

## COMPLEMENTARY NPN/PNP PRE-BIASED SMALL SIGNAL SOT-563 DUAL SURFACE MOUNT TRANSISTOR

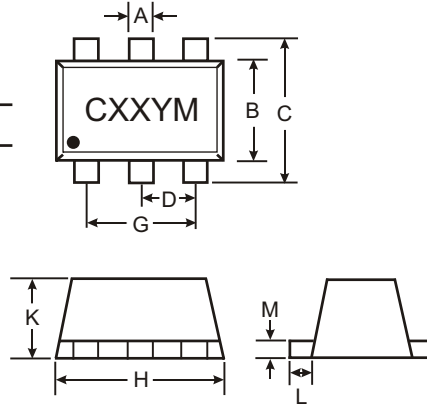
**NEW PRODUCT**

### Features

- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- Lead Free By Design/RoHS Compliant (Note 3)

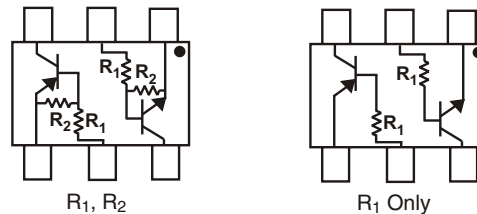
### Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Matte Tin annealed over Alloy 42 leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.005 grams (approx.)



SOT-563			
Dim	Min	Max	Typ
A	0.15	0.30	0.25
B	1.10	1.25	1.20
C	1.55	1.70	1.60
D	0.50		
G	0.90	1.10	1.00
H	1.50	1.70	1.60
K	0.56	0.60	0.60
L	0.15	0.25	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

P/N	R1 (NOM)	R2 (NOM)	MARKING
DCX122LH	0.22K $\Omega$	10K $\Omega$	C81
DCX142JH	0.47K $\Omega$	10K $\Omega$	C82
DCX122TH	0.22K $\Omega$	OPEN	C83
DCX142TH	0.47K $\Omega$	OPEN	C84



SCHEMATIC DIAGRAM, TOP VIEW

### Maximum Ratings NPN Section @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	50	V
Input Voltage	V <sub>IN</sub>	-5 to +6	V
Input Voltage	V <sub>EBO (MAX)</sub>	-5 to +6	V
Output Current	I <sub>C</sub>	5	V
Power Dissipation (Note 1, 2)	P <sub>d</sub>	100	mA
Thermal Resistance, Junction to Ambient Air (Note 1)	R <sub>θJA</sub>	150	mW
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	833	°C/W
		-55 to +150	°C

- Note: 1. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.  
 2. NPN Section, PNP Section, or maximum combined.  
 3. No purposefully added lead.

### Maximum Ratings PNP Section @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	V <sub>CC</sub>	-50	V
Input Voltage	DCX122LH DCX142JH V <sub>IN</sub>	+5 to -6 +5 to -6	V
Input Voltage	DCX122TH DCX142TH V <sub>EBO (MAX)</sub>	-5	V
Output Current	All I <sub>C</sub>	-100	mA
Power Dissipation (Note 1, 2)	P <sub>d</sub>	150	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	R <sub>θJA</sub>	833	°C/W
Operating and Storage and Temperature Range	T <sub>j</sub> , T <sub>STG</sub>	-55 to +150	°C

Note: 1. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.  
2. NPN Section, PNP Section, or maximum combined.

### Electrical Characteristics NPN Section @ T<sub>A</sub> = 25°C unless otherwise specified R1, R2 Types

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX122LH DCX142JH V <sub>I(off)</sub>	0.3	—	—	V	V <sub>CC</sub> = 5V, I <sub>O</sub> = 100μA
	DCX122LH DCX142JH V <sub>I(on)</sub>	—	—	2.0 2.0	V	V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA V <sub>O</sub> = 0.3V, I <sub>O</sub> = 20mA
Output Voltage	V <sub>O(on)</sub>	—	—	0.3V	V	I <sub>O</sub> /I <sub>I</sub> = 5mA/0.25mA
Input Current	DCX122LH DCX142JH I <sub>I</sub>	—	—	28 13	mA	V <sub>I</sub> = 5V
Output Current	I <sub>O(off)</sub>	—	—	0.5	μA	V <sub>CC</sub> = 50V, V <sub>I</sub> = 0V
DC Current Gain	DDCX122LH DDCX142JH G <sub>I</sub>	56 56	—	—	—	V <sub>O</sub> = 5V, I <sub>O</sub> = 10mA
Gain-Bandwidth Product*	f <sub>T</sub>	—	200	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = 5mA, f = 100MHz

\* Transistor - For Reference Only

### Electrical Characteristics NPN Section @ T<sub>A</sub> = 25°C unless otherwise specified R1-Only

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	50	—	—	V	I <sub>C</sub> = 50μA
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	40	—	—	V	I <sub>C</sub> = 1mA
Emitter-Base Breakdown Voltage	DCX122TH DCX142TH BV <sub>EBO</sub>	5	—	—	V	I <sub>E</sub> = 50μA I <sub>E</sub> = 50μA
Collector Cutoff Current	I <sub>CBO</sub>	—	—	0.5	μA	V <sub>CB</sub> = 50V
Emitter Cutoff Current	DCX122TH DCX142TH I <sub>EBO</sub>	—	—	0.5 0.5	μA	V <sub>EB</sub> = 4V
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	—	0.3	V	I <sub>C</sub> = 5mA, I <sub>B</sub> = 0.25mA
DC Current Transfer Ratio	DCX122TH DCX142TH h <sub>FE</sub>	100 100	250 250	600 600	—	I <sub>C</sub> = 1mA, V <sub>CE</sub> = 5V
Gain-Bandwidth Product*	f <sub>T</sub>	—	200	—	MHz	V <sub>CE</sub> = 10V, I <sub>E</sub> = -5mA, f = 100MHz

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**Electrical Characteristics PNP Section @ T<sub>A</sub> = 25°C unless otherwise specified R1, R2 Types**

Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX122LH DCX142JH	V <sub>I(off)</sub>	-0.3 -0.3	—	—	V	V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA
	DCX122LH DCX142JH	V <sub>I(on)</sub>	—	—	-2.0 -2.0	V	V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA
Output Voltage		V <sub>O(on)</sub>	—	—	-0.3V	V	I <sub>O</sub> /I <sub>I</sub> = -5mA/-0.25mA
Input Current	DCX122LH DCX142JH	I <sub>I</sub>	—	—	-28 -13	mA	V <sub>I</sub> = -5V
Output Current		I <sub>O(off)</sub>	—	—	-0.5	μA	V <sub>CC</sub> = -50V, V <sub>I</sub> = 0V
DC Current Gain	DCX122LH DCX142JH	G <sub>I</sub>	56 56	—	—	—	V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA
Gain-Bandwidth Product*		f <sub>T</sub>	—	200	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz

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**Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified R1-Only Types**

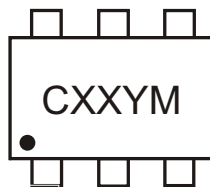
Characteristic		Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage		BV <sub>CBO</sub>	-50	—	—	V	I <sub>C</sub> = -50μA
Collector-Emitter Breakdown Voltage		BV <sub>CEO</sub>	-40	—	—	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	DCX122TH DCX142TH	BV <sub>EBO</sub>	-5	—	—	V	I <sub>E</sub> = -50μA I <sub>E</sub> = -50μA
Collector Cutoff Current		I <sub>CBO</sub>	—	—	-0.5	μA	V <sub>CB</sub> = -50V
Emitter Cutoff Current	DCX122TH DCX142TH	I <sub>EBO</sub>	—	—	-0.5 -0.5	μA	V <sub>EB</sub> = -4V
Collector-Emitter Saturation Voltage		V <sub>CE(sat)</sub>	—	—	-0.3	V	I <sub>C</sub> = -5mA, I <sub>B</sub> = -0.25mA
DC Current Transfer Ratio	DCX122TH DCX142TH	h <sub>FE</sub>	100 100	250 250	600 600	—	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V
Gain-Bandwidth Product*		f <sub>T</sub>	—	200	—	MHz	V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz

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**Ordering Information (Note 4)**

Device	Packaging	Shipping
DCX122LH-7	SOT-563	3000/Tape & Reel
DCX142JH-7	SOT-563	3000/Tape & Reel
DCX122TH-7	SOT-563	3000/Tape & Reel
DCX142TH-7	SOT-563	3000/Tape & Reel

Notes: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**


CXX = Product Type Marking Code (See Page 1)  
 YM = Date Code Marking  
 Y = Year ex: P = 2003  
 M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009
Code	N	P	R	S	T	U	V	W

Month	Jan	Feb	March	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

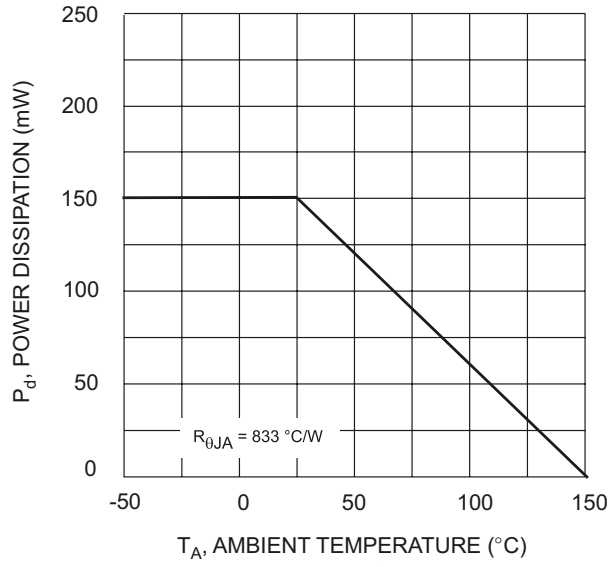


Fig. 1 Derating Curve - Total