



**THE DATASHEET OF  
DCX124EU-7**



## 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/>

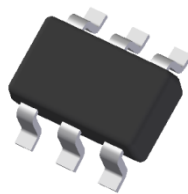
Part Number	R1(NOM)	R2(NOM)
DCX124EU	22k $\Omega$	22k $\Omega$
DCX144EU	47k $\Omega$	47k $\Omega$
DCX114YU	10k $\Omega$	47k $\Omega$
DCX123JU	2.2k $\Omega$	47k $\Omega$
DCX114EU	10k $\Omega$	10k $\Omega$
DCX143EU	4.7k $\Omega$	4.7k $\Omega$
DCX143ZU	4.7k $\Omega$	47k $\Omega$
DCX115EU	100k $\Omega$	100k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

## Mechanical Data

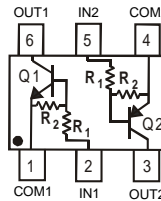
- Package: SOT363
- Package Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 Ⓒ3
- Weight: 0.006 grams (Approximate)

Part Number	R1 Only
DCX143TU	4.7k $\Omega$
DCX114TU	10k $\Omega$

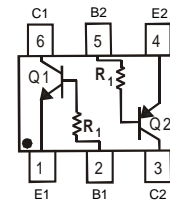
SOT363



Top View



R1, R2



R1 Only

Device Schematic

## Ordering Information (Notes 4, 5)

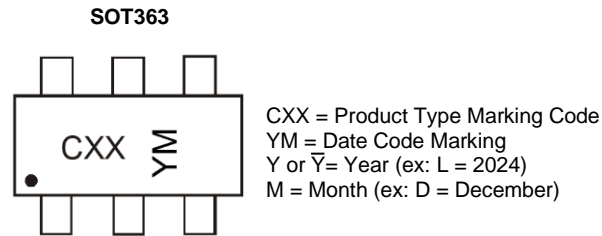
Part Number	Status	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
						Qty.	Carrier
DCX124EU-7-F	Active	SOT363	C17	7	8	3,000	Reel
DCX124EU-13-F	Active	SOT363	C17	13	8	10,000	Reel
DCX124EUQ-7-F	NRND (Use <a href="#">ACX124EUQ</a> )	SOT363	C17	7	8	3,000	Reel
DCX124EUQ-13-F	NRND (Use <a href="#">ACX124EUQ</a> )	SOT363	C17	13	8	10,000	Reel
DCX124EUQ-13R-F	NRND (Use <a href="#">ACX124EUQ</a> )	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 <a href="#">ACX114YUQ</a> )	SOT363	C14	7	8	3,000	Reel
DCX114YUQ-13-F	NRND (Use <a href="#">ACX114YUQ</a> )	SOT363	C14	13	8	10,000	Reel
DCX114YUQ-13R-F	NRND (Use <a href="#">ACX114YUQ</a> )	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 <a href="#">ACX114EUQ</a> )	SOT363	C13	7	8	3,000	Reel
DCX114EUQ-13-F	NRND (Use <a href="#">ACX114EUQ</a> )	SOT363	C13	13	8	10,000	Reel
DCX114EUQ-13R-F	NRND (Use <a href="#">ACX114EUQ</a> )	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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage		V <sub>O</sub>	50	V
Input Voltage	DCX124EU	V <sub>I</sub>	-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 <sub>O</sub>	30	mA
	DCX144EU		30	
	DCX114YU		70	
	DCX123JU		100	
	DCX114EU		50	
	DCX143TU		100	
	DCX143EU		100	
	DCX114TU		100	
	DCX143ZU		100	
DCX115EU	20			
Peak Output Current		I <sub>CM</sub>	100	mA

**Absolute Maximum Ratings PNP Section** (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Supply Voltage		V <sub>O</sub>	50	V
Input Voltage	DCX124EU	V <sub>I</sub>	+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 <sub>O</sub>	-30	mA
	DCX144EU		-30	
	DCX114YU		-70	
	DCX123JU		-100	
	DCX114EU		-50	
	DCX143TU		-100	
	DCX143EU		-100	
	DCX114TU		-100	
	DCX143ZU		-100	
DCX115EU	-20			
Peak Output Current		I <sub>CM</sub>	-100	mA

**Thermal Characteristics** (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Notes 6, 7)	P <sub>D</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 6)	R <sub>θJA</sub>	625	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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.)

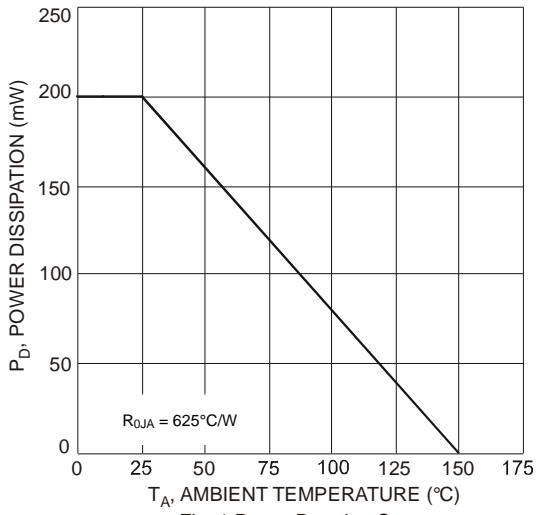


Fig. 1 Power Derating Curve

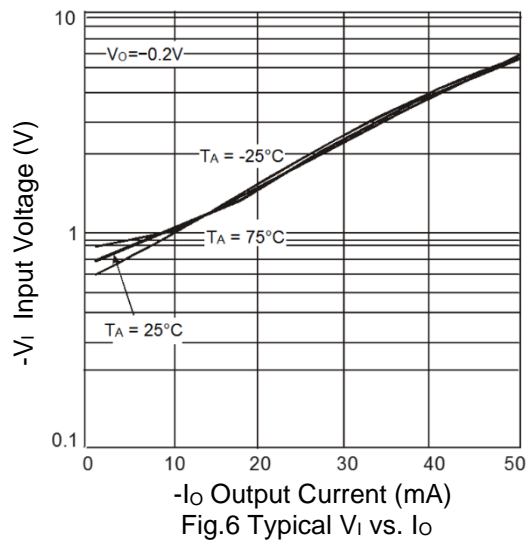
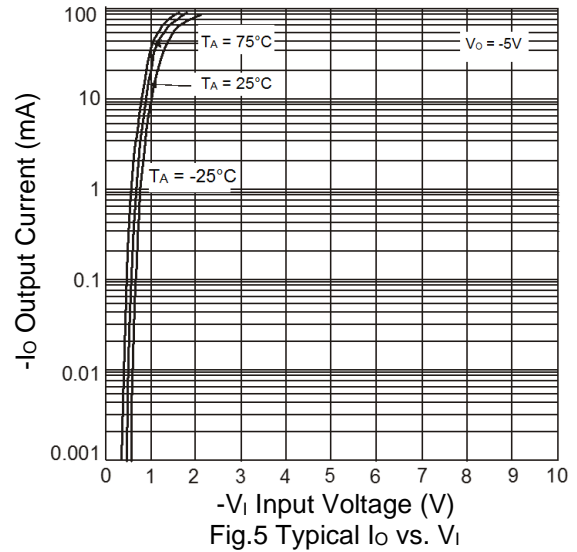
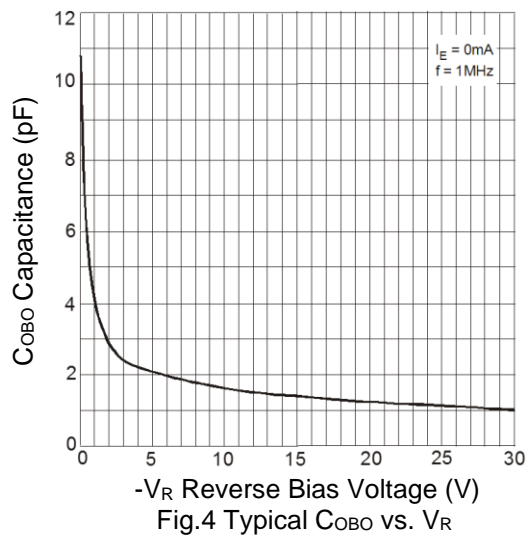
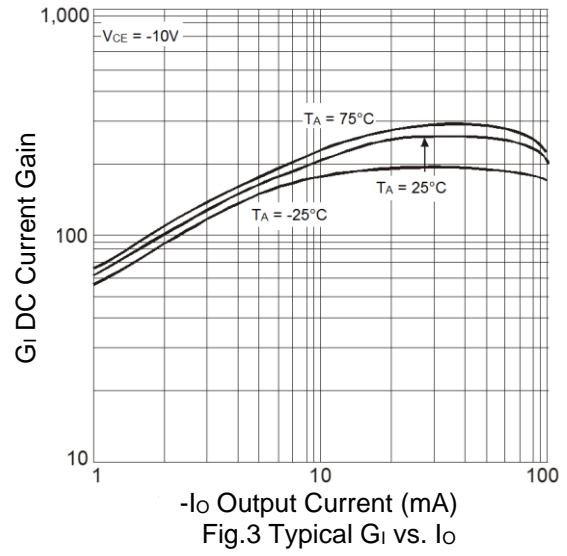
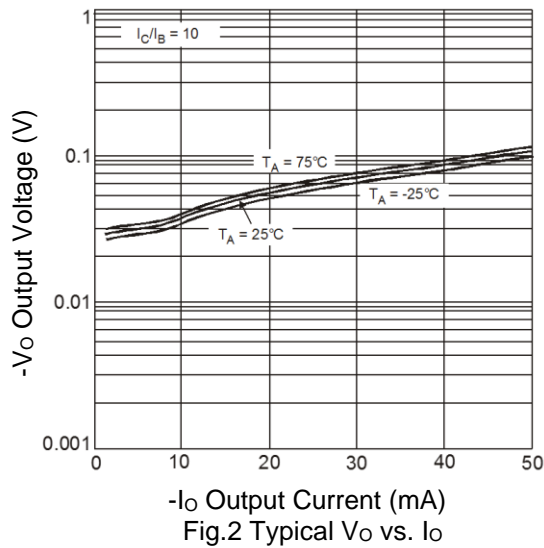
**Electrical Characteristics NPN Section** (@ T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition	
<b>R1 Only (DCX143TU &amp; DCX114TU)</b>								
Collector-Base Breakdown Voltage		BV <sub>CBO</sub>	50	—	—	V	I <sub>C</sub> = 50μA	
Collector-Emitter Breakdown Voltage		BV <sub>CEO</sub>	50	—	—	V	I <sub>C</sub> = 1mA	
Emitter-Base Breakdown Voltage		BV <sub>EBO</sub>	5	—	—	V	I <sub>E</sub> = 50μA	
Collector Cutoff Current		I <sub>CBO</sub>	—	—	0.5	μA	V <sub>CB</sub> = 50V	
Emitter Cutoff Current		I <sub>EBO</sub>	—	—	0.5	μA	V <sub>EB</sub> = 4V	
Collector-Emitter Saturation Voltage		V <sub>CE(sat)</sub>	—	—	0.3	V	I <sub>C</sub> /I <sub>B</sub> = 2.5mA / 0.25mA DCX143TU I <sub>C</sub> /I <sub>B</sub> = 1mA / 0.1mA DCX114TU	
DC Current Transfer Ratio		h <sub>FE</sub>	100	250	600	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V	
Input Resistor (R <sub>1</sub> ) Tolerance		ΔR <sub>1</sub>	-30	—	+30	%	—	
Gain-Bandwidth Product		f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz	
<b>R1/R2 Only</b>								
Input Voltage	DCX124EU	V <sub>I(off)</sub>	0.5	1.1	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 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 <sub>I(on)</sub>	—	1.9	3.0	V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA	
	DCX144EU		—	1.9	3.0		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 2mA	
	DCX114YU		—	—	1.4		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA	
	DCX123JU		—	—	1.1		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA	
	DCX114EU		—	1.9	3.0		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 10mA	
	DCX143EU		—	1.99	3.0		V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA	
DCX143ZU	—		—	1.3	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 5mA			
DCX115EU	—	—	3	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 1mA				
Output Voltage	DCX124EU	V <sub>O(on)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA	
	DCX144EU						I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA	
	DCX114YU						I <sub>O</sub> /I <sub>I</sub> = 5mA / 0.25mA	
	DCX123JU						I <sub>O</sub> /I <sub>I</sub> = 5mA / 0.25mA	
	DCX114EU						I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA	
	DCX143EU						I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA	
	DCX143ZU						I <sub>O</sub> /I <sub>I</sub> = 5mA / 0.25mA	
	DCX115EU						I <sub>O</sub> /I <sub>I</sub> = 10mA / 0.5mA	
Input Current	DCX124EU	I <sub>I</sub>	—	—	—	mA	V <sub>I</sub> = 5V	
	DCX144EU							0.36
	DCX114YU							0.18
	DCX123JU							0.88
	DCX114EU							3.6
	DCX143EU							0.88
	DCX143ZU							1.8
	DCX115EU							0.15
Output Current		I <sub>O(off)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V	
DC Current Gain	DCX124EU	G <sub>I</sub>	56	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA	
	DCX124EUQ						60	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DCX144EU						68	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DCX114YU						68	V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DCX114YUQ						80	V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DCX123JU						80	V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DCX114EU						30	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA
	DCX143EU						50	V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
	DCX143ZU						80	V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
DCX115EU	82	V <sub>O</sub> = 5V, I <sub>O</sub> = 5mA						
Input Resistor (R <sub>1</sub> ) Tolerance		ΔR <sub>1</sub>	-30	—	+30	%	—	
Resistance Ratio Tolerance		ΔR <sub>2</sub> /R <sub>1</sub>	-20	—	+20	%	—	
Gain-Bandwidth Product		f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz	

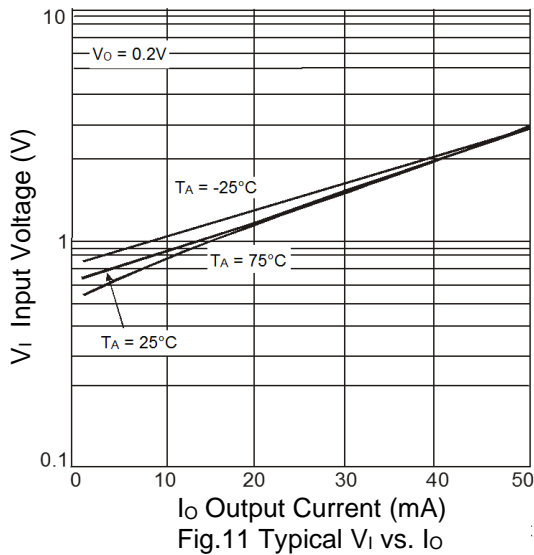
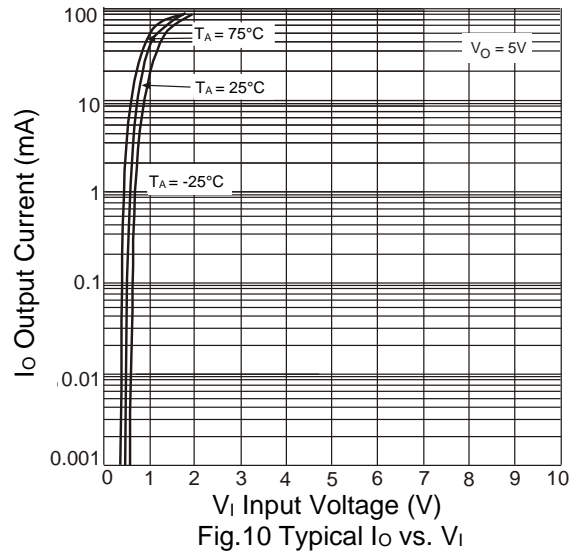
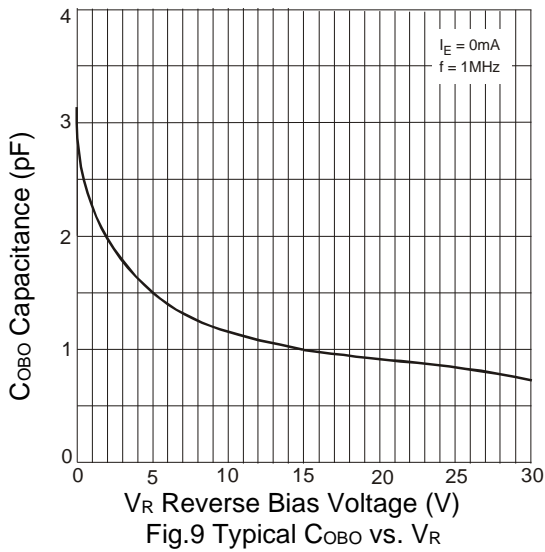
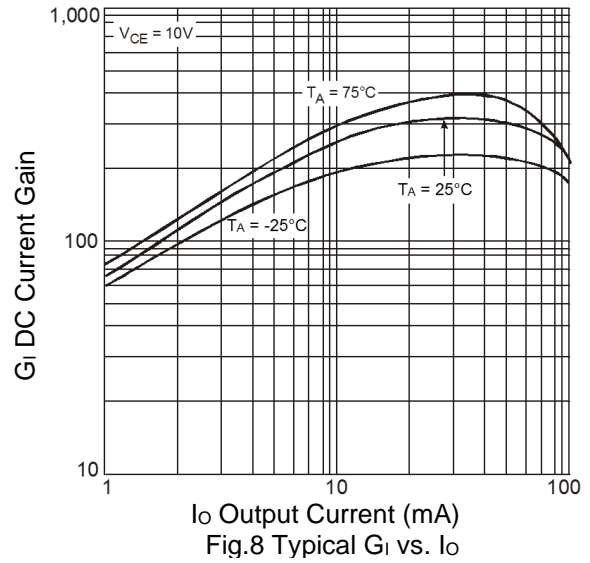
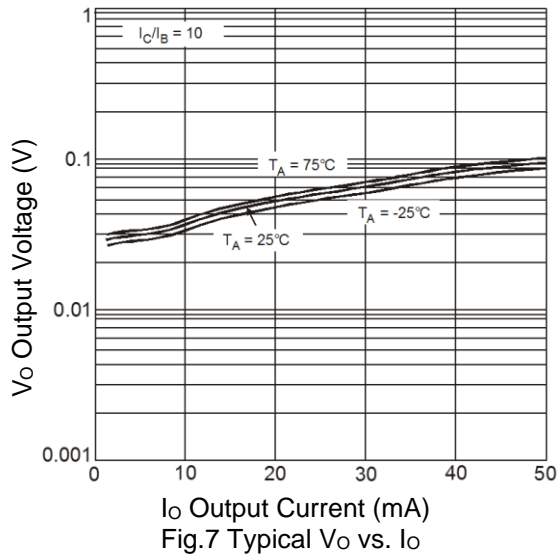
**Electrical Characteristics PNP Section** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition	
<b>R1 Only (DCX143TU &amp; DCX114TU)</b>								
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	$\mu\text{A}$	$V_{CB} = -50\text{V}$	
Emitter Cutoff Current		$I_{EBO}$	—	—	-0.5	$\mu\text{A}$	$V_{EB} = -4\text{V}$	
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		$\Delta R_1$	-30	—	+30	%	—	
Gain-Bandwidth Product		$f_T$	—	250	—	MHz	$V_{CE} = -10\text{V}$ , $I_E = -5\text{mA}$ , $f = 100\text{MHz}$	
<b>R1/R2 Only</b>								
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	$\mu\text{A}$	$V_{CC} = -50\text{V}$ , $V_I = 0\text{V}$	
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		$\Delta R_1$	-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.)

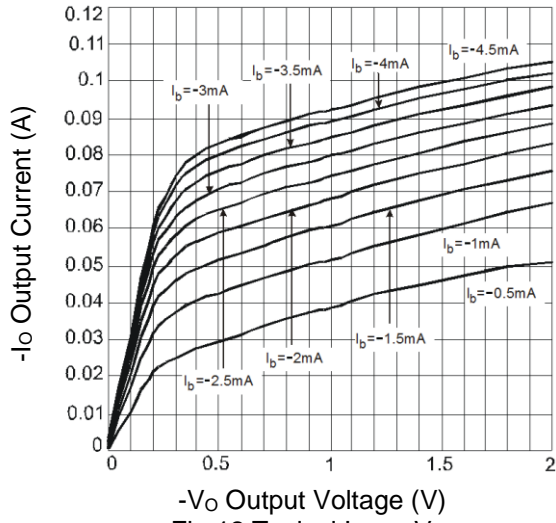


Fig.12 Typical  $I_o$  vs.  $V_o$

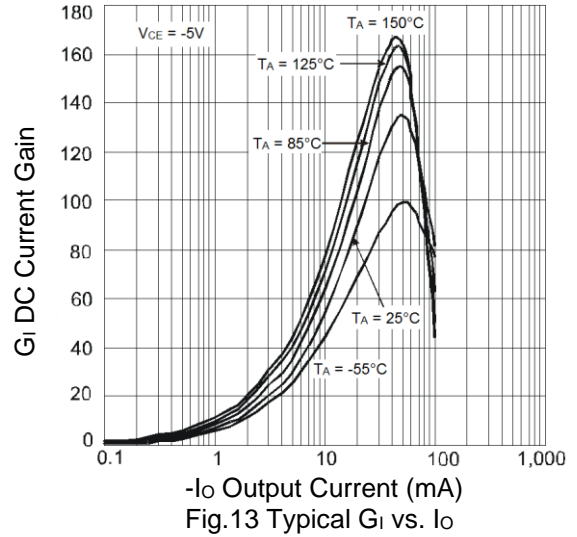


Fig.13 Typical  $G_i$  vs.  $I_o$

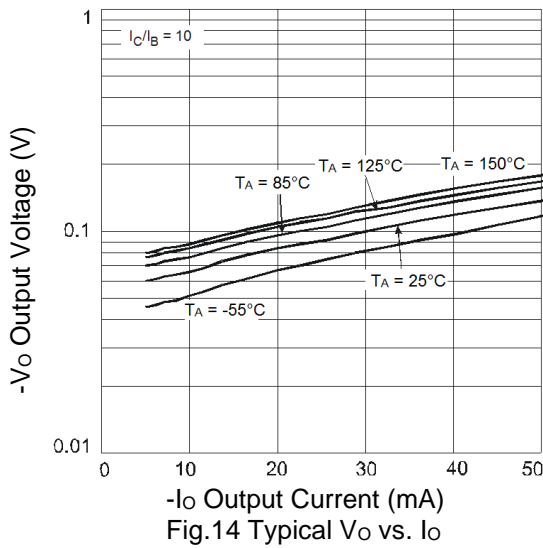


Fig.14 Typical  $V_o$  vs.  $I_o$

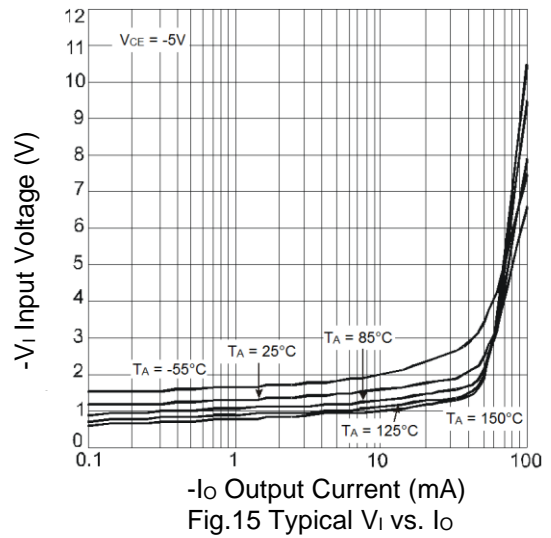


Fig.15 Typical  $V_i$  vs.  $I_o$

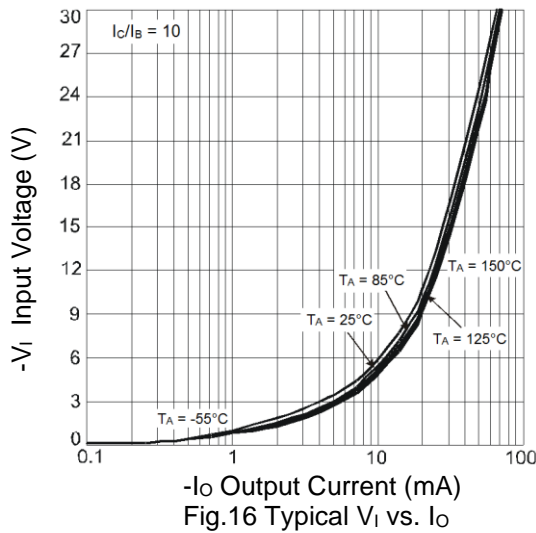


Fig.16 Typical  $V_i$  vs.  $I_o$

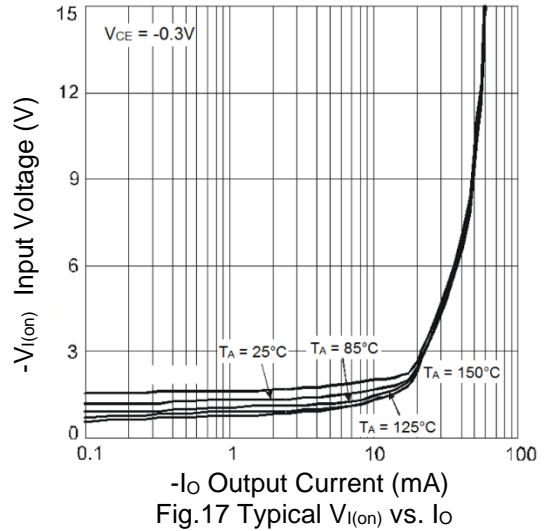
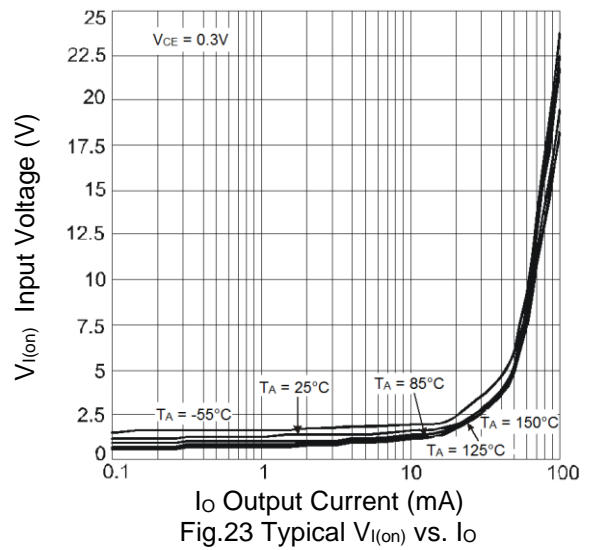
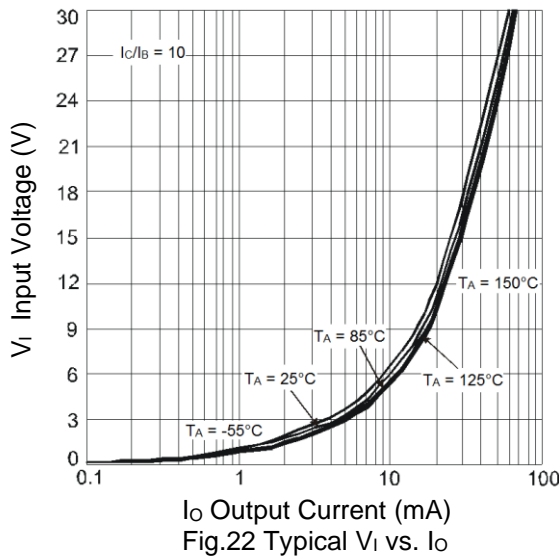
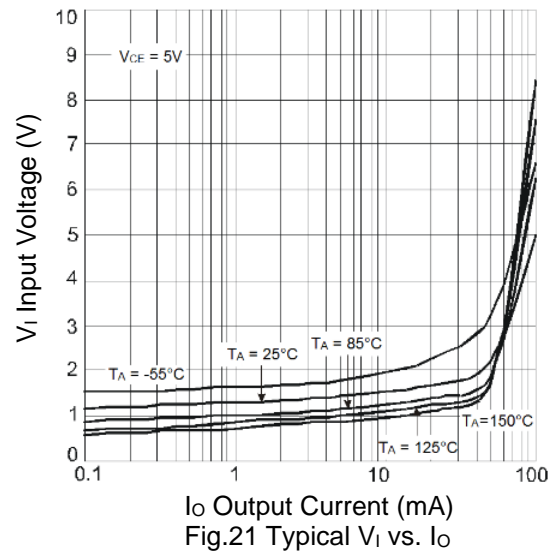
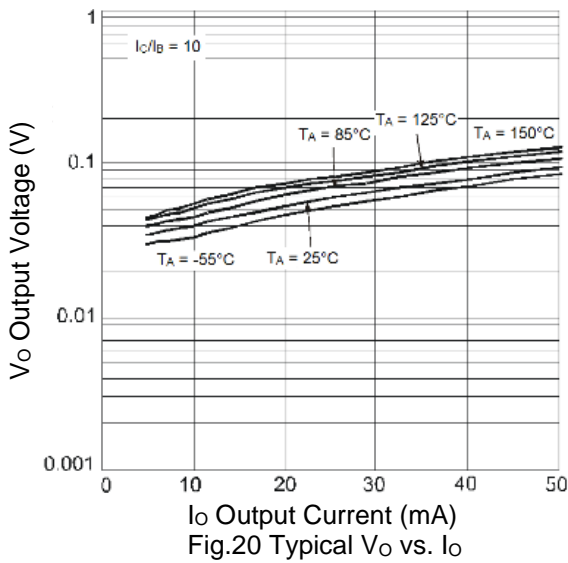
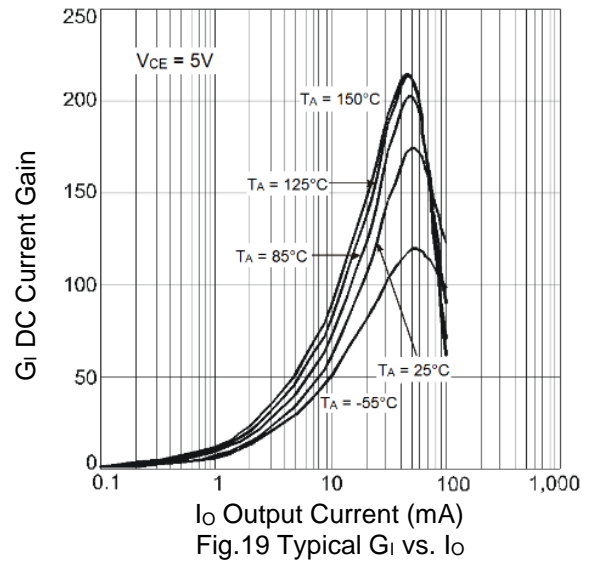
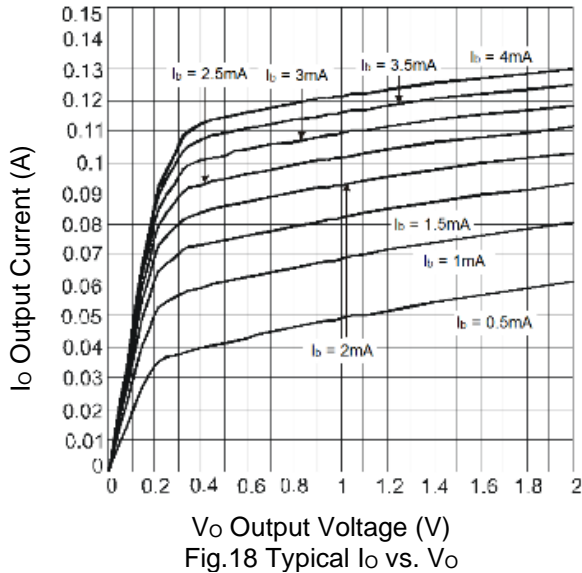


Fig.17 Typical  $V_{i(on)}$  vs.  $I_o$

**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.)

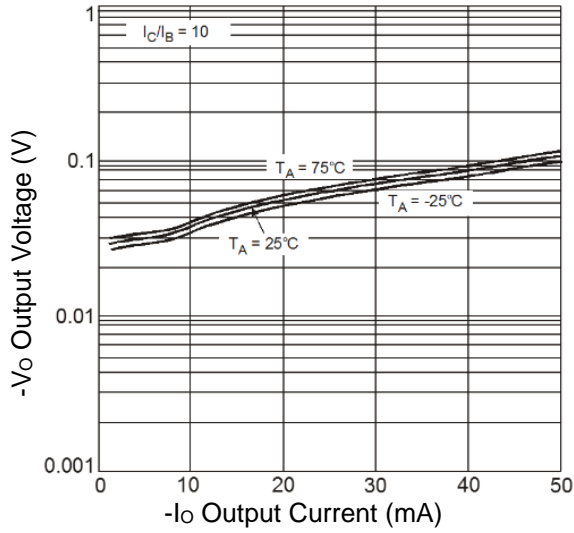


Fig.24 Typical  $V_O$  vs.  $I_o$

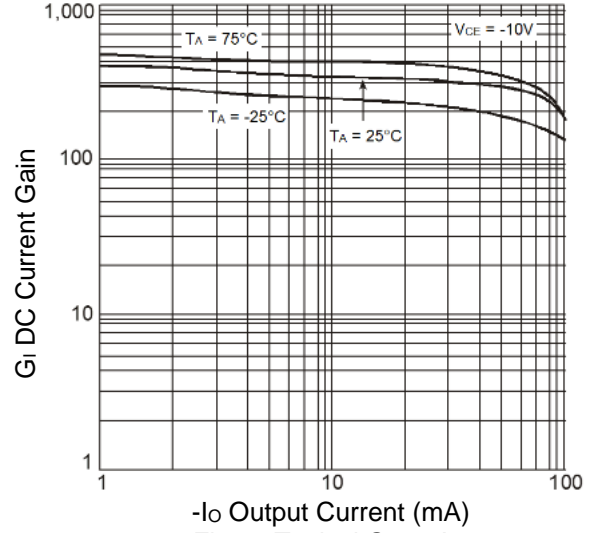


Fig.25 Typical  $G_1$  vs.  $I_o$

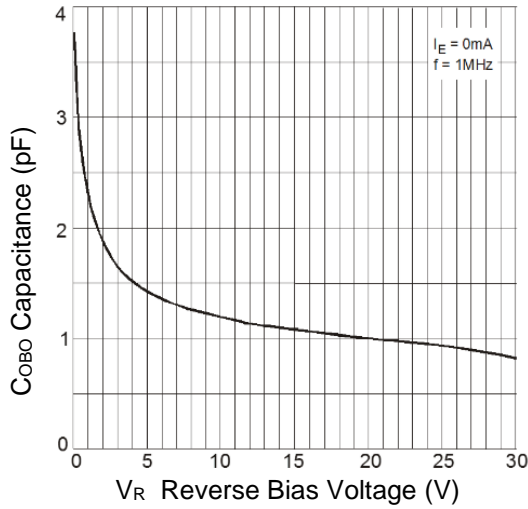


Fig.26 Typical  $C_{OBO}$  vs.  $V_R$

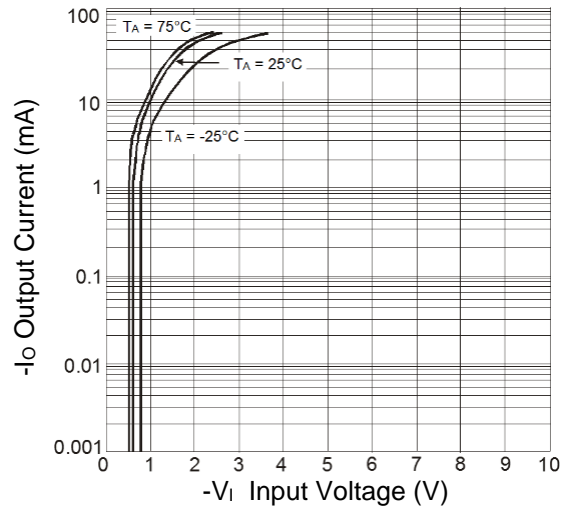


Fig.27 Typical  $I_o$  vs.  $V_I$

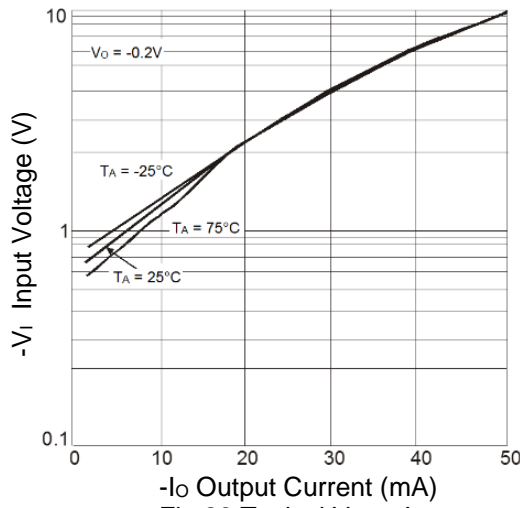
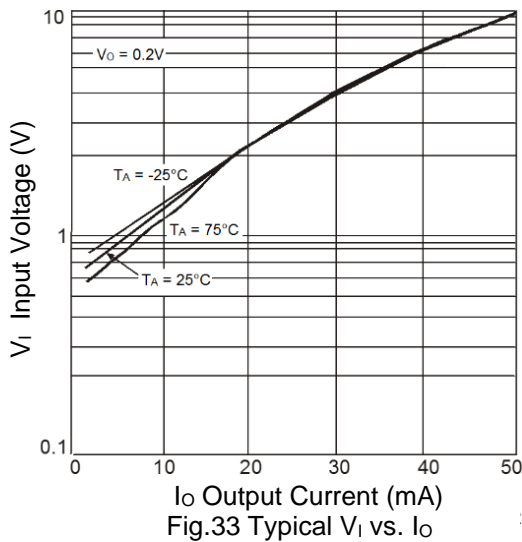
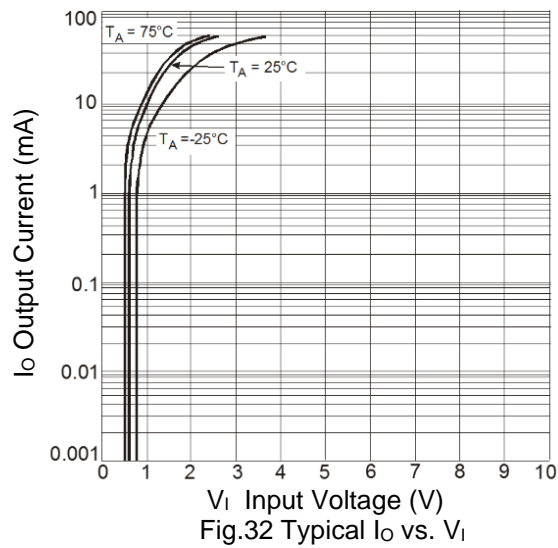
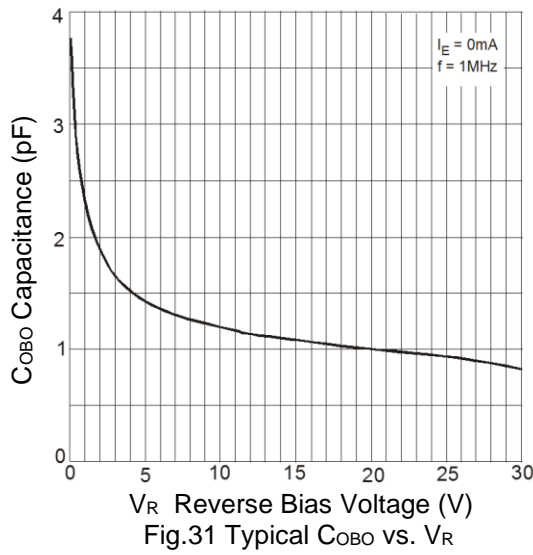
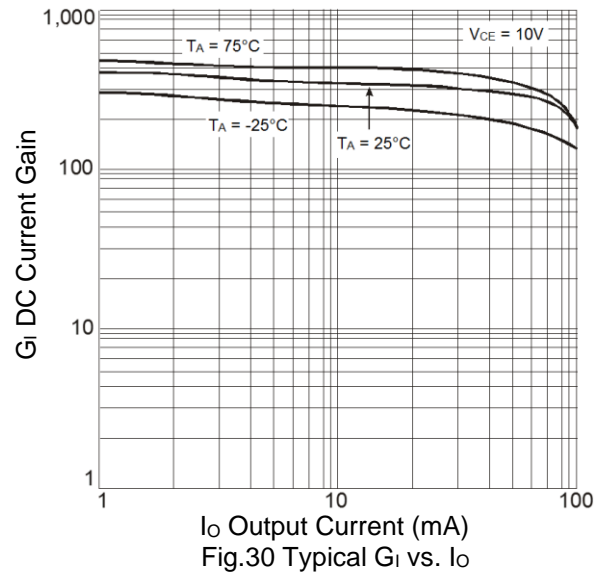
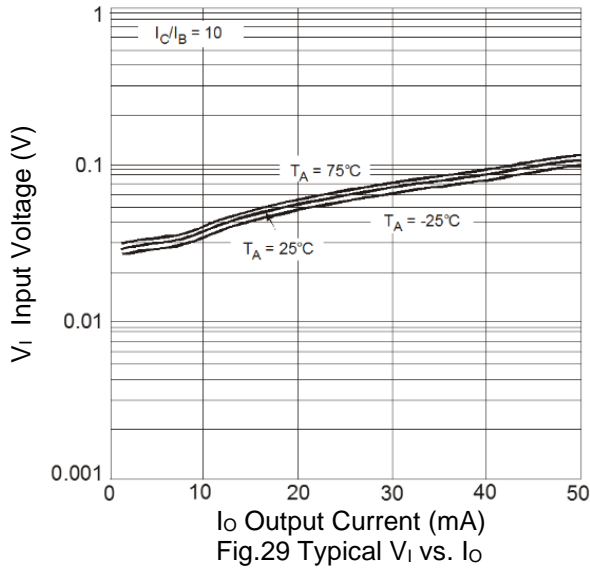


Fig.28 Typical  $V_I$  vs.  $I_o$

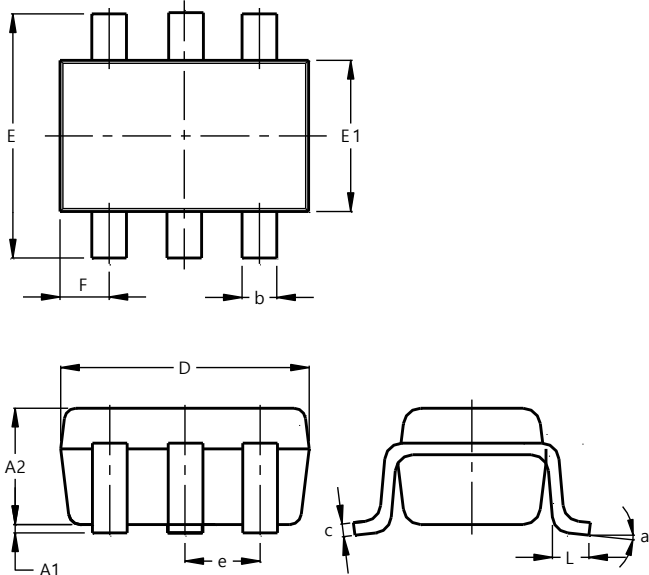
**Typical Curves – DCX114TU NPN Section** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

SOT363

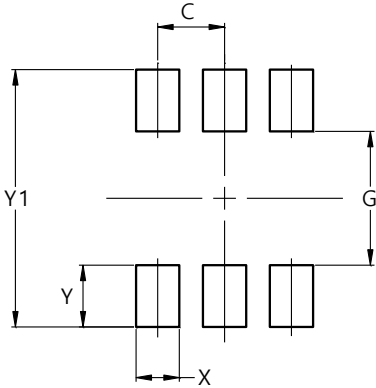


SOT363			
Dim	Min	Max	Typ
A1	0.00	0.10	0.05
A2	0.90	1.00	0.95
b	0.10	0.30	0.25
c	0.10	0.22	0.11
D	1.80	2.20	2.15
E	2.00	2.20	2.10
E1	1.15	1.35	1.30
e	0.650 BSC		
F	0.40	0.45	0.425
L	0.25	0.40	0.30
a	0°	8°	--
All Dimensions in mm			

**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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