



**THE DATASHEET OF
DCX143ZU-13R-F**



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/>

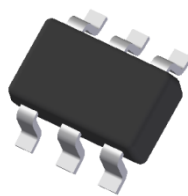
Mechanical Data

- 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)

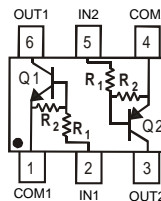
Part Number	R1(NOM)	R2(NOM)
DCX124EU	22kΩ	22kΩ
DCX144EU	47kΩ	47kΩ
DCX114YU	10kΩ	47kΩ
DCX123JU	2.2kΩ	47kΩ
DCX114EU	10kΩ	10kΩ
DCX143EU	4.7kΩ	4.7kΩ
DCX143ZU	4.7kΩ	47kΩ
DCX115EU	100kΩ	100kΩ

Part Number	R1 Only
DCX143TU	4.7kΩ
DCX114TU	10kΩ

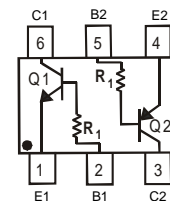
SOT363



Top View



R1, R2



R1 Only

Device Schematic

Ordering Information (Notes 4, 5)

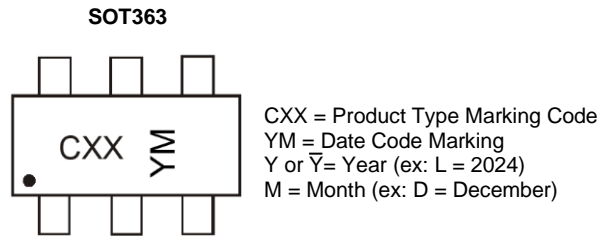
Part Number	Status	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
						Qty.	Carrier
DCX124EU-7-F	Active	SOT363	C17	7	8	3,000	Reel
DCX124EU-13-F	Active	SOT363	C17	13	8	10,000	Reel
DCX124EUQ-7-F	NRND (Use ACX124EUQ)	SOT363	C17	7	8	3,000	Reel
DCX124EUQ-13-F	NRND (Use ACX124EUQ)	SOT363	C17	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
DCX143ZU-7R-F	Active	SOT363	C02	7	8	3,000	Reel
DCX115EU-7-F	Active	SOT363	C01	7	8	3,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. 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.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.
 5. 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 (@ $T_A = +25^\circ\text{C}$, 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 (@ $T_A = +25^\circ\text{C}$, 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 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 6, 7)	P_D	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	625	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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.)

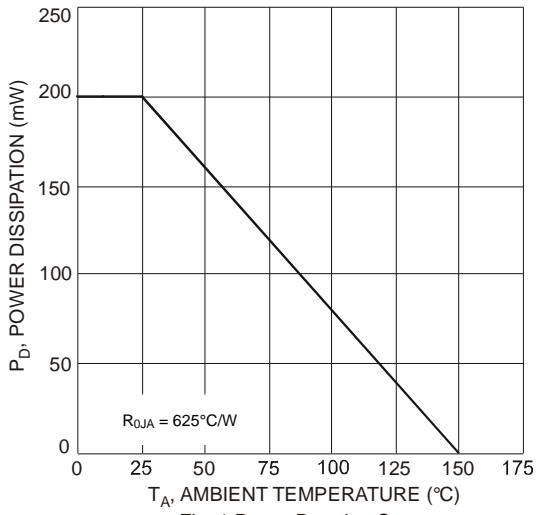


Fig. 1 Power Derating Curve

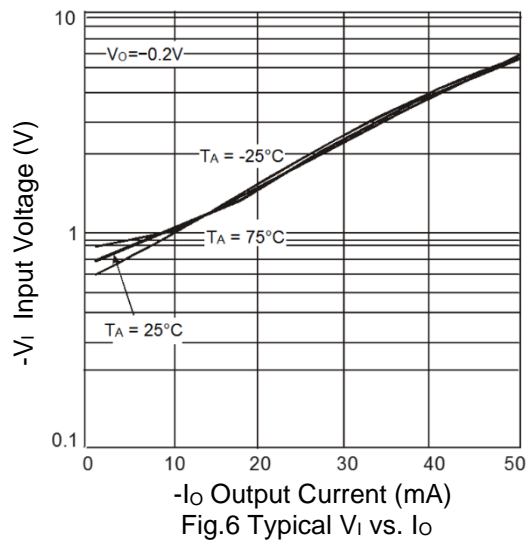
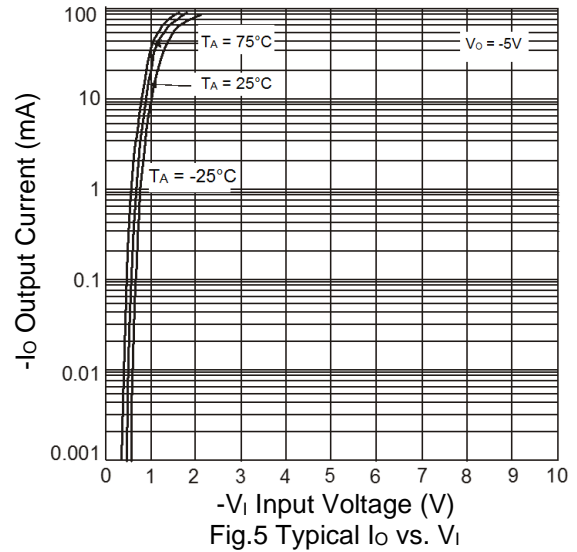
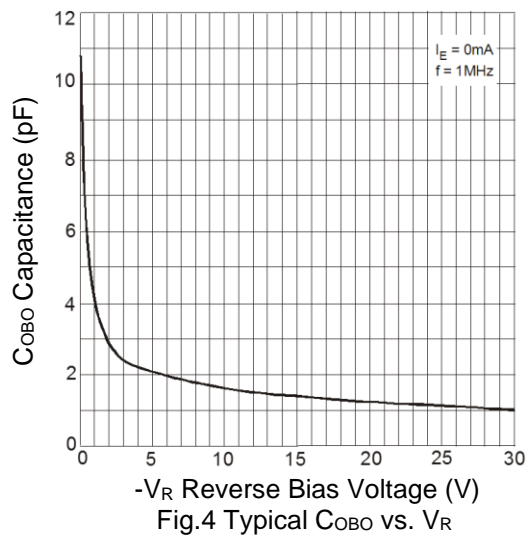
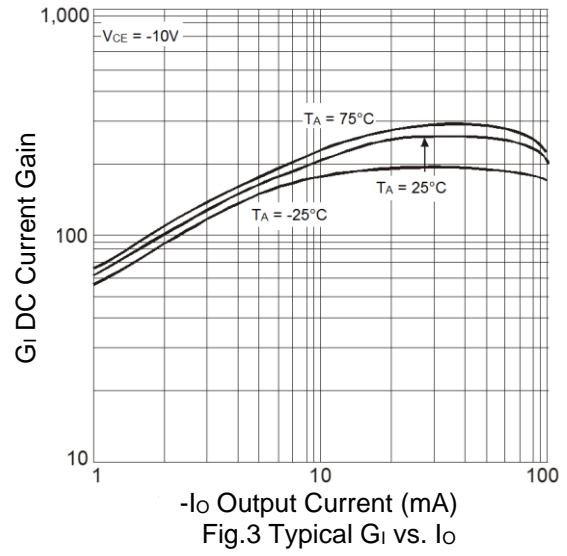
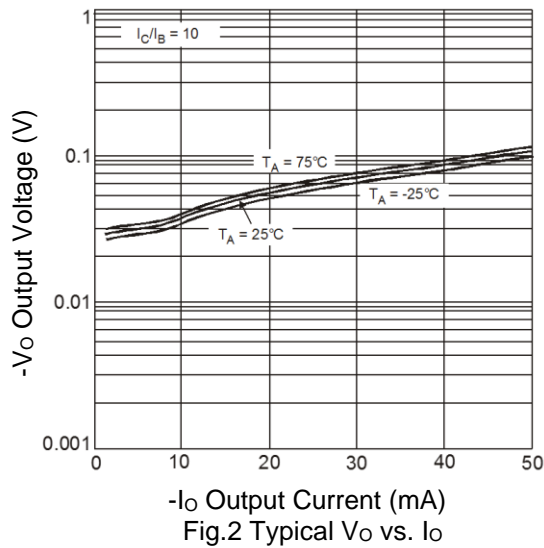
Electrical Characteristics NPN Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

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		—	0.1	0.3		$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX114YU		—	0.1	0.3		$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
	DCX123JU		—	0.1	0.3		$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
	DCX114EU		—	0.1	0.3		$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX143EU		—	0.1	0.3		$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX143ZU		—	0.1	0.3		$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
	DCX115EU		—	0.1	0.3		$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
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		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	$V_{CE} = 10\text{V}, I_E = 5\text{mA}, f = 100\text{MHz}$

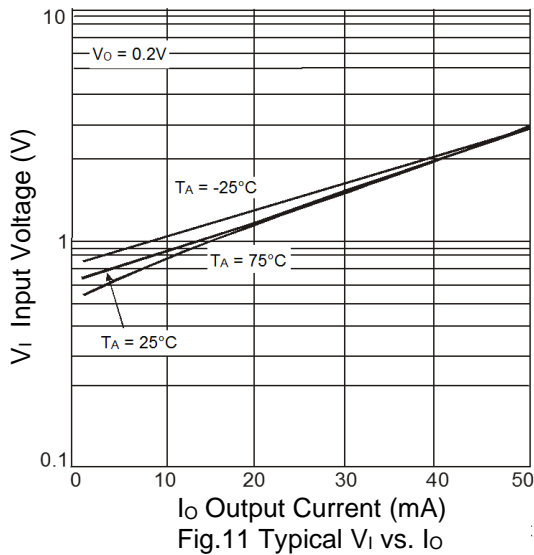
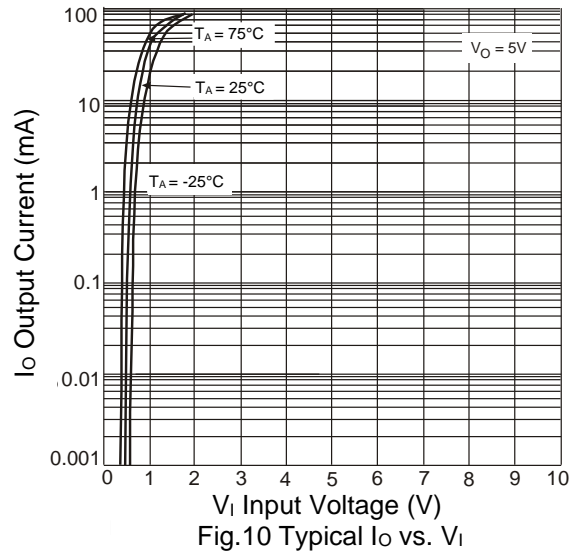
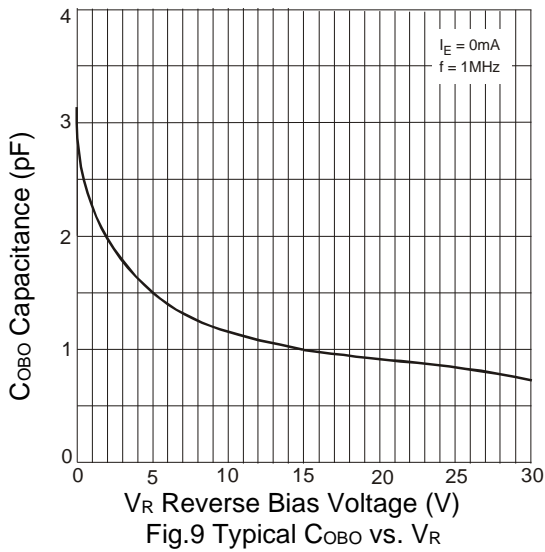
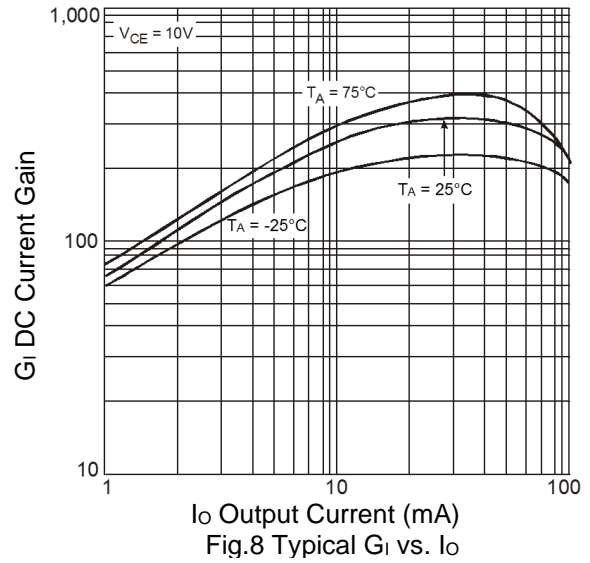
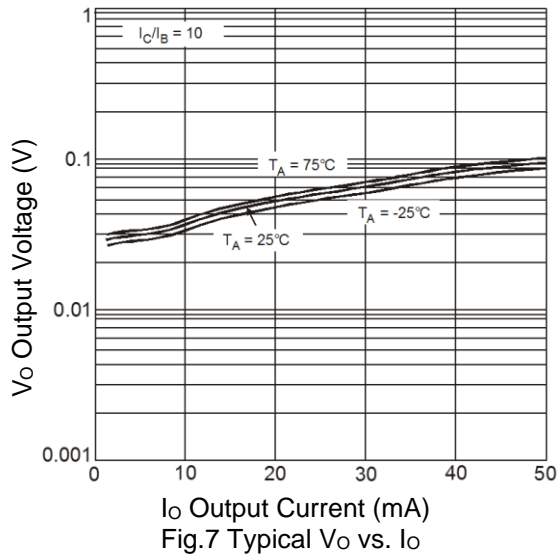
Electrical Characteristics PNP Section (@ T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition	
R1 Only (DCX143TU & DCX114TU)								
Collector-Base Breakdown Voltage		BV _{CBO}	-50	—	—	V	I _C = -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	
R1/R2 Only								
Input Voltage	DCX124EU	V _{I(off)}	-0.5	-1.1	—	V	V _{CC} = -5V, I _O = -100μA	
	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 = -0.3V, I _O = -5mA	
	DCX144EU		—	-1.9	-3.0		V _O = -0.3V, I _O = -2mA	
	DCX114YU		—	—	-1.4		V _O = -0.3V, I _O = -1mA	
	DCX123JU		—	—	-1.1		V _O = -0.3V, I _O = -5mA	
	DCX114EU		—	-1.9	-3.0		V _O = -0.3V, I _O = -10mA	
	DCX143EU		—	-2.5	-3.0		V _O = -0.3V, I _O = -20mA	
DCX143ZU	—		—	-1.3	V _O = -0.3V, I _O = -5mA			
DCX115EU	—	—	-3	V _O = -0.3V, I _O = -1mA				
Output Voltage	DCX124EU	V _{O(on)}	—	-0.1	-0.3	V	I _O /I _I = -10mA / -0.5mA	
	DCX144EU						I _O /I _I = -10mA / -0.5mA	
	DCX114YU						I _O /I _I = -5mA / -0.25mA	
	DCX123JU						I _O /I _I = -5mA / -0.25mA	
	DCX114EU						I _O /I _I = -10mA / -0.5mA	
	DCX143EU						I _O /I _I = -10mA / -0.5mA	
	DCX143ZU						I _O /I _I = -5mA / -0.25mA	
	DCX115EU						I _O /I _I = -10mA / -0.5mA	
Input Current	DCX124EU	I _I	—	—	-0.36	mA	V _I = -5V	
	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} = -50V, V _I = 0V	
DC Current Gain	DCX124EU	G _i	56	—	—	—	V _O = -5V, I _O = -5mA	
	DCX124EUQ						60	V _O = -5V, I _O = -5mA
	DCX144EU						68	V _O = -5V, I _O = -5mA
	DCX114YU						68	V _O = -5V, I _O = -10mA
	DCX114YUQ						80	V _O = -5V, I _O = -10mA
	DCX123JU						80	V _O = -5V, I _O = -10mA
	DCX114EU						30	V _O = -5V, I _O = -5mA
	DCX143EU						40	V _O = -5V, I _O = -10mA
	DCX143ZU						80	V _O = -5V, I _O = -10mA
DCX115EU	82	V _O = -5V, I _O = -5mA						
Input Resistor (R ₁) Tolerance		ΔR ₁	-30	—	+30	%	—	
Resistance Ratio Tolerance		ΔR ₂ /R ₁	-20	—	+20	%	—	
Gain-Bandwidth Product		f _T	—	250	—	MHz	V _{CE} = -10V, I _E = -5mA, f = 100MHz	

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.)

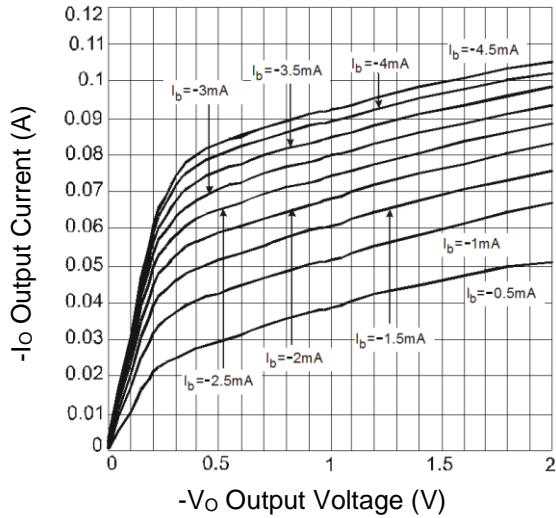


Fig. 12 Typical I_o vs. V_o

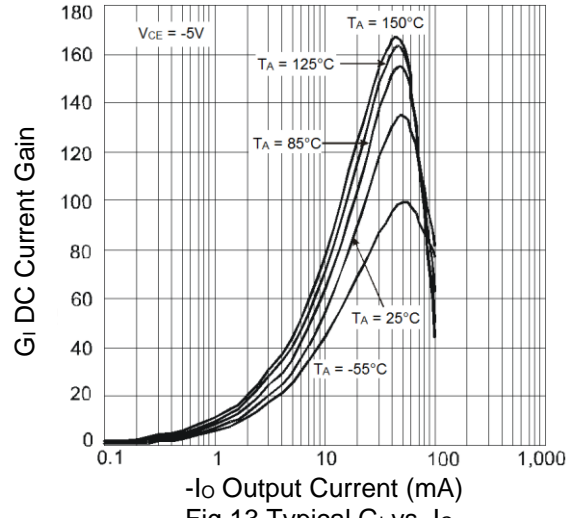


Fig. 13 Typical G_i vs. I_o

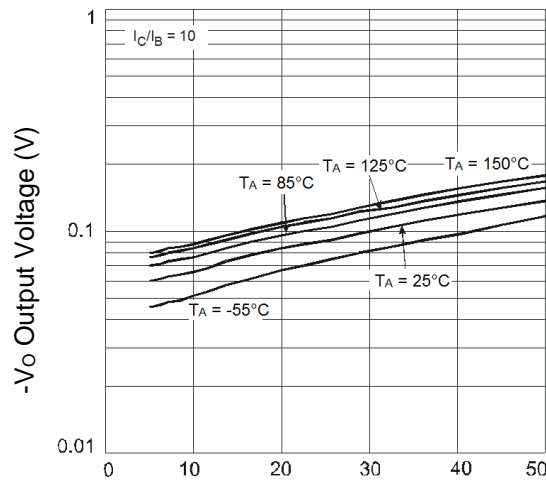


Fig. 14 Typical V_o vs. I_o

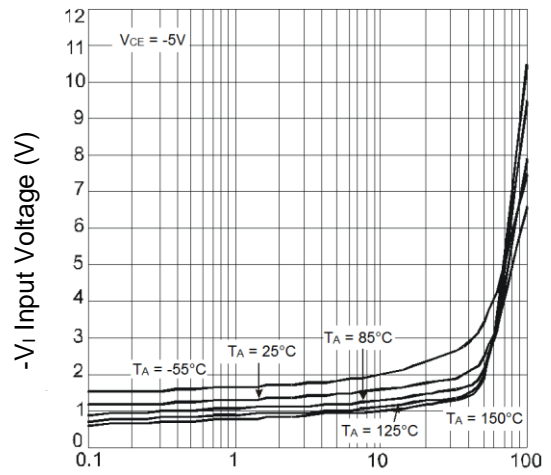


Fig. 15 Typical V_i vs. I_o

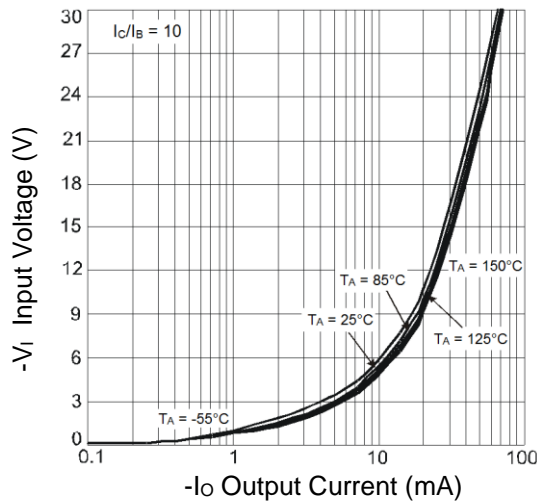


Fig. 16 Typical V_i vs. I_o

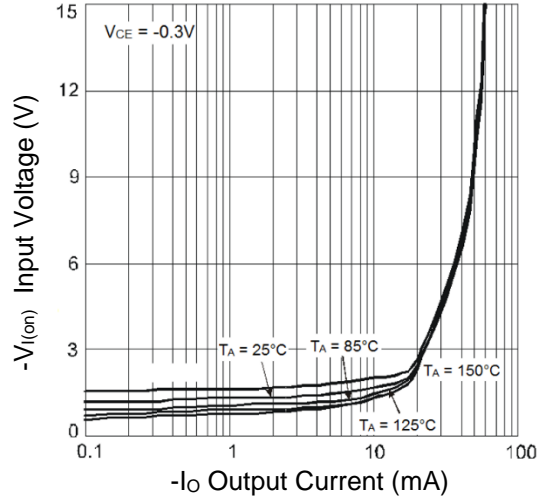
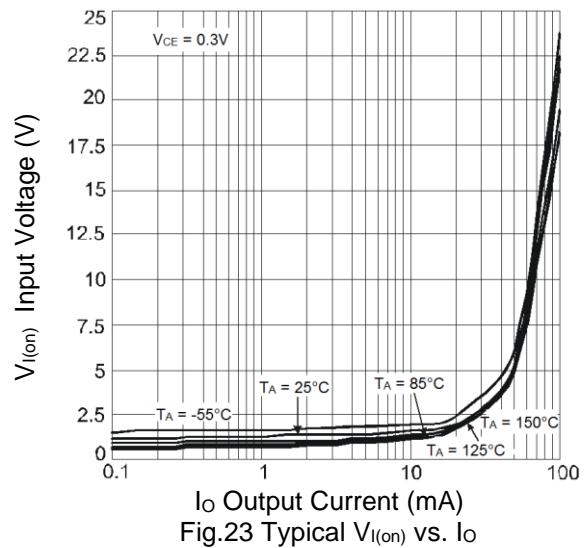
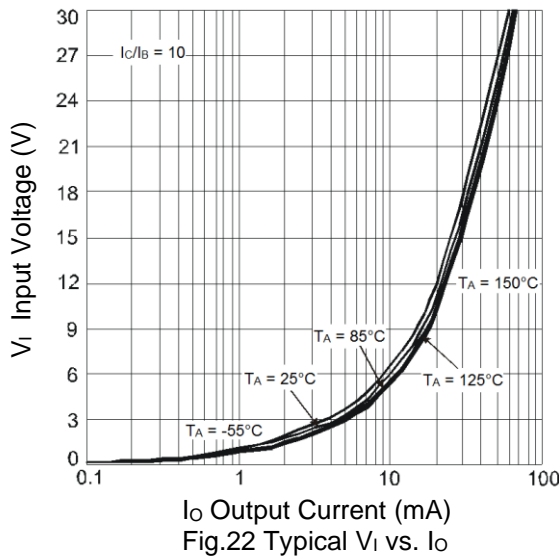
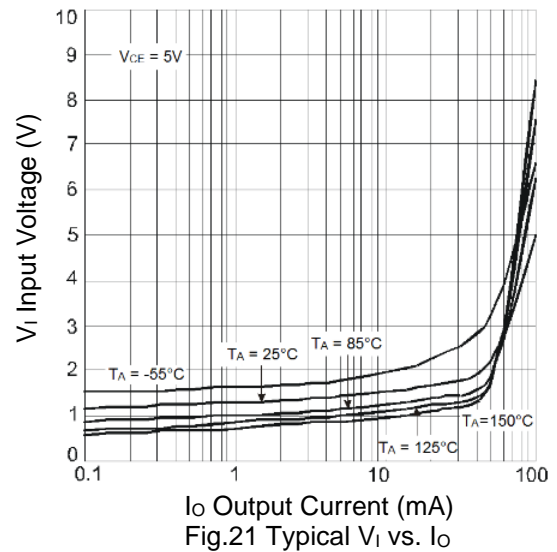
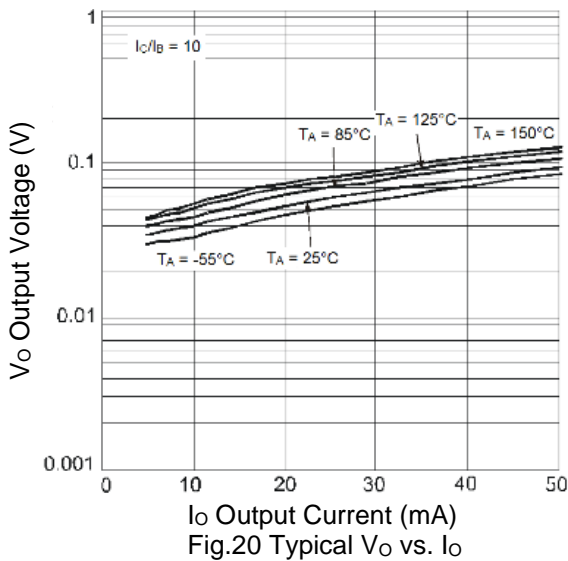
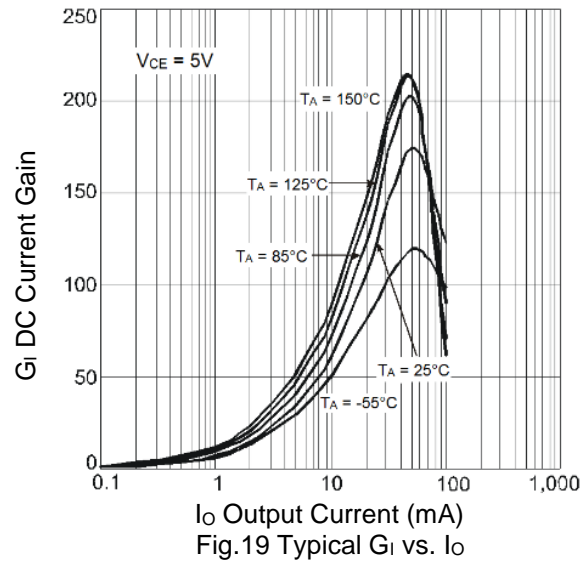
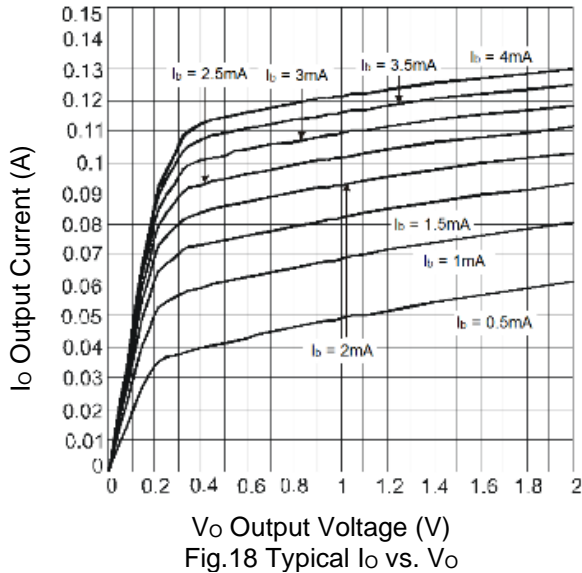


Fig. 17 Typical $V_{i(on)}$ vs. I_o

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.)

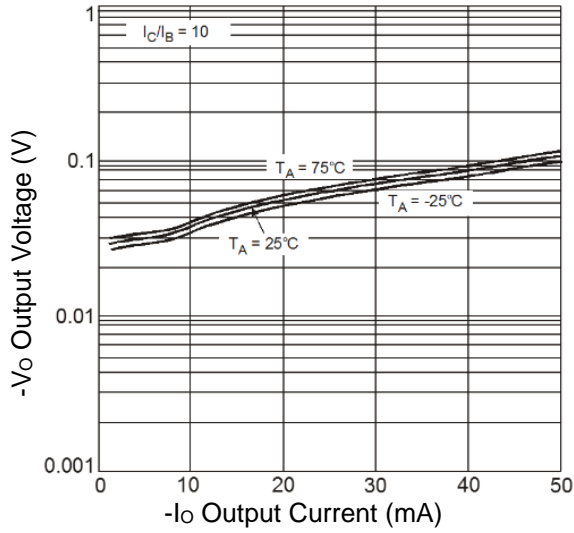


Fig.24 Typical V_O vs. I_o

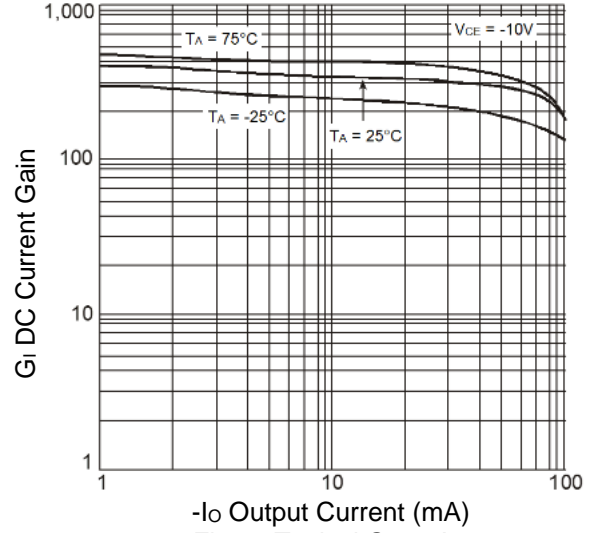


Fig.25 Typical G_I vs. I_o

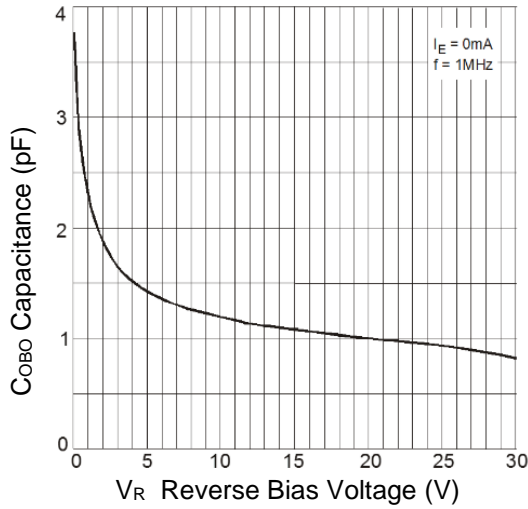


Fig.26 Typical C_{OBO} vs. V_R

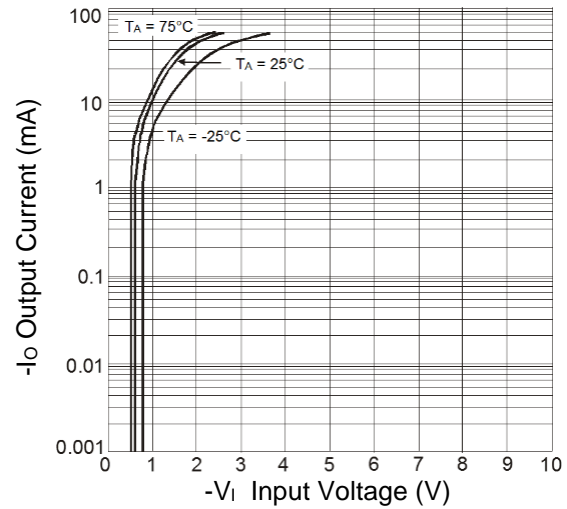


Fig.27 Typical I_o vs. V_I

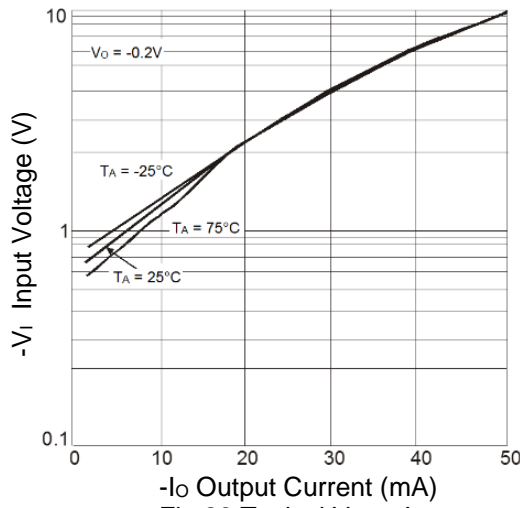
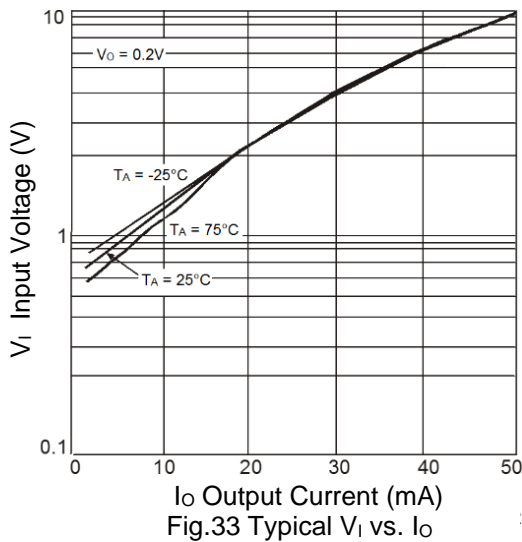
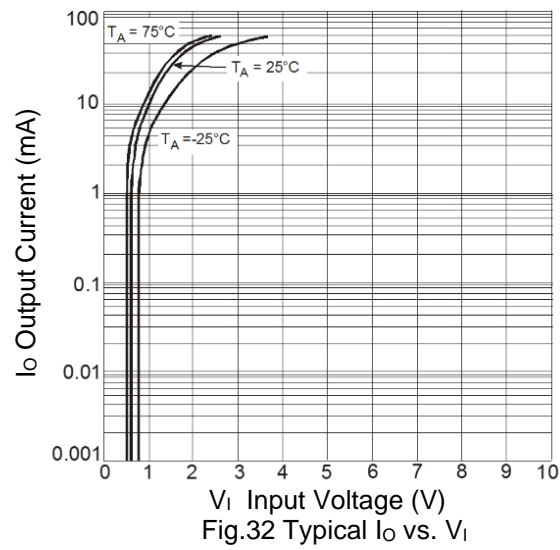
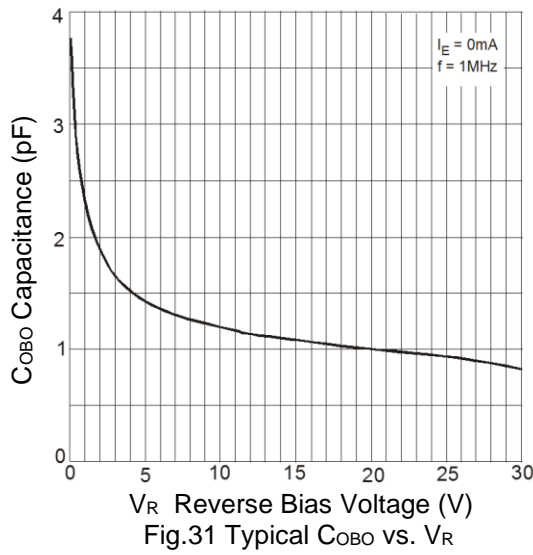
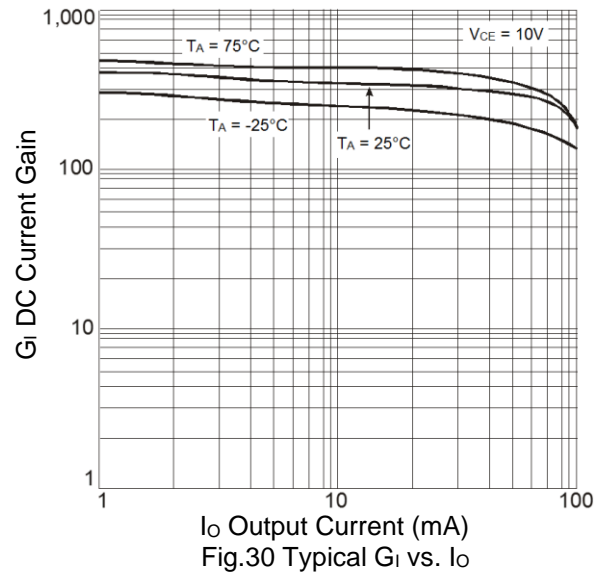
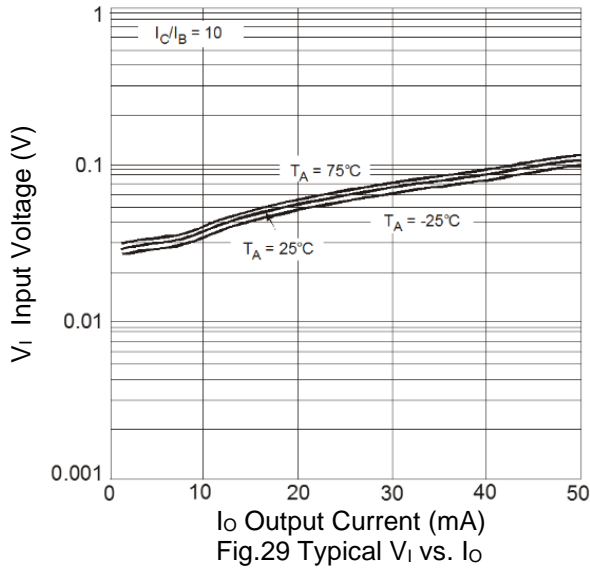


Fig.28 Typical V_I vs. I_o

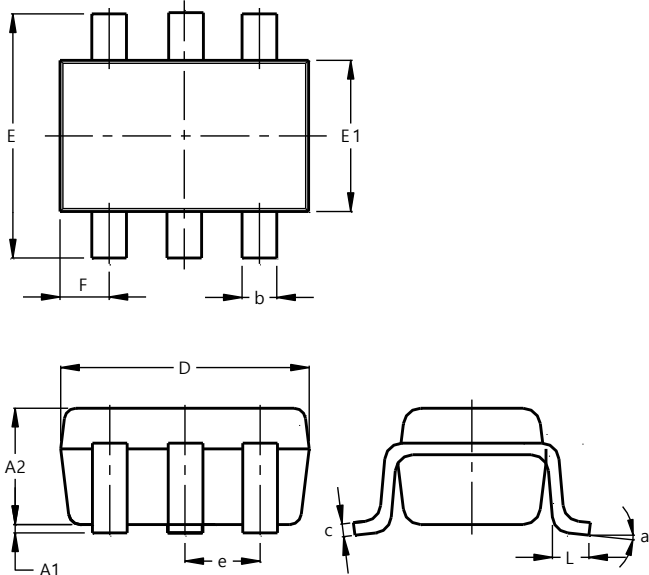
Typical Curves – DCX114TU NPN Section (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

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

SOT363

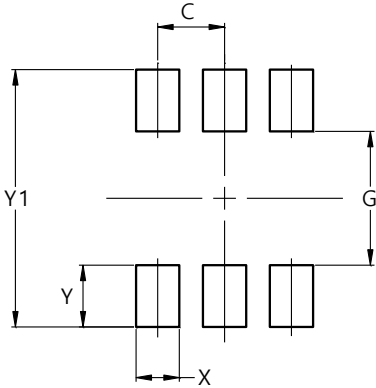


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

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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