



SINGLE 3 INPUT POSITIVE AND GATE

Description

The 74LVC1G11 is a single 3-input positive AND gate with a standard push-pull output. The device is designed for operation with a power supply range of 1.65V to 5.5V. The inputs are tolerant to 5.5V allowing this device to be used in a mixed voltage environment. The device is fully specified for partial power down applications using IOFF. The IOFF circuitry disables the output preventing damaging current backflow when the device is powered down.

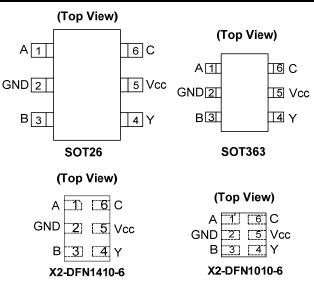
The gate performs the positive Boolean function:

$$Y = A \bullet B \bullet C$$
 or $Y = \overline{A} + \overline{B} + \overline{C}$

Features

- Wide Supply Voltage Range from 1.65V to 5.5V
- ± 24mA Output Drive at 3.3V
- CMOS Low Power Consumption
- IOFF Supports Partial-Power-Down Mode Operation
- Inputs Accept up to 5.5V
- ESD Protection Exceeds JESD 22:
 - 200-V Machine Model (A115-A)
 - 2000-V Human Body Model (A114-A)
- Latch-Up Exceeds 100mA per JESD 78, Class I
- Range of Package Options
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Pin Assignments



Applications

- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
 - PCs, networking, notebooks, Netbooks, PDAs
 - Computer Peripherals, Hard Drives, CD/DVD ROM
 - TV, DVD, DVR, Set Top Box
 - 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 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.

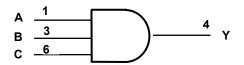
Click here for ordering information, located at the end of datasheet



Pin Descriptions

Pin Name	Function
A	Data Input
GND	Ground
В	Data Input
Y	Data Output
Vcc	Supply Voltage
С	Data Input

Logic Diagram



Function Table

	Inputs					
Α	В	С	Y			
Н	Н	Н	Н			
L	Х	Х	L			
Х	L	Х	L			
Х	Х	L	L			

Absolute Maximum Ratings (Note 4) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	kV
ESD MM	Machine Model ESD Protection	200	V
Vcc	Supply Voltage Range	-0.5 to 6.5	V
VI	Input Voltage Range	-0.5 to 6.5	V
Vo	Voltage applied to output in high impedance or I _{OFF} state	-0.5 to 6.5	V
Vo	Voltage applied to output in high or low state	-0.3 to V _{CC} +0.5	V
I _{IK}	Input Clamp Current VI<0	-50	mA
I _{ОК}	Output Clamp Current	-50	mA
lo	Continuous output current	±50	mA
ICC MAX CONT	Continuous current through Vcc or GND	±100	mA
TJ	Operating Junction Temperature	-40 to +150	°C
T _{STG}	Storage Temperature	-65 to +150	°C

Note: 4. 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.



Symbol		Parameter	Min	Max	Unit
		Operating	1.65	5.5	V
Vcc	Operating Voltage	Data Retention Only	1.5		V
		V _{CC} = 1.65V to 1.95V	0.65 X V _{CC}		
		V _{CC} = 2.3V to 2.7V	1.7		V
VIH	High-Level Input Voltage	V _{CC} = 3V to 3.6V	2		v
		V _{CC} = 4.5V to 5.5V	0.7 X V _{CC}		
		V _{CC} = 1.65V to 1.95V		0.35 X V _{CC}	
		V _{CC} = 2.3V to 2.7V		0.7	V
V _{IL}	Low-Level Input Voltage	V _{CC} = 3V to 3.6V		0.8	V
		V _{CC} = 4.5V to 5.5V		0.3 X V _{CC}	
VI	Input Voltage	-	0	5.5	V
Vo	Output Voltage		0	V _{CC}	V
		V _{CC} = 1.65V		-4	
		V _{CC} = 2.3V		-8	
I _{OH}	High-Level Output Current	<u>)/2)/</u>		-16	mA
		V _{CC} = 3V		-24	
		$V_{CC} = 4.5V$		-32	
		V _{CC} = 1.65V		4	
		V _{CC} = 2.3V		8	
I _{OL}	Low-Level Output Current	V _{CC} = 3V		16	mA
		VCC - 3V		24	
		$V_{CC} = 4.5V$		32	
		V_{CC} = 1.8V ± 0.15V, 2.5V ± 0.2V		20	
Δt/ΔV	Input Transition Rise or Fall Rate	V_{CC} = 3.3V ± 0.3V		10	ns/V
		$V_{CC} = 5V \pm 0.5V$		5	
TA	Operating Free-Air Temperature		-40	+125	°C

Recommended Operating Conditions (Note 5) (@T_A = +25°C, unless otherwise specified.)

Note: 5. Unused inputs should be held at V_{CC} or Ground.



Symbol	Parameter	Test Conditions	Vcc	Min	Тур	Max	Unit	
		I _{OH} = -100μA	1.65V to 5.5V	V _{CC} – 0.1				
		I _{OH} = -4mA	1.65V	1.2				
.,	List Louis Outer (1) (alterna	I _{OH} = -8mA	2.3V	1.9				
Voh	High-Level Output Voltage	I _{OH} = -16mA	2) (2.4			V	
		I _{OH} = -24mA	- 3V	2.3				
		I _{OH} = -32mA	4.5V	3.8				
		I _{OL} = 100μA	1.65V to 5.5V			0.1		
		I _{OL} = 4mA	1.65V			0.45		
		I _{OL} = 8mA	2.3V			0.3		
V _{OL}	Low-Level Output Voltage	I _{OL} = 16mA	2) (0.4	V	
		I _{OL} = 24mA	3V			0.55		
		I _{OL} = 32mA	4.5V			0.55		
II.	Input Current	V _I = 5.5 V or GND	0 to 5.5V			± 5	μA	
I _{OFF}	Power Down Leakage Current	V_1 or V_0 = 5.5V	0			± 10	μA	
I _{CC}	Supply Current	V_{I} = 5.5V of GND, I_{O} = 0	1.65V to 5.5V			10	μA	
Δl _{CC}	Additional Supply Current	Input at V _{CC} –0.6V	3V to 5.5V			500	μA	

Electrical Characteristics T_A = -40°C to +85°C (All typical values are at V_{CC} = 3.3V, T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Vcc	Min	Тур	Max	Unit
		I _{OH} = -100μA	1.65V to 5.5V	V _{CC} – 0.1			
		I _{OH} = -4mA	1.65V	0.95			
	Lligh Lovel Output Veltage	I _{OH} = -8mA	2.3V	1.7			V
Voh	High-Level Output Voltage	I _{OH} = -16mA	- 3V	1.9			v
		I _{OH} = -24mA	30	2.0			
		I _{OH} = -32mA	4.5V	3.4			
		I _{OL} = 100μA	1.65V to 5.5V			0.1	
		I _{OL} = 4mA	1.65V			0.70	
V	Low-Level Output Voltage	I _{OL} = 8mA	2.3V			0.45	V
V _{OL}		I _{OL} = 16mA	- 3V			0.60	v
		I _{OL} = 24mA	30			0.80	
		I _{OL} = 32mA	4.5V			0.80	1
II.	Input Current	V _I = 5.5 V or GND	0 to 5.5V			± 20	μA
I _{OFF}	Power Down Leakage Current	V_1 or V_0 = 5.5V	0			± 20	μA
I _{CC}	Supply Current	V_{I} = 5.5V of GND, I_{O} = 0	1.65V to 5.5V			40	μA
Δl _{CC}	Additional Supply Current	Input at V _{CC} –0.6 V	3V to 5.5V			5000	μA



Package Characteristics (All typical values are at V_{CC} = 3.3V, T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions	Vcc	Min	Тур	Max	Unit
CI	Input Capacitance	$V_{I} = V_{CC} - or GND$	3.3		3.5		pF
		SOT26			204		
0	θ _{JA} Thermal Resistance Junction- to-Ambient	SOT363			371		°0141
ÐJA		X2-DFN1410-6	(Note 6)		430		°C/W
		X2-DFN1010-6			510		
		SOT26			52		
0	Thermal Resistance Junction-	SOT363	(Nata 6)		143		°C/W
$\theta_{\rm JC}$	to-Case	X2-DFN1410-6	(Note 6)		190		C/vv
		X2-DFN1010-6	7		250		

Note: 6. Test condition for SOT26, SOT363, X2-DFN1410-6 and X2-DFN1010-6 : Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

Switching Characteristics

T _A = -40°C to +85°C	: , C _L = 15pF	(see Figure 1)									
Parameter	From (Input)	TO (OUTPUT)	V _{CC} = 1.8V ± 0.15V		V _{CC} = 2.5V ± 0.2V		V _{CC} = 3.3V ± 0.3V		V _{CC} = 5V ± 0.5V		Unit
	(input)	(001201)	Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	Any	Y	1.0	15.2	0.7	5.6	0.7	4.1	0.7	3.1	ns

T_A = -40°C to +85°C, C_L = 30 or 50pF (see Figure 2)

Parameter	From (Input)	TO (OUTPUT)	V _{CC} = 1.8V ± 0.15V			: 2.5V .2V	V _{CC} = 3.3V ± 0.3V		V _{CC} ± 0	= 5V .5V	Unit
	(input)	(001201)	Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	Any	Y	1.0	17.2	0.7	6.2	0.7	4.9	0.7	3.5	ns

T_A = -40°C to +125°C, C_L = 15pF (see Figure 1)

Parameter	From (Input)			1.8V 15V		= 2.5V 0.2V	V _{CC} = ± 0	: 3.3V .3V	V _{CC} ±0	= 5V 0.5V	Unit
	(input)		Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	Any	Y	1.0	18.3	0.7	6.7	0.7	4.9	0.7	3.7	ns

T_A = -40°C to +125°C, C_L = 30 or 50pF (see Figure 2)

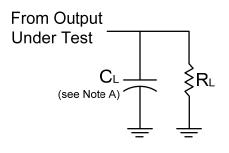
Parameter	From (Input)	TO (OUTPUT)	V _{CC} = ± 0.			: 2.5V .2V	V _{CC} = ± 0	: 3.3V .3V	V _{CC} ±0	= 5V 0.5V	Unit
	(input)		Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	Any	Y	1.0	20.7	0.7	7.5	0.7	5.9	0.7	4.2	ns



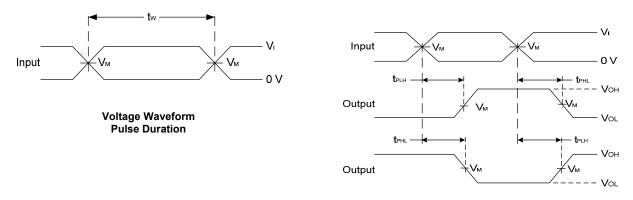
Operating Characteristics (@T_A = +25°C, unless otherwise specified.)

	Parameter	Test Conditions	V _{CC} = 1.8V Typ	V _{CC} = 2.5V Typ	V _{CC} = 3.3V Typ	V _{CC} = 5V Typ	Unit
C _{pd}	Power dissipation capacitance	f = 10 MHz	17	18	19	22	pF

Parameter Measurement Information



N N	Inputs		X	0	_
V _{cc}	VI	t _r /t _f	V _M	CL	RL
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	15pF	1MΩ
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	15pF	1MΩ
3.3V±0.3V	3V	≤2.5ns	1.5V	15pF	1MΩ
5V±0.5V	V _{CC}	≤2.5ns	V _{CC} /2	15pF	1MΩ



Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

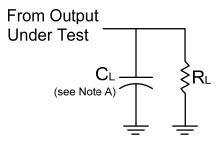
Notes:

- A. Includes test lead and test apparatus capacitance.
- B. All pulses are supplied at pulse repetition rate ≤ 10MHz
- C. Inputs are measured separately one transition per measurement
- D. t_{PLH} and t_{PHL} are the same as t_{PD} .

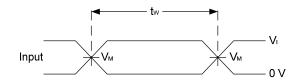
Figure 1 Load Circuit and Voltage Waveforms



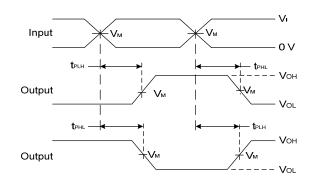
Parameter Measurement Information (cont.)



N N	Inj	outs	V	0	P
V _{cc}	VI	t _r /t _f	V _M	CL	RL
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	30pF	1kΩ
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	Vcc	≤2.5ns	V _{CC} /2	50pF	500Ω



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times Inverting and Non Inverting Outputs

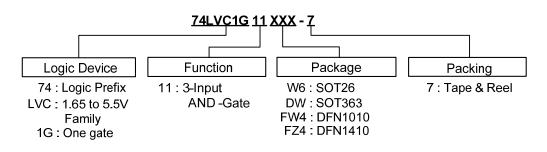
Notes:

- 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}

Figure 2 Load Circuit and Voltage Waveforms



Ordering Information

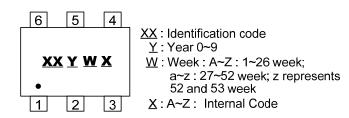


Part Number	Packaging Packaging	7" Tape and Reel		
Part Number	Package Code	(Note 7)	Quantity	Part Number Suffix
74LVC1G11W6-7	W6	SOT26	3000/Tape & Reel	-7
74LVC1G11DW-7	DW	SOT363	3000/Tape & Reel	-7
74LVC1G11FW4-7	FW4	X2-DFN1010-6	5000/Tape & Reel	-7
74LVC1G11FZ4-7	FZ4	X2-DFN1410-6	5000/Tape & Reel	-7

Note: 7. The taping orientation is located on our website at http://www.diodes.com/datasheets/ap02007.pdf

Marking Information

(1) SOT26, SOT363



Ī	Part Number	Package	Identification Code
	74LVC1G11W6	SOT26	TV
	74LVC1G11DW	SOT363	TV

(2) X2-DFN1010-6, X2-DFN1410-6

(Top View)	
XX	∣ <u>XX</u> ∶Iden Y∶Yea
YWX	<u> </u>
•	— a~z
	52 :

. . .

tification Code ır : 0~9 ek : A~Z : 1~26 week; z : 27~52 week; z represents 52 and 53 week \underline{X} : A~Z : Internal code

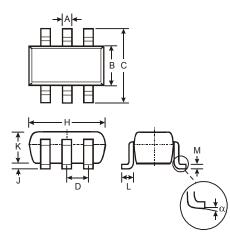
Part Number	Package	Identification Code
74LVC1G11FW4	X2-DFN1010-6	TV
74LVC1G11FZ4	X2-DFN1410-6	TV



Package Outline Dimensions (All dimensions in mm.)

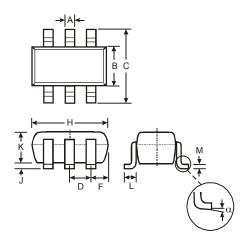
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

(1) Package Type: SOT26



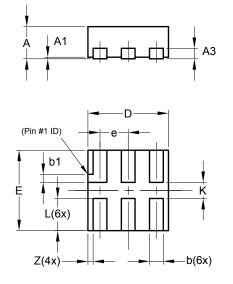
	SOT26			
Dim	Min	Max	Тур	
Α	0.35	0.50	0.38	
В	1.50	1.70	1.60	
С	2.70	3.00	2.80	
D	_		0.95	
Н	2.90	3.10	3.00	
J	0.013	0.10	0.05	
κ	1.00	1.30	1.10	
L	0.35	0.55	0.40	
Μ	0.10	0.20	0.15	
α	0°	8°	_	
All D	imensi	ons in	mm	

(2) Package Type: SOT363



	SOT363			
Dim	Min	Max		
Α	0.10	0.30		
в	1.15	1.35		
С	2.00	2.20		
D	0.65	0.65 Typ		
F	0.40	0.45		
Н	1.80	2.20		
J	0	0.10		
K	0.90	1.00		
L	0.25	0.40		
М	0.10	0.22		
α	0°	8°		
All Di	mensions	in mm		

(3) Package Type: DFN1010



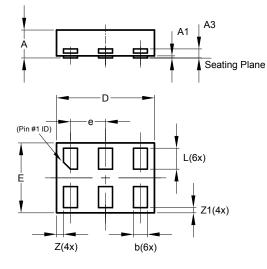
	X2-DFN1010-6				
Dim	Min	Max	Тур		
Α		0.40	0.39		
A1	0.00	0.05	0.02		
A3			0.13		
b	0.14	0.20	0.17		
b1	0.05	0.15	0.10		
D	0.95	1.05	1.00		
Е	0.95	1.05	1.00		
е			0.35		
L	0.35	0.45	0.40		
Κ	0.15				
Z			0.065		
All	All Dimensions in mm				



Package Outline Dimensions (cont.) (All dimensions in mm.)

Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.

(4) Package Type X2-DFN1410-6



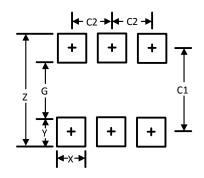
	X2-DFN1410-6				
Dim	Min	Max	Тур		
Α		0.40	0.39		
A1	0.00	0.05	0.02		
A3			0.13		
b	0.15	0.25	0.20		
D	1.35	1.45	1.40		
Е	0.95	1.05	1.00		
е			0.50		
L	0.25	0.35	0.30		
Z			0.10		
Z1	0.045	0.105	0.075		
All	All Dimensions in mm				



Suggested Pad Layout (All dimensions in mm.)

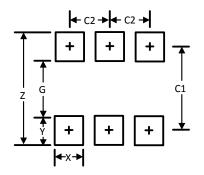
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

(1) Package Type: SOT26



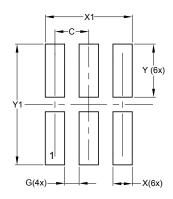
Dimensions	Value (in mm)
Z	3.20
G	1.60
х	0.55
Y	0.80
C1	2.40
C2	0.95

(2) Package Type: SOT363



Dimensions Value (in mm) Z 2.5 G 1.3 X 0.42 Y 0.6 C1 1.9 C2 0.65

(3) Package Type X2-DFN1010-6



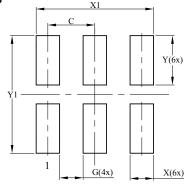
Dimensions	Value (in mm)
С	0.350
G	0.150
X	0.200
X1	0.900
Y	0.550
Y1	1.250



Suggested Pad Layout (cont.)

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

(4) Package Type: X2-DFN1410-6



Dimensions	Value (in mm)
С	0.500
G	0.250
Х	0.250
X1	1.250
Y	0.525
Y1	1.250

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