DCX115EK-7-F Datasheet

https://www.DiGi-Electronics.com

DiGi Electronics Part Number	DCX115EK-7-F-DG
Manufacturer	Diodes Incorporated
Manufacturer Product Number	DCX115EK-7-F
Description	TRANS NPN/PNP PREBIAS 0.3W SC74R
Detailed Description	Pre-Biased Bipolar Transistor (BJT) 1 NPN, 1 PNP - Pre-Biased (Dual) 50V 100mA 250MHz 300mW Surface Mount SC-74R

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RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
DCX115EK-7-F	Diodes Incorporated
Series:	Product Status:
-	Active
Transistor Type:	Current - Collector (Ic) (Max):
1 NPN, 1 PNP - Pre-Biased (Dual)	100mA
Voltage - Collector Emitter Breakdown (Max):	Resistor - Base (R1):
50V	100kOhms
Resistor - Emitter Base (R2):	DC Current Gain (hFE) (Min) @ Ic, Vce:
100kOhms	82 @ 5mA, 5V
Vce Saturation (Max) @ Ib, Ic:	Current - Collector Cutoff (Max):
300mV @ 250µA, 5mA	500nA
Frequency - Transition:	Power - Max:
250MHz	300mW
Mounting Type:	Package / Case:
Surface Mount	SC-74, SOT-457
Supplier Device Package:	Base Product Number:
SC-74R	DCX115

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8541.21.0075	

Lead-free Green

DCX (XXXX) K

DUAL COMPLEMENTARY PRE-BIASED TRANSISTOR IN SOT26

Features

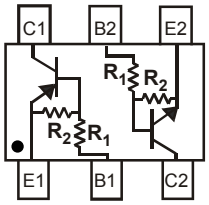
- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable,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

Mechanical Data

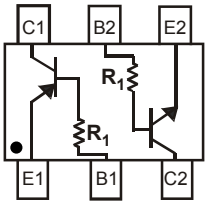
- Case: SOT26
- Surface Mount Package
- Case Material: Molded Plastic, UL Flammability Classification Rating 94V-0
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.016 grams (Approximate)

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



R1, R2 Device Schematic



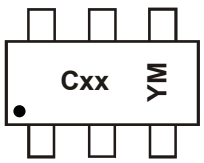
R1 only Device Schematic

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		-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	°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		+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	°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_{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 NPN Section (R1 & R2) (continued) @ T_A = 25°C unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EK	$V_{I(off)}$	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			
	DCX124EK	$V_{I(on)}$	—	1.65	3.0	V	V_O = 0.3V, I_O = 5mA
	DCX144EK			1.9	3.0		V_O = 0.3V, I_O = 2mA
	DCX114YK			—	1.4		V_O = 0.3V, I_O = 1mA
	DCX123JK			—	1.1		V_O = 0.3V, I_O = 5mA
	DCX114EK			1.9	3.0		V_O = 0.3V, I_O = 10mA
	DCX115EK			1.9	3.0		V_O = 0.3V, I_O = 1mA
Output Voltage	DCX124EK	$V_{O(on)}$	—	0.1	0.3	V	I_O/I_I = 10mA / 0.5mA
	DCX144EK						I_O/I_I = 10mA / 0.5mA
	DCX114YK						I_O/I_I = 5mA / 0.25mA
	DCX123JK						I_O/I_I = 5mA / 0.25mA
	DCX114EK						I_O/I_I = 10mA / 0.5mA
	DCX115EK						I_O/I_I = 5mA / 0.25mA
Input Current	DCX124EK	I_I	—	—	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	DCX124EK	G_I	80	—	—	—	V_O = 5V, I_O = 5mA
	DCX144EK		68				V_O = 5V, I_O = 5mA
	DCX114YK		68				V_O = 5V, I_O = 10mA
	DCX123JK		80				V_O = 5V, I_O = 10mA
	DCX114EK		30				V_O = 5V, I_O = 5mA
	DCX115EK		82				V_O = 5V, I_O = 5mA
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

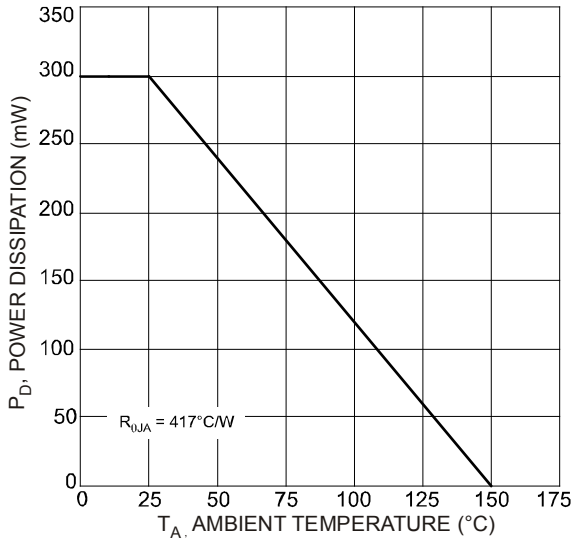
Characteristic (DCX143TK & DCX114TK only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	I_C = -50µA
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	—	—	V	I_C = -1mA
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	I_E = -50µA
Collector Cut-Off Current	I_{CBO}	—	—	-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	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX115EK	$V_{I(off)}$	-0.5 -0.5 -0.3 -0.5 -0.5 -0.5	-1.1 -1.1 — — –1.1 –1.1	—	V	V_{CC} = -5V, I_O = -100µA
	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX115EK	$V_{I(on)}$	—	-1.9 -1.9 — — -1.9 -1.9	-3.0 -3.0 -1.4 -1.1 -3.0 -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
Output Voltage	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX115EK	$V_{O(on)}$	—	-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
Input Current	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX115EK	I_I	—	—	-0.36 -0.18 -0.88 -3.6 -0.88 -0.15	mA	V_I = -5V
Output Current		$I_{O(off)}$	—	—	-0.5	µA	V_{CC} = 50V, V_I = 0V
DC Current Gain	DCX124EK DCX144EK DCX114YK DCX123JK DCX114EK DCX115EK	G_I	80 68 68 80 30 82	—	—	—	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
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

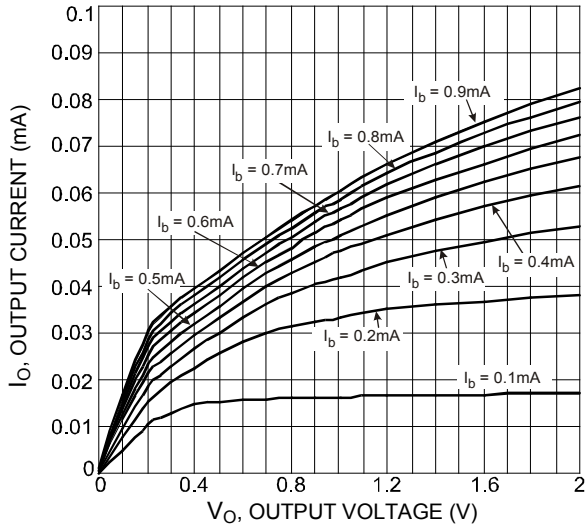
Note: 6. Transistor - for reference only.

Typical Curves – Total Device

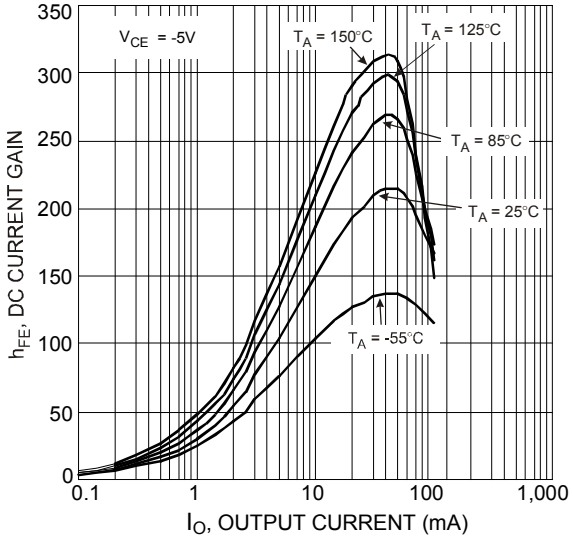


P_D v T_A

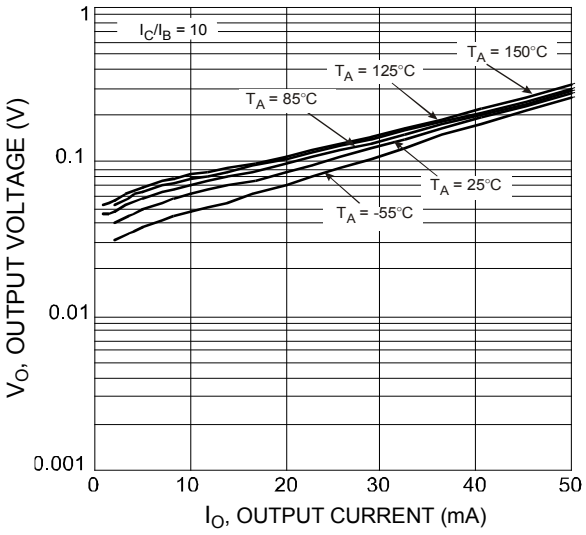
Typical Curves – DCX124EK PNP Section



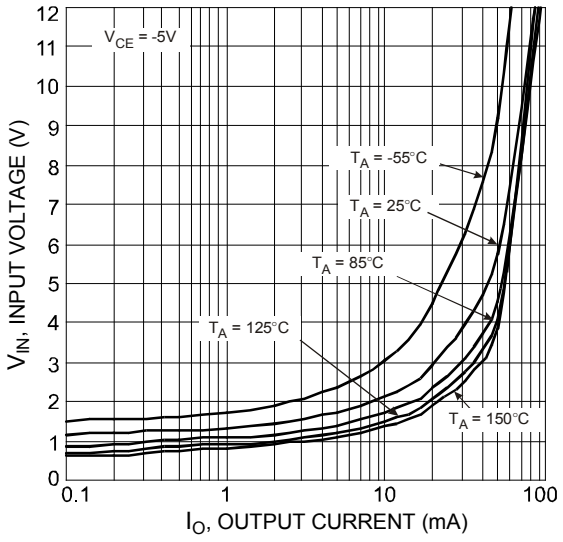
I_O v V_O



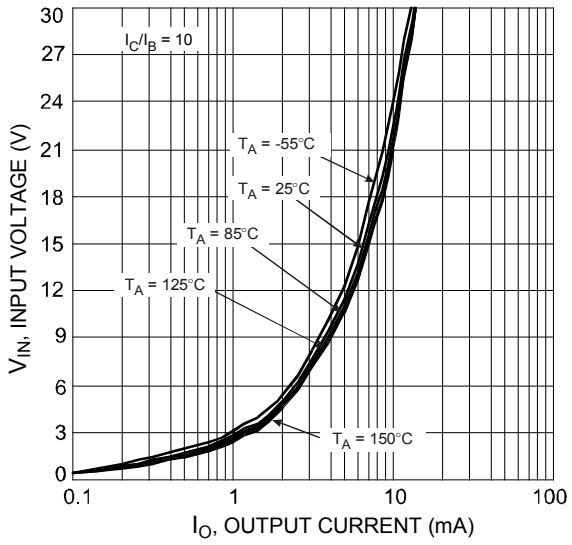
h_{FE} v I_O



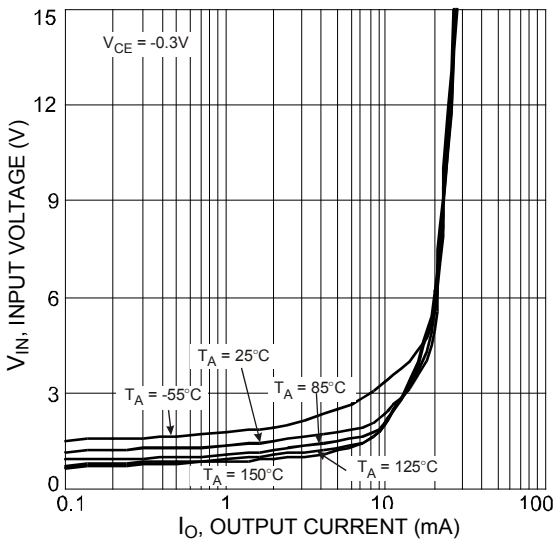
V_O v I_O



V_{IN} v I_O

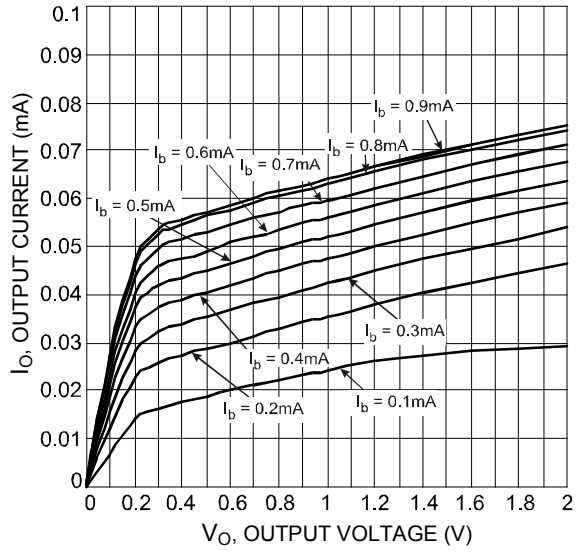


V_{IN} v I_O

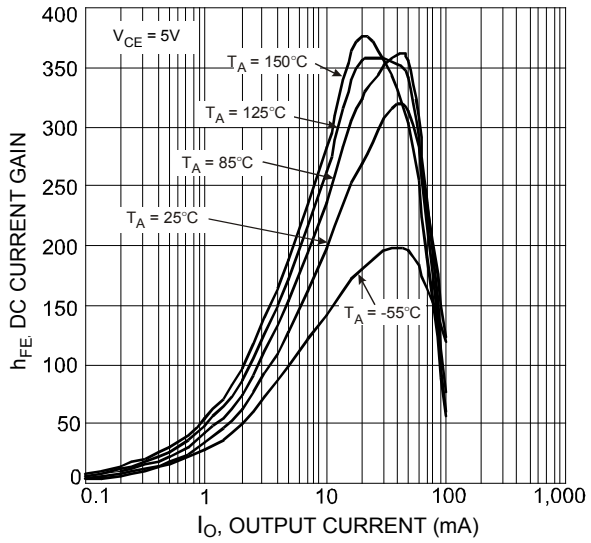


V_{IN} v I_O

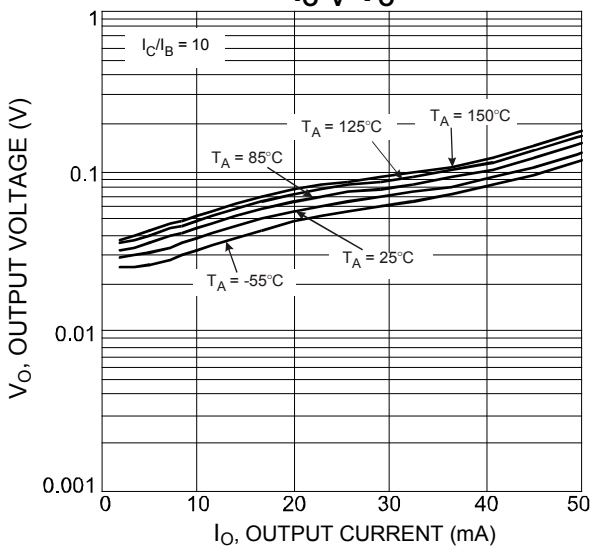
Typical Curves – DCX124EK NPN Section



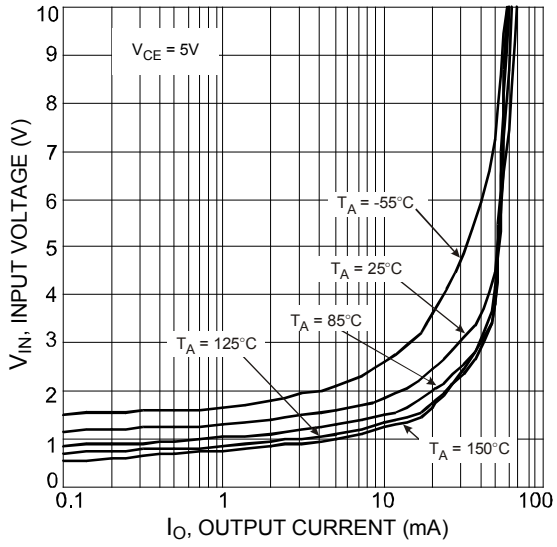
I_O v V_O



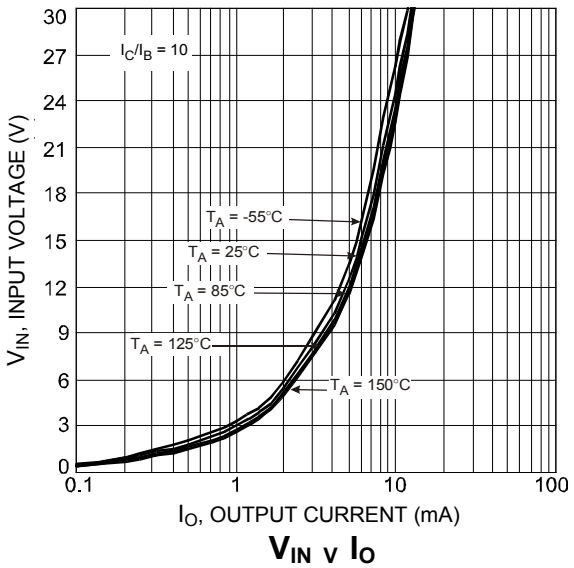
h_{FE} v I_O



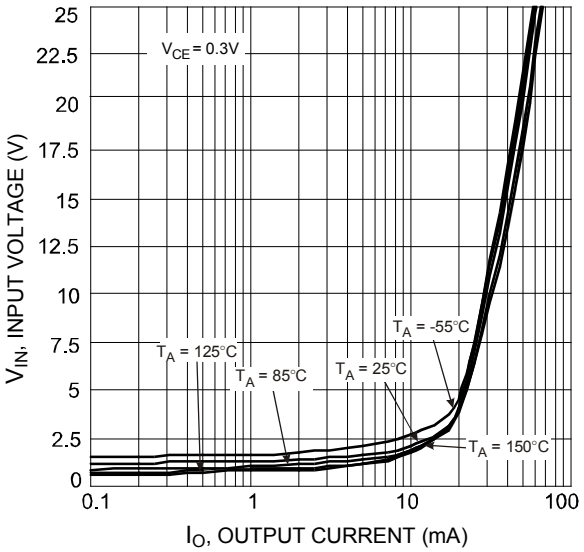
V_O v I_O



V_{IN} v I_O

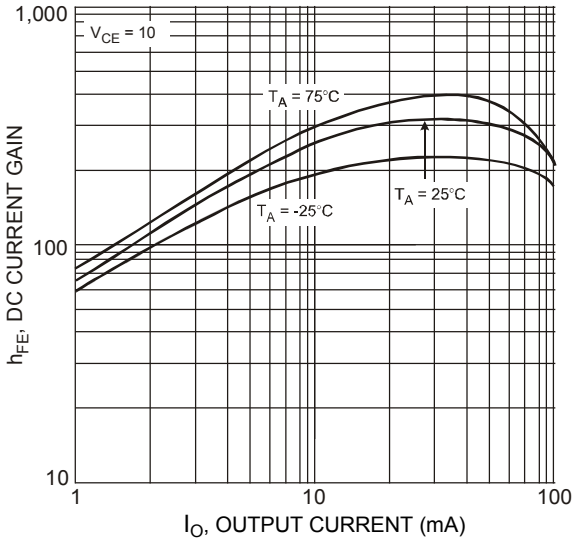


V_{IN} v I_O

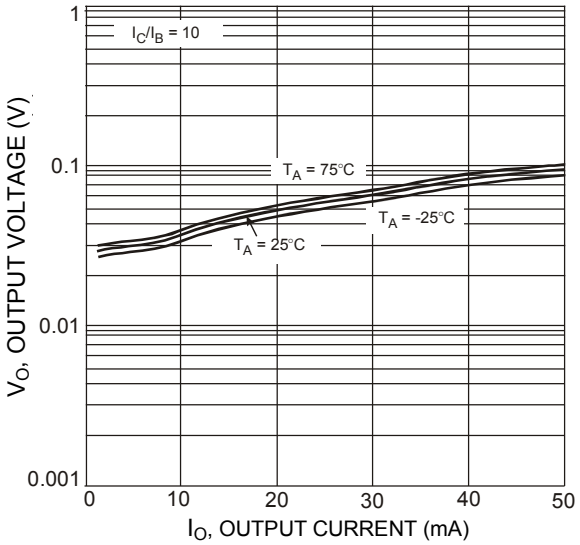


V_{IN} v I_O

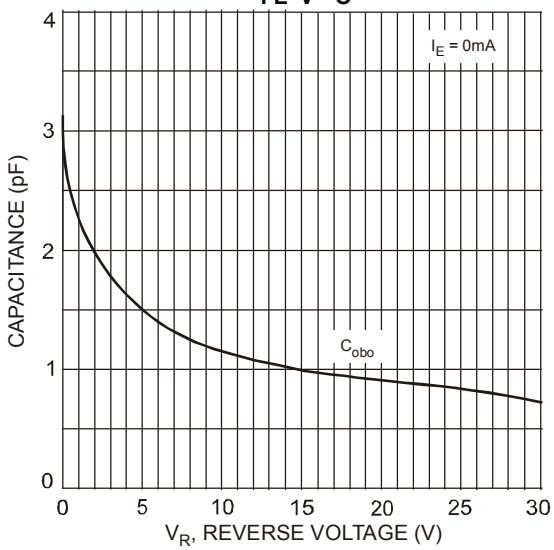
Typical Curves – DCX123JK PNP Section



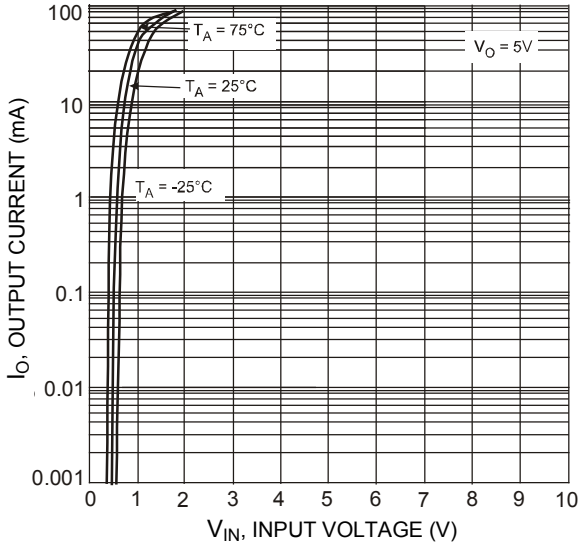
h_{FE} v I_O



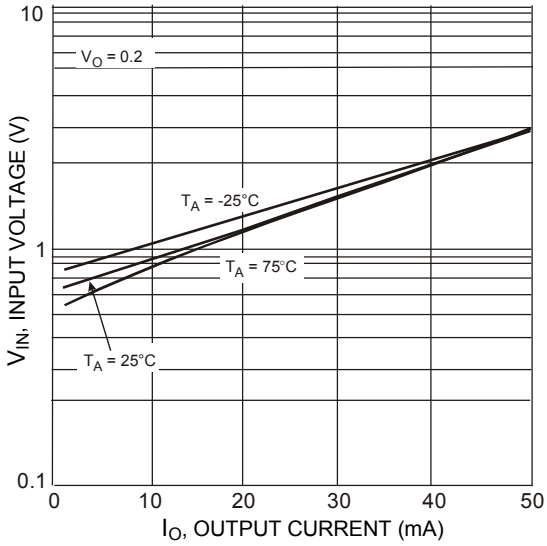
V_O v I_O



C v V_R

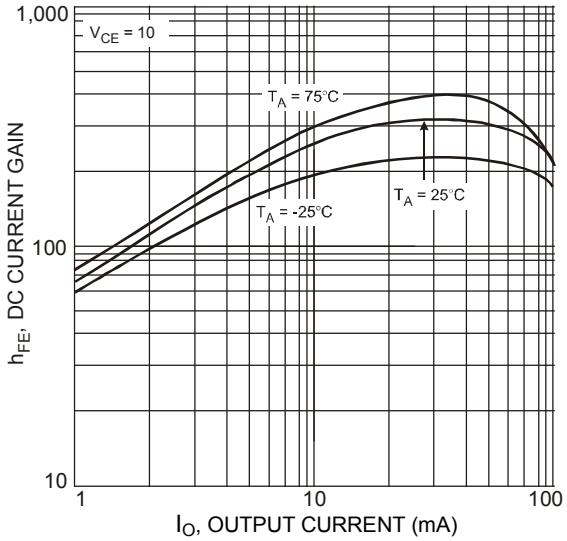


I_O v V_{IN}

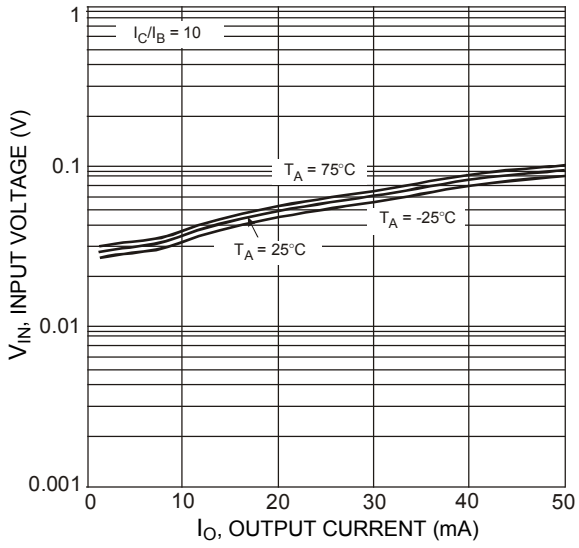


V_{IN} v I_O

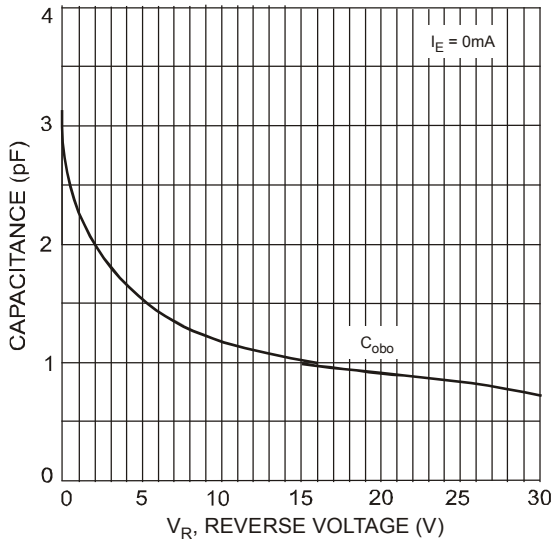
Typical Curves – DCX123JK NPN Section



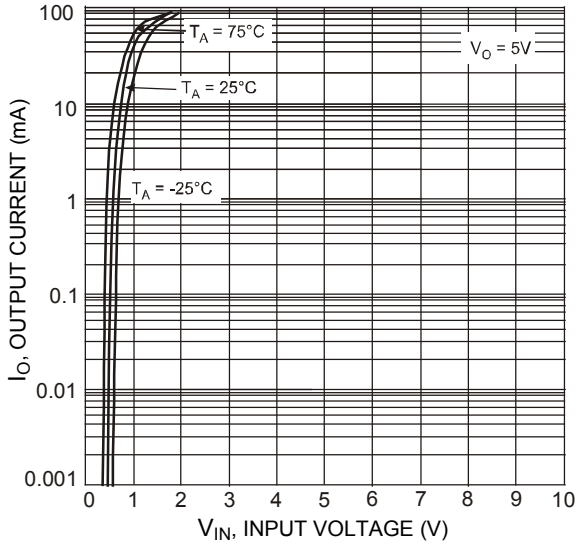
h_{FE} v I_O



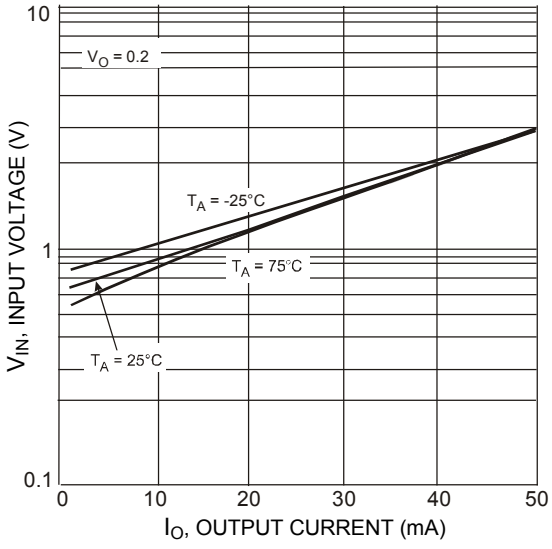
V_{IN} v I_O



C v V_R

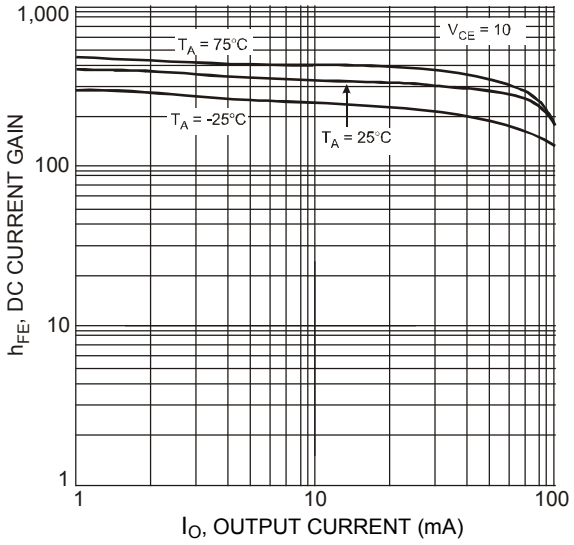


I_O v V_{IN}

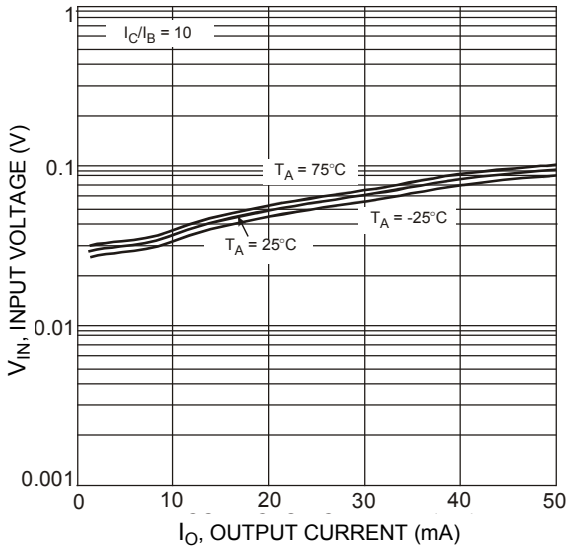


V_{IN} v I_O

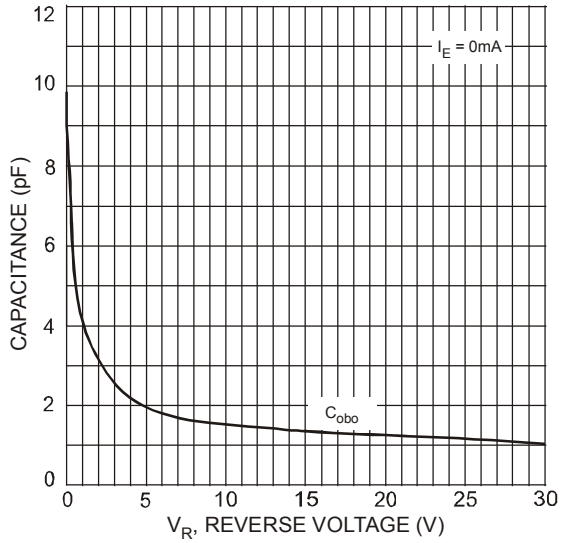
Typical Curves – DCX114TK PNP Section



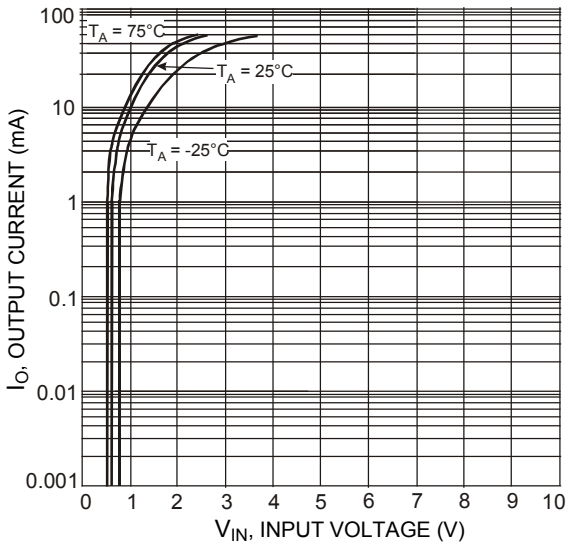
h_{FE} v I_O



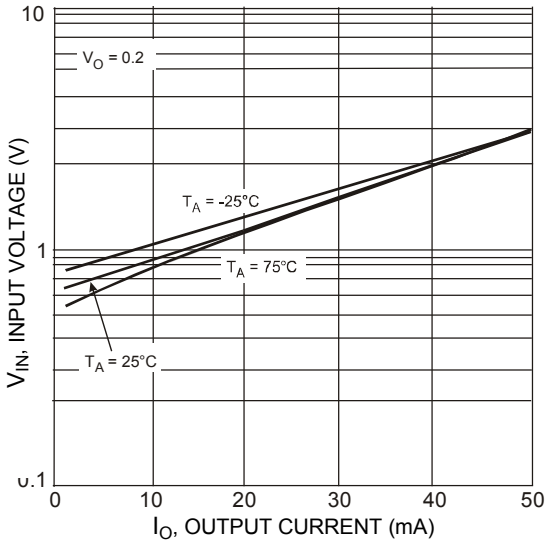
V_{IN} v I_O



C v V_R

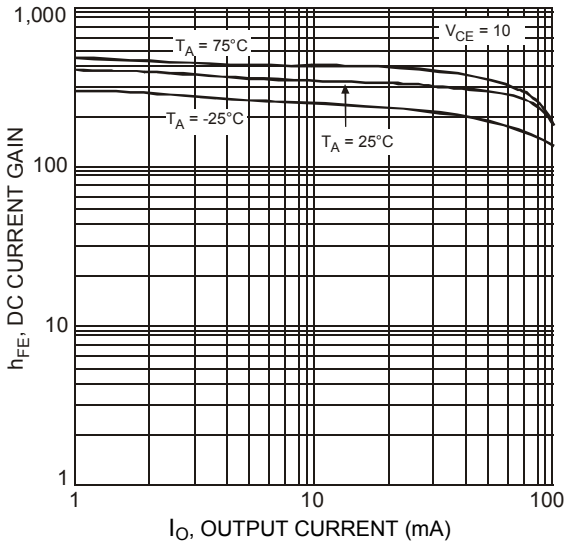


I_O v V_{IN}

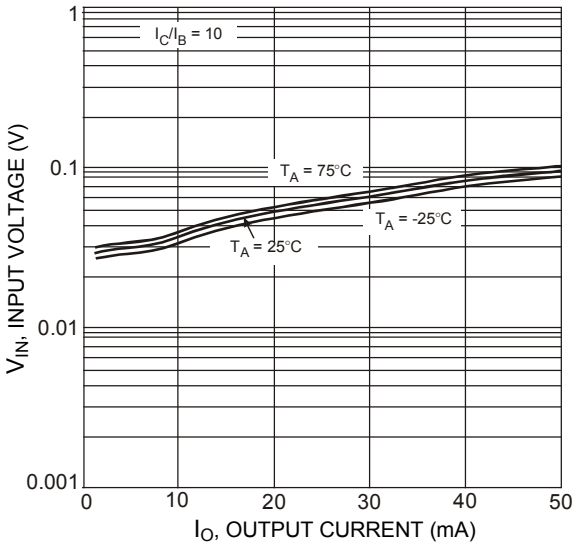


V_{IN} v I_O

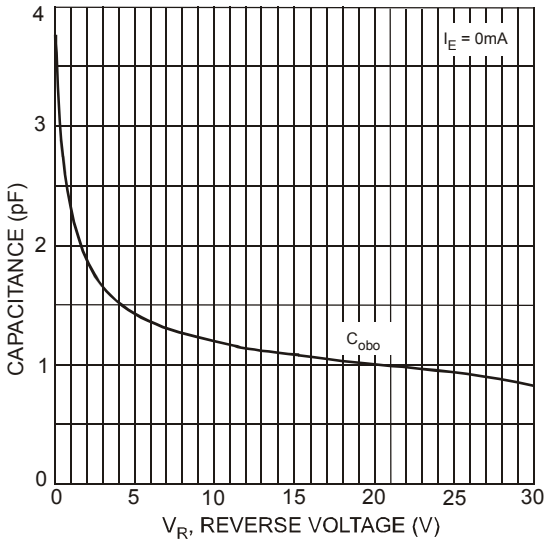
Typical Curves- DCX114TK NPN Section



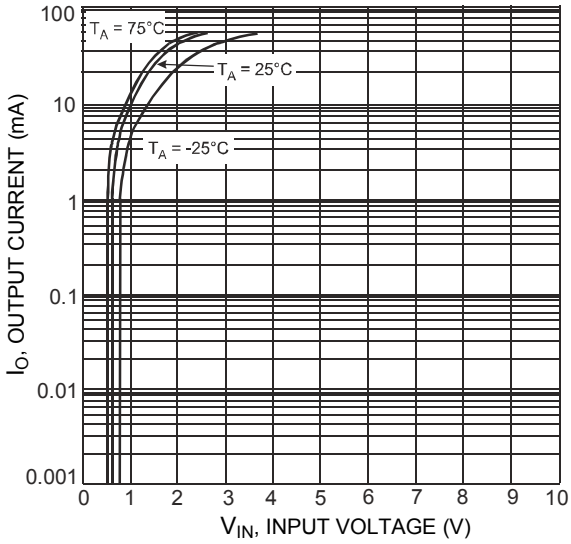
h_{FE} v I_O



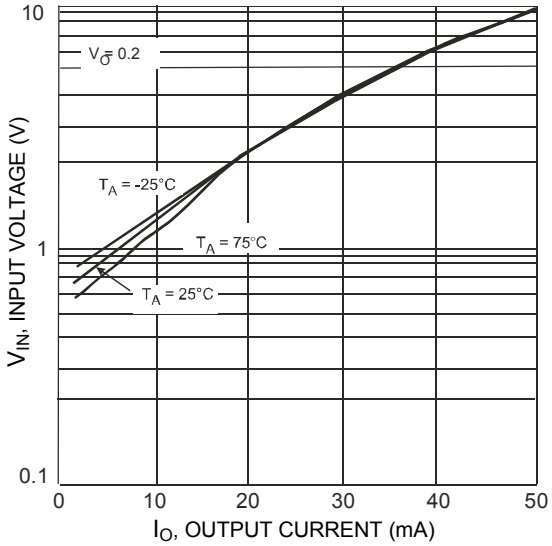
V_{IN} v I_O



C v V_R



I_O v V_{IN}

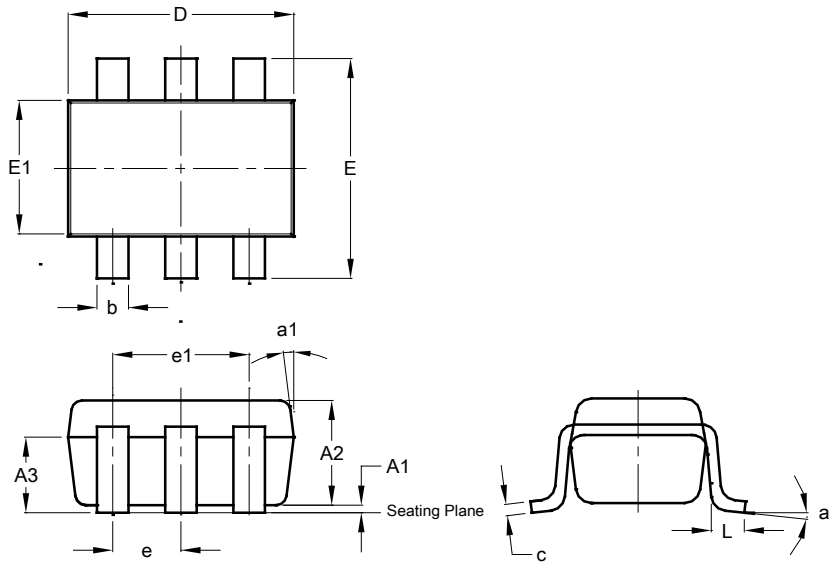


V_{IN} v I_O

Package Outline Dimensions

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

SOT26

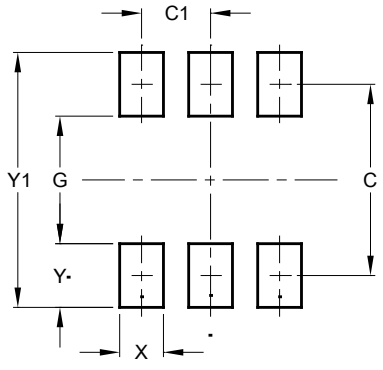


SOT26			
Dim	**Min**	**Max**	**Typ**
A1	0.013	0.10	0.05
A2	1.00	1.30	1.10
A3	0.70	0.80	0.75
b	0.35	0.50	0.38
c	0.10	0.20	0.15
D	2.90	3.10	3.00
e	-	-	0.95
e1	-	-	1.90
E	2.70	3.00	2.80
E1	1.50	1.70	1.60
L	0.35	0.55	0.40
a	-	-	8°
a1	-	-	7°
All Dimensions in mm			

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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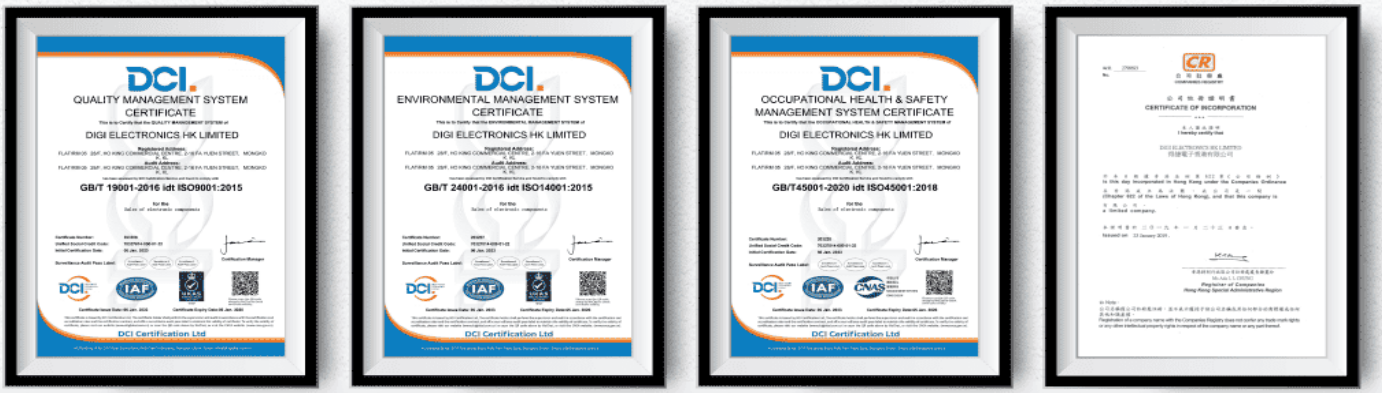

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