

Maximum Ratings NPN Section @ $T_A = 25^\circ\text{C}$ 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		-5V max	
	DCX114TK		-5V max	
Output Current	DCX124EK	I _O	30	mA
	DCX144EK		30	
	DCX114YK		70	
	DCX123JK		100	
	DCX114EK		50	
	DCX115EK		20	
	DCX143TK		100	
	DCX114TK		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)	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Maximum Ratings PNP Section @ $T_A = 25^\circ\text{C}$ 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		+5V max	
	DCX114TK		+5V max	
Output Current	DCX124EK	I _O	-30	mA
	DCX144EK		-30	
	DCX114YK		-70	
	DCX123JK		-100	
	DCX114EK		-50	
	DCX115EK		-20	
	DCX143TK		-100	
	DCX114TK		-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)	$R_{\theta JA}$	417	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

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

Electrical Characteristics NPN Section (R1 only) @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic (DDC143TK & DDC114TK only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	50	—	—	V	$I_C = 50\mu\text{A}$
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 Cut-Off Current	I_{CBO}	—	—	0.5	μA	$V_{CB} = 50\text{V}$
Emitter Cut-Off Current	I_{EBO}	—	—	0.5	μA	$V_{EB} = 4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.3	V	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA} - \text{DCX143TK}$ $I_C/I_B = 1\text{mA} / 0.1\text{mA} - \text{DCX114TK}$
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	%	—
Transition frequency (Note 6)	f_T	—	250	—	MHz	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

Electrical Characteristics NPN Section (R1 & R2) (continued) @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EK	0.5	1.1	—	V	$V_{CC} = 5\text{V}, I_O = 100\mu\text{A}$
	DCX144EK	0.5	1.1	—		
	DCX114YK	0.3	—	—		
	DCX123JK	0.5	—	—		
	DCX114EK	0.5	1.1	—		
	DCX115EK	0.5	1.1	—		
	DCX124EK	—	1.65	3.0	V	$V_O = 0.3\text{V}, I_O = 5\text{mA}$
	DCX144EK	—	1.9	3.0		$V_O = 0.3\text{V}, I_O = 2\text{mA}$
	DCX114YK	—	—	1.4		$V_O = 0.3\text{V}, I_O = 1\text{mA}$
	DCX123JK	—	—	1.1		$V_O = 0.3\text{V}, I_O = 5\text{mA}$
	DCX114EK	—	1.9	3.0		$V_O = 0.3\text{V}, I_O = 10\text{mA}$
	DCX115EK	—	1.9	3.0		$V_O = 0.3\text{V}, I_O = 1\text{mA}$
Output Voltage	DCX124EK	—	—	—	V	$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX144EK	—	—	—		$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX114YK	—	—	—		$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
	DCX123JK	—	—	—		$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
	DCX114EK	—	—	—		$I_O/I_I = 10\text{mA} / 0.5\text{mA}$
	DCX115EK	—	—	—		$I_O/I_I = 5\text{mA} / 0.25\text{mA}$
Input Current	DCX124EK	—	—	0.36	mA	$V_I = 5\text{V}$
	DCX144EK	—	—	0.18		
	DCX114YK	—	—	0.88		
	DCX123JK	—	—	3.6		
	DCX114EK	—	—	0.88		
	DCX115EK	—	—	0.15		
Output Current	$I_{O(off)}$	—	—	0.5	μA	$V_{CC} = 50\text{V}, V_I = 0\text{V}$
DC Current Gain	DCX124EK	80	—	—	—	$V_O = 5\text{V}, I_O = 5\text{mA}$
	DCX144EK	68	—	—		$V_O = 5\text{V}, I_O = 5\text{mA}$
	DCX114YK	68	—	—		$V_O = 5\text{V}, I_O = 10\text{mA}$
	DCX123JK	80	—	—		$V_O = 5\text{V}, I_O = 10\text{mA}$
	DCX114EK	30	—	—		$V_O = 5\text{V}, I_O = 5\text{mA}$
	DCX115EK	82	—	—		$V_O = 5\text{V}, I_O = 5\text{mA}$
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	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

Note: 6. Transistor - for reference only.

Electrical Characteristics PNP Section (R1 only) @ $T_A = 25^\circ\text{C}$ unless otherwise specified

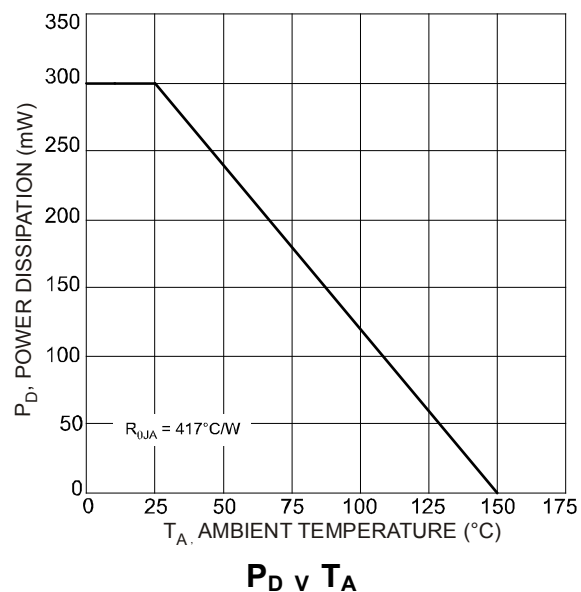
Characteristic (DCX143TK & DCX114TK only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	$I_C = -50\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	—	—	V	$I_C = -1\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	$I_E = -50\mu\text{A}$
Collector Cut-Off Current	I_{CBO}	—	—	-0.5	μA	$V_{CB} = -50\text{V}$
Emitter Cut-Off Current	I_{EBO}	—	—	-0.5	μA	$V_{EB} = -4\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	-0.3	V	$I_C/I_B = -2.5\text{mA} / -0.25\text{mA}$ - DCX143TK $I_C/I_B = -1\text{mA} / -0.1\text{mA}$ - DCX114TK
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	%	—
Transition frequency (Note 6)	f_T	—	250	—	MHz	$V_{CE} = -10\text{V}$, $I_E = 5\text{mA}$, $f = 100\text{MHz}$

Electrical Characteristics PNP Section (R1 & R2) (continued) @ $T_A = 25^\circ\text{C}$ unless otherwise specified

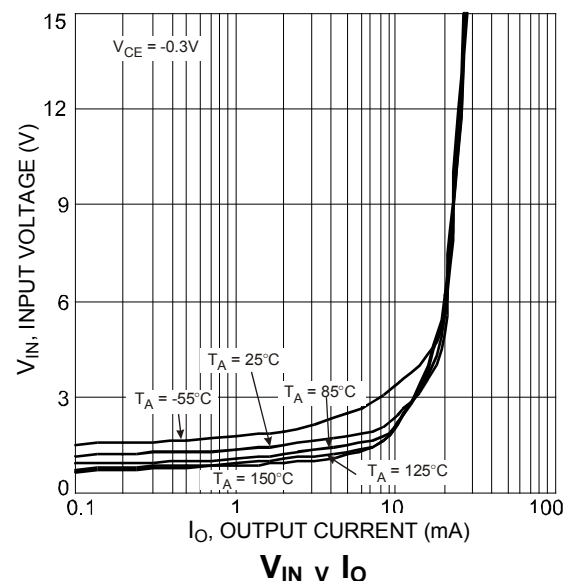
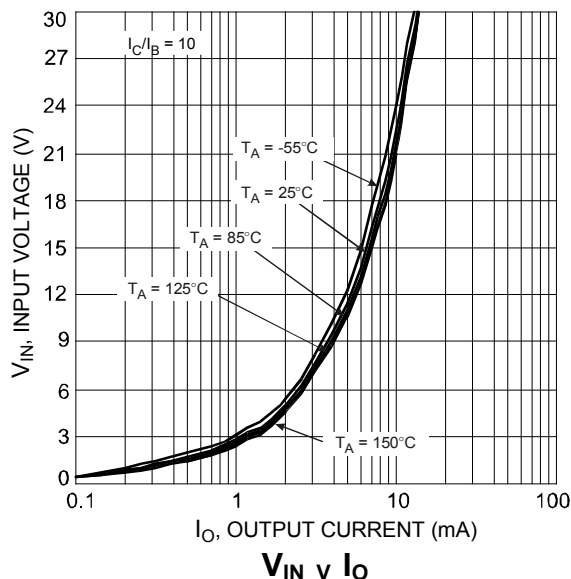
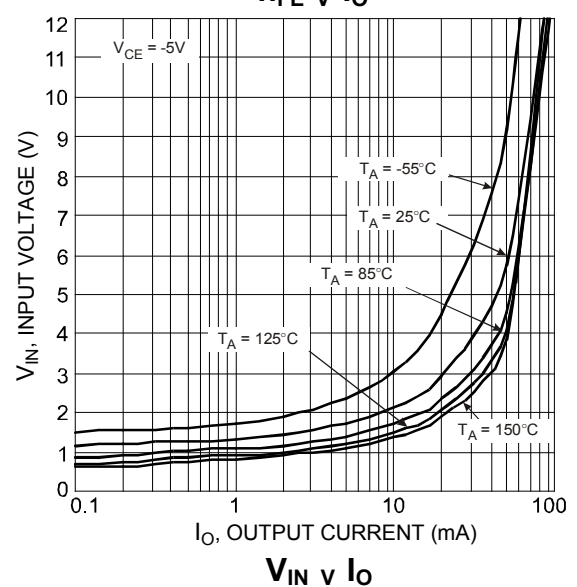
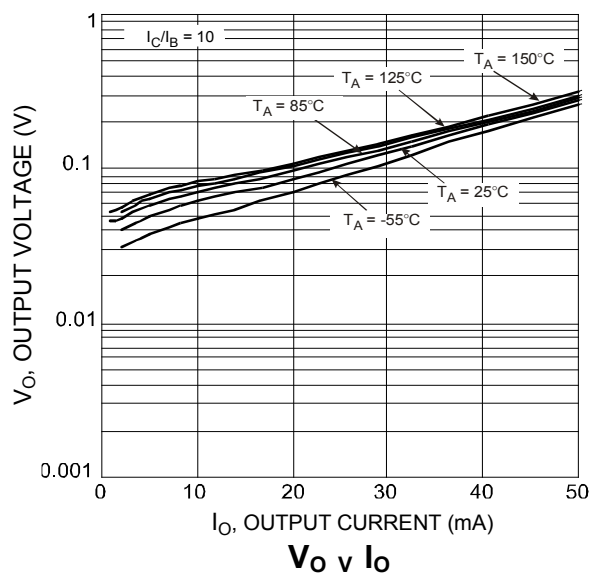
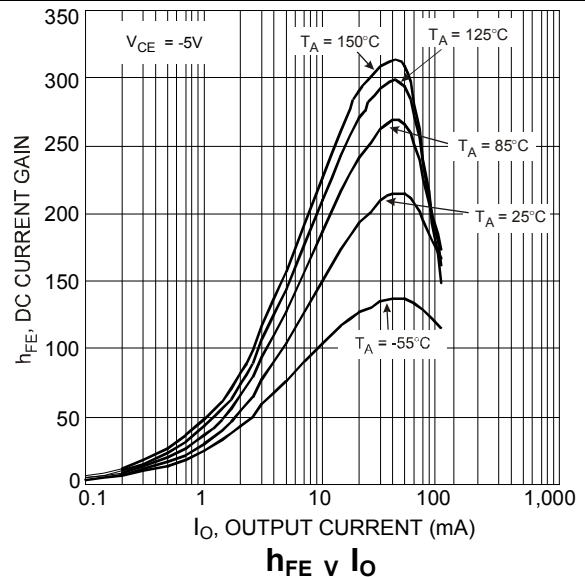
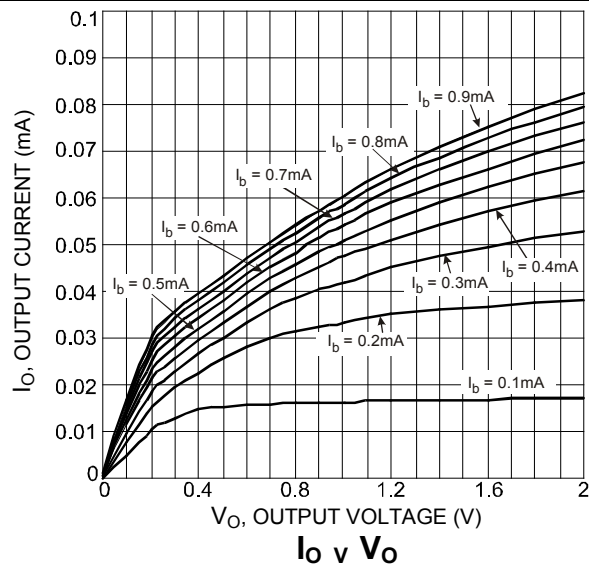
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EK	-0.5	-1.1	—	V	$V_{CC} = -5\text{V}$, $I_O = -100\mu\text{A}$
	DCX144EK	-0.5	-1.1	—		
	DCX114YK	-0.3	—	—		
	DCX123JK	-0.5	—	—		
	DCX114EK	-0.5	-1.1	—		
	DCX115EK	-0.5	-1.1	—		
	DCX124EK	—	-1.9	-3.0	V	$V_O = -0.3\text{V}$, $I_O = -5\text{mA}$
	DCX144EK	—	-1.9	-3.0		$V_O = -0.3\text{V}$, $I_O = -2\text{mA}$
	DCX114YK	—	—	-1.4		$V_O = -0.3\text{V}$, $I_O = -1\text{mA}$
	DCX123JK	—	—	-1.1		$V_O = -0.3\text{V}$, $I_O = -5\text{mA}$
	DCX114EK	—	-1.9	-3.0		$V_O = -0.3\text{V}$, $I_O = -10\text{mA}$
	DCX115EK	—	-1.9	-3.0		$V_O = -0.3\text{V}$, $I_O = -1\text{mA}$
Output Voltage	DCX124EK	—	-0.1	-0.3	V	$I_O/I_I = -10\text{mA} / -0.5\text{mA}$
	DCX144EK	—	-0.1	-0.3		$I_O/I_I = -10\text{mA} / -0.5\text{mA}$
	DCX114YK	—	-0.1	-0.3		$I_O/I_I = -5\text{mA} / -0.25\text{mA}$
	DCX123JK	—	-0.1	-0.3		$I_O/I_I = -5\text{mA} / -0.25\text{mA}$
	DCX114EK	—	-0.1	-0.3		$I_O/I_I = -10\text{mA} / -0.5\text{mA}$
	DCX115EK	—	-0.1	-0.3		$I_O/I_I = -5\text{mA} / -0.25\text{mA}$
Input Current	DCX124EK	—	—	-0.36	mA	$V_I = -5\text{V}$
	DCX144EK	—	—	-0.18		
	DCX114YK	—	—	-0.88		
	DCX123JK	—	—	-3.6		
	DCX114EK	—	—	-0.88		
	DCX115EK	—	—	-0.15		
Output Current	$I_{O(off)}$	—	—	-0.5	μA	$V_{CC} = 50\text{V}$, $V_I = 0\text{V}$
DC Current Gain	DCX124EK	80	—	—	—	$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX144EK	68	—	—		$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX114YK	68	—	—		$V_O = -5\text{V}$, $I_O = -10\text{mA}$
	DCX123JK	80	—	—		$V_O = -5\text{V}$, $I_O = -10\text{mA}$
	DCX114EK	30	—	—		$V_O = -5\text{V}$, $I_O = -5\text{mA}$
	DCX115EK	82	—	—		$V_O = -5\text{V}$, $I_O = -5\text{mA}$
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	$V_{CE} = -10\text{V}$, $I_E = -5\text{mA}$, $f = 100\text{MHz}$

Note: 6. Transistor - for reference only.

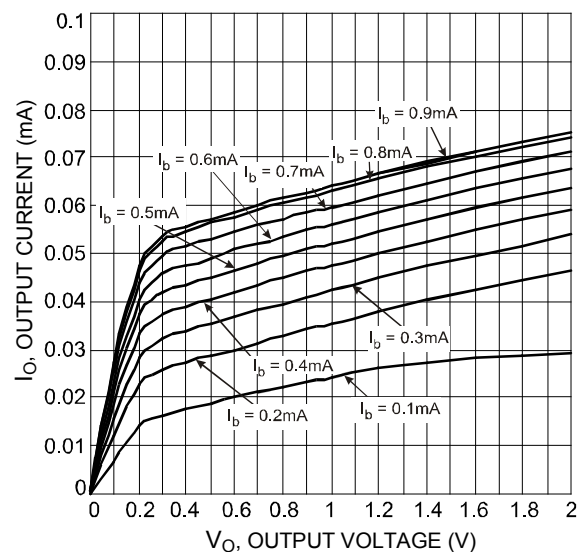
Typical Curves – Total Device



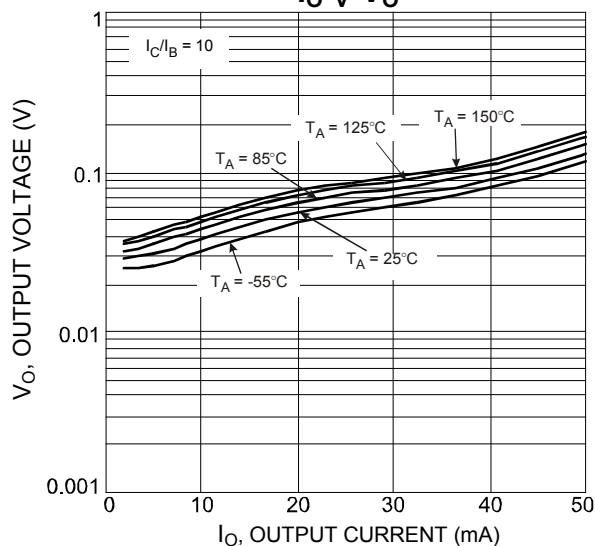
Typical Curves – DCX124EK PNP Section



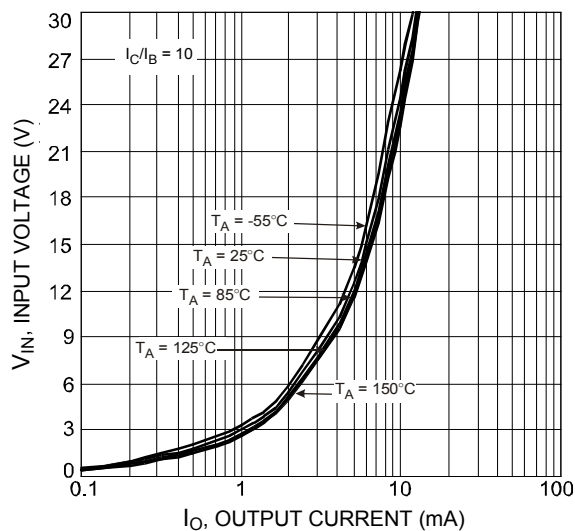
Typical Curves – DCX124EK NPN Section



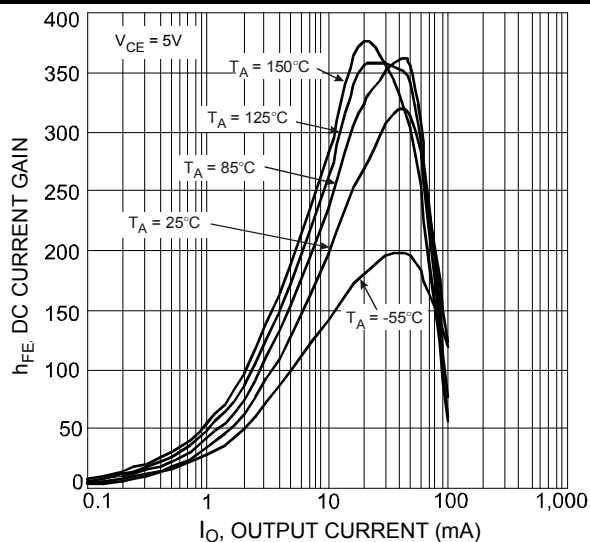
I_O v V_O



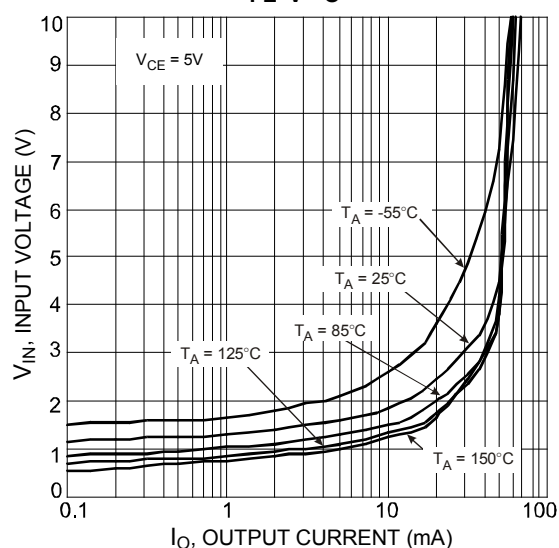
V_O v I_O



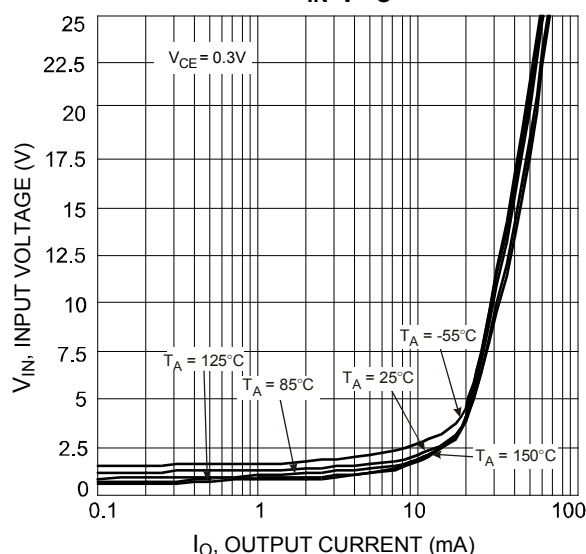
V_{IN} v I_O



h_{FE} v I_O

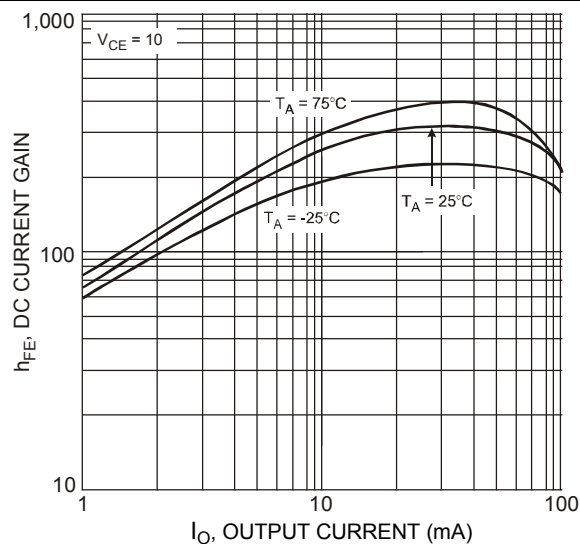


V_{IN} v I_O

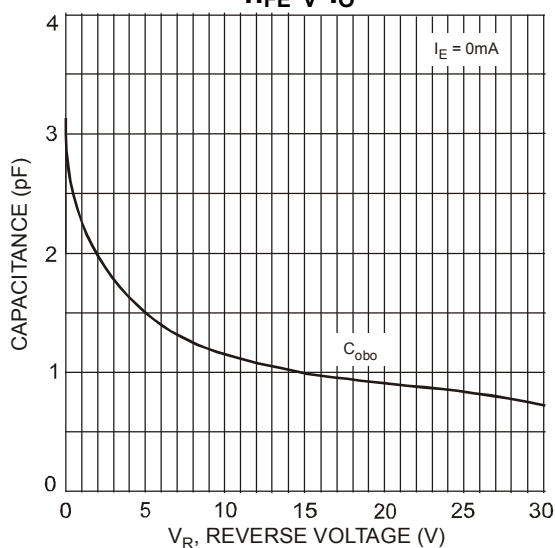


V_{IN} v I_O

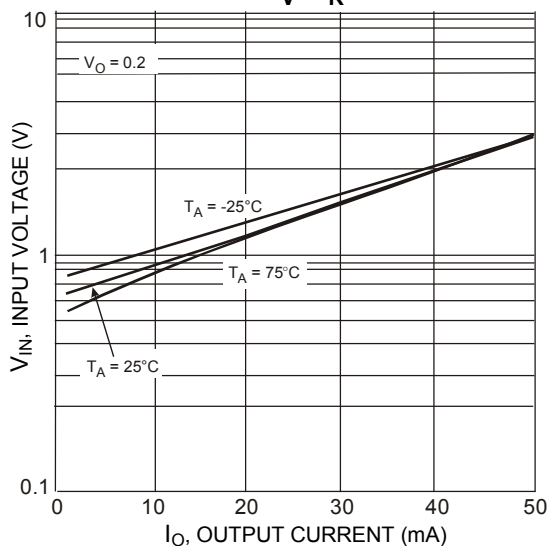
Typical Curves – DCX123JK PNP Section



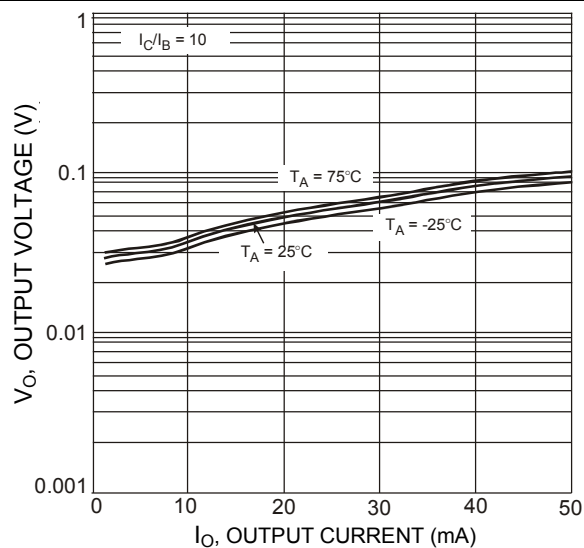
$h_{FE} \text{ v } I_O$



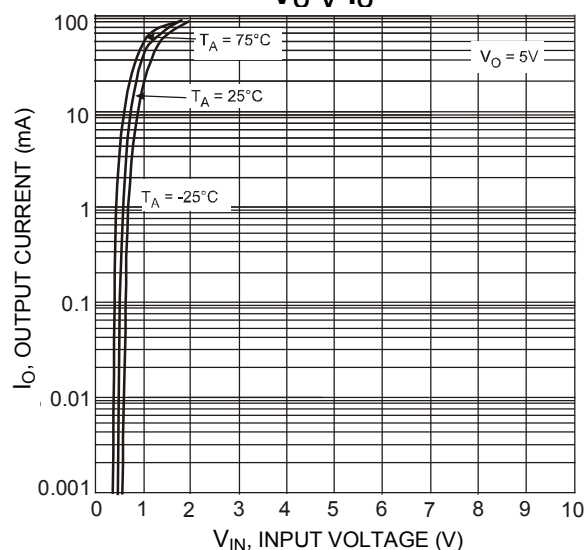
$C \text{ v } V_R$



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

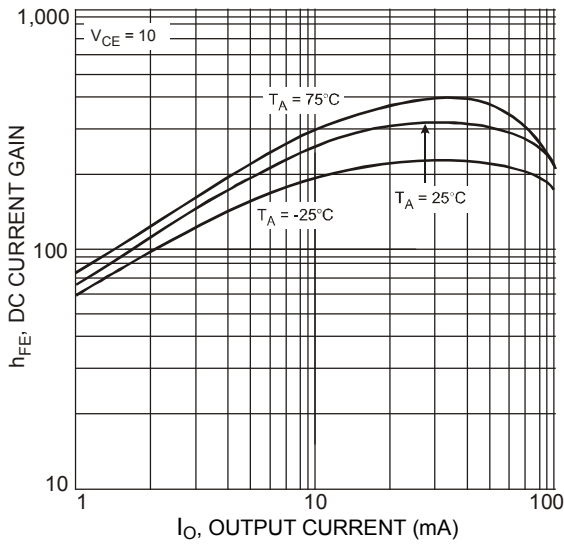


$V_O \text{ v } I_O$

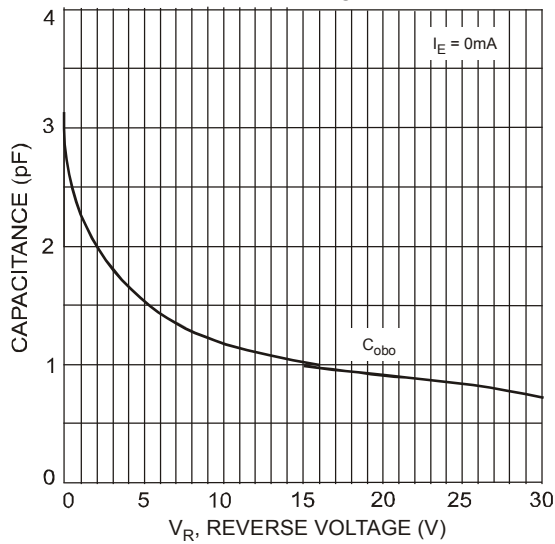


$I_O \text{ v } V_{IN}$

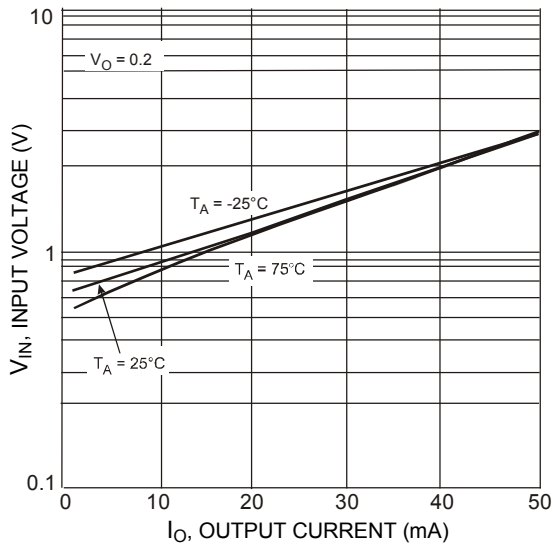
Typical Curves – DCX123JK NPN Section



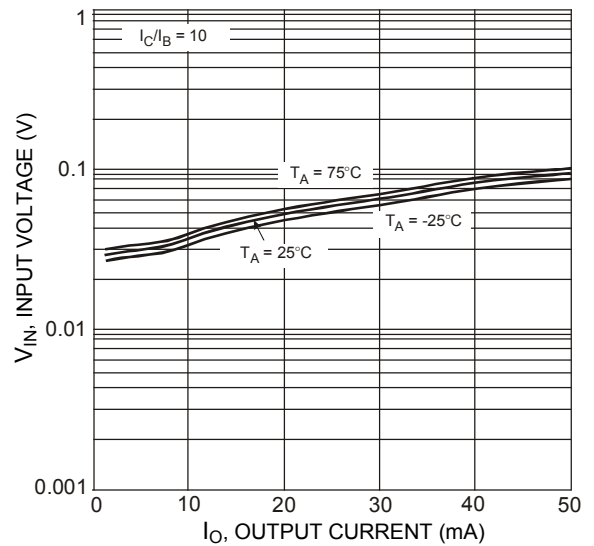
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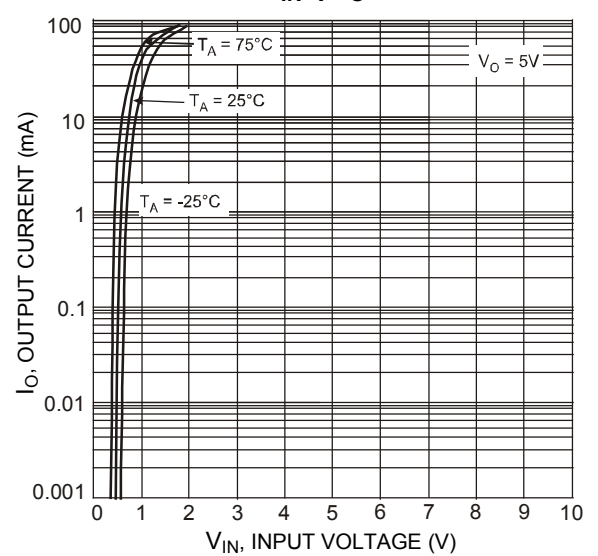
$C \text{ v } V_R$



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

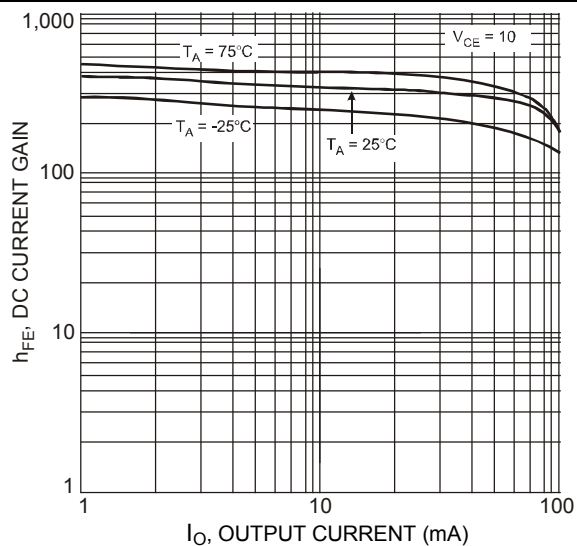


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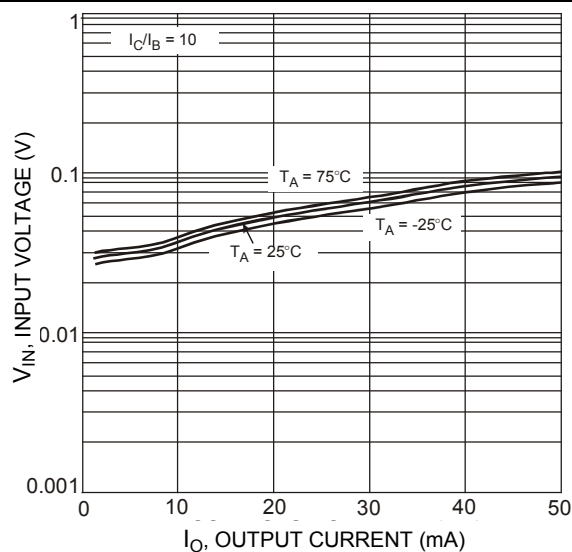


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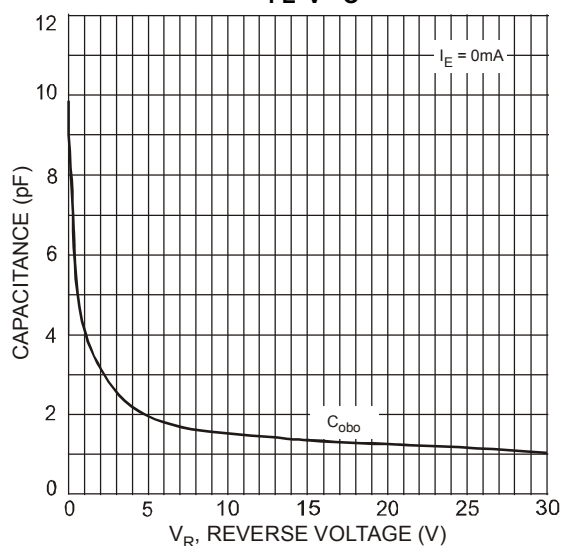
Typical Curves – DCX114TK PNP Section



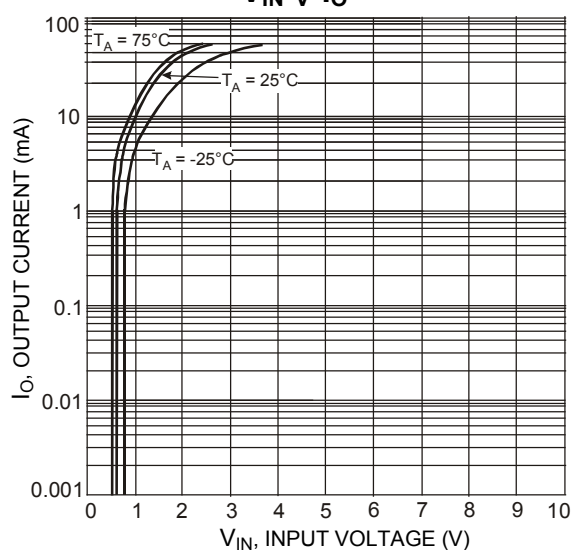
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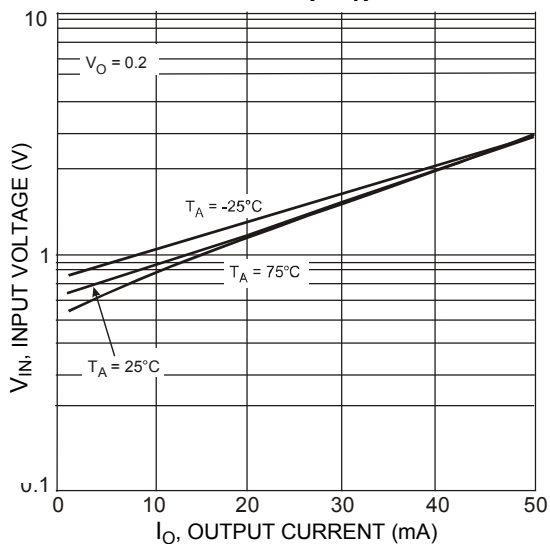
$V_{IN} \text{ v } I_O$



$C \text{ v } V_R$

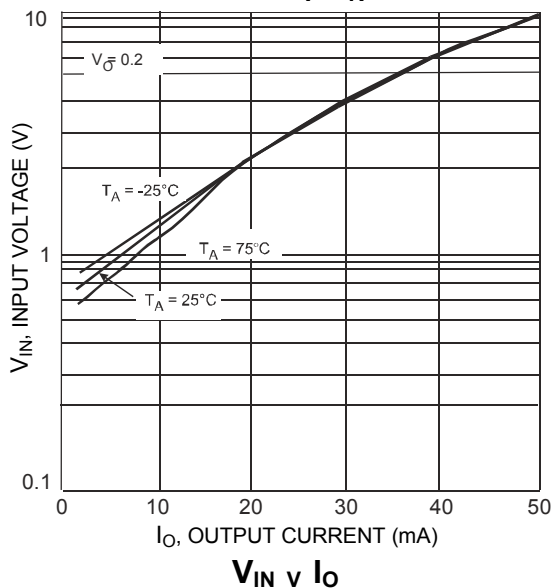
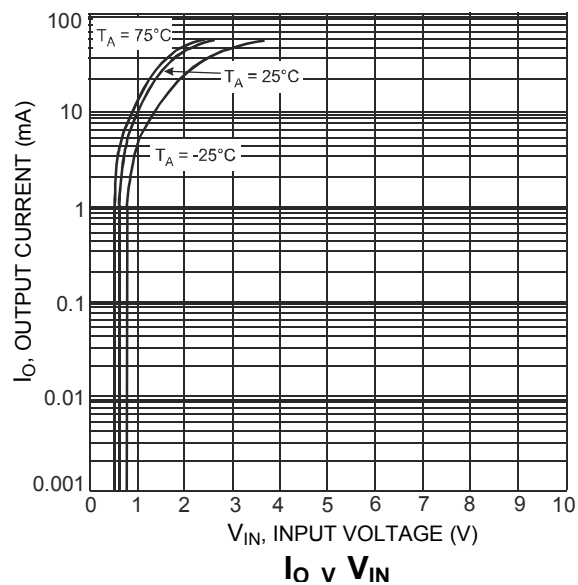
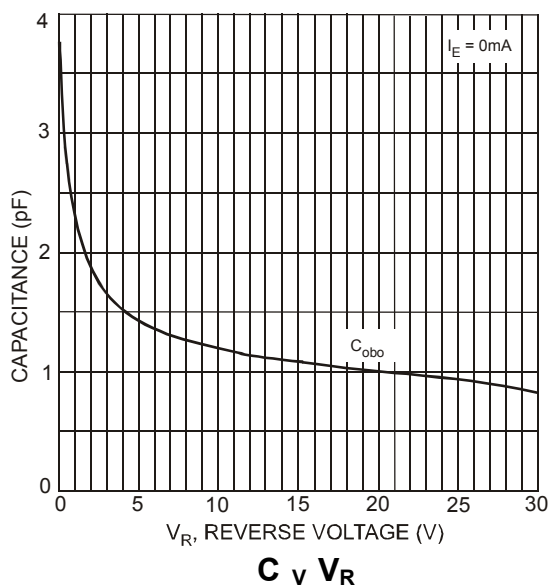
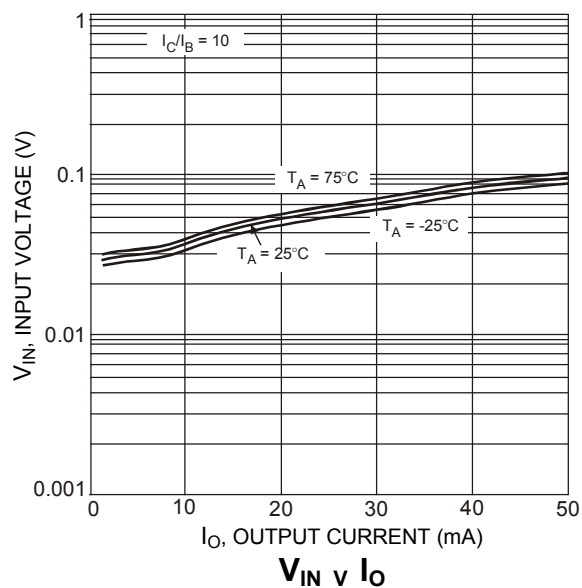
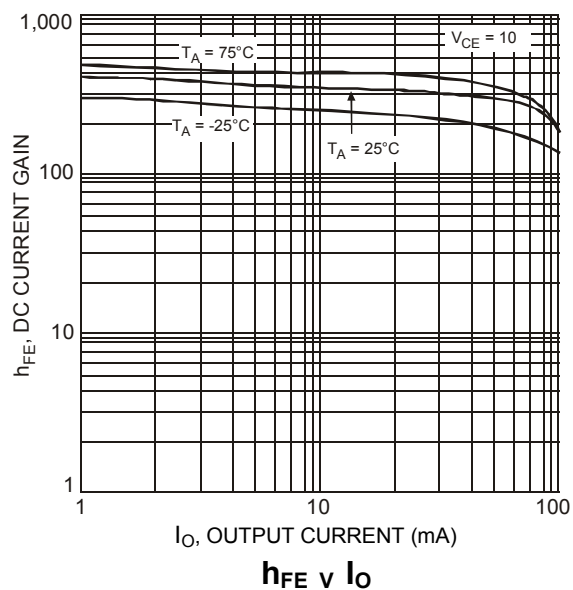


$I_O \text{ v } V_{IN}$



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

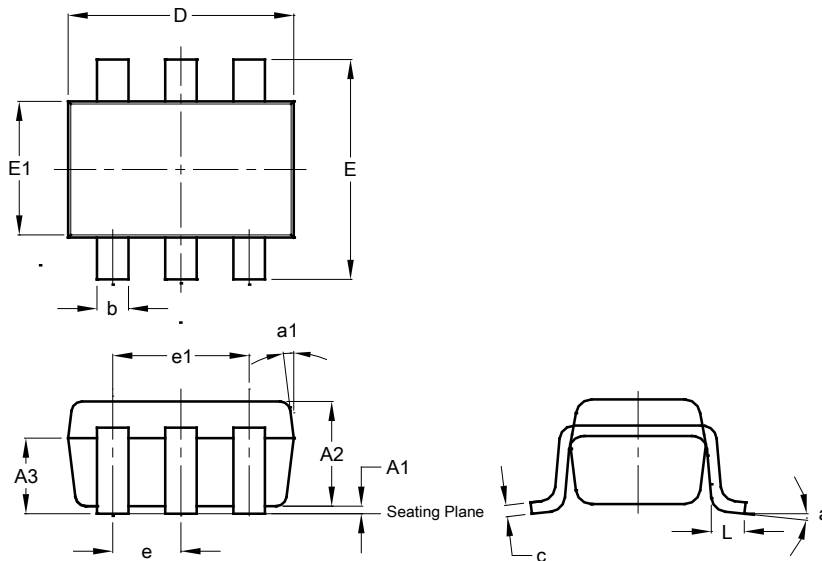
Typical Curves- DCX114TK NPN Section



Package Outline Dimensions

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

SOT26

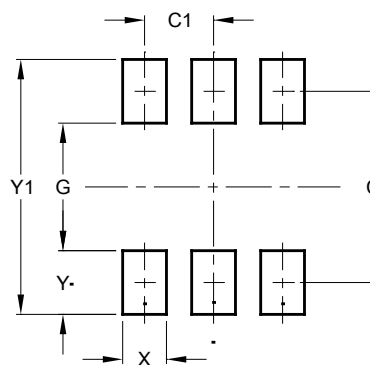


SOT26			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

Suggested Pad Layout

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

SOT26



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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