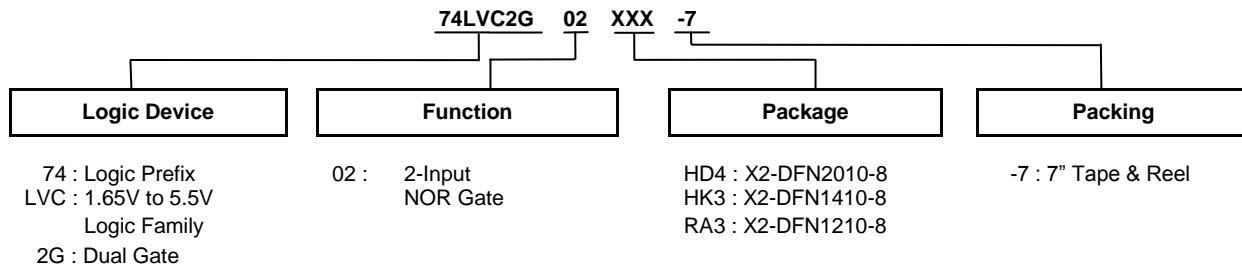


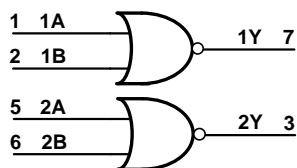
Ordering Information (Note 4)


Device	Package Code	Package (Note 5)	Package Size	7" Tape and Reel (Note 6)	
				Quantity	Part Number Suffix
74LVC2G02HD4-7	HD4	X2-DFN2010-8	1.95mm x 1.0mm x 0.4mm 0.5 mm lead pitch	5,000/Tape & Reel	-7
74LVC2G02HK3-7	HK3	X2-DFN1410-8	1.35mm x 1.0mm x 0.35mm 0.4 mm lead pitch	5,000/Tape & Reel	-7
74LVC2G02RA3-7	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
1A	1	Data Input
1B	2	Data Input
2Y	3	Data Output
GND	4	Ground
2A	5	Data Input
2B	6	Data Input
1Y	7	Data Output
V _{CC}	8	Supply Voltage

Logic Diagram

Function Table

Inputs		Output
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	L

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 _{CC}	Supply Voltage	-0.5 to +6.5	V
V _I	Input Voltage	-0.5 to +6.5	V
V _O	Output Voltage -Active Mode	-0.5 to V _{CC} +0.5	V
	Output Voltage Power Down Mode	-0.5 to +6.5	V
I _{IK}	Input Clamp Current V _I <0	-50	mA
I _{OK}	Output Clamp Current (V _O < 0 OR V _O > V _{CC})	±50	mA
I _O	Continuous Output Current (V _O = 0 to V _{CC})	±50	mA
I _{CC}	Continuous Current Through V _{CC}	100	mA
I _{GND}	Continuous Current Through GND	-100	mA
T _J	Operating Junction Temperature	-40 to +150	°C
T _{STG}	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 recommend 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 _{CC}	Operating Voltage	Operating	1.65	5.5	V
		Data Retention Only	1.5	—	
V _I	Input Voltage		0	5.5	V
V _O	Output Voltage Active Mode		0	V _{CC}	V
	Output Voltage Power-Down Mode		0	5.5	
I _{OH}	High-Level Output Current	V _{CC} = 1.65V	—	-4	mA
		V _{CC} = 2.3V	—	-8	
		V _{CC} = 2.7V	—	-12	
		V _{CC} = 3.0V	—	-16	
		V _{CC} = 4.5V	—	-24	
I _{OL}	Low-Level Output Current	V _{CC} = 1.65V	—	4	mA
		V _{CC} = 2.3V	—	8	
		V _{CC} = 2.7V	—	12	
		V _{CC} = 3.0V	—	16	
		V _{CC} = 4.5V	—	32	
Δt/ΔV	Input Transition Rise or Fall Rate	V _{CC} = 1.65V to 2.7V	—	20	ns/V
		V _{CC} = 2.7V to 5.5V	—	10	
T _A	Operating Free-Air Temperature		-40	+125	°C

Note: 9. Unused inputs should be held at V_{CC} 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	—	± 0.1	± 5	—	± 20	μA
I_{OFF}	Power Down Leakage Current	$V_I \text{ or } V_O = 5.5\text{V}$	0V	—	± 0.1	± 10	—	± 20	μA
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	μA
ΔI_{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	μA
C_I	Input Capacitance	$V_I = V_{CC} \text{ or GND}$	3.3V	—	2.5	—	—	—	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	18	18	19	22	pF

Package Characteristics

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

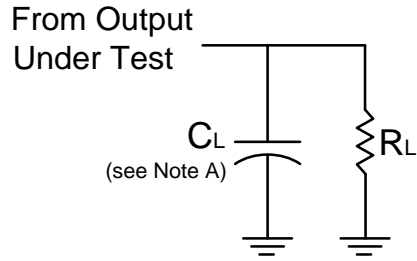
Note: 10. Test condition for each package type: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Switching Characteristics

Typical Values at T_A = +25°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°C to +85°C			T _A = -40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	
t _{pd}	A or B	Y	1.8V ± 0.15V	1.2	3.8	8.9	1.2	11.2	ns
			2.5V ± 0.2V	0.8	2.4	5.4	0.8	6.8	
			2.7V	0.8	3.2	6.0	0.8	7.5	
			3.3V ± 0.3V	0.6	2.4	4.9	0.6	6.2	
			5.0V ± 0.5V	0.6	1.8	4.3	0.6	5.5	

Parameter Measurement Information



V_{CC}	Inputs		V_M	C_L	R_L
	V_I	t_r/t_f			
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	30pF	1k Ω
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	30pF	500 Ω
2.7V	2.7V	$\leq 2.5ns$	1.5V	50pF	500 Ω
$3.3V \pm 0.3V$	2.7V	$\leq 2.5ns$	1.5V	50pF	500 Ω
$5.0V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 Ω

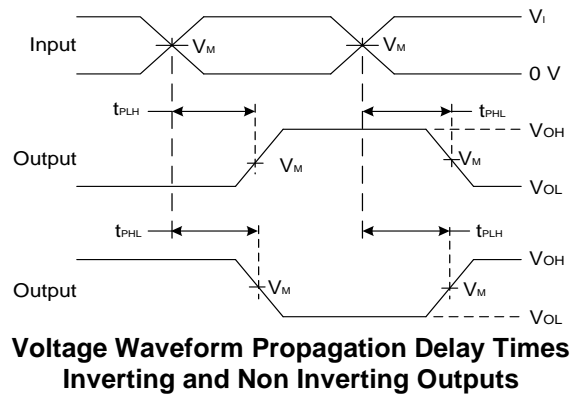
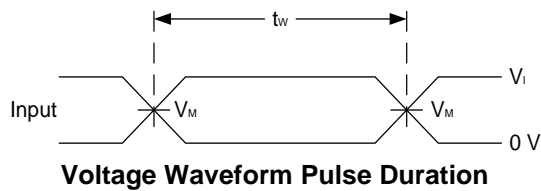
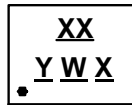


Figure 1. Load Circuit and Voltage Waveforms

- 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_{PLH} and t_{PHL} are the same as t_{pd} .

Marking Information

(Top View)



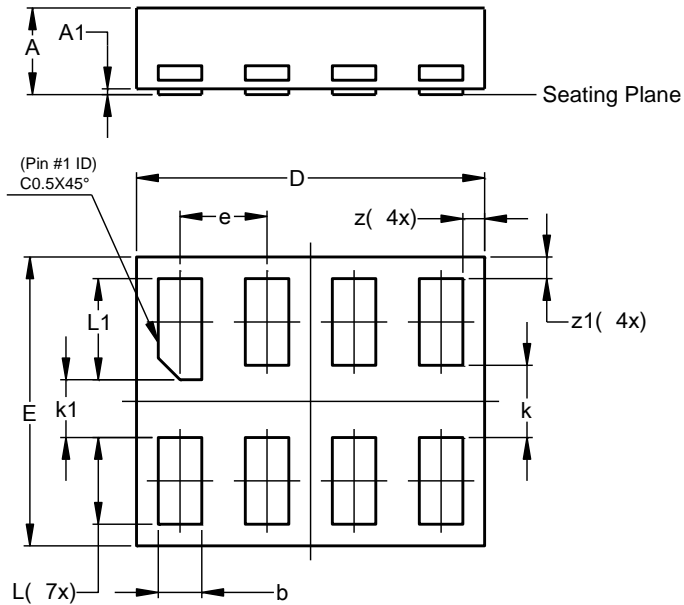
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
X : Internal Code

Part Number	Package	Identification Code
74LVC2G02HD4-7	X2-DFN2010-8	9B
74LVC2G02HK3-7	X2-DFN1410-8	9C
74LVC2G02RA3-7	X2-DFN1210-8	9D

X2-DFN1210-8 Package Outline Dimensions

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

X2-DFN1210-8

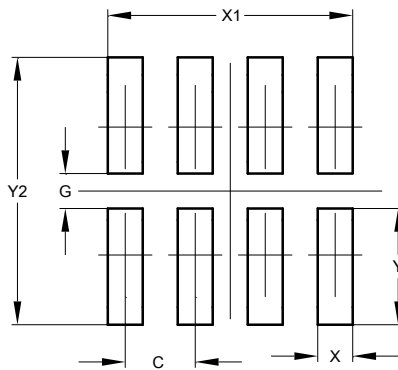


X2-DFN1210-8			
Dim	Min	Max	Typ
A	-	0.35	0.30
A1	0	0.03	0.02
b	0.10	0.20	0.15
D	1.15	1.25	1.20
E	0.95	1.05	1.00
e	-	-	0.30
k	-	-	0.25
k1	-	-	0.20
L	0.25	0.35	0.30
L1	0.30	0.40	0.35
z	0.050	0.100	0.075
z1	0.050	0.100	0.075
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN1210-8

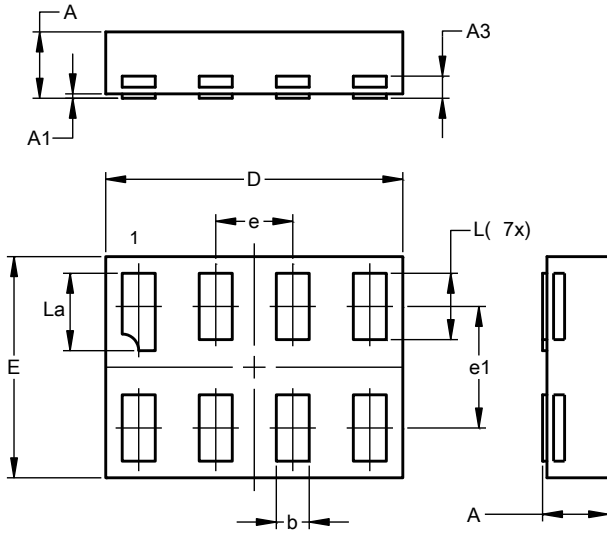


Dimensions	Value (in mm)
C	0.300
G	0.150
X	0.150
X1	1.050
Y	0.500
Y1	1.150

X2-DFN1410-8 Package Outline Dimensions

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

X2-DFN1410-8

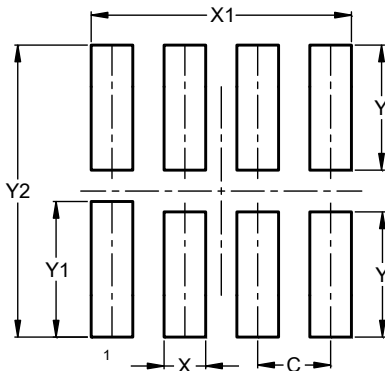


X2-DFN1410-8			
Dim	Min	Max	Typ
A	0.30	0.35	0.33
A1	0.00	0.03	0.02
A3	--	--	0.10
b	0.12	0.20	0.15
D	1.30	1.40	1.35
E	0.95	1.05	1.00
e	--	--	0.35
e1	--	--	0.55
L	0.27	0.35	0.30
L1	0.32	0.40	0.35
All Dimensions in mm			

Suggested Pad Layout

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

X2-DFN1410-8

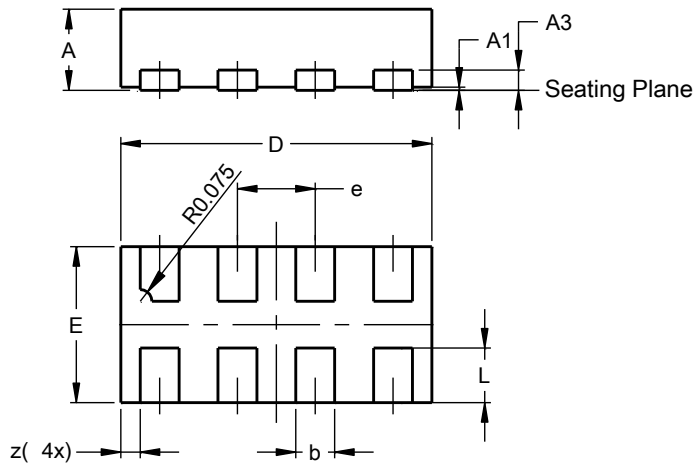


Dimensions	Value (in mm)
C	0.350
X	0.200
X1	1.250
Y	0.600
Y1	0.650
Y2	1.400

X2-DFN2010-8 Package Outline Dimensions

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

X2-DFN2010-8

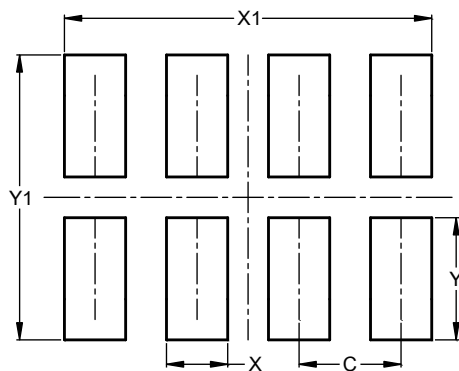


X2-DFN2010-8			
Dim	Min	Max	Typ
A	--	0.40	--
A1	0.00	0.05	0.02
A3	--	--	0.13
b	0.20	0.30	0.25
D	1.950	2.05	2.00
E	0.95	1.05	1.00
e	--	--	0.50
L	0.30	0.40	0.35
z	--	--	0.125
All Dimensions in mm			

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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