

## COMPLEMENTARY NPN/PNP PRE-BIASED SMALL SIGNAL SOT-363 DUAL SURFACE MOUNT TRANSISTOR

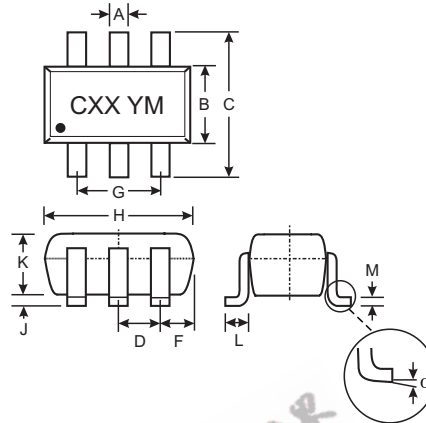
NEW PRODUCT

### Features

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

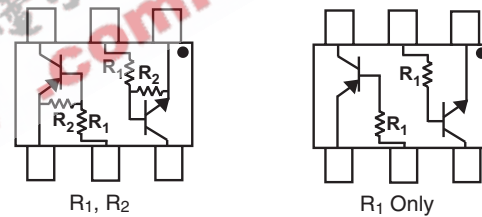
### Mechanical Data

- Case: SOT-363
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish - Matte Tin Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Terminal Connections: See Diagram
- Marking: Date Code and Type Code, See Page 3
- Type Code: See Table Below
- Ordering Information (See Page 3)
- Weight: 0.006 grams (approx.)



SOT-363		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Nominal	
F	0.30	0.40
H	1.80	2.20
J	—	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.25
$\alpha$	0°	8°
All Dimensions in mm		

P/N	R1 (NOM)	R2 (NOM)	Type Code
DCX122LU	0.22K	10K	C81
DCX142JU	0.47K	10K	C82
DCX122TU	0.22K	OPEN	C83
DCX142TU	0.47K	OPEN	C84



SCHEMATIC DIAGRAM

### 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</sub> (MAX)	5	V
Output Current	I <sub>C</sub>	100	mA
Power Dissipation (Note 1, 2)	P <sub>d</sub>	200	mW
Thermal Resistance, Junction to Ambient Air (Note 2)	R <sub>θJA</sub>	625	°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. 150mW per element must not be exceeded.  
 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	DCX122LU DCX142JU $V_{IN}$	+5 to -6 +5 to -6	V
Input Voltage	DCX122TU DCX142TU $V_{EBO (MAX)}$	-5	V
Output Current	All $I_C$	-100	mA
Power Dissipation (Note 1,2)	$P_d$	200	mW
Thermal Resistance, Junction to Ambient Air (Note 1,2)	$R_{\theta JA}$	625	$^\circ\text{C/W}$
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. 150mW per element must not be exceeded.

**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	DCX122LU DCX142JU $V_{I(off)}$	0.3 0.3	—	—	V	$V_{CC} = 5V, I_O = 100\mu\text{A}$
	DCX122LU DCX142JU $V_{I(on)}$	—	—	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	DCX122LU DCX142JU $I_I$	—	—	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	DCX122LU DCX142JU $G_I$	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	DCX122TU DCX142TU $BV_{EBO}$	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	DCX122TU DCX142TU $I_{EBO}$	—	—	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	DCX122TU DCX142TU $h_{FE}$	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	DCX122LU DCX142JU	V <sub>I(off)</sub>	-0.3 -0.3	—	—	V	V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA
	DCX122LU DCX142JU	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	DCX122LU DCX142JU	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	DCX122LU DCX142JU	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 PNP Section @ 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>CB0</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	DCX122TU DCX142TU	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	DCX122TU DCX142TU	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	DCX122TU DCX142TU	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

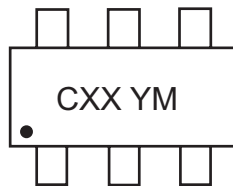
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**Ordering Information (Note 4)**

Device	Packaging	Shipping
DCX122LU-7-F	SOT-363	3000/Tape & Reel
DCX142JU-7-F	SOT-363	3000/Tape & Reel
DCX122TU-7-F	SOT-363	3000/Tape & Reel
DCX142TU-7-F	SOT-363	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 Table on Page 1  
 YM = Date Code Marking  
 Y = Year ex: N = 2002  
 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

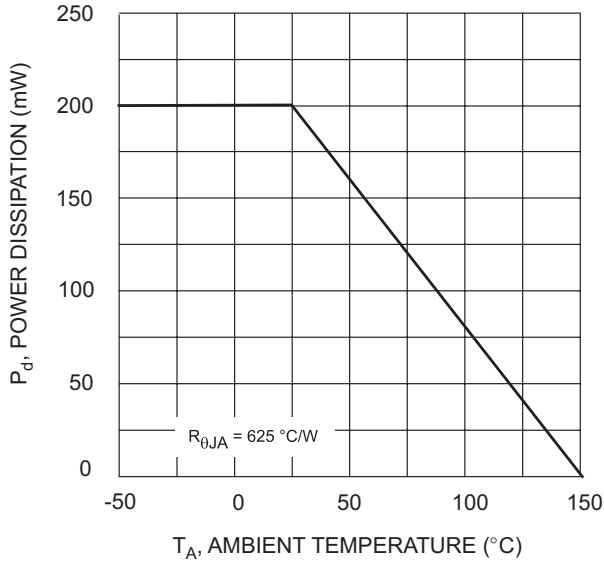


Fig. 1 Power Derating Curve

(150mW per element must not be exceeded).

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