

DUAL COMPLEMENTARY PRE-BIASED TRANSISTOR IN SOT26

Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.**

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

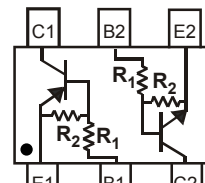
Part Number	R1	R2
DCX124EK	22kΩ	22kΩ
DCX144EK	47kΩ	47kΩ
DCX114YK	10kΩ	47kΩ
DCX123JK	2.2kΩ	47kΩ
DCX114EK	10kΩ	10kΩ
DCX115EK	100kΩ	100kΩ
DCX143TK	4.7kΩ	—
DCX114TK	10kΩ	—



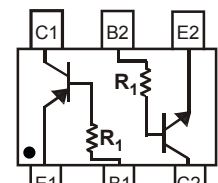
SOT26

Mechanical Data

- Case: SOT26
- Surface Mount Package
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 Ⓔ3
- Weight: 0.016 grams (Approximate)



R1, R2 Device Schematic



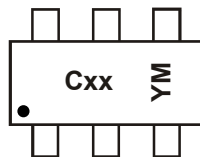
R1 only Device Schematic

Ordering Information (Note 4)

Part Number	Status	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
DCX124EK-7-F	Active	Standard	C17	7	8	3,000
DCX144EK-7	Obsolete	Standard	C20	7	8	3,000
DCX114YK-7-F	Obsolete	Standard	C14	7	8	3,000
DCX123JK-7	Obsolete	Standard	C06	7	8	3,000
DCX114EK-7	Obsolete	Standard	C13	7	8	3,000
DCX115EK-7-F	Active	Standard	C15	7	8	3,000
DCX143TK-7-F	Obsolete	Standard	C07	7	8	3,000
DCX114TK-7	Obsolete	Standard	C12	7	8	3,000

- 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/>.

Marking Information



Cxx = Product Type Marking Code (See Page 1)
 YM = Date Code Marking
 Y = Year (ex: I = 2021)
 M = Month (ex: 9 = September)

Date Code Key

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	I	J	K	L	M	N	O	P	R	S	T	U

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

Maximum Ratings NPN Section @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage		V _{CC}	50	V
Input Voltage	DCX124EK	V _{IN}	-10 to +40	V
	DCX144EK		-10 to +40	
	DCX114YK		-6 to +40	
	DCX123JK		-5 to +12	
	DCX114EK		-10 to +40	
	DCX115EK		-10 to +40	
	DCX143TK DCX114TK		-5V max -5V max	
Output Current	DCX124EK	I _O	30	mA
	DCX144EK		30	
	DCX114YK		70	
	DCX123JK		100	
	DCX114EK		50	
	DCX115EK		20	
	DCX143TK DCX114TK		100 100	
Output Current	All	I _{C(MAX)}	100	mA

Thermal Characteristics NPN Section

Characteristic	Symbol	Value	Unit
Power Dissipation (Total) (Note 5)	P _D	300	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	R _{θJA}	417	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Maximum Ratings PNP Section @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Value	Unit
Supply Voltage		V _{CC}	50	V
Input Voltage	DCX124EK	V _{IN}	+10 to -40	V
	DCX144EK		+10 to -40	
	DCX114YK		+6 to -40	
	DCX123JK		+5 to -12	
	DCX114EK		+10 to -40	
	DCX115EK		+10 to -40	
	DCX143TK DCX114TK		+5V max +5V max	
Output Current	DCX124EK	I _O	-30	mA
	DCX144EK		-30	
	DCX114YK		-70	
	DCX123JK		-100	
	DCX114EK		-50	
	DCX115EK		-20	
	DCX143TK DCX114TK		-100 -100	
Output Current	All	I _{C(MAX)}	-100	mA

Thermal Characteristics PNP Section

Characteristic	Symbol	Value	Unit
Power Dissipation (Total) (Note 5)	P _D	300	mW
Thermal Resistance, Junction to Ambient Air (Note 5)	R _{θJA}	417	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 5. Mounted on FR-4 PC Board with minimum recommended pad layout.

Electrical Characteristics NPN Section (R1 only) @ T_A = 25°C unless otherwise specified

Characteristic (DDC143TK & DDC114TK only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CB0}	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 Cut-Off Current	I _{CB0}	—	—	0.5	μA	V _{CB} = 50V
Emitter Cut-Off 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	%	—
Transition frequency (Note 6)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = -5mA, f = 100MHz

Electrical Characteristics NPN Section (R1 & R2) (continued) @ T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Input Voltage	V _{I(off)}	0.5	1.1	—	V	V _{CC} = 5V, I _O = 100μA	
		DCX124EK	0.5	1.1			
		DCX144EK	0.3	—			
		DCX114YK	0.5	—			
		DCX123JK	0.5	1.1			
		DCX114EK	0.5	1.1			
Input Voltage	V _{I(on)}	—	1.65	3.0	V	V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 2mA V _O = 0.3V, I _O = 1mA V _O = 0.3V, I _O = 5mA V _O = 0.3V, I _O = 10mA V _O = 0.3V, I _O = 1mA	
		DCX124EK	—	1.9			3.0
		DCX144EK	—	—			1.4
		DCX114YK	—	—			1.1
		DCX123JK	—	1.9			3.0
		DCX114EK	—	1.9			3.0
Output Voltage	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 I _O /I _I = 5mA / 0.25mA	
		DCX124EK	—	—			—
		DCX144EK	—	—			—
		DCX114YK	—	—			—
		DCX123JK	—	—			—
		DCX114EK	—	—			—
Input Current	I _I	—	—	0.36	mA	V _I = 5V	
		DCX124EK	—	—			0.18
		DCX144EK	—	—			0.88
		DCX114YK	—	—			3.6
		DCX123JK	—	—			0.88
		DCX114EK	—	—			0.15
Output Current	I _{O(off)}	—	—	0.5	μA	V _{CC} = 50V, V _I = 0V	
DC Current Gain	G _I	80	—	—	—	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 = 5mA	
		DCX124EK	68	—			—
		DCX144EK	68	—			—
		DCX114YK	80	—			—
		DCX123JK	30	—			—
		DCX114EK	82	—			—
Input Resistor (R ₁) Tolerance	ΔR ₁	-30	—	+30	%	—	
Resistance Ratio Tolerance	R ₂ /R ₁	-20	—	+20	%	—	
Transition frequency (Note 6)	f _T	—	250	—	MHz	V _{CE} = 10V, I _E = -5mA, f = 100MHz	

Note: 6. Transistor - for reference only.

Electrical Characteristics PNP Section (R1 only) @ T_A = 25°C unless otherwise specified

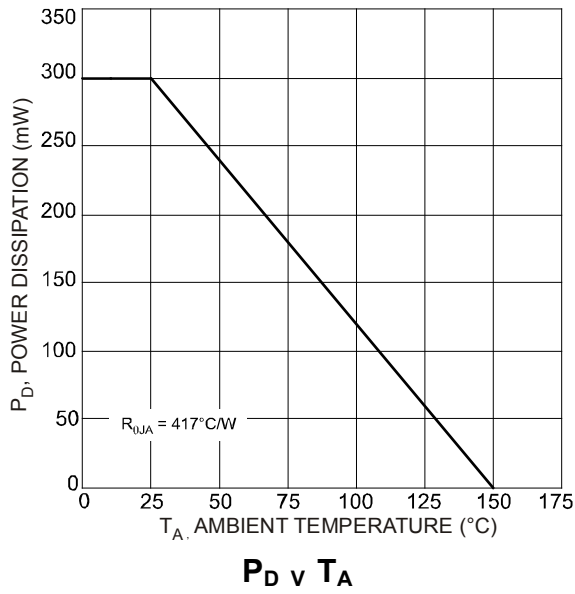
Characteristic (DCX143TK & DCX114TK only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV _{CBO}	-50	—	—	V	I _C = -50μA
Collector-Emitter Breakdown Voltage	BV _{CEO}	-50	—	—	V	I _C = -1mA
Emitter-Base Breakdown Voltage	BV _{EBO}	-5	—	—	V	I _E = -50μA
Collector Cut-Off Current	I _{CBO}	—	—	-0.5	μA	V _{CB} = -50V
Emitter Cut-Off 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	%	—
Transition frequency (Note 6)	f _T	—	250	—	MHZ	V _{CE} = -10V, I _E = 5mA, f = 100MHZ

Electrical Characteristics PNP Section (R1 & R2) (continued) @ T_A = 25°C unless otherwise specified

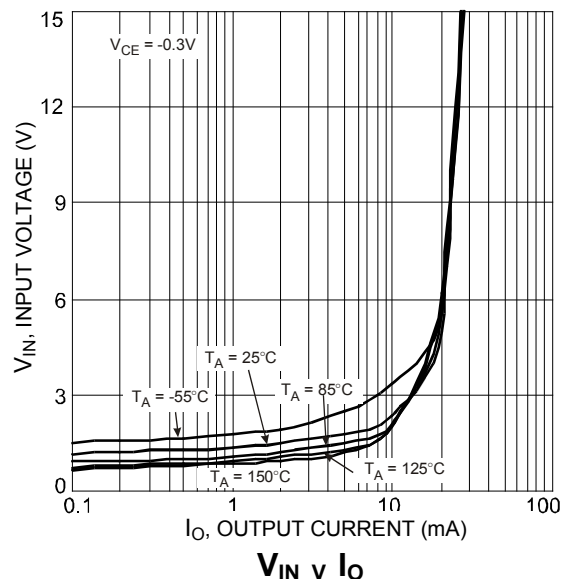
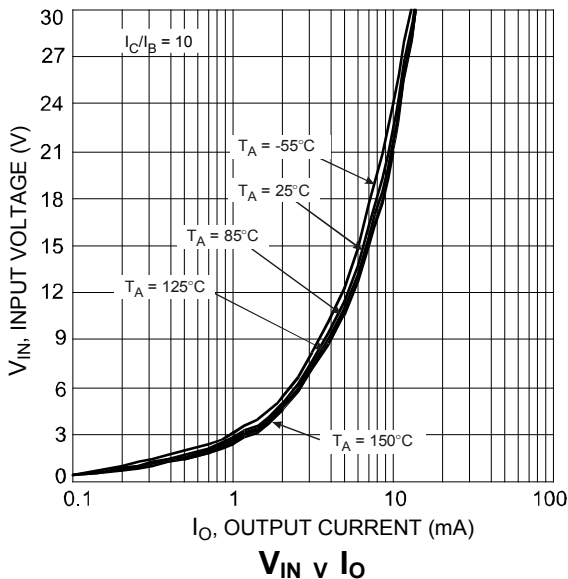
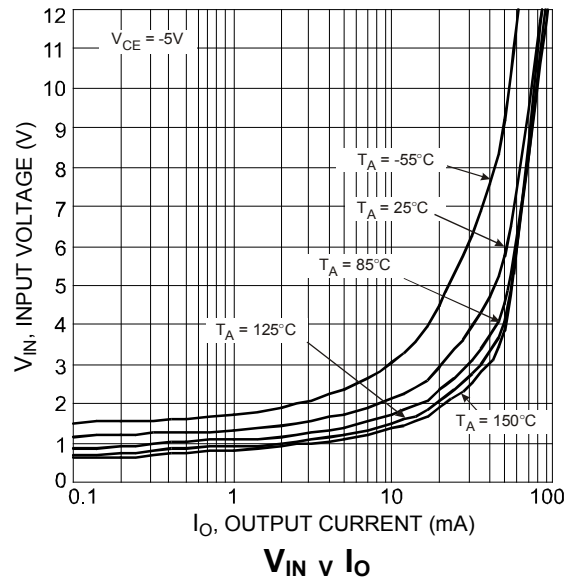
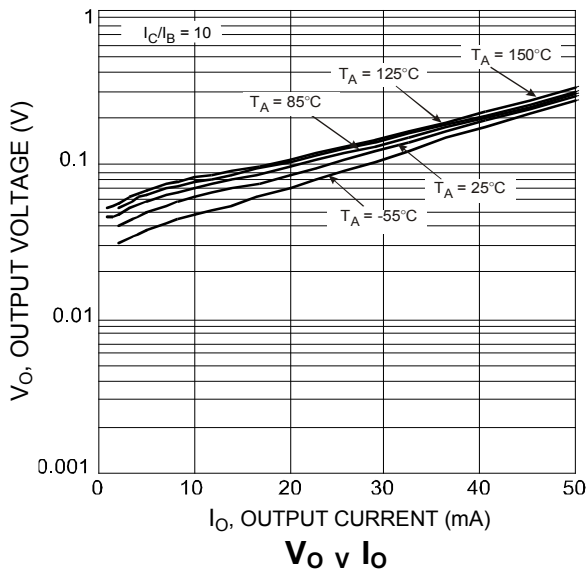
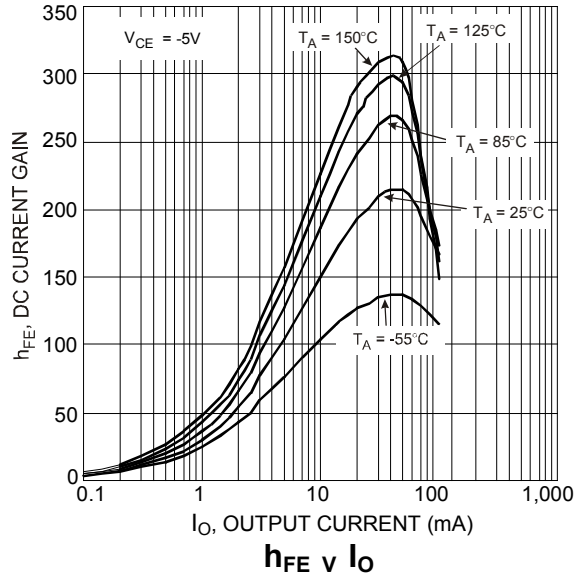
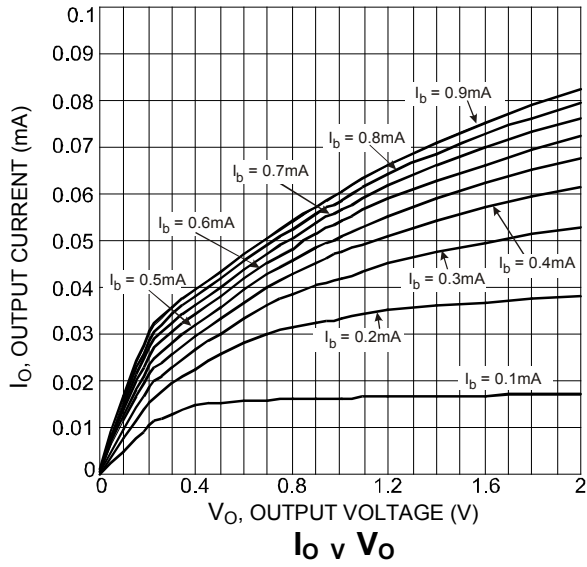
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Input Voltage	V _{I(off)}	DCX124EK	-0.5	-1.1	—	V	V _{CC} = -5V, I _O = -100μA
		DCX144EK	-0.5	-1.1	—		
		DCX114YK	-0.3	—	—		
		DCX123JK	-0.5	—	—		
		DCX114EK	-0.5	-1.1	—		
		DCX115EK	-0.5	-1.1	—		
Input Voltage	V _{I(on)}	DCX124EK	—	-1.9	-3.0	V	V _O = -0.3V, I _O = -5mA
		DCX144EK	—	-1.9	-3.0		
		DCX114YK	—	—	-1.4		
		DCX123JK	—	—	-1.1		
		DCX114EK	—	-1.9	-3.0		
		DCX115EK	—	-1.9	-3.0		
Output Voltage	V _{O(on)}	DCX124EK	—	-0.1	-0.3	V	I _O /I _I = -10mA / -0.5mA
		DCX144EK	—	-0.1	-0.3		
		DCX114YK	—	-0.1	-0.3		
		DCX123JK	—	-0.1	-0.3		
		DCX114EK	—	-0.1	-0.3		
		DCX115EK	—	-0.1	-0.3		
Input Current	I _I	DCX124EK	—	—	-0.36	mA	V _I = -5V
		DCX144EK	—	—	-0.18		
		DCX114YK	—	—	-0.88		
		DCX123JK	—	—	-3.6		
		DCX114EK	—	—	-0.88		
		DCX115EK	—	—	-0.15		
Output Current	I _{O(off)}	—	—	-0.5	μA	V _{CC} = 50V, V _I = 0V	
DC Current Gain	G _I	DCX124EK	80	—	—	—	V _O = -5V, I _O = -5mA
		DCX144EK	68	—	—		
		DCX114YK	68	—	—		
		DCX123JK	80	—	—		
		DCX114EK	30	—	—		
		DCX115EK	82	—	—		
Input Resistor (R ₁) Tolerance	ΔR ₁	-30	—	+30	%	—	
Resistance Ratio Tolerance	R ₂ /R ₁	-20	—	+20	%	—	
Transition Frequency (Note 6)	f _T	—	250	—	MHZ	V _{CE} = -10V, I _E = -5mA, f = 100MHZ	

Note: 6. Transistor - for reference only.

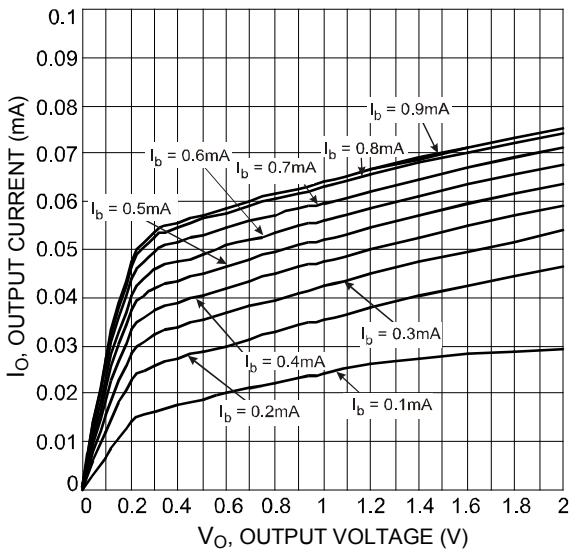
Typical Curves – Total Device



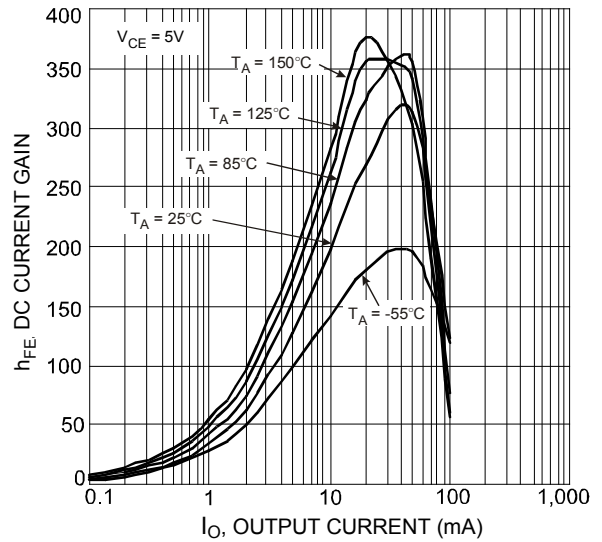
Typical Curves – DCX124EK PNP Section



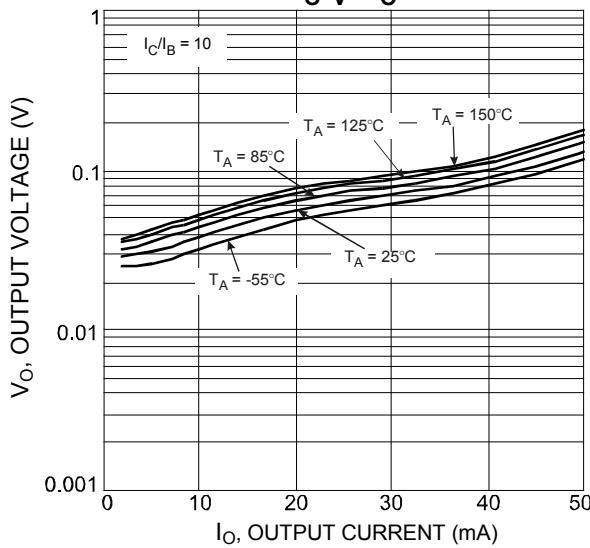
Typical Curves – DCX124EK NPN Section



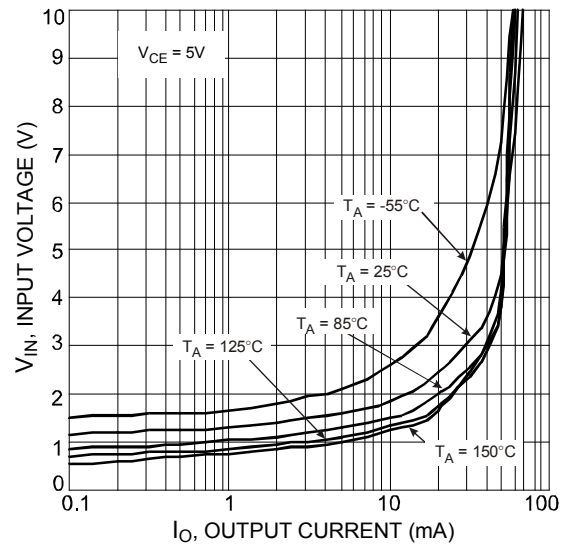
I_O v V_O



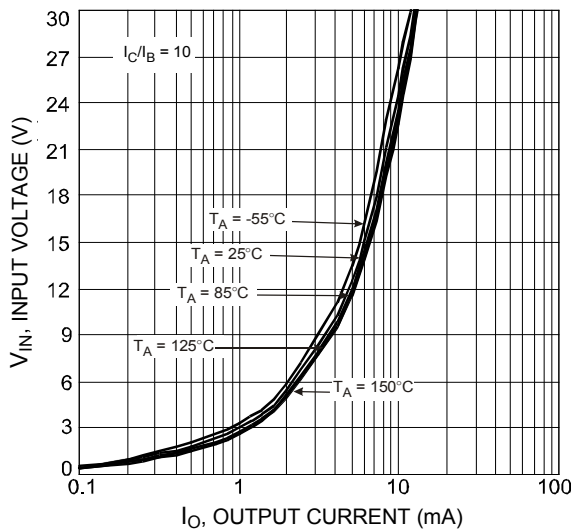
h_{FE} v I_O



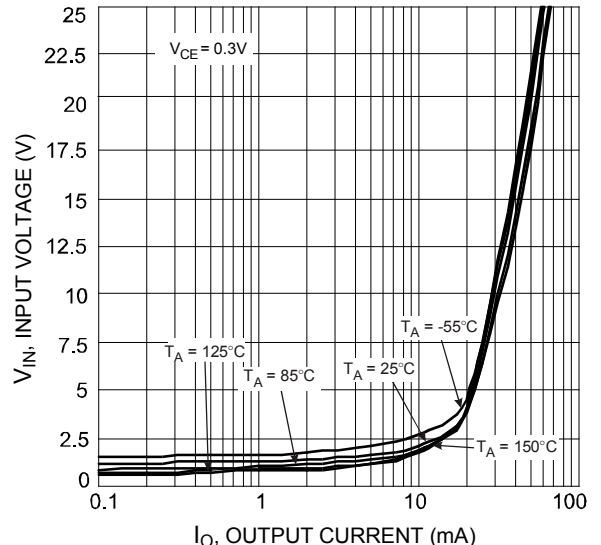
V_O v I_O



V_{IN} v I_O

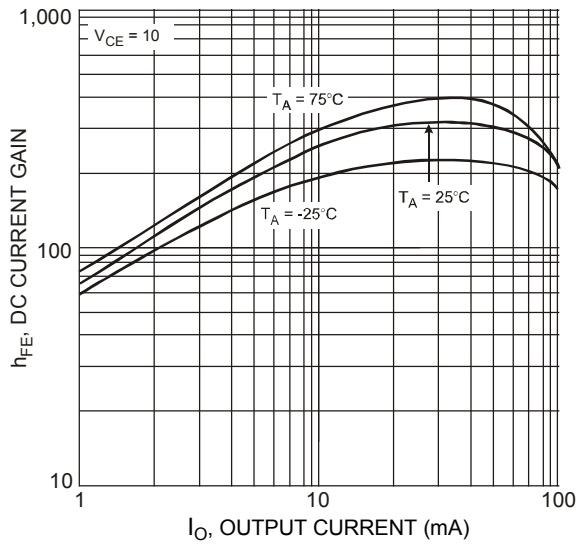


V_{IN} v I_O

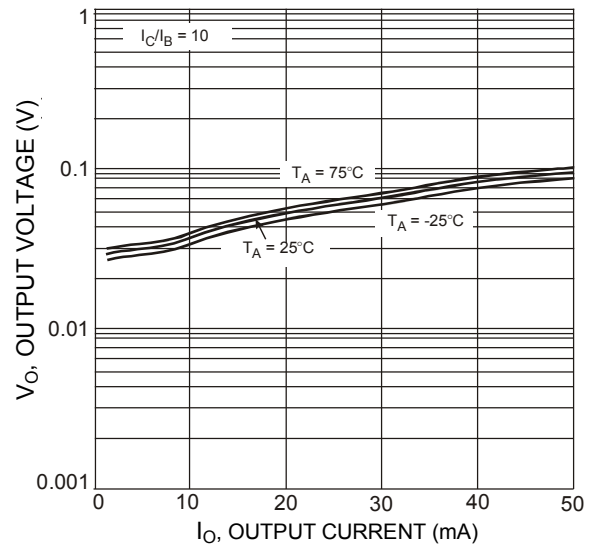


V_{IN} v I_O

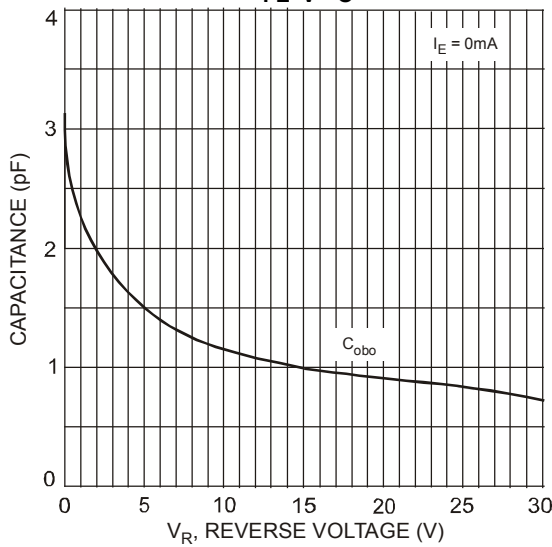
Typical Curves – DCX123JK PNP Section



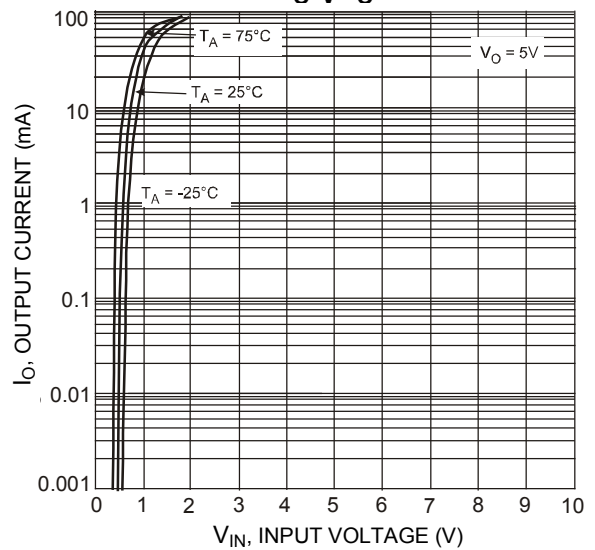
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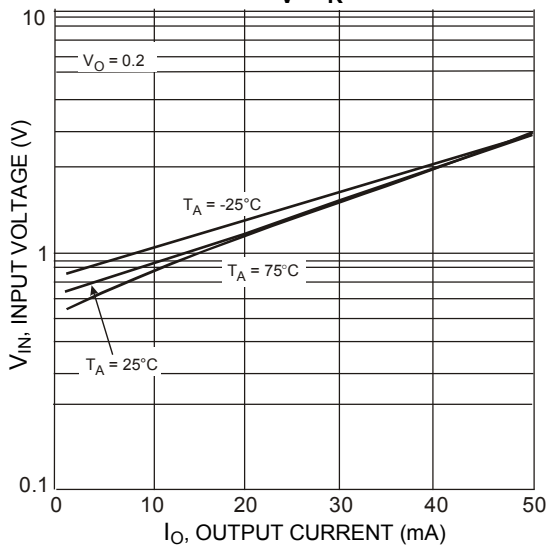
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$C \text{ v } V_R$

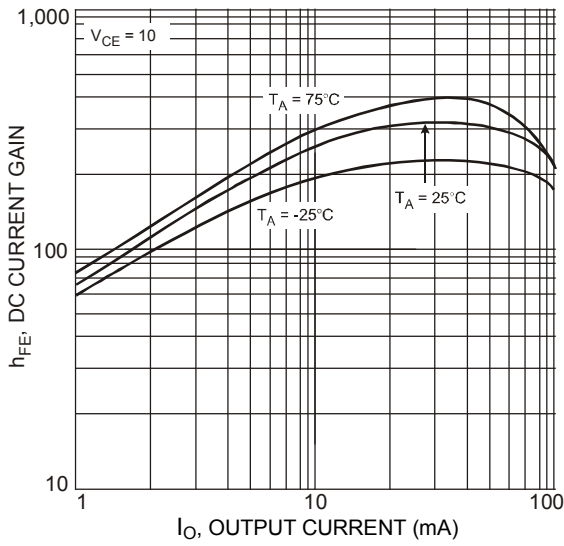


$I_O \text{ v } V_{IN}$

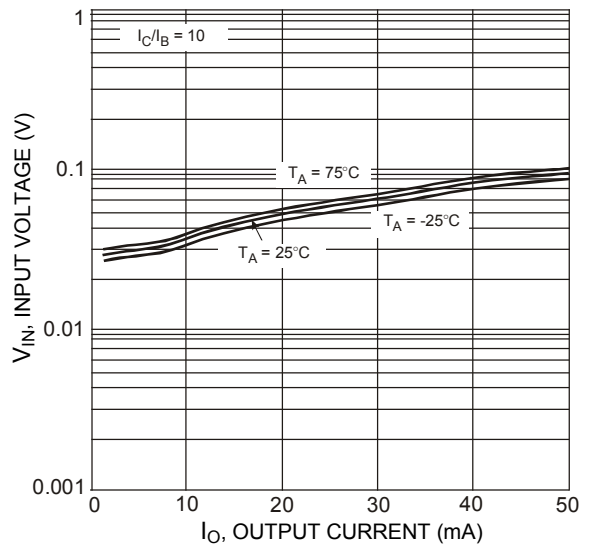


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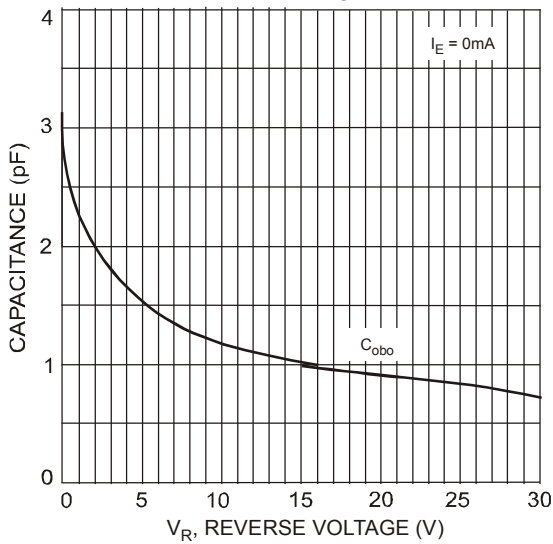
Typical Curves – DCX123JK NPN Section



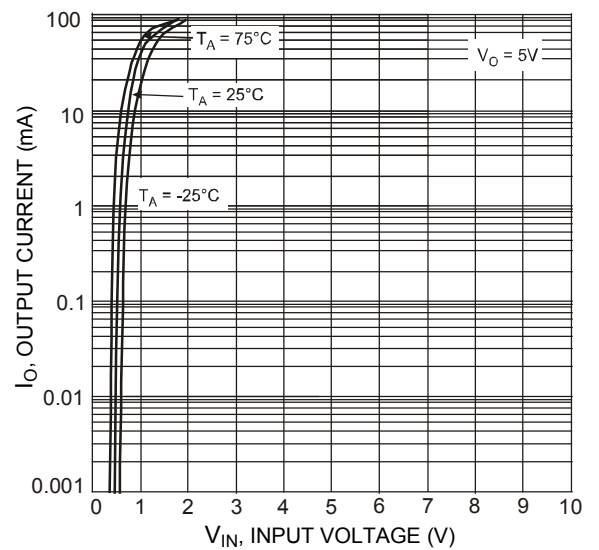
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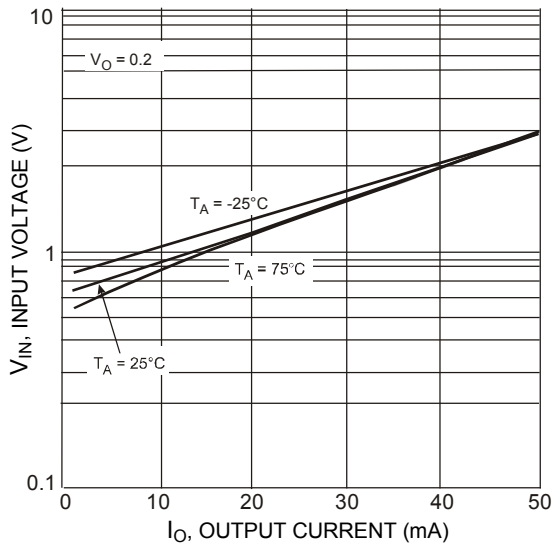
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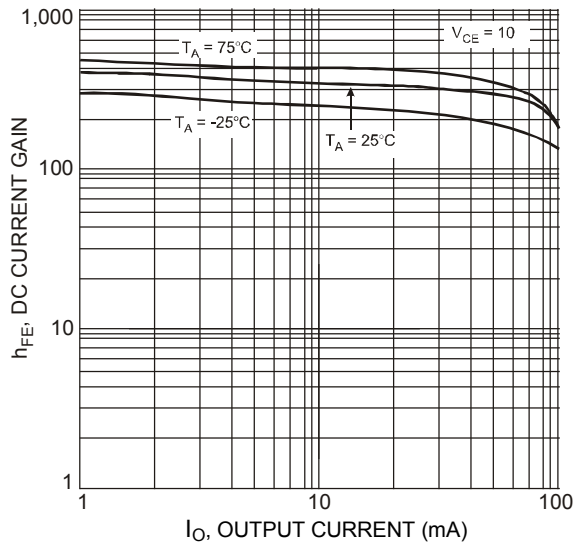


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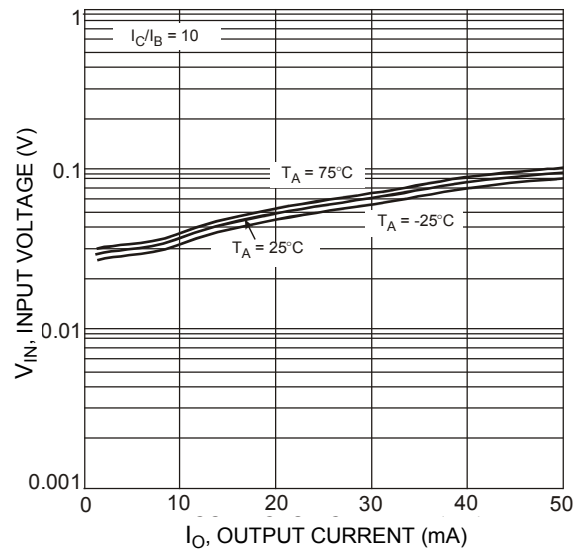


$V_{IN} \text{ v } I_O$

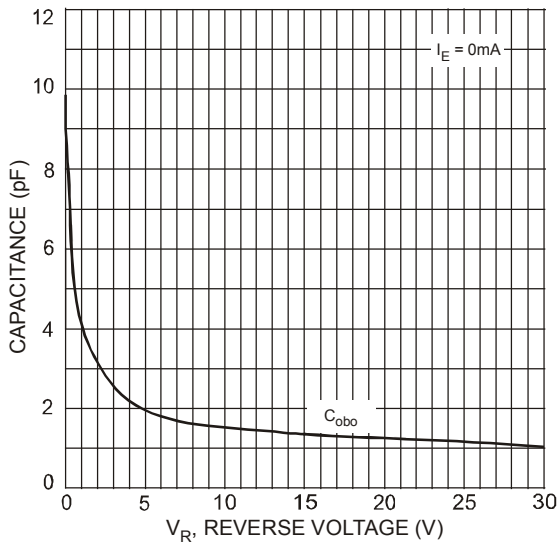
Typical Curves – DCX114TK PNP Section



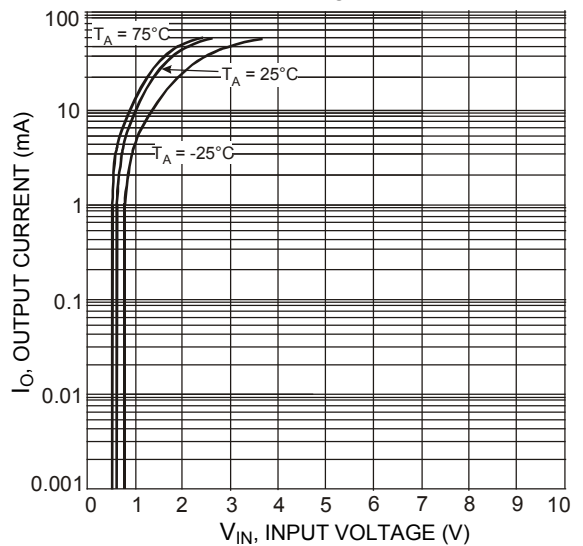
$h_{FE} \ v \ I_O$



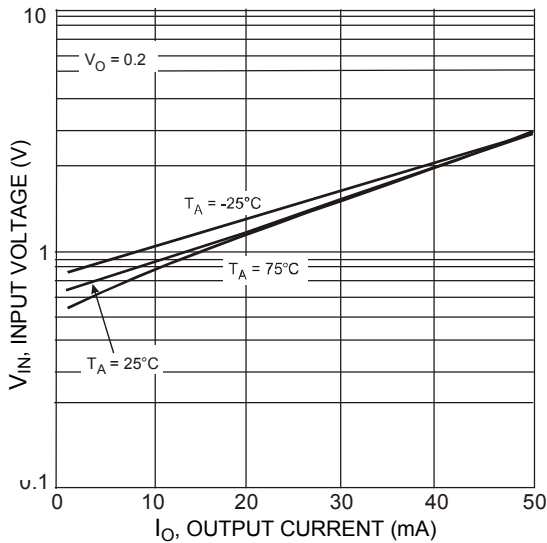
$V_{IN} \ v \ I_O$



$C \ v \ V_R$

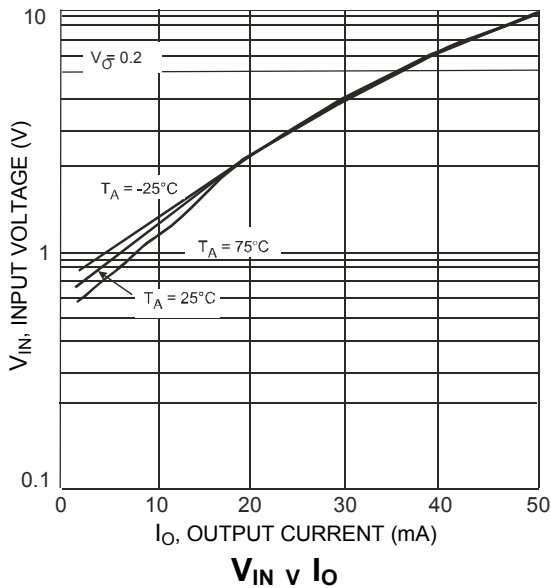
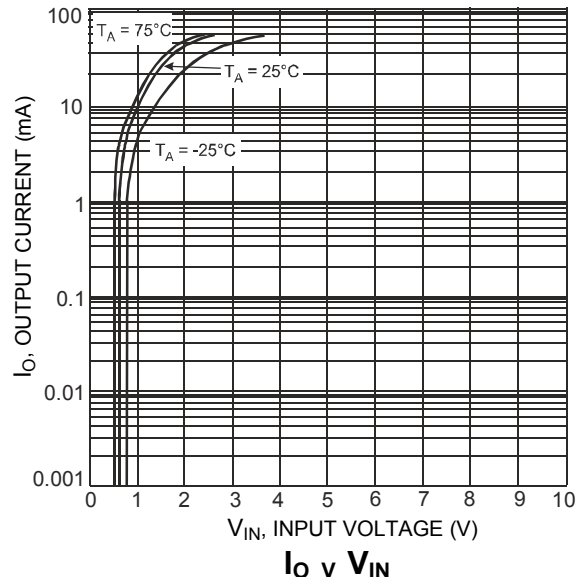
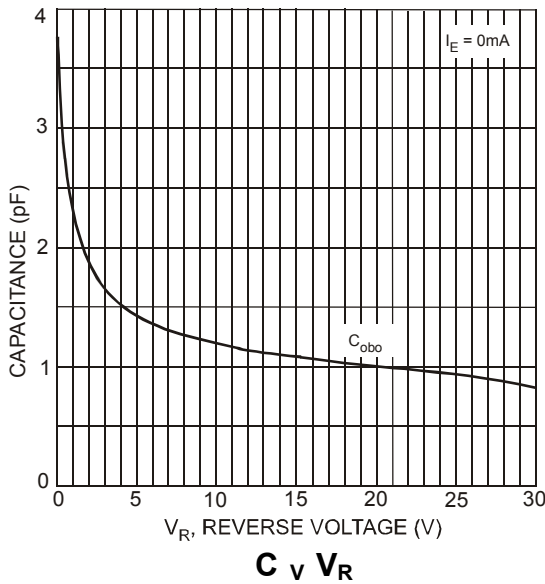
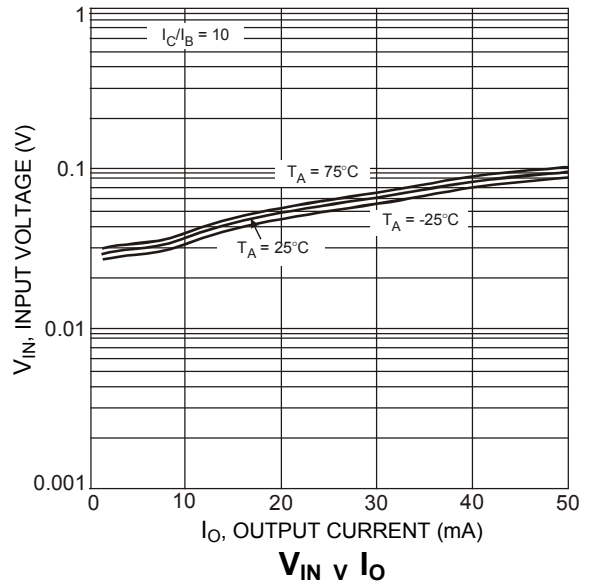
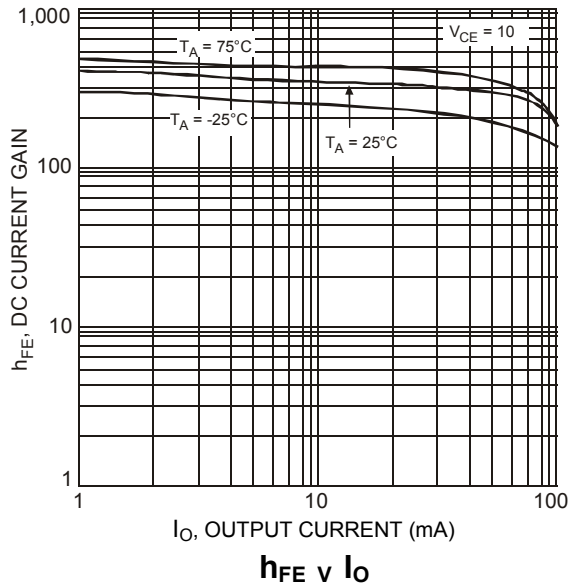


$I_O \ v \ V_{IN}$



$V_{IN} \ v \ I_O$

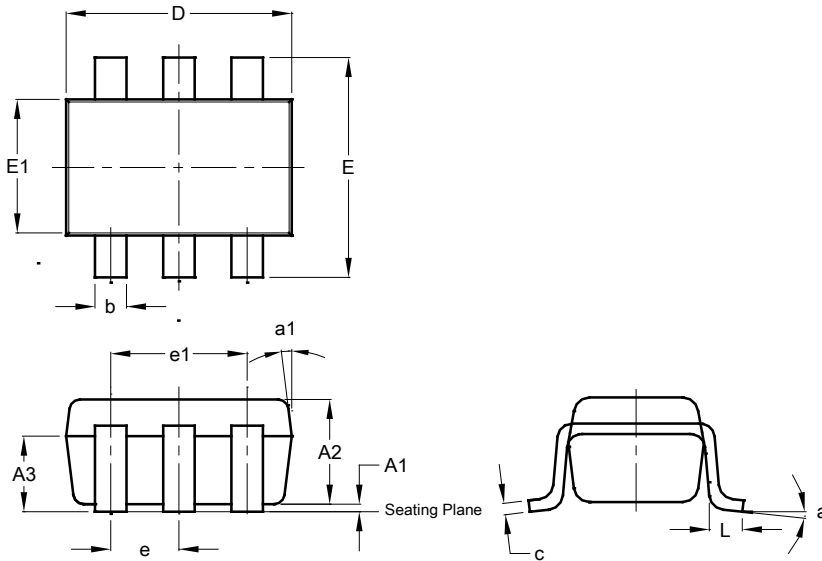
Typical Curves- DCX114TK NPN Section



Package Outline Dimensions

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

SOT26



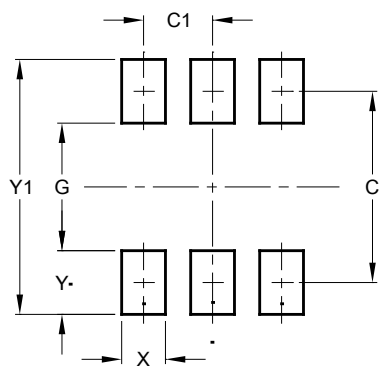
SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°

All Dimensions in mm

Suggested Pad Layout

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Dimensions	Value (in mm)
C	2.40
C1	0.95
G	1.60
X	0.55
Y	0.80
Y1	3.20

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