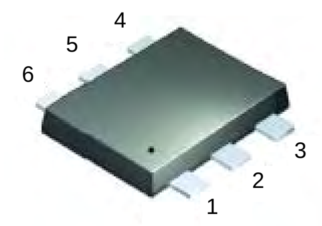
DCX4710H

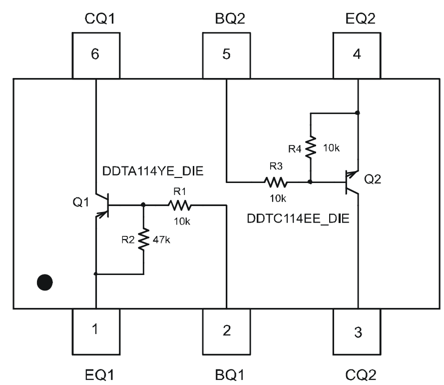
100mA DUAL COMPLEMENTARY PRE-BIASED TRANSISTORS

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.



SOT-563



Schematic and Pin Configuration

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)

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

Maximum Ratings: Total Device @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Output Current	I_{out}	100	mA
Power Dissipation (Note 3)	P_d	150	mW
Power Derating Factor above 45°C	P_{der}	1.43	mW/°C
Junction Operation and Storage Temperature Range	P_d	-55 to +150	°C
Thermal Resistance, Junction to Ambient Air (Note 3) (Equivalent to one heated junction of PNP transistor) @ T_A = 25°C	$R_{\theta JA}$	833	°C/W

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. 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°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°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°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Cut Off Current	I_{CBO}	—	—	-100	nA	V_{CB} = -50V, I_E = 0
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-50		—	V	I_C = -10μA, I_E = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-50		—	V	I_C = -4mA, I_B = 0
Input Off Voltage	$V_{I(OFF)}$	—	—	-0.3	V	V_{CE} = -5V, I_C = -100μA
Output Off Current	$I_{O(OFF)}$	—	—	-0.5	μA	V_{CC} = -50V, V_I = 0V
ON CHARACTERISTICS						
DC Current Gain	h_{FE}	80	—	—	—	V_{CE} = -5V, I_C = -5mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	-0.25	V	I_C = -10mA, I_B = -0.3mA
Output On Voltage	$V_{O(ON)}$	—	-0.1	-0.3	V	I_O/I_I = -10mA/-0.5mA
Input On Voltage (Load is present)	$V_{I(ON)}$	-1.4	-0.9	—	V	V_O = -0.3V, I_C = -2mA
Input Current	I_I	—	—	-0.88	mA	V_I = -5V
Input Resistor +/- 30% (Base)	ΔR1	7	10	13	KΩ	—
Pull-up Resistor (Base to Vcc supply)	R2	32	47	62	KΩ	—
Resistor Ratio	Δ(R2/R1)	20	—	20	%	—
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency (gain bandwidth product)	f_T	—	250	—	MHz	V_{CE} = -10V, I_E = -5mA, f = 100MHz

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

Pre-Biased NPN Transistor (Q2) @T_A = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Cut Off Current	I_{CBO}	—	—	100	nA	V_{CB} = 50V, I_E = 0
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50	—	—	V	I_C = 10μA, I_E = 0
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	50	—	—	V	I_C = 2mA, I_B = 0
Input Off Voltage	$V_{I(OFF)}$	—	1.2	0.5	V	V_{CE} = 5V, I_C = 100μA
Output Current	$I_{O(OFF)}$	—	—	0.5	μA	V_{CC} = 50V, V_I = 0V
ON CHARACTERISTICS						
DC Current Gain	h_{FE}	35	—	—	—	V_{CE} = 5V, I_C = 5mA
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	—	0.25	V	I_C = -10mA, I_B = -0.3mA
Output On Voltage	$V_{O(ON)}$	—	0.1	0.3	V	I_O/I_I = 10mA/0.5mA
Input On Voltage	$V_{I(ON)}$	3	1.6	—	V	V_O = 0.3V, I_C = 2mA
Input Current	I_I	—	—	0.88	mA	V_I = 5V
Input Resistor +/- 30% (Base)	R1	7	10	13	KΩ	—
Resistor Ratio	(R2/R1)	0.8	1	1.2	—	—
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency (Gain bandwidth product)	f_T	—	250	—	MHz	V_{CE} = 10V, I_E = 5mA, f = 100MHz

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

Typical Characteristics @T_{amb} = 25°C unless otherwise specified

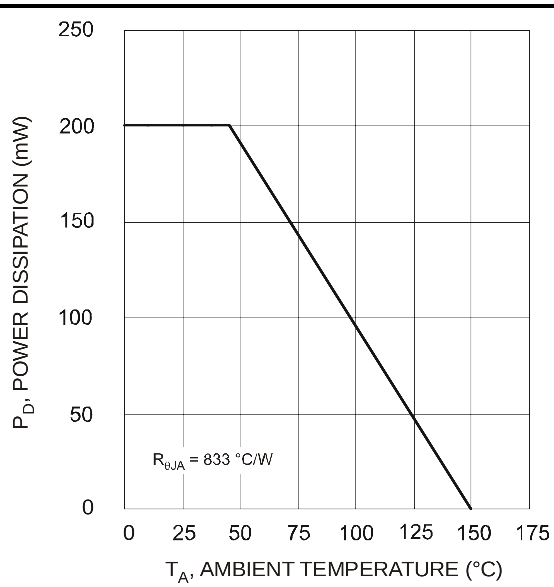


Fig. 1 Power Derating Curve (Note 3)

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°C unless otherwise specified

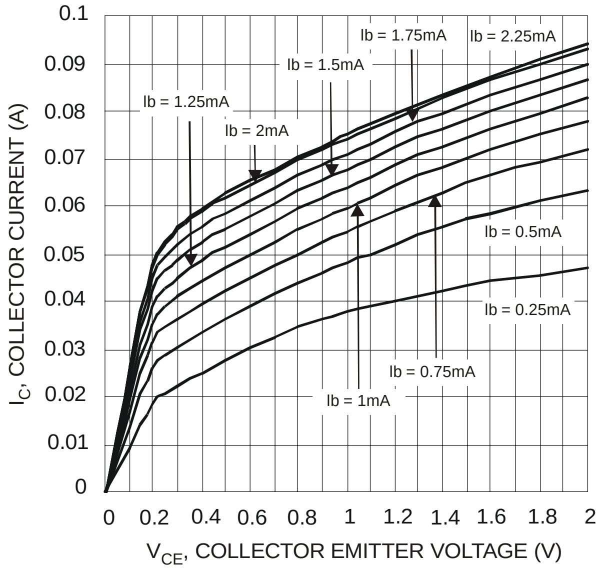


Fig. 2 V_{CE} vs. I_C

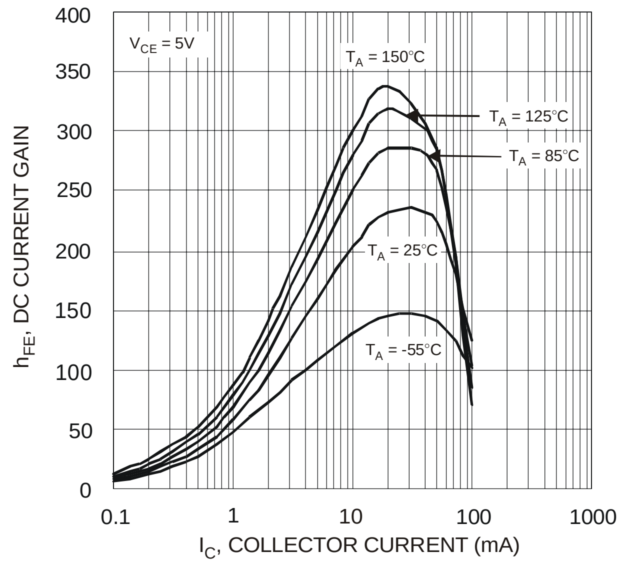


Fig. 3 DC Current Gain vs. I_C

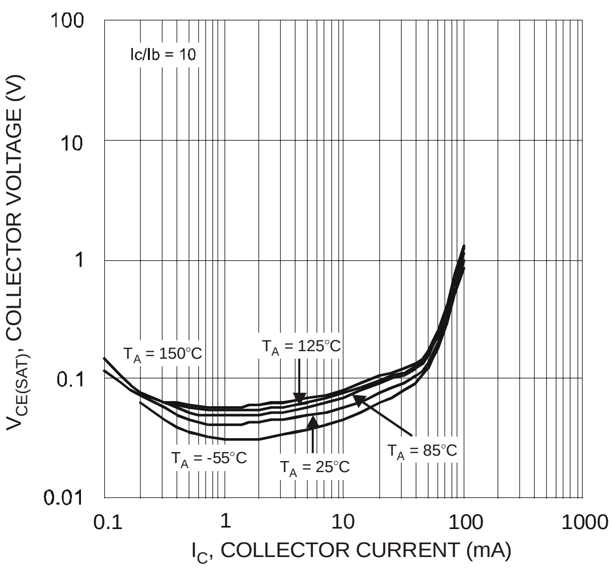


Fig. 4 I_C vs. $V_{CE(SAT)}$

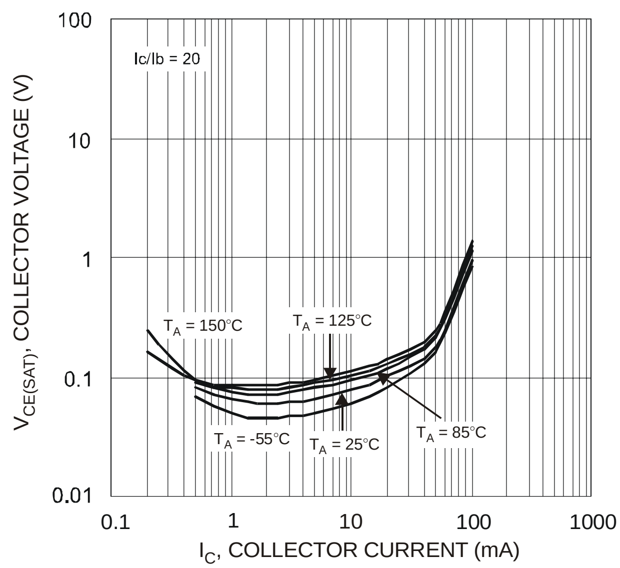


Fig. 5 I_C vs. $V_{CE(SAT)}$

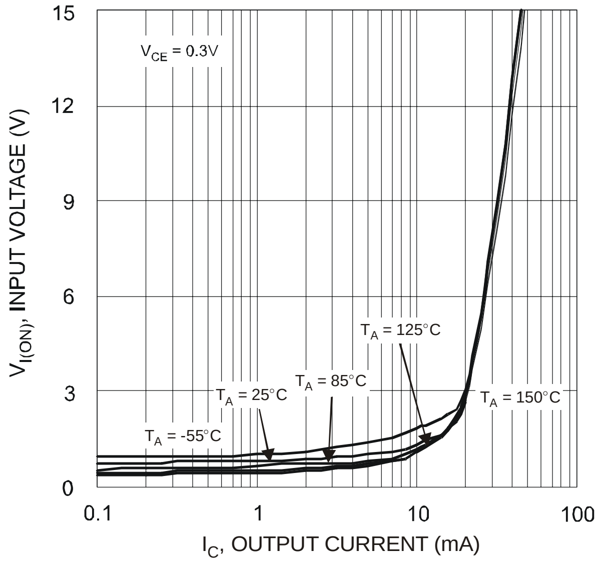


Fig. 6 Input Voltage vs. Collector Current

Characteristics Curves of NPN Transistor (Q2) @T_{amb} = 25°C unless otherwise specified

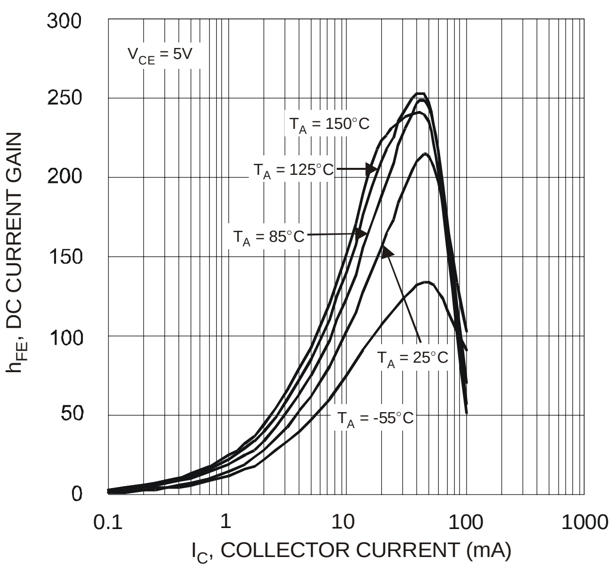


Fig. 7 DC Current Gain vs. I_C

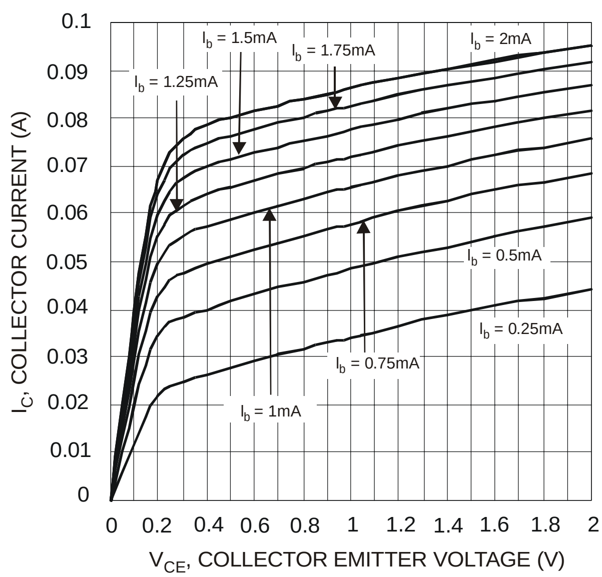


Fig. 8 V_{CE} vs. I_C

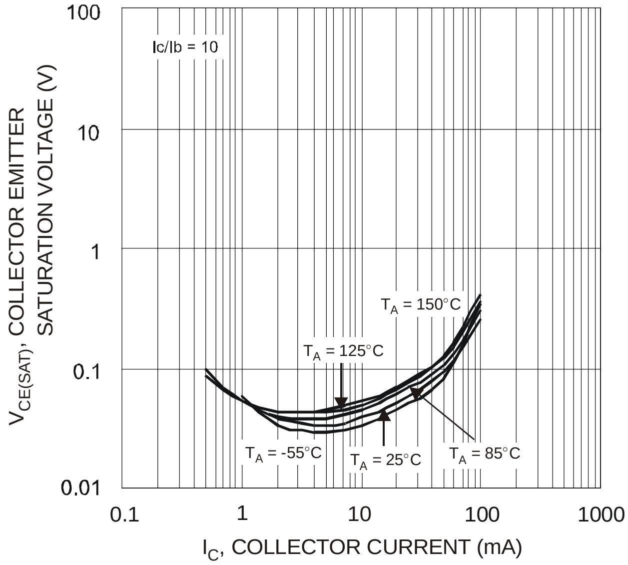


Fig. 9 I_C vs. $V_{CE(SAT)}$

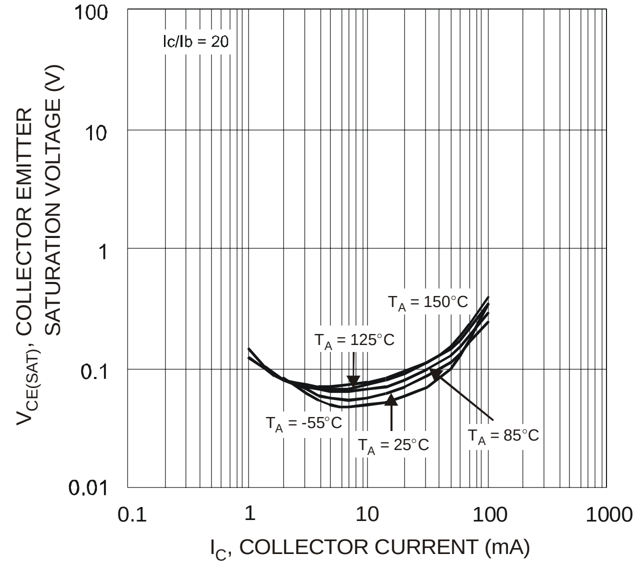


Fig. 10 I_C vs. $V_{CE(SAT)}$

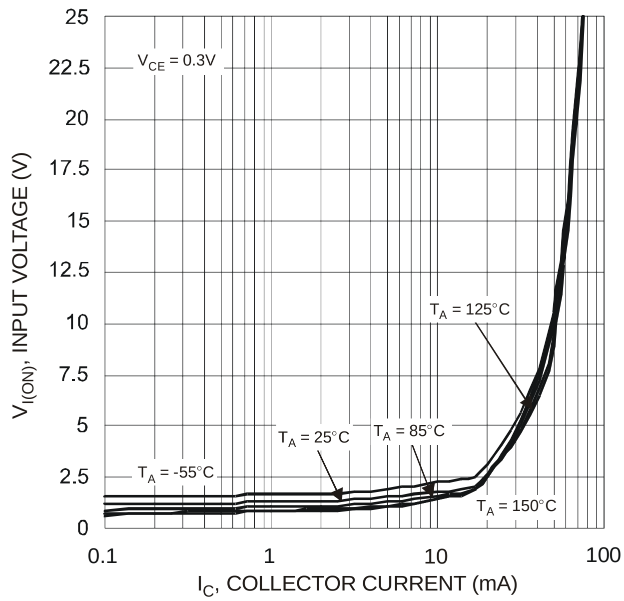


Fig. 11 Input Voltage vs. Output Current

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

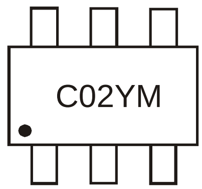


Fig. 12

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