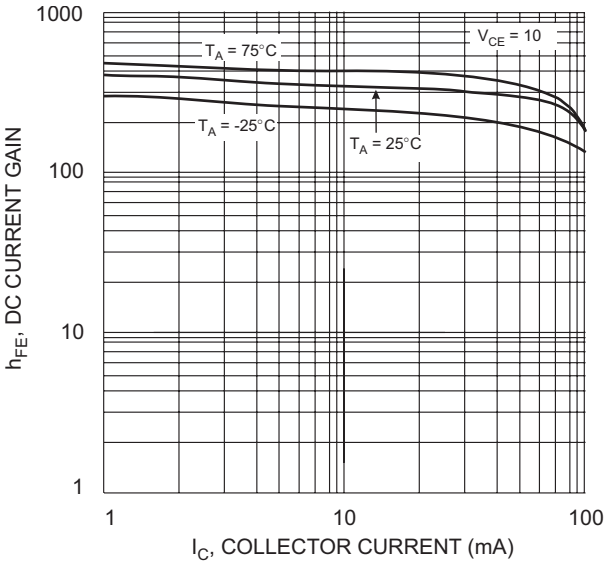


Fig. 35 DC Current Gain

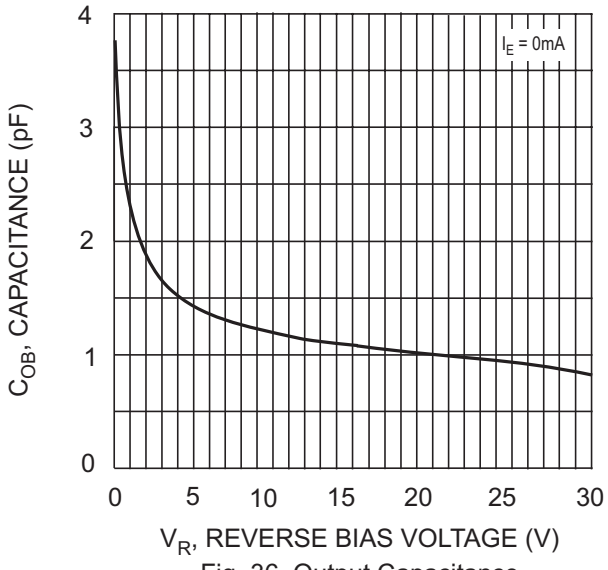


Fig. 36 Output Capacitance

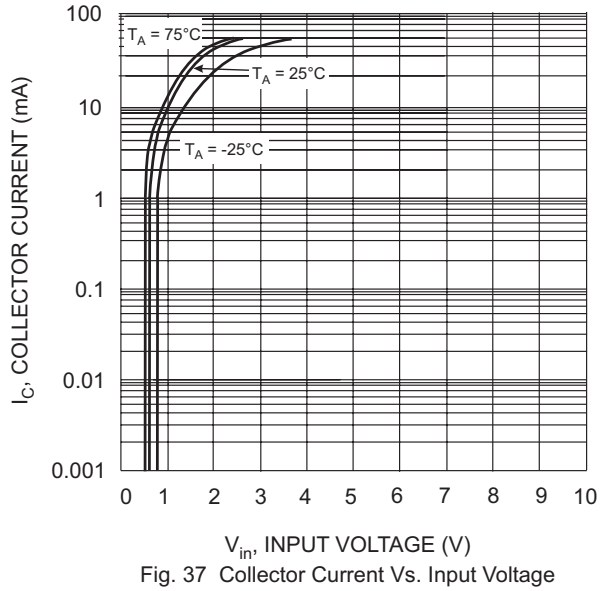


Fig. 37 Collector Current Vs. Input Voltage

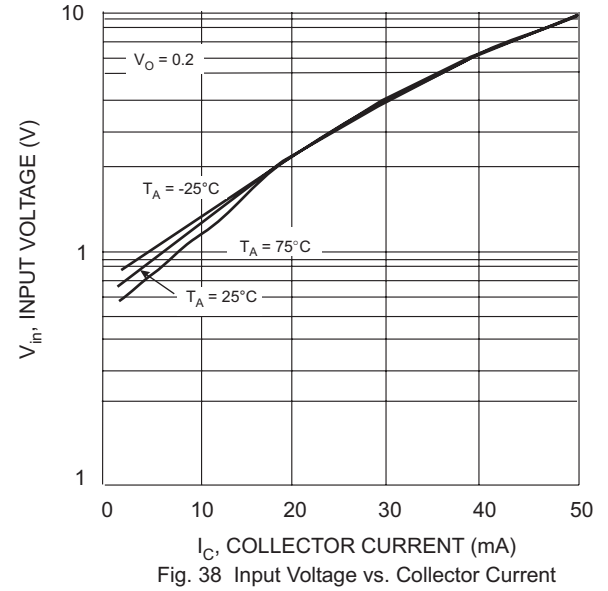


Fig. 38 Input Voltage vs. Collector Current

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