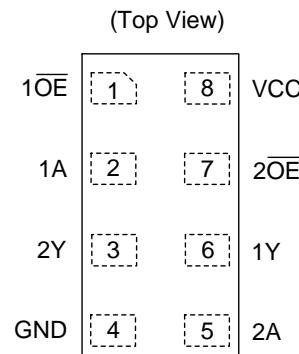


## Description

The 74LVC2G125 is a dual buffer gate with 3-state outputs. The device is designed for operation over a power supply range of 1.65V to 5.5V. The device is fully specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing damaging current backflow when the device is powered down.

## Pin Assignments



X2-DFN2010-8

X2-DFN1410-8

X2-DFN1210-8

## Features

- Wide Supply Voltage Range from 1.65 to 5.5V
- $\pm 24\text{mA}$  Output Drive at 3.3V
- CMOS Low Power Consumption
- $I_{OFF}$  Supports Partial-Power-Down Mode Operation
- Inputs accept up to 5.5V
- Schmitt Trigger Action at all inputs makes the circuit tolerant for slower input rise and fall times. The hysteresis is typically 100mV at  $V_{CC} = 3.0\text{V}$ .
- ESD Protection Exceeds JESD 22
  - 2000-V Human Body Model (A114)
  - Exceeds 1000-V Charged Device Model (C101)
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

## Applications

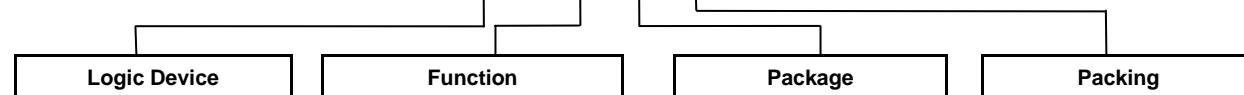
- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation
- Wide Array of Products Such as:
  - PCs, Networking, Notebooks, Netbooks, PDAs
  - Tablet Computers, E-readers
  - Computer Peripherals, Hard Drives, CD/DVD ROMs
  - TVs, DVDs, DVRs, Set Top Boxes
  - Cell Phones, Personal Navigation / GPS
  - MP3 Players, Cameras, Video Recorders

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.

**Ordering Information** (Note 4)

74LVC2G 125 XXX -7



74 : Logic Prefix  
 LVC : 1.65V to 5.5V  
 Logic Family  
 2G : Dual Gate

125: 3-State Buffer  
 OE - Low

HD4 : X2-DFN2010-8  
 HK3 : X2-DFN1410-8  
 RA3 : X2-DFN1210-8

-7 : 7" Tape & Reel

Device	Package Code	Package (Note 5)	Package Size	7" Tape and Reel (Note 6)	
				Quantity	Part Number Suffix
74LVC2G125HD4-7	HD4	X2-DFN2010-8	1.95mm x 1.0mm x 0.4mm 0.5 mm lead pitch	5,000/Tape & Reel	-7
74LVC2G125HK3-7	HK3	X2-DFN1410-8	1.35mm x 1.0mm x 0.35mm 0.4 mm lead pitch	5,000/Tape & Reel	-7
74LVC2G125RA3-7	RA3	X2-DFN1210-8	1.2mm x 1.0mm x 0.35mm 0.3 mm lead pitch	5,000/Tape & Reel	-7

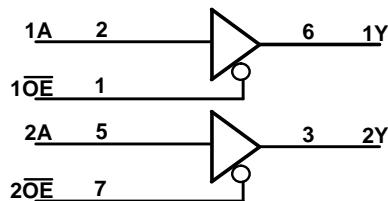
Notes: 4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

5. Pad layout as shown in Diodes Incorporated's package outline PDFs, which can be found on our website at <http://www.diodes.com/package-outlines.html>.

6. The taping orientation is located on our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Pin Descriptions**

Pin Name	Pin No.	Description
1 $\overline{OE}$	1	Output Enable for buffer 1
1A	2	Data Input
2Y	3	Data Output
GND	4	Ground
2A	5	Data Input
1Y	6	Data Output
2 $\overline{OE}$	7	Output Enable for buffer 2
V <sub>CC</sub>	8	Supply Voltage

**Logic Diagram**

**Function Table**

Inputs		Output
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

**Absolute Maximum Ratings** (Notes 7 & 8)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	kV
ESD CDM	Charged Device Model ESD Protection	1	kV
V <sub>CC</sub>	Supply Voltage	-0.5 to +6.5	V
V <sub>I</sub>	Input Voltage	-0.5 to +6.5	V
V <sub>O</sub>	Output Voltage -Active Mode	-0.5 to V <sub>CC</sub> +0.5	V
	Output Voltage Power Down Mode	-0.5 to +6.5	V
I <sub>IK</sub>	Input Clamp Current V <sub>I</sub> <0	-50	mA
I <sub>OK</sub>	Output Clamp Current (V <sub>O</sub> < 0 OR V <sub>O</sub> > V <sub>CC</sub> )	±50	mA
I <sub>O</sub>	Continuous Output Current (V <sub>O</sub> = 0 to V <sub>CC</sub> )	±50	mA
I <sub>CC</sub>	Continuous Current Through V <sub>CC</sub>	100	mA
I <sub>GND</sub>	Continuous Current Through GND	-100	mA
T <sub>J</sub>	Operating Junction Temperature	-40 to +150	°C
T <sub>STG</sub>	Storage Temperature	-65 to +150	°C

Notes:

- 7. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommended values.
- 8. Forcing the maximum allowed voltage could cause a condition exceeding the maximum current or conversely forcing the maximum current could cause a condition exceeding the maximum voltage. The ratings of both current and voltage must be maintained within the controlled range.

**Recommended Operating Conditions** (Note 9)

Symbol	Parameter	Min	Max	Unit
V <sub>CC</sub>	Operating Voltage	Operating	1.65	5.5
		Data Retention Only	1.5	—
V <sub>I</sub>	Input Voltage	0	5.5	V
V <sub>O</sub>	Output Voltage Active Mode	0	V <sub>CC</sub>	V
	Output Voltage Power-Down Mode	0	5.5	
I <sub>OH</sub>	High-Level Output Current	V <sub>CC</sub> = 1.65V	—	mA
		V <sub>CC</sub> = 2.3V	—	
		V <sub>CC</sub> = 2.7V	—	
		V <sub>CC</sub> = 3.0V	—	
		V <sub>CC</sub> = 4.5V	—	
		V <sub>CC</sub> = 1.65V	—	
I <sub>OL</sub>	Low-Level Output Current	V <sub>CC</sub> = 2.3V	—	mA
		V <sub>CC</sub> = 2.7V	—	
		V <sub>CC</sub> = 3.0V	—	
		V <sub>CC</sub> = 4.5V	—	
		V <sub>CC</sub> = 1.65V to 2.7V	—	
Δt/ΔV	Input Transition Rise or Fall Rate	V <sub>CC</sub> = 2.7V to 5.5V	—	ns/V
		V <sub>CC</sub> = 1.65V to 2.7V	—	
T <sub>A</sub>	Operating Free-Air Temperature	-40	+125	°C

Note: 9. Unused inputs should be held at V<sub>CC</sub> or Ground.

Electrical Characteristics (All typical values are at  $T_A = +25^\circ\text{C}$ )

Symbol	Parameter	Test Conditions	$V_{CC}$	-40°C to +85°C			-40°C to +125°C		Unit
				Min	Typ.	Max	Min	Max	
$V_{IH}$	High-Level Input Voltage	—	$V_{CC} = 1.65\text{V to } 1.95\text{V}$	$0.65 \times V_{CC}$	—	—	$0.65 \times V_{CC}$	—	V
			$V_{CC} = 2.3\text{V to } 2.7\text{V}$	1.7	—	—	1.7	—	
			$V_{CC} = 2.7\text{V to } 3.6\text{V}$	2.0	—	—	2.0	—	
			$V_{CC} = 4.5\text{V to } 5.5\text{V}$	$0.7 \times V_{CC}$	—	—	$0.7 \times V_{CC}$	—	
$V_{IL}$	Low-Level Input Voltage	—	$V_{CC} = 1.65\text{V to } 1.95\text{V}$	—	—	$0.35 \times V_{CC}$	—	$0.35 \times V_{CC}$	V
			$V_{CC} = 2.3\text{V to } 2.7\text{V}$	—	—	0.7	—	0.7	
			$V_{CC} = 2.7\text{V to } 3.6\text{V}$	—	—	0.8	—	0.8	
			$V_{CC} = 4.5\text{V to } 5.5\text{V}$	—	—	$0.3 \times V_{CC}$	—	$0.3 \times V_{CC}$	
$V_{OH}$	High-Level Output Voltage	$I_{OH} = -100\mu\text{A}$	1.65V to 5.5V	$V_{CC} - 0.1$	$V_{CC}$	—	$V_{CC} - 0.1$	—	V
		$I_{OH} = -4\text{mA}$	1.65V	1.2	1.53	—	0.95	—	
		$I_{OH} = -8\text{mA}$	2.3V	1.9	2.13	—	1.7	—	
		$I_{OH} = -12\text{mA}$	2.7	2.2	2.5	—	1.9	—	
		$I_{OH} = -16\text{mA}$	3V	2.4	2.7	—	2.2	—	
		$I_{OH} = -24\text{mA}$		2.3	2.6	—	2.0	—	
		$I_{OH} = -32\text{mA}$	4.5V	3.8	4.1	—	3.4	—	
$V_{OL}$	Low-Level Output Voltage	$I_{OL} = 100\mu\text{A}$	1.65V to 5.5V	—	0	0.1	—	0.1	V
		$I_{OL} = 4\text{mA}$	1.65V	—	0.08	0.45	—	0.7	
		$I_{OL} = 8\text{mA}$	2.3V	—	0.14	0.3	—	0.45	
		$I_{OL} = 12\text{mA}$	2.7V	—	0.19	0.4	—	0.6	
		$I_{OL} = 16\text{mA}$	3V	—	0.25	0.4	—	0.6	
		$I_{OL} = 24\text{mA}$		—	0.37	0.55	—	0.8	
		$I_{OL} = 32\text{mA}$	4.5V	—	0.43	0.55	—	0.8	
$I_I$	Input Current	$V_I = 5.5\text{V or GND}$	0V to 5.5V	—	$\pm 0.1$	$\pm 5$	—	$\pm 20$	$\mu\text{A}$
$I_{OZ}$	Z-State Leakage Current	$V_I = V_{IH}$ or $V_{IL}$ $V_O = 5.5\text{V or GND}$	3.6V	—	$\pm 0.1$	$\pm 10$	—	$\pm 20$	$\mu\text{A}$
$I_{OFF}$	Power Down Leakage Current	$V_I$ or $V_O = 5.5\text{V}$	0V	—	$\pm 0.1$	$\pm 10$	—	$\pm 20$	$\mu\text{A}$
$I_{CC}$	Supply Current	$V_I = 5.5\text{V or GND}$ $I_O=0\text{A}$	1.65V to 5.5V	—	0.1	10	—	40	$\mu\text{A}$
$\Delta I_{CC}$	Additional Supply Current	One input at $V_{CC} - 0.6\text{V}$ Other inputs at $V_{CC}$ or GND	2.3V to 5.5V	—	5	500	—	5,000	$\mu\text{A}$
$C_I$	Input Capacitance	$V_I = V_{CC}$ or GND	3.3V	—	2.5	—	—	—	$\text{pF}$

## Operating Characteristics

Parameter		Test Conditions	$V_{CC} = 1.8V$	$V_{CC} = 2.5V$	$V_{CC} = 3.3V$	$V_{CC} = 5V$	Unit
			Typ.	Typ.	Typ.	Typ.	
$C_{pd}$	Power Dissipation Capacitance	$f = 10MHz$ output enabled	17	17	17	17	pF
		$f = 10MHz$ output disabled	5	5	5	5	pF

## Package Characteristics

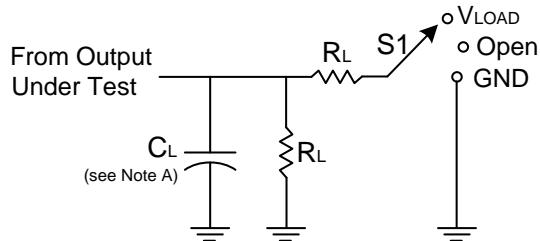
Symbol	Parameter	Package	Test Conditions	Min	Typ.	Max	Unit
$\theta_{JA}$	Thermal Resistance Junction-to-Ambient	X2-DFN2010-8	(Note 10)	—	313	—	°C/W
		X2-DFN1410-8		—	321	—	
		X2-DFN1210-8		—	395	—	
$\theta_{JC}$	Thermal Resistance Junction-to-Case	X2-DFN2010-8	(Note 10)	—	145	—	°C/W
		X2-DFN1410-8		—	166	—	
		X2-DFN1210-8		—	236	—	

Note: 10. Test condition for each package type: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

## Switching Characteristics

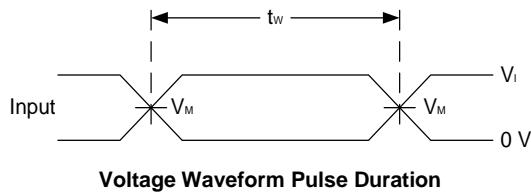
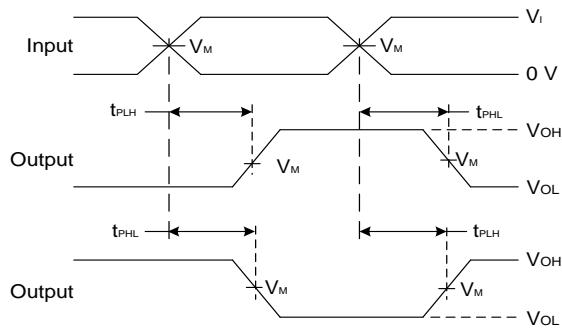
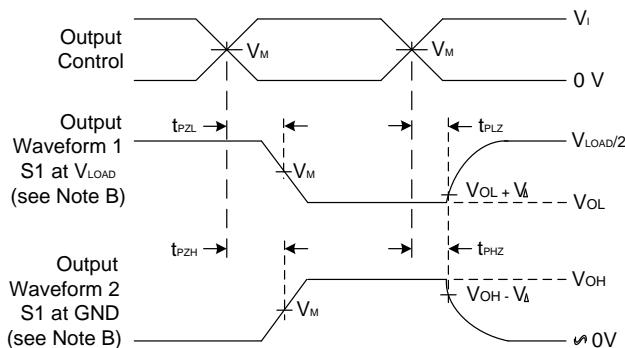
Typical Values at  $T_A = +25^\circ C$  and nominal voltages 1.8V, 2.5V, 2.7V, 3.3V, and 5.0V. See Figure 1.

Parameter	From Input	To Output	$V_{CC}$	$T_A = -40^\circ C$ to $+85^\circ C$			Unit	
				Min	Typ	Max		
$t_{pd}$	A	Y	$1.8V \pm 0.15V$	1.0	3.7	9.1	1.0	11.4
			$2.5V \pm 0.2V$	0.5	2.5	4.8	0.5	6.0
			2.7V	1.0	2.7	4.8	1.0	6.0
			$3.3V \pm 0.3V$	0.5	2.3	4.4	0.5	5.5
			$5.0V \pm 0.5V$	0.5	1.9	3.7	0.5	4.6
$t_{on}$	$\overline{OE}$	Y	$1.8V \pm 0.15V$	1.5	4.3	9.9	1.5	12.4
			$2.5V \pm 0.2V$	1.0	2.8	5.6	1.0	7.0
			2.7V	1.5	3.3	5.7	1.5	7.1
			$3.3V \pm 0.3V$	0.5	2.4	5.0	0.5	5.9
			$5.0V \pm 0.5V$	0.5	2.0	3.8	0.5	4.8
$t_{dis}$	$\overline{OE}$	Y	$1.8V \pm 0.15V$	1.0	3.5	11.6	1.0	14.1
			$2.5V \pm 0.2V$	0.5	1.8	5.8	0.5	7.6
			2.7V	1.0	2.7	4.8	1.0	6.2
			$3.3V \pm 0.3V$	1.0	2.7	4.6	1.0	5.9
			$5.0V \pm 0.5V$	0.5	1.8	3.4	0.5	4.6

**Parameter Measurement Information**


TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$V_{LOAD}$
$t_{PHZ}/t_{PZH}$	GND

$V_{CC}$	Inputs		$V_M$	$V_{LOAD}$	$C_L$	$R_L$	$V_{\Delta}$
	$V_I$	$t_r/t_f$					
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	$30pF$	$1k\Omega$	$0.15V$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	$30pF$	$500\Omega$	$0.15V$
$2.7V$	$2.7V$	$\leq 2.5ns$	$1.5V$	$6V$	$50pF$	$500\Omega$	$0.3V$
$3.3V \pm 0.3V$	$3V$	$\leq 2.5ns$	$1.5V$	$6V$	$50pF$	$500\Omega$	$0.3V$
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	$50pF$	$500\Omega$	$0.3V$


**Voltage Waveform Pulse Duration**

**Voltage Waveform Propagation Delay Times**  
**Inverting and Non Inverting Outputs**

**Voltage Waveform Enable and Disable Times**  
**Low and High Level Enabling**
**Figure 1. Load Circuit and Voltage Waveforms**

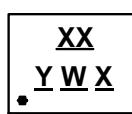
Notes:

- A. Includes test lead and test apparatus capacitance.
- B. All pulses are supplied at pulse repetition rate  $\leq 10MHz$ .
- C. Inputs are measured separately one transition per measurement.
- D.  $t_{PLZ}$  and  $t_{PZH}$  are the same as  $t_{dis}$ .
- E.  $t_{PLZ}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
- F.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

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**Marking Information**

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**(Top View)**

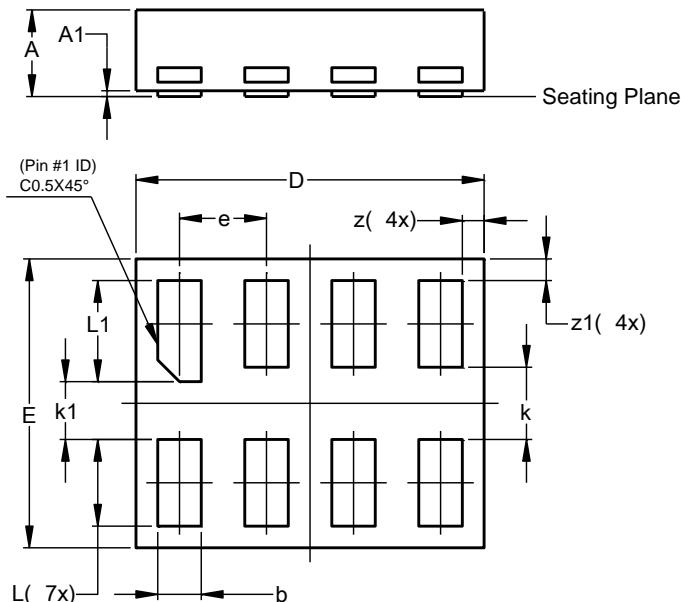
XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
a~z : 27~52 week; z represents  
52 and 53 week  
X : Internal Code

Part Number	Package	Identification Code
74LVC2G125HD4-7	X2-DFN2010-8	9U
74LVC2G125HK3-7	X2-DFN1410-8	9V
74LVC2G125RA3-7	X2-DFN1210-8	9W

## X2-DFN1210-8 Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN1210-8



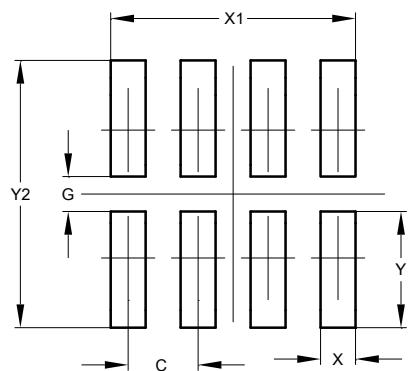
X2-DFN1210-8			
Dim	Min	Max	Typ
<b>A</b>	-	0.35	0.30
<b>A1</b>	0	0.03	0.02
<b>b</b>	0.10	0.20	0.15
<b>D</b>	1.15	1.25	1.20
<b>E</b>	0.95	1.05	1.00
<b>e</b>	-	-	0.30
<b>k</b>	-	-	0.25
<b>k1</b>	-	-	0.20
<b>L</b>	0.25	0.35	0.30
<b>L1</b>	0.30	0.40	0.35
<b>z</b>	0.050	0.100	0.075
<b>z1</b>	0.050	0.100	0.075

**All Dimensions in mm**

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN1210-8

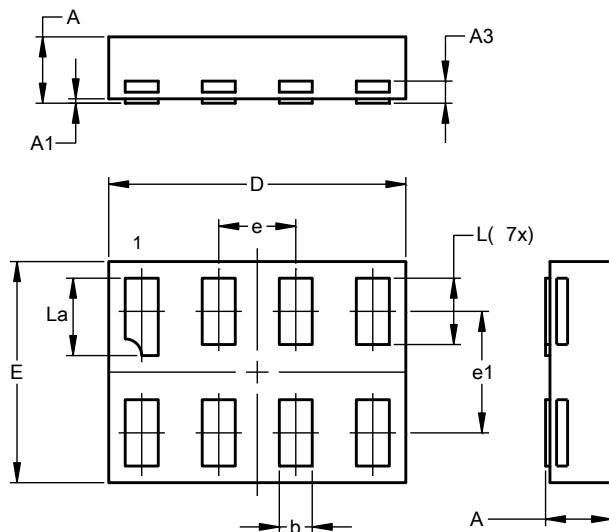


Dimensions	Value (in mm)
<b>C</b>	0.300
<b>G</b>	0.150
<b>X</b>	0.150
<b>X1</b>	1.050
<b>Y</b>	0.500
<b>Y1</b>	1.150

## X2-DFN1410-8 Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN1410-8



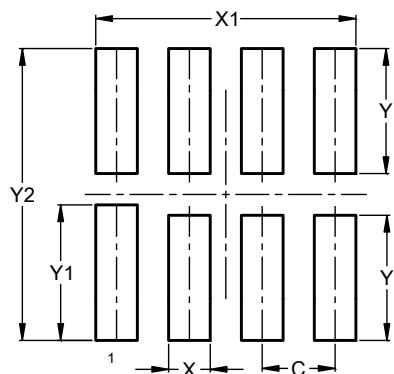
X2-DFN1410-8			
Dim	Min	Max	Typ
A	0.30	0.35	0.33
A1	0.00	0.03	0.02
A3	--	--	0.10
b	0.12	0.20	0.15
D	1.30	1.40	1.35
E	0.95	1.05	1.00
e	--	--	0.35
e1	--	--	0.55
L	0.27	0.35	0.30
L1	0.32	0.40	0.35

All Dimensions in mm

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN1410-8

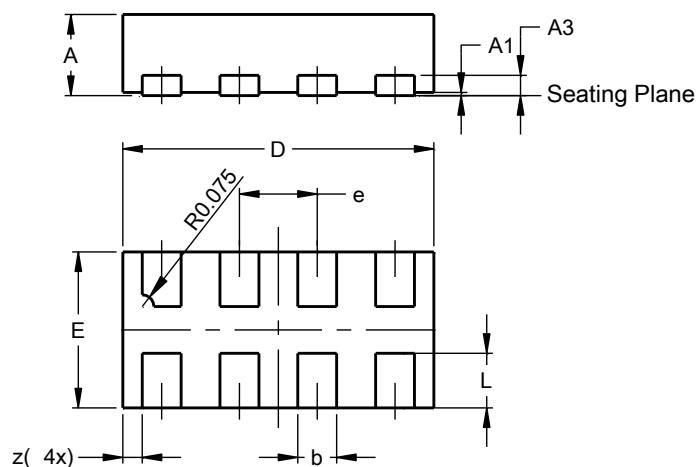


Dimensions	Value (in mm)
C	0.350
X	0.200
X1	1.250
Y	0.600
Y1	0.650
Y2	1.400

## X2-DFN2010-8 Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN2010-8



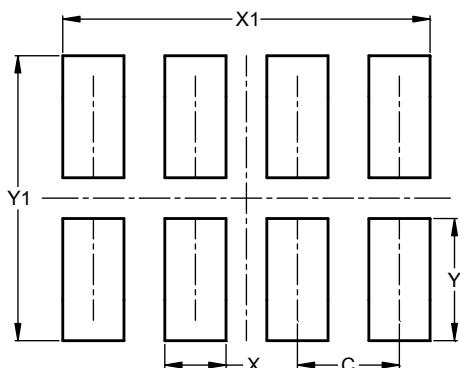
X2-DFN2010-8			
Dim	Min	Max	Typ
A	--	0.40	--
A1	0.00	0.05	0.02
A3	--	--	0.13
b	0.20	0.30	0.25
D	1.950	2.05	2.00
E	0.95	1.05	1.00
e	--	--	0.50
L	0.30	0.40	0.35
z	--	--	0.125

All Dimensions in mm

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

X2-DFN2010-8



Dimensions	Value (in mm)
C	0.500
X	0.300
X1	1.800
Y	0.600
Y1	1.400

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A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

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