

**General Description**

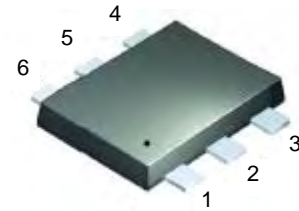
- DCX4710H is best suited for applications where the load needs to be turned on and off using micro-controllers, comparators or other control circuits, particularly at a point of load. It features a discrete pre-biased PNP transistor which can support continuous maximum current of 100 mA. It also contains a pre-biased NPN transistor which can be used as a control and can be biased using a higher supply. The component devices can be used as a part of circuit or as stand alone discrete devices.

**Features**

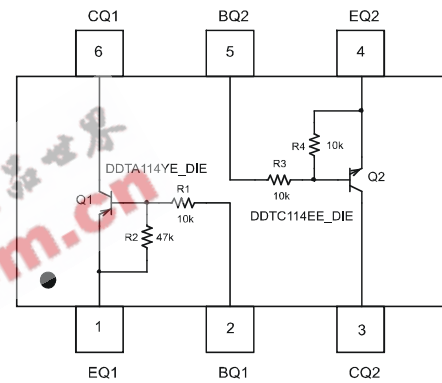
- Built in Biasing Resistors
- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- Lead Free By Design/RoHS Compliant (Note 1)**
- "Green" Device (Note 2)**

**Mechanical Data**

- Case: SOT-563
- Case Material: Molded Plastic. "Green Molding" Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Fig. 2
- Terminals: Finish - Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking & Type Code Information: See Page 7
- Ordering Information: See Page 7
- Weight: 0.005 grams (approximate)



SOT-563



Schematic and Pin Configuration

Reference	Device Type	R1 (NOM)	R2 (NOM)	R3 (NOM)	R4 (NOM)
Q1	PNP	10KΩ	47KΩ	—	—
Q2	NPN	—	—	10KΩ	10KΩ

**Maximum Ratings: Total Device** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Output Current	I <sub>out</sub>	100	mA
Power Dissipation (Note 3)	P <sub>d</sub>	150	mW
Power Derating Factor above 45°C	P <sub>der</sub>	1.43	mW/°C
Junction Operation and Storage Temperature Range	P <sub>d</sub>	-55 to +150	°C
Thermal Resistance, Junction to Ambient Air (Note 3) (Equivalent to one heated junction of PNP transistor) @ T <sub>A</sub> = 25°C	R <sub>θJA</sub>	833	°C/W

- Notes:
- No purposefully added lead.
  - Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  - Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; as per Diodes Inc. suggested pad layout document AP02001 on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.



**Sub-Component Device – Pre-Biased PNP Transistor (Q1)** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-50	V
Collector-Emitter Voltage	$V_{CEO}$	-50	V
Supply Voltage	$V_{CC}$	-50	V
Input Voltage	$V_{IN}$	+6 to -40	V
Output Current (dc)	$I_{C(max)}$	-100	mA

**Sub-Component Device – Pre-Biased NPN Transistor (Q2)** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	50	V
Collector-Emitter Voltage	$V_{CEO}$	50	V
Supply Voltage	$V_{CC}$	50	V
Input Voltage	$V_{IN}$	-10 to +40	V
Output Current (dc)	$I_{C(max)}$	100	mA

**Electrical Characteristics: Pre-Biased PNP Transistor (Q1)** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Cut Off Current	$I_{CBO}$	—	—	-100	nA	$V_{CB} = -50\text{V}, I_E = 0$
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50	—	—	V	$I_C = -10\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-50	—	—	V	$I_C = -4\text{mA}, I_B = 0$
Input Off Voltage	$V_{I(OFF)}$	—	—	-0.3	V	$V_{CE} = -5\text{V}, I_C = -100\mu\text{A}$
Output Off Current	$I_{O(OFF)}$	—	—	-0.5	$\mu\text{A}$	$V_{CC} = -50\text{V}, V_I = 0\text{V}$
<b>ON CHARACTERISTICS</b>						
DC Current Gain	$h_{FE}$	80	—	—	—	$V_{CE} = -5\text{V}, I_C = -5\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	-0.25	V	$I_C = -10\text{mA}, I_B = -0.3\text{mA}$
Output On Voltage	$V_{O(ON)}$	—	-0.1	-0.3	V	$I_O/I_I = -10\text{mA}/-0.5\text{mA}$
Input On Voltage (Load is present)	$V_{I(ON)}$	-1.4	-0.9	—	V	$V_O = -0.3\text{V}, I_C = -2\text{mA}$
Input Current	$I_I$	—	—	-0.88	mA	$V_I = -5\text{V}$
Input Resistor +/- 30% (Base)	$\Delta R1$	7	10	13	$\text{K}\Omega$	—
Pull-up Resistor (Base to Vcc supply)	R2	32	47	62	$\text{K}\Omega$	—
Resistor Ratio	$\Delta(R2/R1)$	20	—	20	%	—
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency (gain bandwidth product)	$f_T$	—	250	—	MHz	$V_{CE} = -10\text{V}, I_E = -5\text{mA}, f = 100\text{MHz}$

\*Pulse Test: Pulse width,  $t_p < 300 \mu\text{s}$ ; Duty Cycle,  $d \leq 0.02$

**Pre-Biased NPN Transistor (Q2)** @T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Cut Off Current	I <sub>CB0</sub>	—	—	100	nA	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	50	—	—	V	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	50	—	—	V	I <sub>C</sub> = 2mA, I <sub>B</sub> = 0
Input Off Voltage	V <sub>I(OFF)</sub>	—	1.2	0.5	V	V <sub>CE</sub> = 5V, I <sub>C</sub> = 100μA
Output Current	I <sub>O(OFF)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
<b>ON CHARACTERISTICS</b>						
DC Current Gain	h <sub>FE</sub>	35	—	—	—	V <sub>CE</sub> = 5V, I <sub>C</sub> = 5mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	0.25	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = -0.3mA
Output On Voltage	V <sub>O(ON)</sub>	—	0.1	0.3	V	I <sub>O</sub> /I <sub>I</sub> = 10mA/0.5mA
Input On Voltage	V <sub>I(ON)</sub>	3	1.6	—	V	V <sub>O</sub> = 0.3V, I <sub>C</sub> = 2mA
Input Current	I <sub>I</sub>	—	—	0.88	mA	V <sub>I</sub> = 5V
Input Resistor +/- 30% (Base)	R1	7	10	13	KΩ	—
Resistor Ratio	(R2/R1)	0.8	1	1.2	—	—
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency (Gain bandwidth product)	f <sub>T</sub>	—	250	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz

\*Pulse Test: Pulse width, tp<300 uS, Duty Cycle, d<=0.02

**Typical Characteristics** @T<sub>amb</sub> = 25°C unless otherwise specified

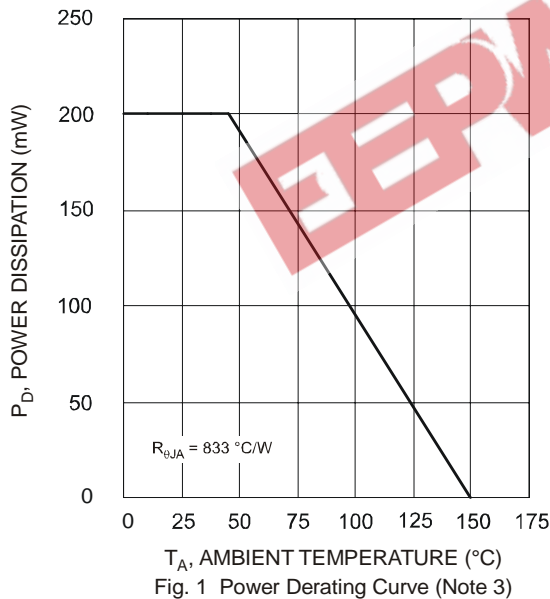


Fig. 1 Power Derating Curve (Note 3)

Notes: 3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; as per Diodes Inc. suggested pad layout document AP02001 on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

**Characteristics Curves of PNP Transistor (Q1)** @ $T_{amb} = 25^{\circ}C$  unless otherwise specified

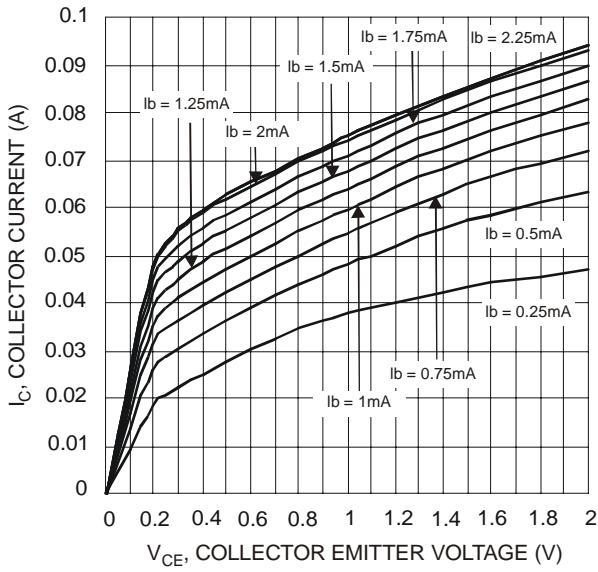


Fig. 2  $V_{CE}$  vs.  $I_C$

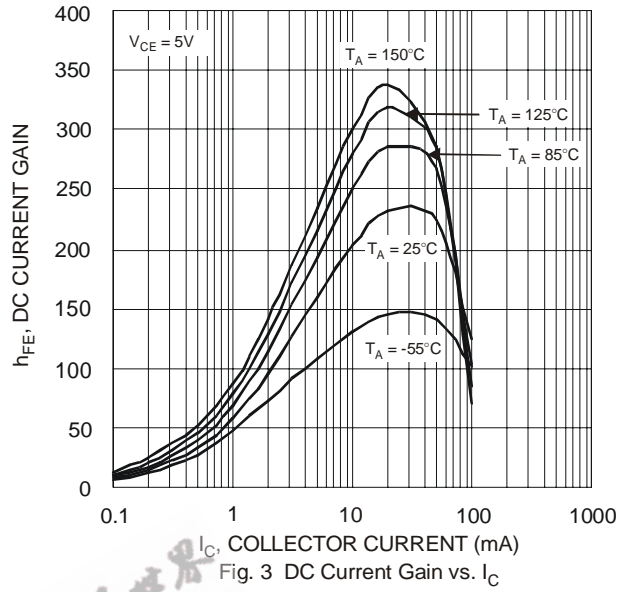


Fig. 3 DC Current Gain vs.  $I_C$

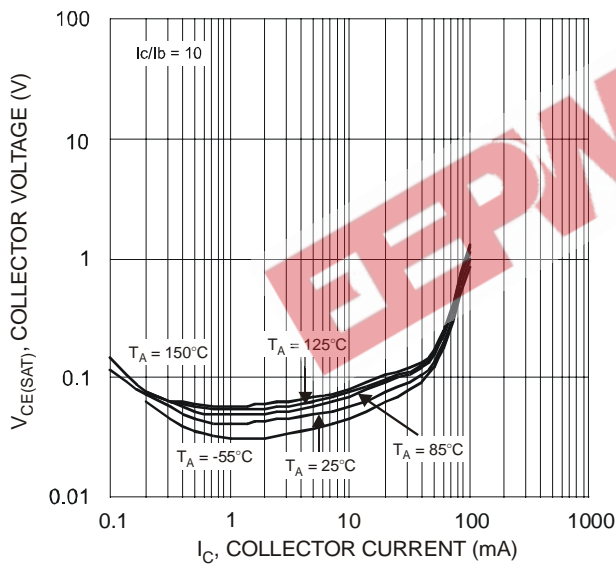


Fig. 4  $I_C$  vs.  $V_{CE(SAT)}$

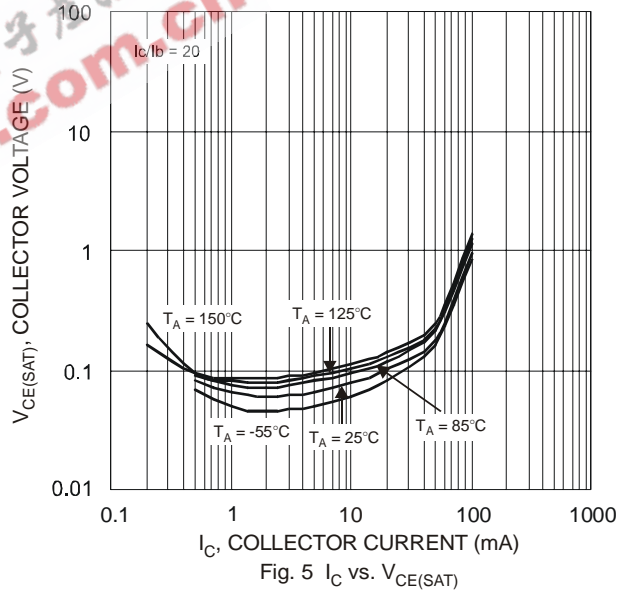


Fig. 5  $I_C$  vs.  $V_{CE(SAT)}$

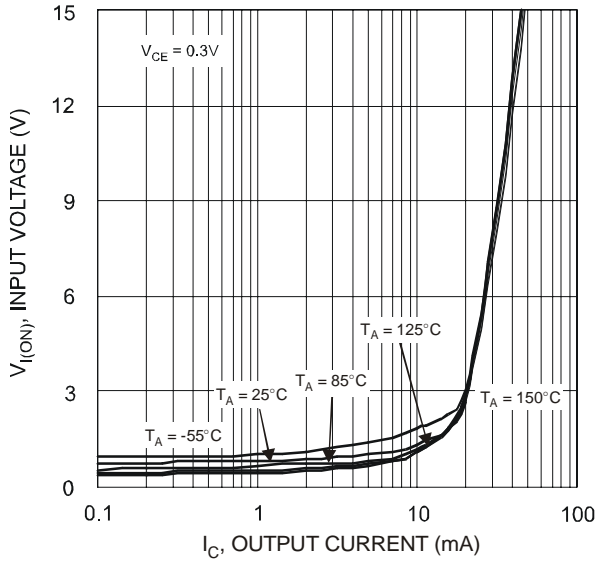


Fig. 6 Input Voltage vs. Collector Current

**Characteristics Curves of NPN Transistor (Q2)** @T<sub>amb</sub> = 25°C unless otherwise specified

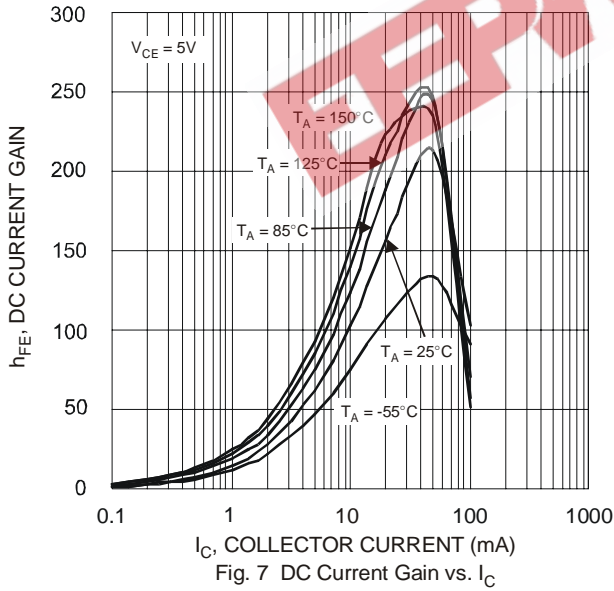


Fig. 7 DC Current Gain vs. I<sub>C</sub>

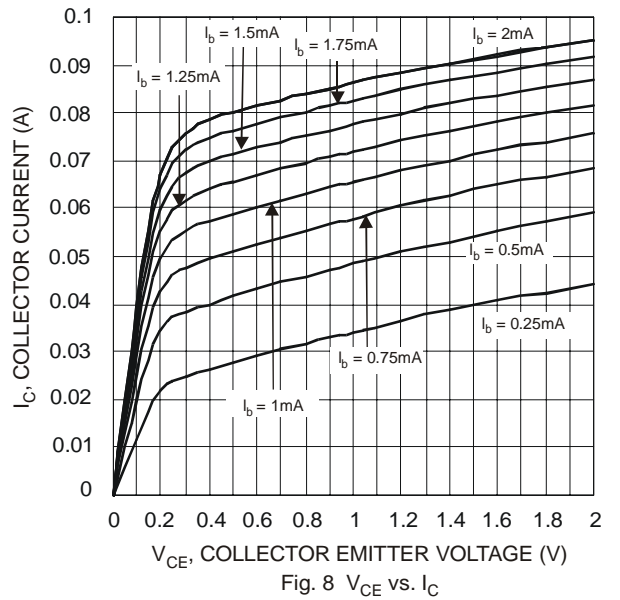


Fig. 8 V<sub>CE</sub> vs. I<sub>C</sub>

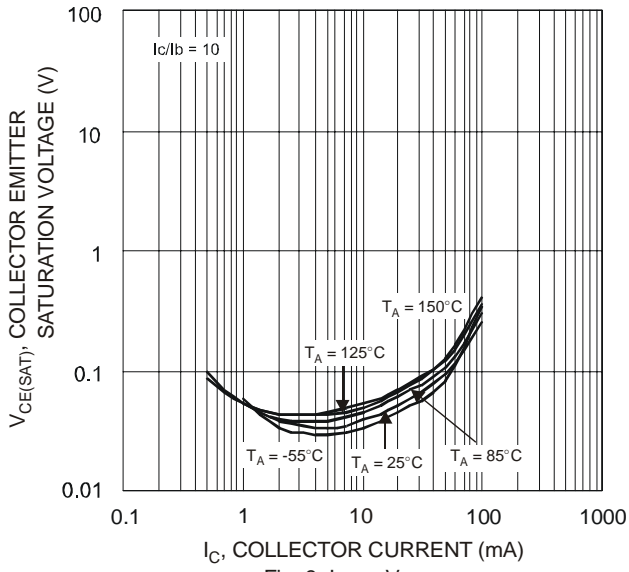


Fig. 9  $I_C$  vs.  $V_{CE(SAT)}$

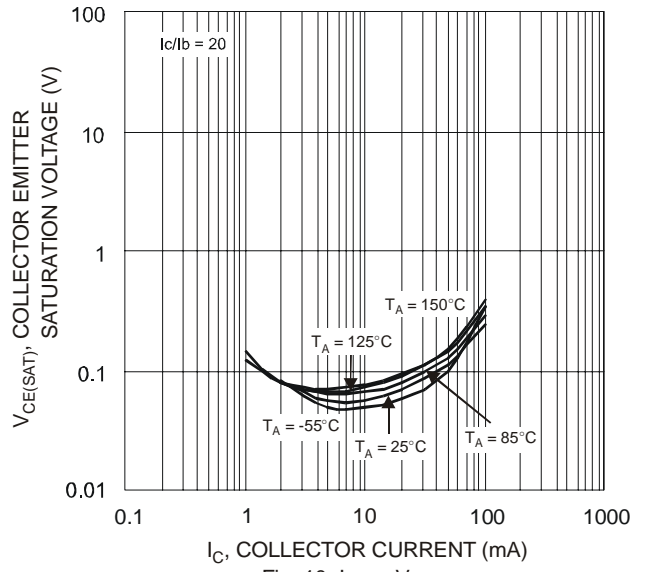


Fig. 10  $I_C$  vs.  $V_{CE(SAT)}$

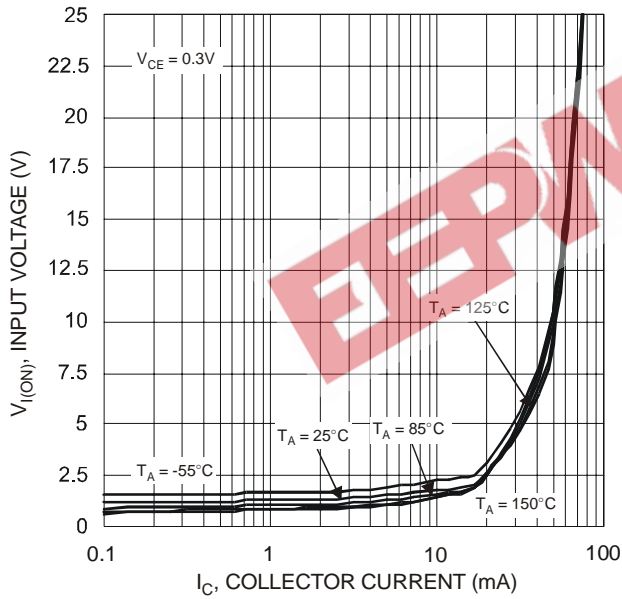


Fig. 11 Input Voltage vs. Output Current

**Ordering Information** (Note 5)

Device	Marking Code	Packaging	Shipping
DCX4710H-7	C02	SOT-563	3000/Tape & Reel

Notes: 5. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**

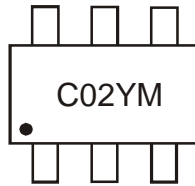


Fig. 12

C02 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year e.g., T = 2006  
 M = Month e.g., 9 = September

Date Code Key

Year	2006	2007	2008	2009	2010	2011	2012
Code	T	U	V	W	X	Y	Z

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

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