# DCX (LO-R1) H

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

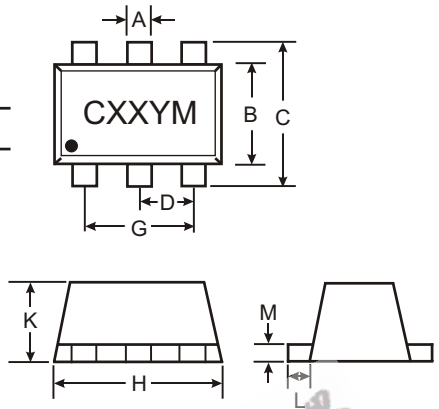
NEW PRODUCT

## Features

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

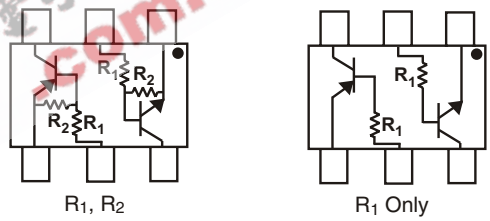
## Mechanical Data

- 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 | 0.22KΩ | 10KΩ | C81 |
| DCX142JH | 0.47KΩ | 10KΩ | C82 |
| DCX122TH | 0.22KΩ | OPEN | C83 |
| DCX142TH | 0.47KΩ | OPEN | C84 |




$R_1$, $R_2$ $R_1$ Only

SCHEMATIC DIAGRAM, TOP VIEW

## Maximum Ratings NPN Section @ $T_A$ = 25°C unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Supply Voltage | | $V_{CC}$ | 50 | V |
| Input Voltage | DCX122LH<br>DCX142JH | $V_{IN}$ | -5 to +6<br>-5 to +6 | V |
| Input Voltage | DCX122TH<br>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 | °C/W |
| Operating and Storage and Temperature Range | | $T_j$, $T_{STG}$ | -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.

NEW PRODUCT

## Maximum Ratings PNP Section @ $T_A = 25°C$ unless otherwise specified

| Characteristic | | Symbol | Value | Unit |
|---|---|---|---|---|
| Supply Voltage | | $V_{CC}$ | -50 | V |
| Input Voltage | DCX122LH<br>DCX142JH | $V_{IN}$ | +5 to -6<br>+5 to -6 | V |
| Input Voltage | DCX122TH<br>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 | °C/W |
| Operating and Storage and Temperature Range | | $T_j$, $T_{STG}$ | -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 @ $T_A = 25°C$ unless otherwise specified R1, R2 Types

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

* Transistor - For Reference Only

## Electrical Characteristics NPN Section @ $T_A = 25°C$ unless otherwise specified R1-Only

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | | $BV_{CBO}$ | 50 | — | — | V | $I_C$ = 50µA |
| Collector-Emitter Breakdown Voltage | | $BV_{CEO}$ | 40 | — | — | V | $I_C$ = 1mA |
| Emitter-Base Breakdown Voltage | DCX122TH<br>DCX142TH | $BV_{EBO}$ | 5 | — | — | V | $I_E$ = 50µA<br>$I_E$ = 50µA |
| Collector Cutoff Current | | $I_{CBO}$ | — | — | 0.5 | µA | $V_{CB}$ = 50V |
| Emitter Cutoff Current | DCX122TH<br>DCX142TH | $I_{EBO}$ | —<br>— | — | 0.5<br>0.5 | µA | $V_{EB}$ = 4V |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | — | — | 0.3 | V | $I_C$ = 5mA, $I_B$ = 0.25mA |
| DC Current Transfer Ratio | DCX122TH<br>DCX142TH | $h_{FE}$ | 100<br>100 | 250<br>250 | 600<br>600 | — | $I_C$ = 1mA, $V_{CE}$ = 5V |
| Gain-Bandwidth Product* | | $f_T$ | — | 200 | — | MHz | $V_{CE}$ = 10V, $I_E$ = -5mA,<br>f = 100MHz |

* Transistor - For Reference Only

NEW PRODUCT

## Electrical Characteristics PNP Section @ $T_A$ = 25°C unless otherwise specified — R1, R2 Types

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

* Transistor - For Reference Only

## Electrical Characteristics @ $T_A$ = 25°C unless otherwise specified — R1-Only Types

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | | $BV_{CBO}$ | -50 | — | — | V | $I_C$ = -50μA |
| Collector-Emitter Breakdown Voltage | | $BV_{CEO}$ | -40 | — | — | V | $I_C$ = -1mA |
| Emitter-Base Breakdown Voltage | DCX122TH<br>DCX142TH | $BV_{EBO}$ | -5 | — | — | V | $I_E$ = -50μA<br>$I_E$ = -50μA |
| Collector Cutoff Current | | $I_{CBO}$ | — | — | -0.5 | μA | $V_{CB}$ = -50V |
| Emitter Cutoff Current | DCX122TH<br>DCX142TH | $I_{EBO}$ | —<br>— | —<br>— | -0.5<br>-0.5 | μA | $V_{EB}$ = -4V |
| Collector-Emitter Saturation Voltage | | $V_{CE(sat)}$ | — | — | -0.3 | V | $I_C$ = -5mA, $I_B$ = -0.25mA |
| DC Current Transfer Ratio | DCX122TH<br>DCX142TH | $h_{FE}$ | 100<br>100 | 250<br>250 | 600<br>600 | — | $I_C$ = -1mA, $V_{CE}$ = -5V |
| Gain-Bandwidth Product* | | $f_T$ | — | 200 | — | MHz | $V_{CE}$ = -10V, $I_E$ = 5mA,<br>f = 100MHz |

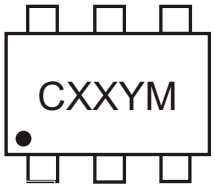
* Transistor - For Reference Only

## 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 |

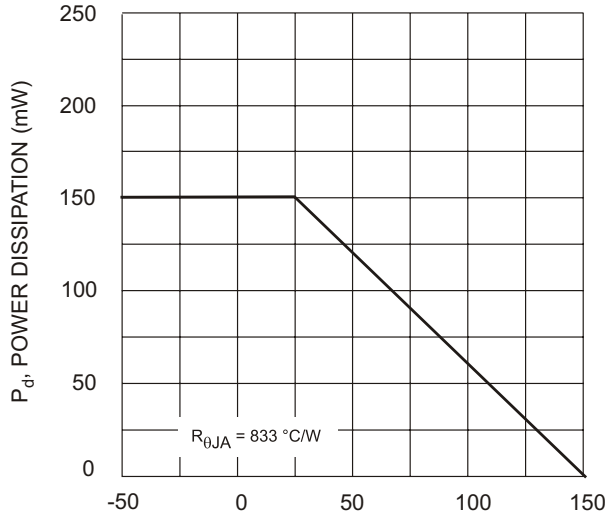



Fig. 1 Derating Curve - Total