

## Description

The 74LVC1G32 is a single 2-input positive OR 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  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output preventing damaging current backflow when the device is powered down.

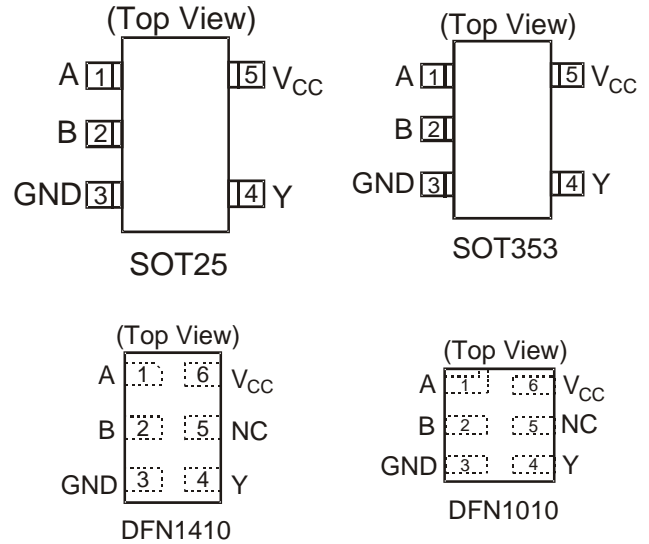
The gate performs the positive Boolean function:

$$Y = A + B \text{ or } Y = \overline{\overline{A} \cdot \overline{B}}$$

## 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
- ESD Protection Tested per JESD 22
  - Exceeds 200-V Machine Model (A115-A)
  - Exceeds 2000-V Human Body Model (A114-A)
  - Exceeds 1000-V Charged Device Model (C101C)
- Latch-Up Exceeds 100mA per JESD 78, Class II
- Range of Package Options
- Direct Interface with TTL Levels
- All packages Assembled with "Green" Molding Compound (no Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

## Pin Assignments



## Applications

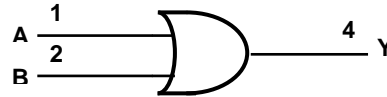
- Voltage Level Shifting
- General Purpose Logic
- Bus Driver / Repeater
- Power Down Signal Isolation
- General Purpose Logic
- Wide array of products such as:
  - PCs, networking, notebooks, netbooks, PDAs
  - Tablet Computers, E-readers
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box
  - Cell Phones, Personal Navigation / GPS
  - MP3 players, Cameras, Video Recorders

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).

## Pin Descriptions

Pin Name	Description
A	Data Input
B	Data Input
GND	Ground
Y	Data Output
V <sub>CC</sub>	Supply Voltage
NC	No Connection

## Logic Diagram



## Function Table

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

## Absolute Maximum Ratings (Note 2)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	KV
ESD CDM	Charged Device Model ESD Protection	1	KV
ESD MM	Machine Model ESD Protection	200	V
V <sub>CC</sub>	Supply Voltage Range	-0.5 to 6.5	V
V <sub>I</sub>	Input Voltage Range	-0.5 to 6.5	V
V <sub>o</sub>	Voltage applied to output in high impedance or I <sub>OFF</sub> state	-0.5 to 6.5	V
V <sub>o</sub>	Voltage applied to output in high or low state.	-0.3 to V <sub>CC</sub> +0.5	V
I <sub>IK</sub>	Input Clamp Current V <sub>I</sub> <0	-50	mA
I <sub>OK</sub>	Output Clamp Current	-50	mA
I <sub>O</sub>	Continuous output current	±50	mA
I <sub>CC</sub> , I <sub>GND</sub>	Continuous current through V <sub>CC</sub> or 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: 2. 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.

### Recommended Operating Conditions (Note 3)

Symbol	Parameter		Min	Max	Unit
V <sub>CC</sub>	Operating Voltage	Operating	1.65	5.5	V
		Data retention only	1.5		V
V <sub>IH</sub>	High-level Input Voltage	V <sub>CC</sub> = 1.65V to 1.95V	0.65 X V <sub>CC</sub>		V
		V <sub>CC</sub> = 2.3V to 2.7V	1.7		
		V <sub>CC</sub> = 3V to 3.6V	2		
		V <sub>CC</sub> = 4.5V to 5.5V	0.7 X V <sub>CC</sub>		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 1.65V to 1.95V		0.35 X V <sub>CC</sub>	V
		V <sub>CC</sub> = 2.3V to 2.7V		0.7	
		V <sub>CC</sub> = 3V to 3.6V		0.8	
		V <sub>CC</sub> = 4.5V to 5.5V		0.3 X V <sub>CC</sub>	
V <sub>I</sub>	Input Voltage		0	5.5	V
V <sub>O</sub>	Output Voltage		0	V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 1.65V		-4	mA
		V <sub>CC</sub> = 2.3V		-8	
		V <sub>CC</sub> = 3V		-16	
				-24	
		V <sub>CC</sub> = 4.5V		-32	
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 1.65V		4	mA
		V <sub>CC</sub> = 2.3V		8	
		V <sub>CC</sub> = 3V		16	
				24	
		V <sub>CC</sub> = 4.5V		32	
Δt/ΔV	Input transition rise or fall rate	V <sub>CC</sub> = 1.8V ± 0.15V, 2.5V ± 0.2V		20	ns/V
		V <sub>CC</sub> = 3.3V ± 0.3V		10	
		V <sub>CC</sub> = 5V ± 0.5V		5	
T <sub>A</sub>	Operating free-air temperature		-40	125	°C

Notes: 3. Unused inputs should be held at  $V_{CC}$  or Ground.

**Electrical Characteristics (All typical values are at  $V_{CC} = 3.3V$ ,  $T_A = 25^\circ C$ )**

Symbol	Parameter	Test Conditions	$V_{CC}$	-40°C to 85°C			-40°C to 125°C		Unit
				Min	Typ.	Max	Min	Max	
$V_{OH}$	High Level Output Voltage	$I_{OH} = -100\mu A$	1.65V to 5.5V	$V_{CC} - 0.1$			$V_{CC} - 0.1$		V
		$I_{OH} = -4mA$	1.65V	1.2			0.95		
		$I_{OH} = -8mA$	2.3V	1.9			1.7		
		$I_{OH} = -16mA$	3V	2.4			2.2		
		$I_{OH} = -24mA$		2.3			2.0		
		$I_{OH} = -32mA$	4.5V	3.8			3.4		
$V_{OL}$	Low Level Output Voltage	$I_{OL} = 100\mu A$	1.65V to 5.5V			0.1		0.1	V
		$I_{OL} = 4mA$	1.65V			0.45		0.7	
		$I_{OL} = 8mA$	2.3V			0.3		0.45	
		$I_{OL} = 16mA$	3V			0.4		0.6	
		$I_{OL} = 24mA$				0.55		0.8	
		$I_{OL} = 32mA$	4.5V			0.55		.8	
$I_I$	Input Current	$V_I = 5.5V$ or GND	0 to 5.5V		$\pm 0.1$	$\pm 5$		$\pm 100$	$\mu A$
$I_{OFF}$	Power Down Leakage Current	$V_I$ or $V_O = 5.5V$	0V			$\pm 10$		$\pm 200$	$\mu A$
$I_{CC}$	Supply Current	$V_I = 5.5V$ or GND $I_O = 0$	5.5V		0.1	10		200	$\mu A$
$\Delta I_{CC}$	Additional Supply Current	One input at $V_{CC} - 0.6V$ Other inputs at $V_{CC}$ or GND	3V to 5.5V			500		5000	$\mu A$
$C_i$	Input Capacitance	$V_i = V_{CC} -$ or GND	3.3V		5				pF

**Package Characteristics (All typical values are at  $V_{CC} = 3.3V$ ,  $T_A = 25^\circ C$ )**

Symbol	Parameter	Test Conditions	$V_{CC}$	Min	Typ.	Max	Unit
$\theta_{JA}$	Thermal Resistance Junction-to-Ambient	SOT25	(Note 4)		204		$^\circ C/W$
		SOT353			371		
		DFN1010			445		
		DFN1410			460		
$\theta_{JC}$	Thermal Resistance Junction-to-Case	SOT25	(Note 4)		52		$^\circ C/W$
		SOT353			143		
		DFN1010			250		
		DFN1410			265		

Notes: 4. Test condition for SOT25, SOT353, DFN1410 and DFN1010: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

**Switching Characteristics**

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

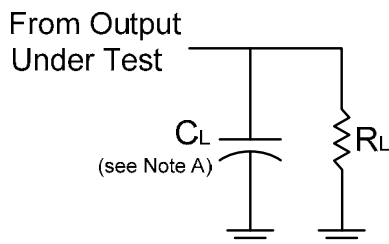
Parameter	From Input	To Output	$V_{CC}$	$T_A = -40^\circ C$ to $85^\circ C$			$T_A = -40^\circ C$ to $125^\circ C$		Unit
				Min	Typ.	Max	Min	Max	
$t_{pd}$	A or B	Y	1.8V $\pm$ 0.15V	1.0	3.1	8.0	1.0	10.5	ns
			2.5V $\pm$ 0.2V	0.5	2.1	5.5	0.5	7.0	
			2.7V	0.5	2.5	5.5	0.5	7.0	
			3.3V $\pm$ 0.3V	0.5	2.1	4.5	0.5	6.0	
			5.0V $\pm$ 0.5V	0.5	1.7	4.0	0.5	5.5	

**Operating Characteristics**

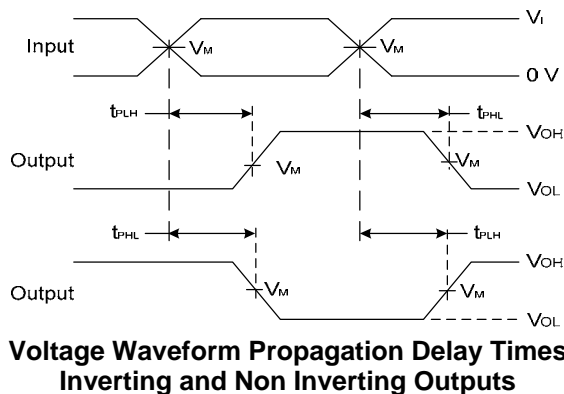
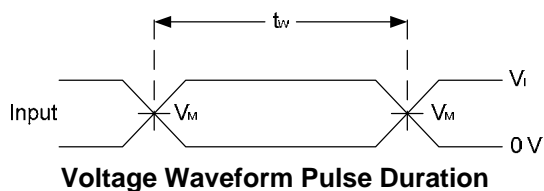
$T_A = 25^\circ C$

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 = 10 MHz	20	20	21	22	pF

**Parameter Measurement Information**



$V_{CC}$	Inputs		$V_M$	$C_L$	$R_L$
	$V_I$	$t_r/t_f$			
$1.8V \pm 0.15V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30 pF	1 K $\Omega$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30 pF	500 $\Omega$
2.7V	$V_{CC}$	$\leq 2.5ns$	1.5V	50 pF	500 $\Omega$
$3.3V \pm 0.3V$	3.0 V	$\leq 2.5ns$	1.5V	50 pF	500 $\Omega$
$5.0V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	50 pF	500 $\Omega$

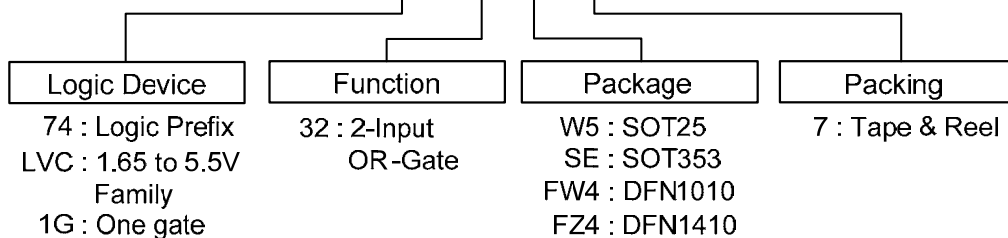


**Figure 1. Load Circuit and Voltage Waveforms**

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

## Ordering Information

### 74LVC1G 32 XXX - Z

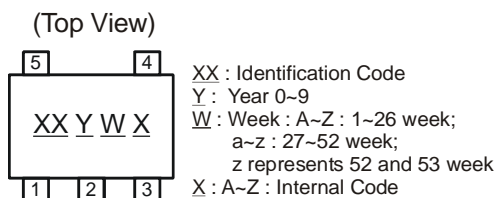


Device	Package Code	Packaging (Note 6)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVC1G32W5-7	W5	SOT25	3000/Tape & Reel	-7
74LVC1G32SE-7	SE	SOT353	3000/Tape & Reel	-7
74LVC1G32FW4-7	FW4	DFN1010	5000/Tape & Reel	-7
74LVC1G32FZ4-7	FZ4	DFN1410	5000/Tape & Reel	-7

Notes: 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.  
6. The taping orientation is located on our website at <http://www.diodes.com/datasheets/ap02007.pdf>

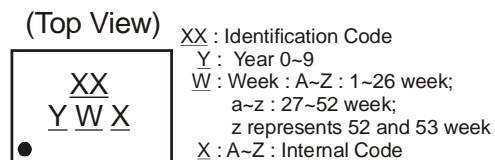
## Marking Information

### (1) SOT25 and SOT353



Part Number	Package	Identification Code
74LVC1G32W5	SOT25	UW
74LVC1G32SE	SOT353	UW

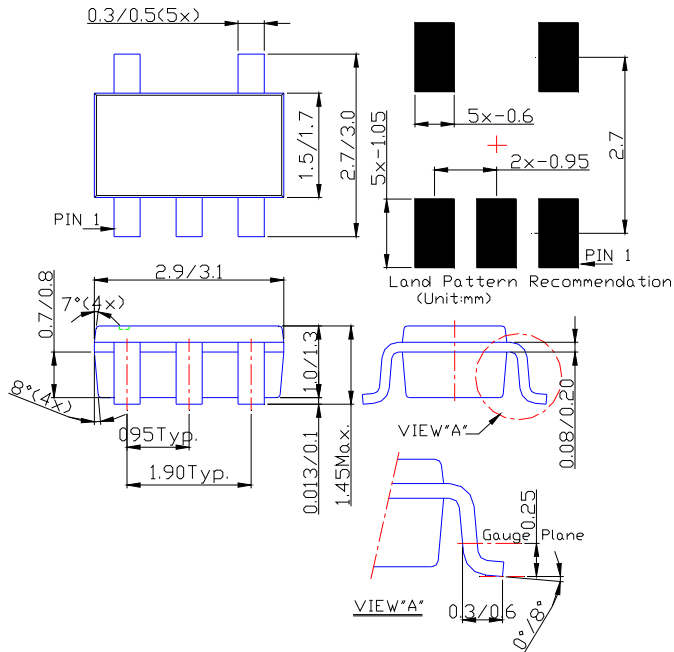
### (2) DFN1010 and DFN1410



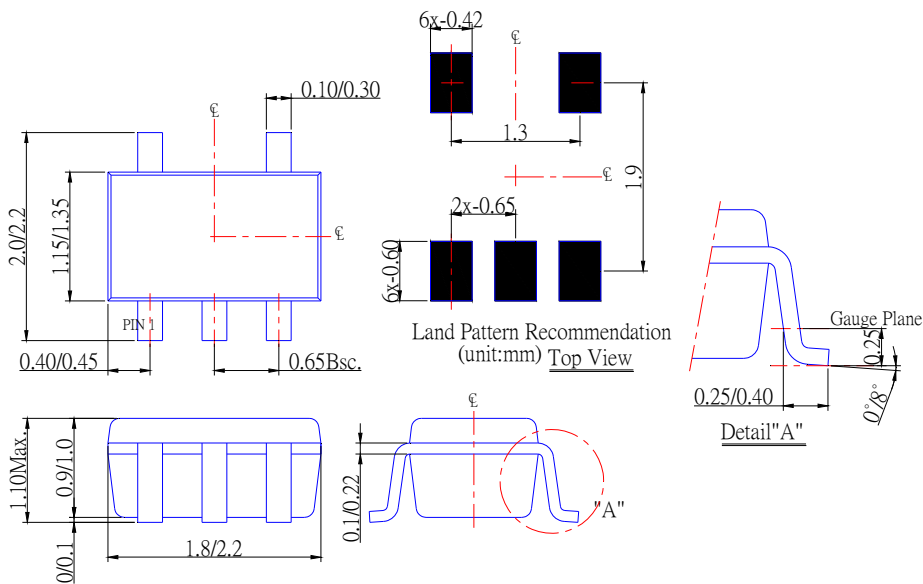
Part Number	Package	Identification Code
74LVC1G32FW4	DFN1010	UW
74LVC1G32FZ4	DFN1410	UW

**Package Outline Dimensions (All Dimensions in mm)**

**(1) Package Type: SOT25**



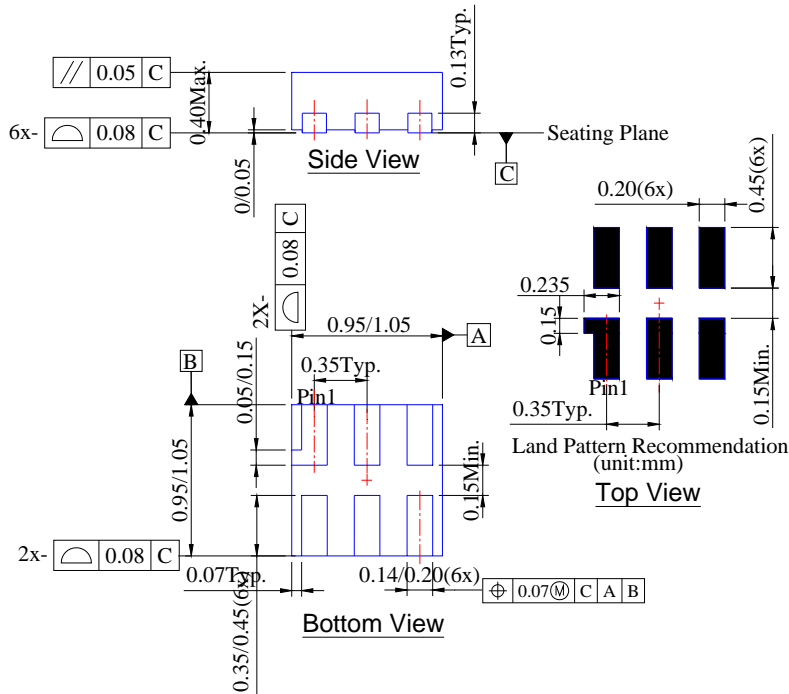
**(2) Package Type: SOT353**



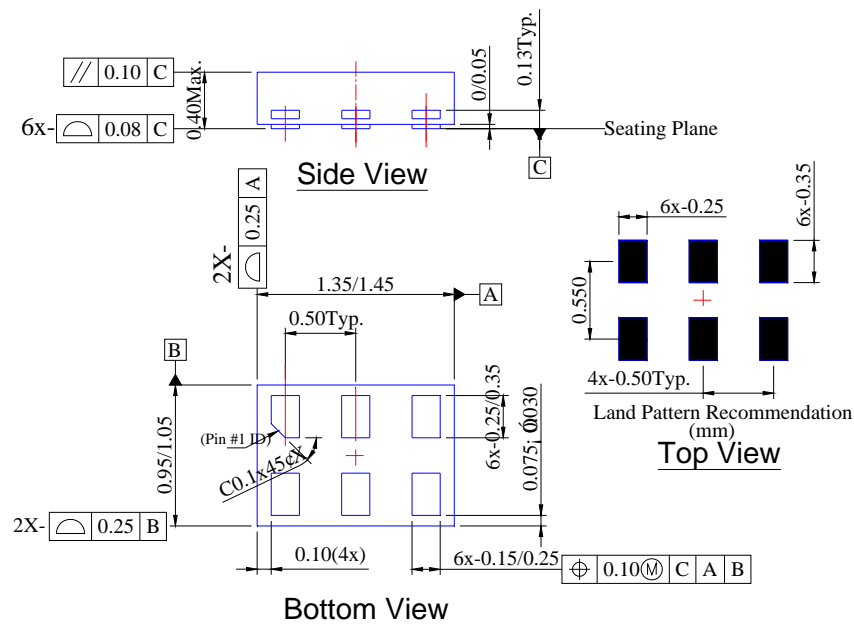


**Package Outline Dimensions (cont.)**

**(3) Package Type DFN1010**



**(4) Package Type: DFN1410**



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