

Features

- Supply Voltage $V_O = 50V$
- Range of Bias Resistors
- Surface-Mount Package Suited for Automated Assembly
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DCX (XXXX) UQs are suitable for automotive applications requiring specific change control; these parts are AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

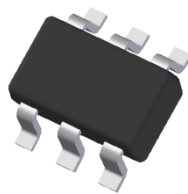
Part Number	R1(NOM)	R2(NOM)
DCX124EU	22k Ω	22k Ω
DCX144EU	47k Ω	47k Ω
DCX114YU	10k Ω	47k Ω
DCX123JU	2.2k Ω	47k Ω
DCX114EU	10k Ω	10k Ω
DCX143EU	4.7k Ω	4.7k Ω
DCX143ZU	4.7k Ω	47k Ω
DCX115EU	100k Ω	100k Ω

Mechanical Data

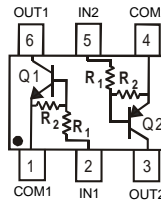
- Package: SOT363
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 Ⓒ3
- Weight: 0.006 grams (Approximate)

Part Number	R1 Only
DCX143TU	4.7k Ω
DCX114TU	10k Ω

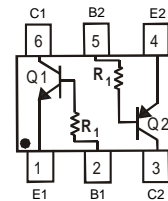
SOT363



Top View



R1, R2



R1 Only

Device Schematic

Ordering Information (Notes 4, 5)

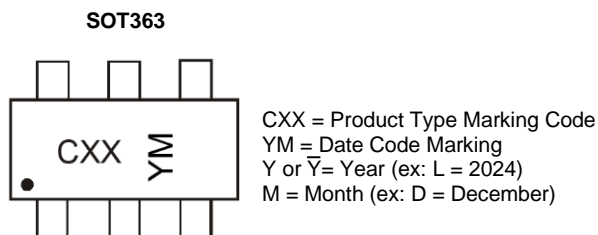
Part Number	Status	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
						Qty.	Carrier
DCX124EU-7-F	Active	SOT363	C17	7	8	3,000	Reel
DCX124EU-13-F	Active	SOT363	C17	13	8	10,000	Reel
DCX124EUQ-7-F	NRND (Use ACX124EUQ)	SOT363	C17	7	8	3,000	Reel
DCX124EUQ-13-F	NRND (Use ACX124EUQ)	SOT363	C17	13	8	10,000	Reel
DCX124EUQ-13R-F	NRND (Use ACX124EUQ)	SOT363	C17	13	8	10,000	Reel
DCX144EU-7-F	Active	SOT363	C20	7	8	3,000	Reel
DCX144EU-7R-F	Active	SOT363	C20	7	8	3,000	Reel
DCX144EUQ-7-F	Active	SOT363	C20	7	8	3,000	Reel
DCX144EUQ-7R-F	Active	SOT363	C20	7	8	3,000	Reel
DCX114YU-7-F	Active	SOT363	C14	7	8	3,000	Reel
DCX114YU-7R-F	Active	SOT363	C14	7	8	3,000	Reel
DCX114YUQ-7-F	NRND (Use ACX114YUQ)	SOT363	C14	7	8	3,000	Reel
DCX114YUQ-13-F	NRND (Use ACX114YUQ)	SOT363	C14	13	8	10,000	Reel
DCX114YUQ-13R-F	NRND (Use ACX114YUQ)	SOT363	C14	13	8	10,000	Reel
DCX123JU-7-F	Active	SOT363	C06	7	8	3,000	Reel
DCX123JU-7R-F	Active	SOT363	C06	7	8	3,000	Reel
DCX123JUQ-7-F	Active	SOT363	C06	7	8	3,000	Reel
DCX114EU-7-F	Active	SOT363	C13	7	8	3,000	Reel
DCX114EU-13R-F	Active	SOT363	C13	13	8	10,000	Reel

Ordering Information (Notes 4, 5) (continued)

Part Number	Status	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
						Qty.	Carrier
DCX114EUQ-7-F	NRND (Use ACX114EUQ)	SOT363	C13	7	8	3,000	Reel
DCX114EUQ-13-F	NRND (Use ACX114EUQ)	SOT363	C13	13	8	10,000	Reel
DCX114EUQ-13R-F	NRND (Use ACX114EUQ)	SOT363	C13	13	8	10,000	Reel
DCX143TU-7-F	Active	SOT363	C07	7	8	3,000	Reel
DCX143EU-7-F	Active	SOT363	C08	7	8	3,000	Reel
DCX143EU-7R-F	Active	SOT363	C08	7	8	3,000	Reel
DCX114TU-7-F	Active	SOT363	C12	7	8	3,000	Reel
DCX143ZU-7-F	Active	SOT363	C02	7	8	3,000	Reel
DCX115EU-7-F	Active	SOT363	C01	7	8	3,000	Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
 - NRND = Not Recommended for New Design.

Marking Information



Date Code Key

Year	2010	-	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Code	X	-	L	M	N	P	R	S	T	U	V	W

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

Absolute Maximum Ratings NPN Section (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage		V _O	50	V
Input Voltage	DCX124EU	V _I	-10 to +40	V
	DCX144EU		-10 to +40	
	DCX114YU		-6 to +40	
	DCX123JU		-5 to +12	
	DCX114EU		-10 to +40	
	DCX143TU		-5V Max	
	DCX143EU		-10 to +30	
	DCX114TU		-5V Max	
	DCX143ZU		-10 to +30	
DCX115EU	-10 to +40			
Output Current	DCX124EU	I _O	30	mA
	DCX144EU		30	
	DCX114YU		70	
	DCX123JU		100	
	DCX114EU		50	
	DCX143TU		100	
	DCX143EU		100	
	DCX114TU		100	
	DCX143ZU		100	
DCX115EU	20			
Peak Output Current		I _{CM}	100	mA

Absolute Maximum Ratings PNP Section (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage		V _O	50	V
Input Voltage	DCX124EU	V _I	+10 to -40	V
	DCX144EU		+10 to -40	
	DCX114YU		+6 to -40	
	DCX123JU		+5 to -12	
	DCX114EU		+10 to -40	
	DCX143TU		+5V Max	
	DCX143EU		+10 to -30	
	DCX114TU		+5V Max	
	DCX143ZU		+5 to -30	
DCX115EU	+10 to -40			
Output Current	DCX124EU	I _O	-30	mA
	DCX144EU		-30	
	DCX114YU		-70	
	DCX123JU		-100	
	DCX114EU		-50	
	DCX143TU		-100	
	DCX143EU		-100	
	DCX114TU		-100	
	DCX143ZU		-100	
DCX115EU	-20			
Peak Output Current		I _{CM}	-100	mA

Thermal Characteristics (@ T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 6, 7)	P _D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R _{θJA}	625	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 6. Mounted on FR-4 PC Board with minimum recommended pad layout.
7. 150mW per element must not be exceeded.

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

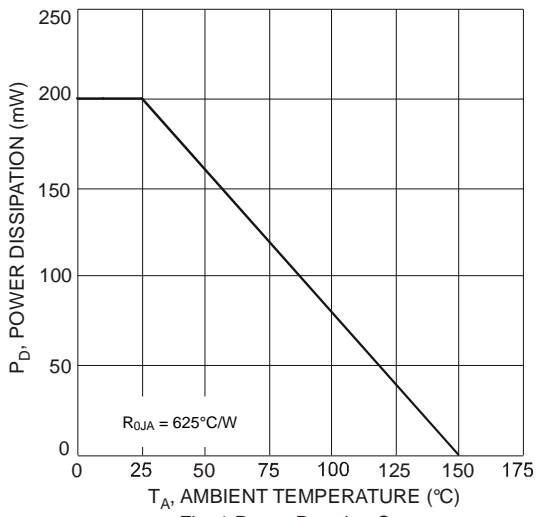


Fig. 1 Power Derating Curve

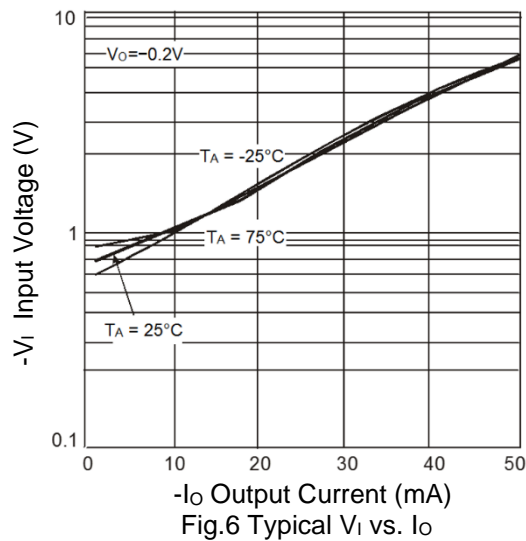
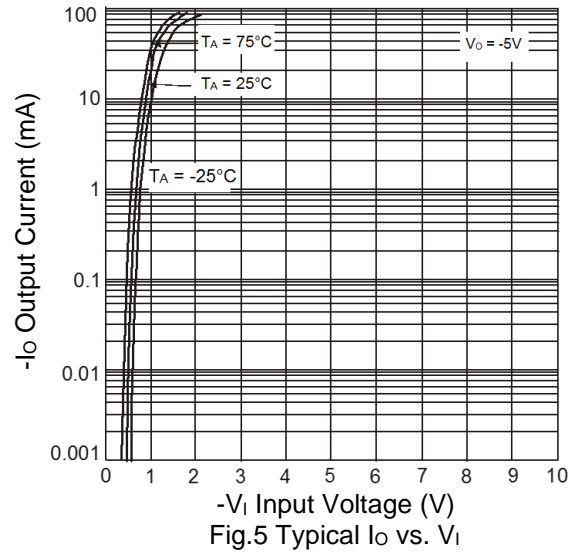
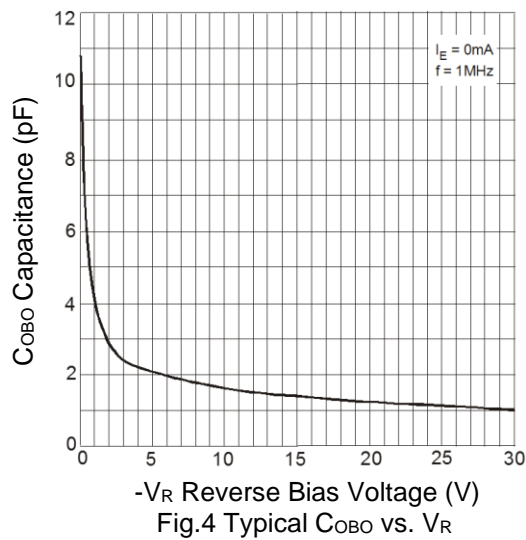
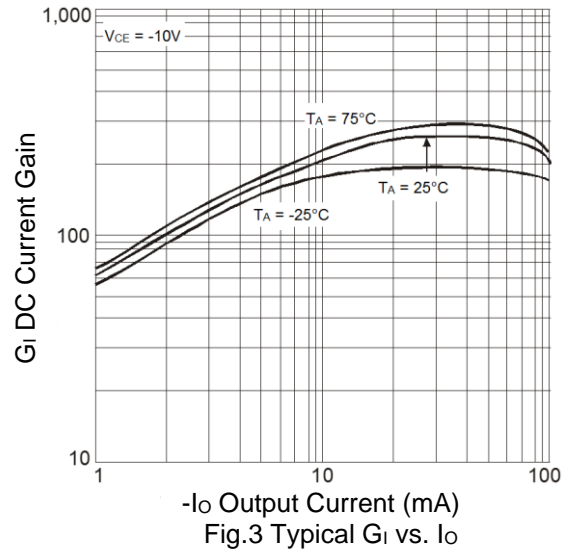
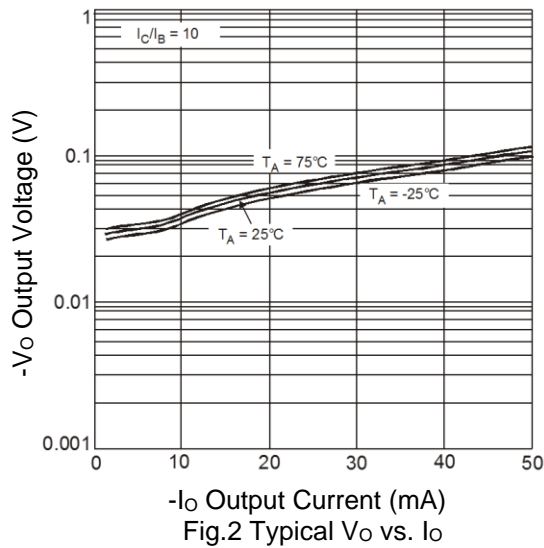
Electrical Characteristics NPN Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

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				
	DCX143ZU		0.5	—				
	DCX115EU		0.5	—				
	DCX124EU	$V_{I(on)}$	—	1.9	3.0	V	$V_O = 0.3\text{V}$, $I_O = 5\text{mA}$	
	DCX144EU		—	1.9	3.0		$V_O = 0.3\text{V}$, $I_O = 2\text{mA}$	
	DCX114YU		—	—	1.4		$V_O = 0.3\text{V}$, $I_O = 1\text{mA}$	
	DCX123JU		—	—	1.1		$V_O = 0.3\text{V}$, $I_O = 5\text{mA}$	
	DCX114EU		—	1.9	3.0		$V_O = 0.3\text{V}$, $I_O = 10\text{mA}$	
	DCX143EU		—	1.99	3.0		$V_O = 0.3\text{V}$, $I_O = 20\text{mA}$	
DCX143ZU	—		—	1.3	$V_O = 0.3\text{V}$, $I_O = 5\text{mA}$			
DCX115EU	—	—	3	$V_O = 0.3\text{V}$, $I_O = 1\text{mA}$				
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						$I_O/I_I = 10\text{mA} / 0.5\text{mA}$	
	DCX143ZU						$I_O/I_I = 5\text{mA} / 0.25\text{mA}$	
	DCX115EU						$I_O/I_I = 10\text{mA} / 0.5\text{mA}$	
Input Current	DCX124EU	I_I	—	—	—	mA	$V_I = 5\text{V}$	
	DCX144EU							0.36
	DCX114YU							0.18
	DCX123JU							0.88
	DCX114EU							3.6
	DCX143EU							0.88
	DCX143ZU							1.8
	DCX115EU							0.15
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	—	—	—	$V_O = 5\text{V}$, $I_O = 5\text{mA}$	
	DCX124EUQ						60	$V_O = 5\text{V}$, $I_O = 5\text{mA}$
	DCX144EU						68	$V_O = 5\text{V}$, $I_O = 5\text{mA}$
	DCX114YU						68	$V_O = 5\text{V}$, $I_O = 10\text{mA}$
	DCX114YUQ						80	$V_O = 5\text{V}$, $I_O = 10\text{mA}$
	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	$V_O = 5\text{V}$, $I_O = 10\text{mA}$
	DCX143ZU						80	$V_O = 5\text{V}$, $I_O = 10\text{mA}$
DCX115EU	82	$V_O = 5\text{V}$, $I_O = 5\text{mA}$						
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—	
Resistance Ratio Tolerance		$\Delta R_2/R_1$	-20	—	+20	%	—	
Gain-Bandwidth Product		f_T	—	250	—	MHz	$V_{CE} = 10\text{V}$, $I_E = 5\text{mA}$, $f = 100\text{MHz}$	

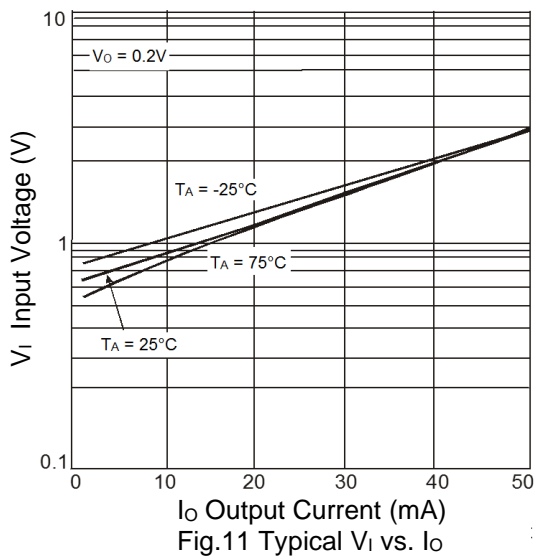
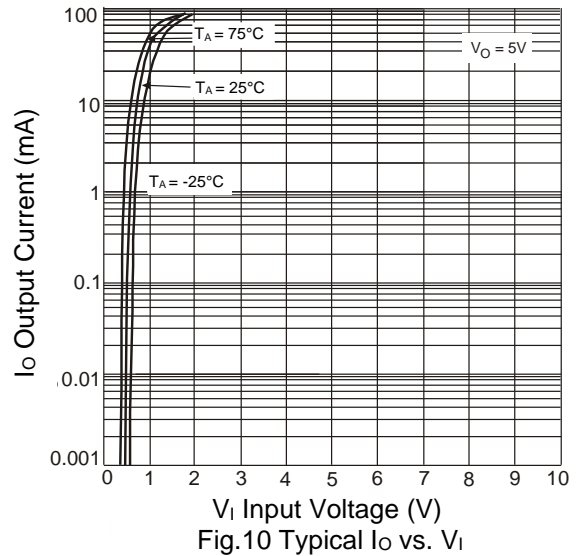
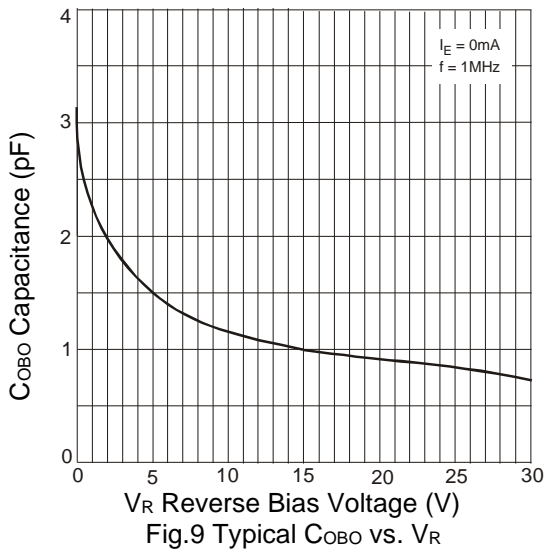
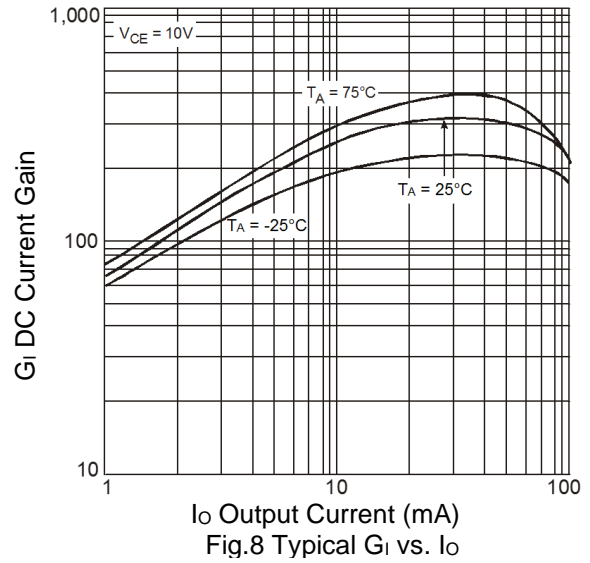
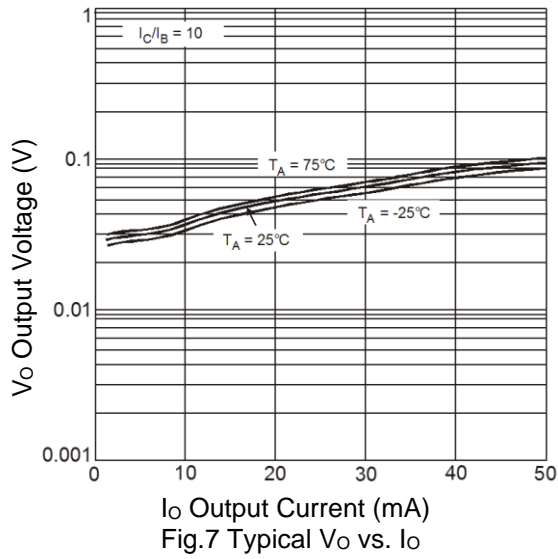
Electrical Characteristics PNP Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

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				
	DCX143ZU		-0.5	—				
	DCX115EU		-0.5	—				
	DCX124EU	$V_{I(on)}$	—	-1.9	-3.0	V	$V_O = -0.3\text{V}$, $I_O = -5\text{mA}$	
	DCX144EU		—	-1.9	-3.0		$V_O = -0.3\text{V}$, $I_O = -2\text{mA}$	
	DCX114YU		—	—	-1.4		$V_O = -0.3\text{V}$, $I_O = -1\text{mA}$	
	DCX123JU		—	—	-1.1		$V_O = -0.3\text{V}$, $I_O = -5\text{mA}$	
	DCX114EU		—	-1.9	-3.0		$V_O = -0.3\text{V}$, $I_O = -10\text{mA}$	
	DCX143EU		—	-2.5	-3.0		$V_O = -0.3\text{V}$, $I_O = -20\text{mA}$	
DCX143ZU	—		—	-1.3	$V_O = -0.3\text{V}$, $I_O = -5\text{mA}$			
DCX115EU	—	—	-3	$V_O = -0.3\text{V}$, $I_O = -1\text{mA}$				
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						$I_O/I_I = -10\text{mA} / -0.5\text{mA}$	
	DCX143ZU						$I_O/I_I = -5\text{mA} / -0.25\text{mA}$	
	DCX115EU						$I_O/I_I = -10\text{mA} / -0.5\text{mA}$	
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
	DCX143ZU							-1.8
	DCX115EU							-0.15
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	—	—	—	$V_O = -5\text{V}$, $I_O = -5\text{mA}$	
	DCX124EUQ						60	$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX144EU						68	$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX114YU						68	$V_O = -5\text{V}$, $I_O = -10\text{mA}$
	DCX114YUQ						80	$V_O = -5\text{V}$, $I_O = -10\text{mA}$
	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	$V_O = -5\text{V}$, $I_O = -10\text{mA}$
	DCX143ZU						80	$V_O = -5\text{V}$, $I_O = -10\text{mA}$
DCX115EU	82	$V_O = -5\text{V}$, $I_O = -5\text{mA}$						
Input Resistor (R_1) Tolerance		ΔR_1	-30	—	+30	%	—	
Resistance Ratio Tolerance		$\Delta R_2/R_1$	-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 – DCX123JU PNP Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Typical Curves – DCX123JU NPN Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Typical Curves – DCX143EU PNP Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

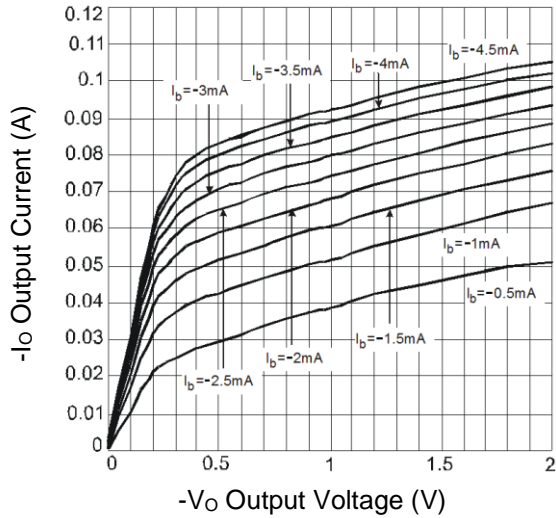


Fig.12 Typical I_o vs. V_o

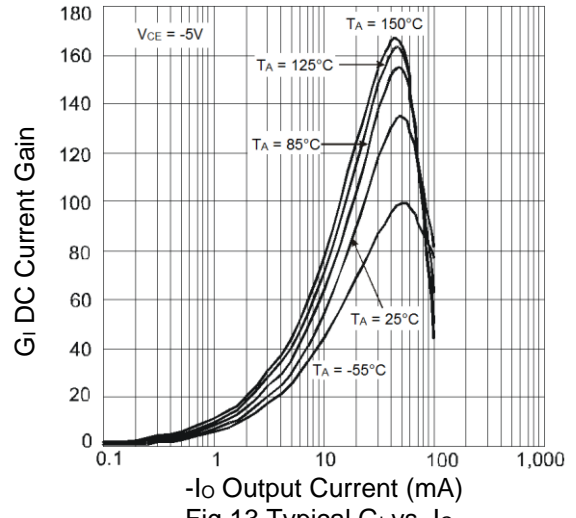


Fig.13 Typical G_i vs. I_o

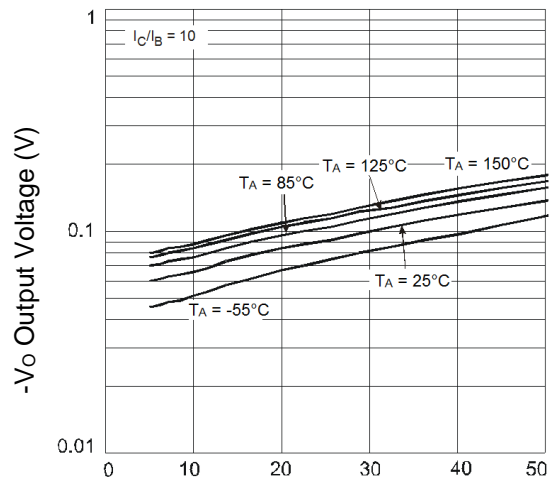


Fig.14 Typical V_o vs. I_o

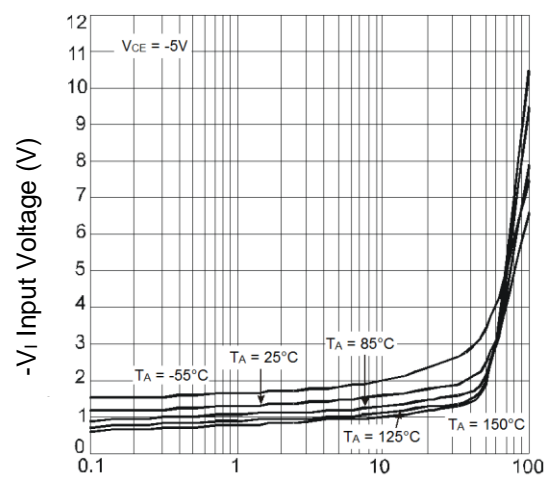


Fig.15 Typical V_i vs. I_o

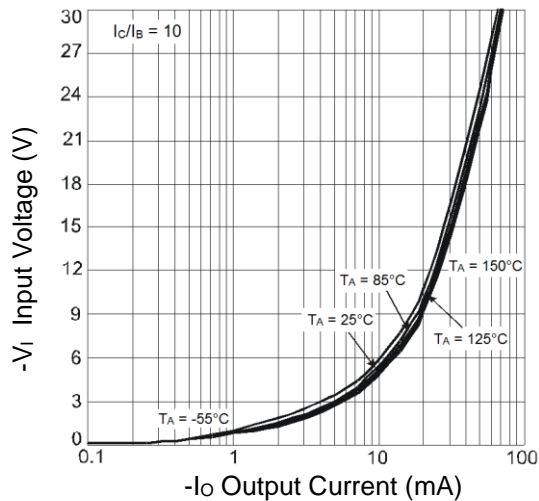


Fig.16 Typical V_i vs. I_o

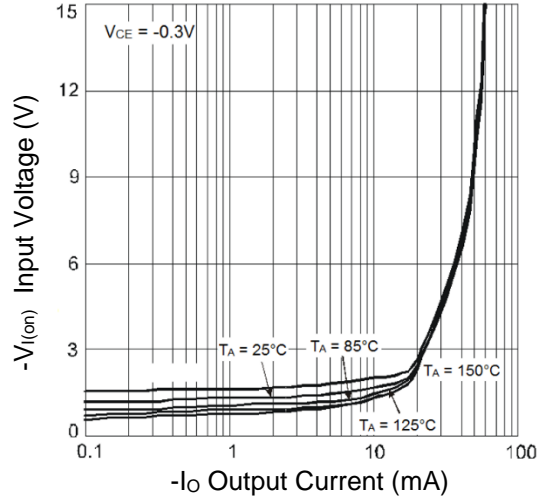
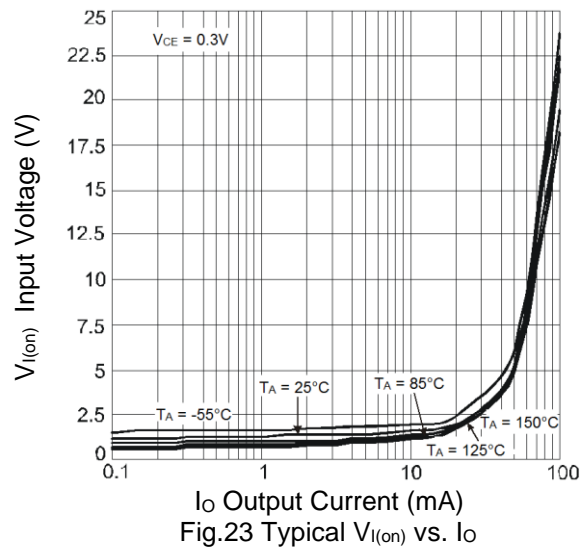
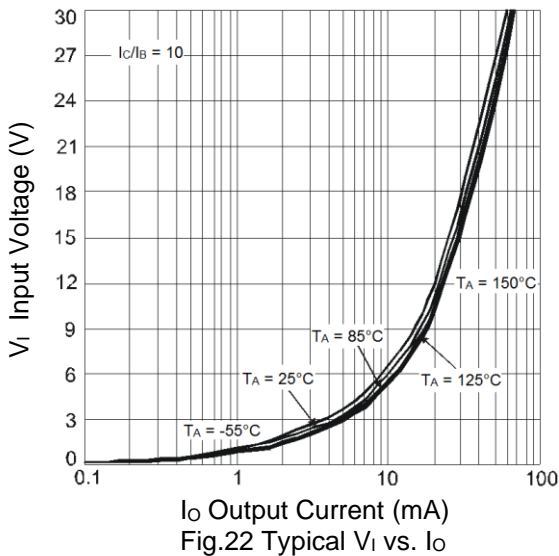
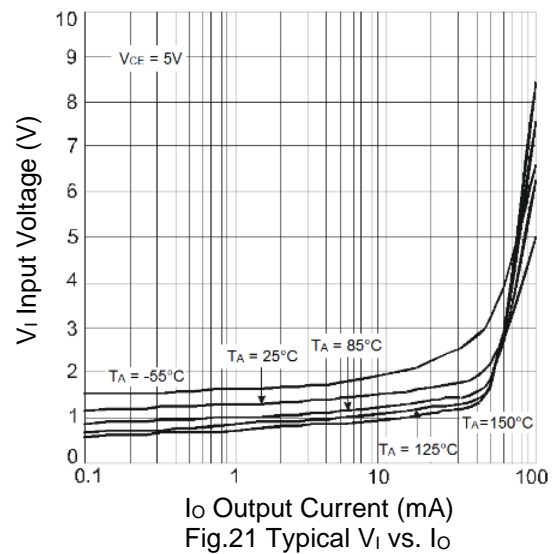
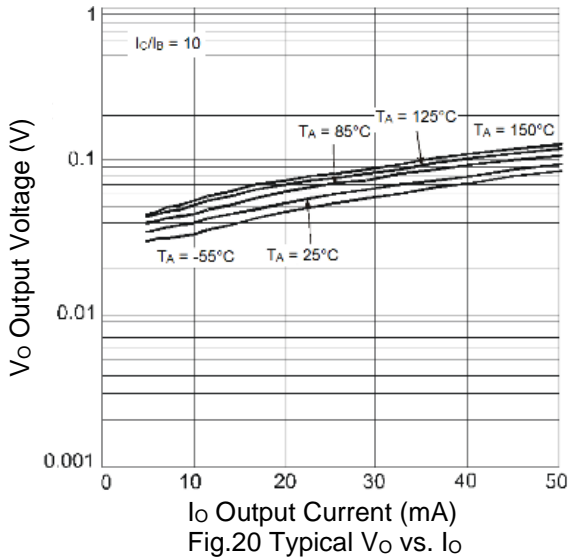
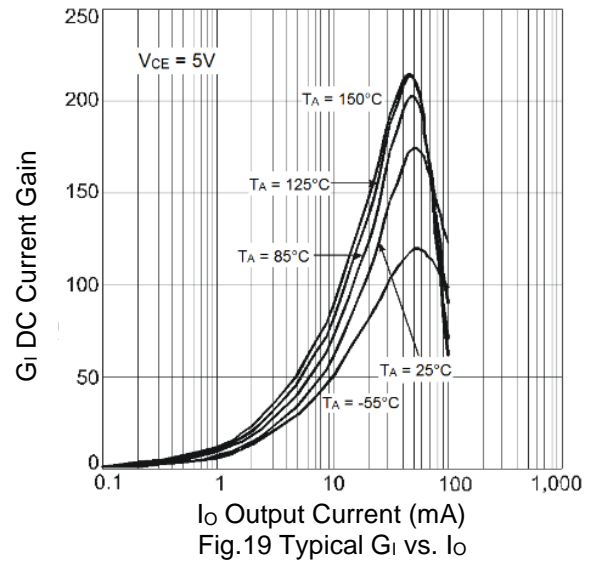
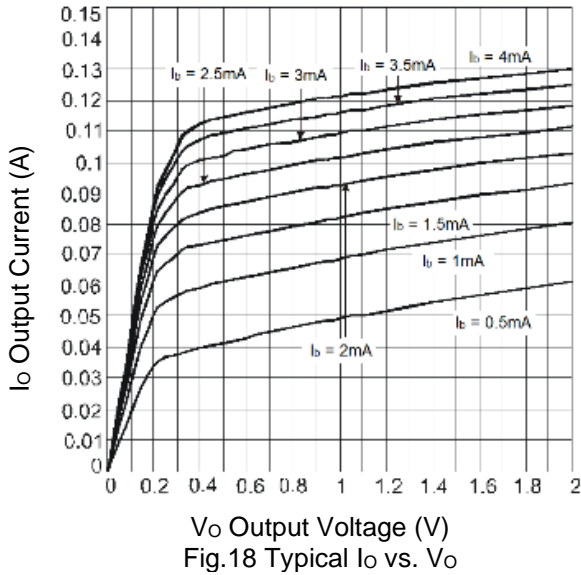


Fig.17 Typical $V_{i(on)}$ vs. I_o

Typical Curves – DCX143EU NPN Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Typical Curves – DCX114TU PNP Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

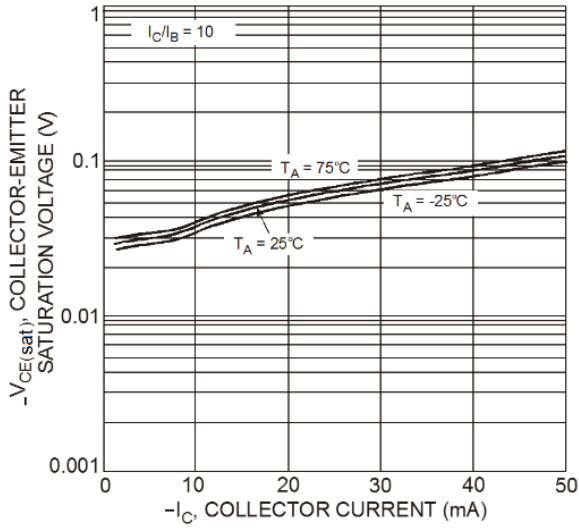


Fig. 24 Typical $V_{CE(sat)}$ vs. I_C

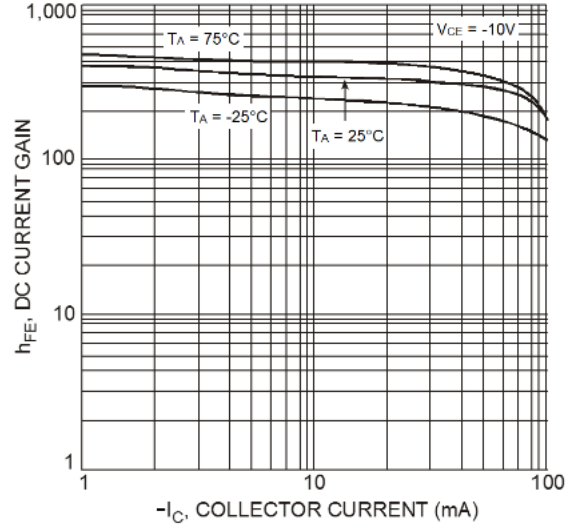


Fig. 25 Typical DC Current Gain

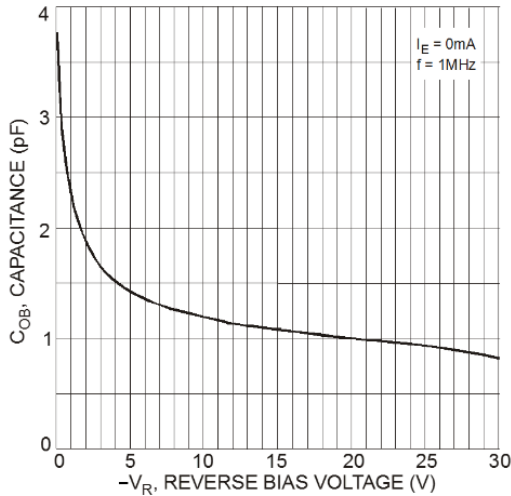


Fig. 26 Typical Output Capacitance

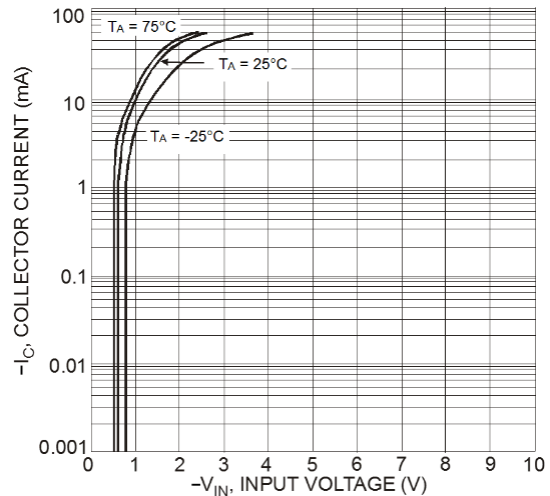


Fig. 27 Typical Collector Current vs. Input Voltage

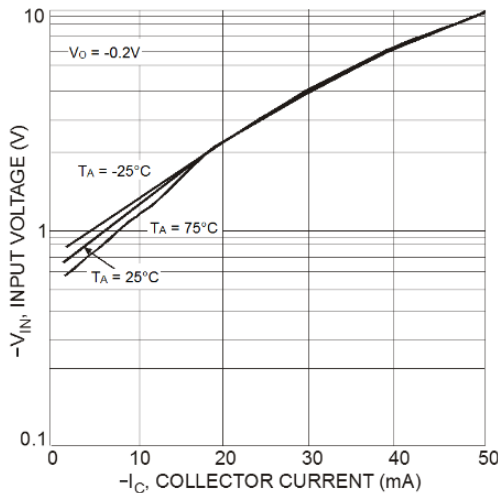


Fig. 28 Typical Input Voltage vs. Collector Current

Typical Curves – DCX114TU NPN Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

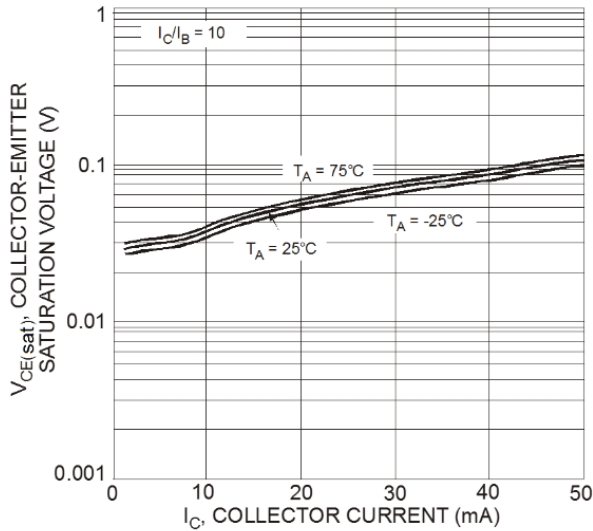


Fig. 29 Typical $V_{CE(sat)}$ vs. I_C

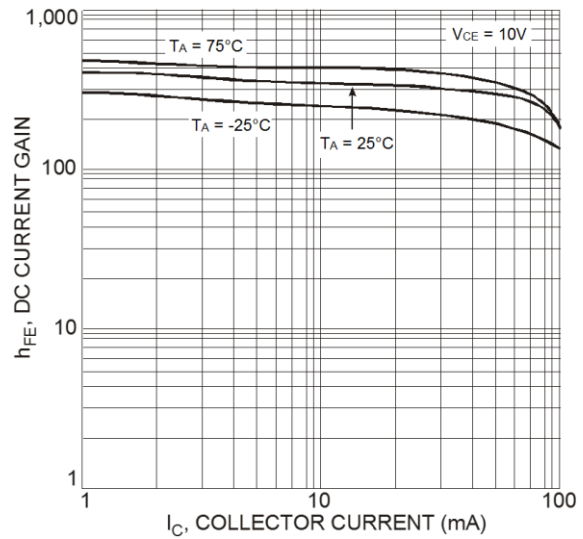


Fig. 30 Typical DC Current Gain

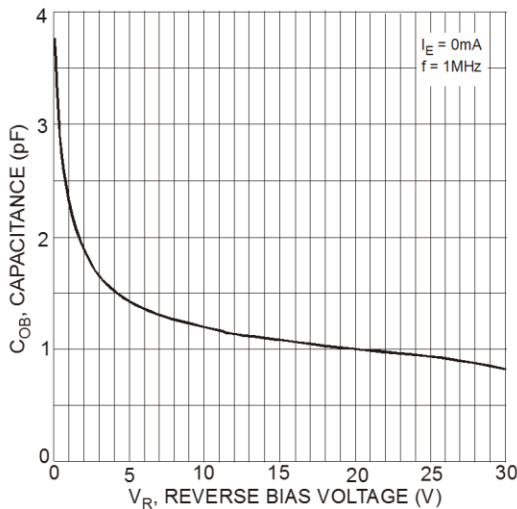


Fig. 31 Typical Output Capacitance

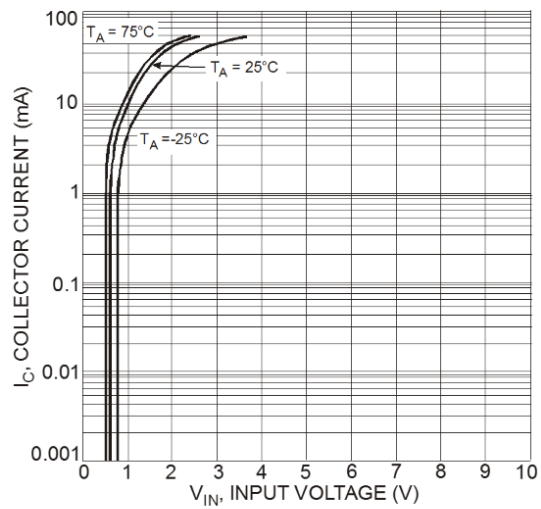


Fig. 32 Typical Collector Current vs. Input Voltage

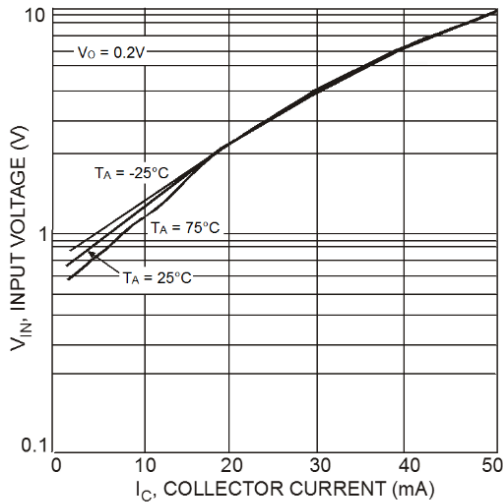
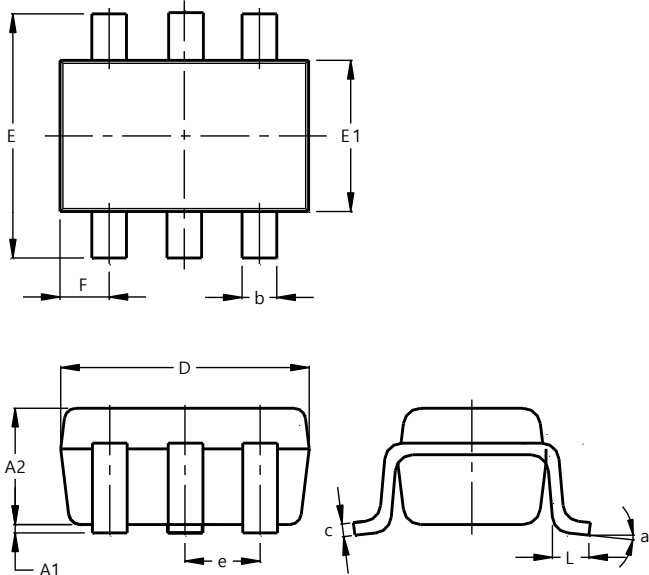


Fig. 33 Typical Input Voltage vs. Collector Current

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT363

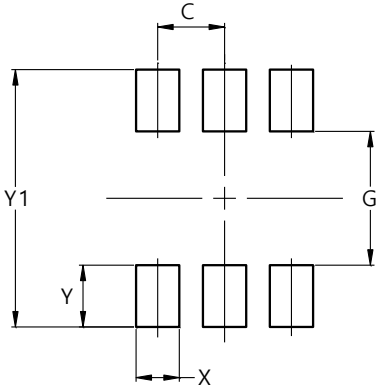


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT363



Dimensions	Value (in mm)
C	0.650
G	1.300
X	0.420
Y	0.600
Y1	2.500

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