

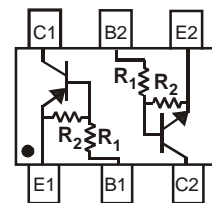
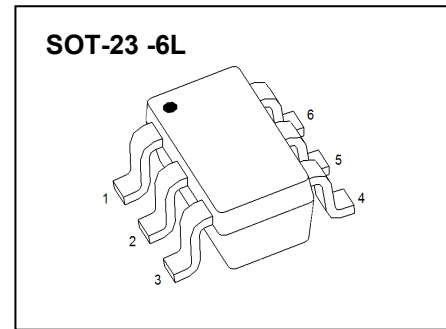
Plastic-Encapsulate Transistors

DUAL TRANSISTOR (PNP+NPN)

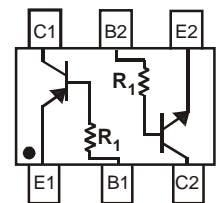
Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- Available in Lead Free/RoHS Compliant Version (Note 1)
- "Green" Device (Note 2)

Part Number	R1	R2	Marking
DCX124EK	22KΩ	22KΩ	C17
DCX144EK	47KΩ	47KΩ	C20
DCX114YK	10KΩ	47KΩ	C14
DCX123JK	2.2KΩ	47KΩ	C06
DCX114EK	10KΩ	10KΩ	C13
DCX115EK	100KΩ	100KΩ	C15
DCX143TK	4.7KΩ	-	C07
DCX114TK	10KΩ	-	C12



R1, R2 Device Schematic



R1 only Device Schematic

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

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

Thermal Characteristics NPN Section

Characteristic	Symbol	Value	Unit
Power Dissipation (Total) (Note 3)	P _D	300	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	R _{θJA}	417	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Mounted on FR4 PC Board with . 200mW per element must not be exceeded.

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	V_{IN}	DCX124EK DCX144EK	+10 to -40	
		DCX114YK	+10 to -40	
		DCX123JK	+6 to -40	
		DCX114EK	+5 to -12	
		DCX115EK	+10 to -40	
		DCX143TK	+10 to -40	
		DCX114TK	+5V max +5V max	
Output Current	I_o	DCX124EK	-30	
		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 3)	P_D	300	mW
Thermal Resistance, Junction to Ambient Air (Note 3)	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics NPN Section @ $T_A = 25^\circ\text{C}$ 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 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	$I_C/I_B = 2.5\text{mA} / 0.25\text{mA} - \text{DCX143TK}$ $I_C/I_B = 1\text{mA} / 0.1\text{mA} - \text{DCX114TK}$
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	%	—
Gain-Bandwidth Product*	f_T	—	250	—	MHz	$V_{CE} = 10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

* Transistor - For Reference Only



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

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX124EK	$V_{I(OFF)}$	0.5	1.1	—	V	$V_{CC} = 5V, I_O = 100\mu A$
	DCX144EK		0.5	1.1	—		
	DCX114YK		0.3	—	—		
	DCX123JK		0.5	—	—		
	DCX114EK		0.5	1.1	—		
	DCX115EK		0.5	1.1	—		
Input Voltage	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	%	—
Gain-Bandwidth Product*		f_T	—	250	—	MHz	$V_{CE} = 10V, I_E = -5mA, f = 100MHz$

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

Characteristic (DCX143TK & DCX114TK only)	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	$I_C = -50\mu A$
Collector-Emitter Breakdown Voltage	BV_{CEO}	-50	—	—	V	$I_C = -1mA$
Emitter-Base Breakdown Voltage	BV_{EBO}	-5	—	—	V	$I_E = -50\mu A$
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	$I_C/I_B = -2.5mA / -0.25mA$ - 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	%	—
Gain-Bandwidth Product*	f_T	—	250	—	MHz	$V_{CE} = -10V, I_E = 5mA, f = 100MHz$

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Electrical Characteristics PNP Section (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	-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	%	—
Gain-Bandwidth Product*		f _T	—	250	—	MHz	V _{CE} = -10V, I _E = -5mA, f = 100MHz

*Transistor - For Reference Only

Typical Curves – Total Device

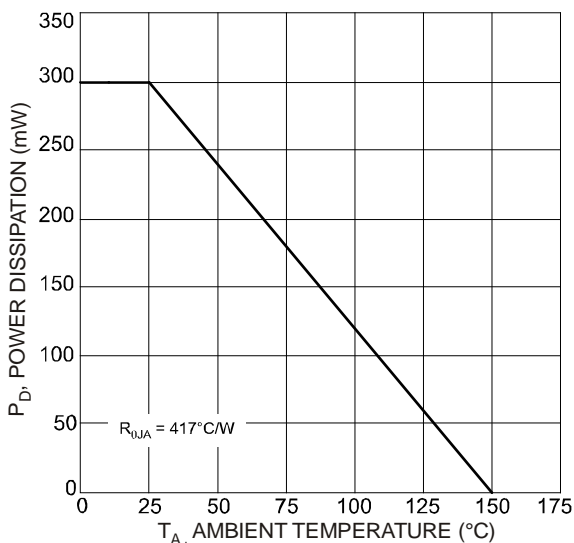
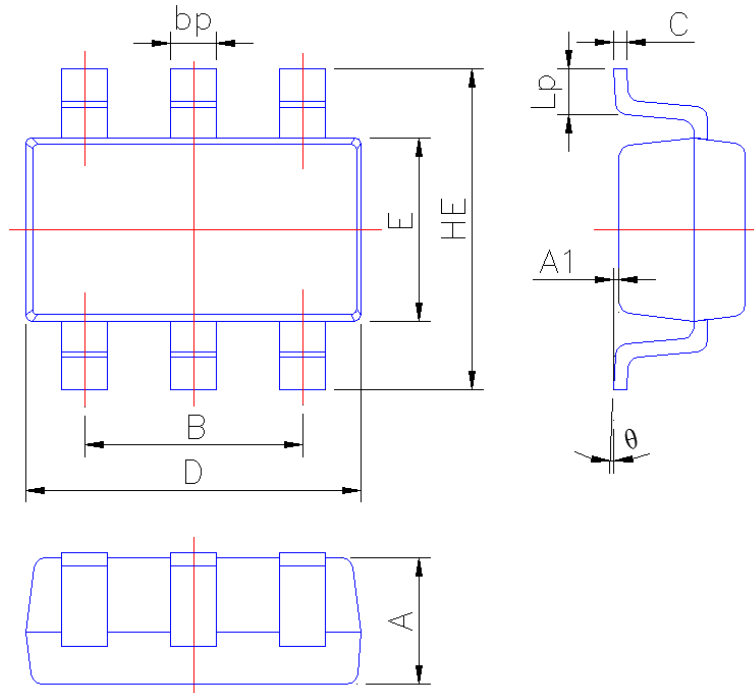


Fig. 1 Power Dissipation vs. Ambient Temperature

SOT-23-6L Package Outline Dimensions



Symbol	Dimension in Millimeters	
	Min	Max
A	1.05	1.20
A1	0.010	0.100
B	1.80	2.00
bp	0.35	0.50
C	0.09	0.15
D	2.80	3.00
E	1.50	1.70
HE	2.60	3.00
Lp	0.25	0.55
θ	2°	6°