

**COMPLEMENTARY NPN/PNP PRE-BIASED  
SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR**

**Features**

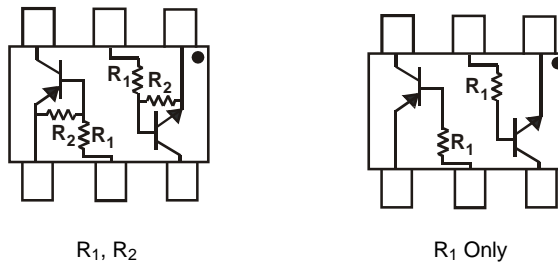
- Epitaxial Planar Die Construction
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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

**Mechanical Data**

- Case: SOT-563
- Case Material: Molded Plastic; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208②③
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)

SOT-563



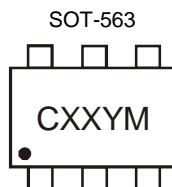
SCHEMATIC DIAGRAM, TOP VIEW

**Ordering Information** (Note 4)

Device	Packaging	Shipping
DCX122LH-7	SOT-563	3,000/Tape & Reel
DCX142JH-7	SOT-563	3,000/Tape & Reel
DCX122TH-7	SOT-563	3,000/Tape & Reel
DCX142TH-7	SOT-563	3,000/Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

**Marking Information**



CXX = Product Type Marking Code  
YM = Date Code Marking  
Y = Year ex: T = 2006  
M = Month ex: 9 = September

Date Code Key

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Code	N	P	R	S	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

**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	DCX122LH DCX142JH	V <sub>IN</sub>	-5 to +6 -5 to +6	V
Input Voltage	DCX122TH DCX142TH	V <sub>EBO</sub> (MAX)	5	V
Output Current	All	I <sub>C</sub>	100	mA
Power Dissipation	(Notes 5 & 6)	P <sub>d</sub>	150	mW
Thermal Resistance, Junction to Ambient Air	(Note 5)	R <sub>θJA</sub>	833	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**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</sub> (MAX)	-5	V
Output Current	All	I <sub>C</sub>	-100	mA
Power Dissipation	(Notes 5 & 6)	P <sub>d</sub>	150	mW
Thermal Resistance, Junction to Ambient Air	(Note 5)	R <sub>θJA</sub>	833	°C/W
Operating and Storage Temperature Range		T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 5. Mounted on FR4 PC Board with recommended pad layout at <http://www.diodes.com/datasheets/ap02001.pdf>.  
6. NPN Section, PNP Section, or maximum combined.

**Electrical Characteristics NPN Section, R1, R2 Types** (@T<sub>A</sub> = +25°C unless otherwise specified.)

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	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, R1-Only** (@T<sub>A</sub> = +25°C unless otherwise specified.)

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 Cut-Off Current		I <sub>CBO</sub>	—	—	0.5	μA	V <sub>CB</sub> = 50V
Emitter Cut-Off 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

\* Transistor - For Reference Only

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

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

\* Transistor - For Reference Only

**Electrical Characteristics, R1-Only Types** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic		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		$BV_{CEO}$	-40	—	—	V	$I_C = -1\text{mA}$
Emitter-Base Breakdown Voltage	DCX122TH DCX142TH	$BV_{EBO}$	-5	—	—	V	$I_E = -50\mu\text{A}$ $I_E = -50\mu\text{A}$
Collector Cut-Off Current		$I_{CBO}$	—	—	-0.5	$\mu\text{A}$	$V_{CB} = -50\text{V}$
Emitter Cut-Off Current	DCX122TH DCX142TH	$I_{EBO}$	— —	—	-0.5 -0.5	$\mu\text{A}$	$V_{EB} = -4\text{V}$
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	—	—	-0.3	V	$I_C = -5\text{mA}$ , $I_B = -0.25\text{mA}$
DC Current Transfer Ratio	DCX122TH DCX142TH	$h_{FE}$	100 100	250 250	600 600	—	$I_C = -1\text{mA}$ , $V_{CE} = -5\text{V}$
Gain-Bandwidth Product*		$f_T$	—	200	—	MHz	$V_{CE} = -10\text{V}$ , $I_E = 5\text{mA}$ , $f = 100\text{MHz}$

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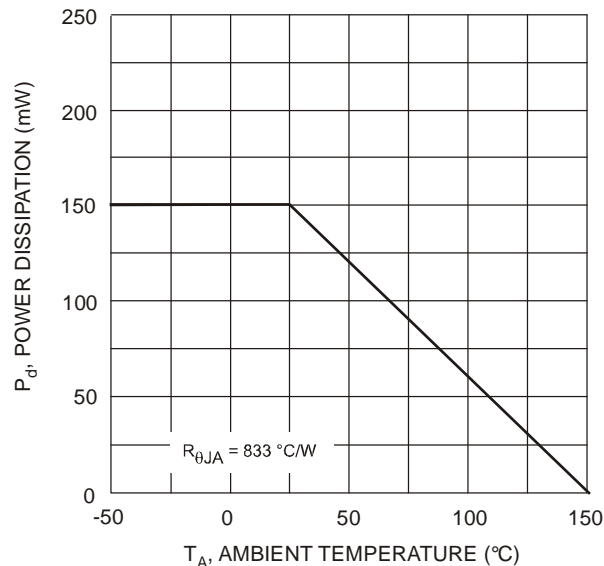
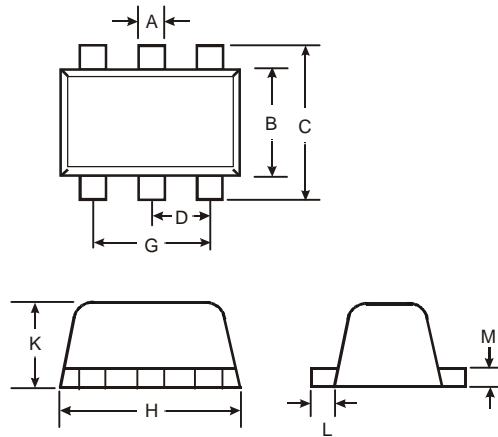


Fig. 1 Derating Curve - Total

## Package Outline Dimensions

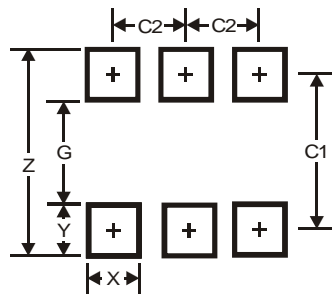
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



SOT563			
Dim	Min	Max	Typ
A	0.15	0.30	0.20
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	0.55	0.60	0.60
L	0.10	0.30	0.20
M	0.10	0.18	0.11
All Dimensions in mm			

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
Z	2.2
G	1.2
X	0.375
Y	0.5
C1	1.7
C2	0.5

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