

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

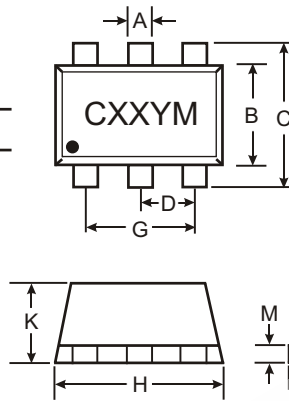
NEW PRODUCT

### Features

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

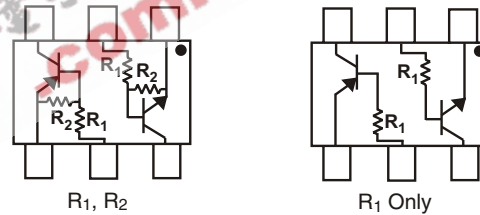
### Mechanical Data

- 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 @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	50	V
Input Voltage	$V_{IN}$	-5 to +6	V
Input Voltage	$V_{EBO} \text{ (MAX)}$	5	V
Output Current	$I_C$	100	mA
Power Dissipation (Note 1, 2)	$P_d$	150	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage and Temperature Range	$T_j, T_{STG}$	-55 to +150	$^\circ\text{C}$

- 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** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	-50	V
Input Voltage	DCX122LH DCX142JH $V_{IN}$	+5 to -6 +5 to -6	V
Input Voltage	DCX122TH DCX142TH $V_{EBO (MAX)}$	-5	V
Output Current	All $I_C$	-100	mA
Power Dissipation (Note 1, 2)	$P_d$	150	mW
Thermal Resistance, Junction to Ambient Air (Note 1)	$R_{\theta JA}$	833	$^\circ\text{C/W}$
Operating and Storage and Temperature Range	$T_j, T_{STG}$	-55 to +150	$^\circ\text{C}$

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** @  $T_A = 25^\circ\text{C}$  unless otherwise specified **R1, R2 Types**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Input Voltage	DCX122LH DCX142JH $V_{I(off)}$	0.3 0.3	—	—	V	$V_{CC} = 5V, I_O = 100\mu\text{A}$
	DCX122LH DCX142JH $V_{I(on)}$	—	—	2.0 2.0	V	$V_O = 0.3V, I_O = 20\text{mA}$ $V_O = 0.3V, I_O = 20\text{mA}$
Output Voltage	$V_{O(on)}$	—	—	0.3V	V	$I_O/I_I = 5\text{mA}/0.25\text{mA}$
Input Current	DCX122LH DCX142JH $I_I$	—	—	28 13	mA	$V_I = 5V$
Output Current	$I_{O(off)}$	—	—	0.5	$\mu\text{A}$	$V_{CC} = 50V, V_I = 0V$
DC Current Gain	DDCX122LH DDCX142JH $G_I$	56 56	—	—	—	$V_O = 5V, I_O = 10\text{mA}$
Gain-Bandwidth Product*	$f_T$	—	200	—	MHz	$V_{CE} = 10V, I_E = 5\text{mA}, f = 100\text{MHz}$

\* Transistor - For Reference Only

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

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 Cutoff Current	$I_{CBO}$	—	—	0.5	$\mu\text{A}$	$V_{CB} = 50V$
Emitter Cutoff Current	DCX122TH DCX142TH $I_{EBO}$	—	—	0.5 0.5	$\mu\text{A}$	$V_{EB} = 4V$
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	—	$I_C = 1\text{mA}, V_{CE} = 5V$
Gain-Bandwidth Product*	$f_T$	—	200	—	MHz	$V_{CE} = 10V, I_E = -5\text{mA}, f = 100\text{MHz}$

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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**

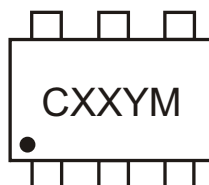
Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition	
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-50	—	—	V	I <sub>C</sub> = -50μA	
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	-40	—	—	V	I <sub>C</sub> = -1mA	
Emitter-Base Breakdown Voltage	DCX122TH DCX142TH	BV <sub>EBO</sub>	-5	—	V	I <sub>E</sub> = -50μA I <sub>E</sub> = -50μA	
Collector Cutoff Current		I <sub>CBO</sub>	—	—	μA	V <sub>CB</sub> = -50V	
Emitter Cutoff Current	DCX122TH DCX142TH	I <sub>EBO</sub>	—	—	μA	V <sub>EB</sub> = -4V	
Collector-Emitter Saturation Voltage		V <sub>CE(sat)</sub>	—	—	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

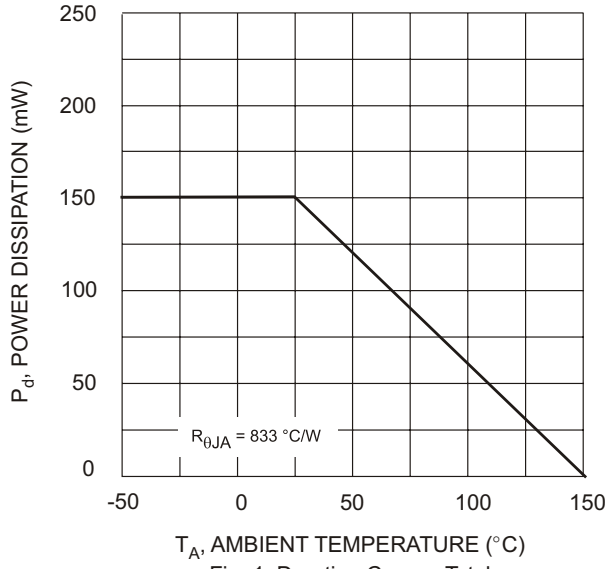


Fig. 1 Derating Curve - Total

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