

### Description

The 74LVC2G14 is a dual Schmitt trigger inverter gate with standard push-pull outputs. 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<sub>OFF</sub>. The I<sub>OFF</sub> circuitry disables the output preventing damaging current backflow when the device is powered down.

The gate performs the positive Boolean function:

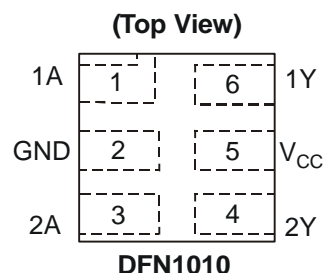
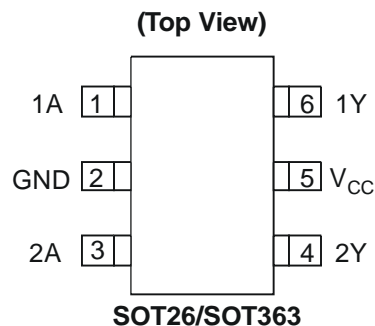
$$Y = \overline{A}$$

### Features

- Wide Supply Voltage Range from 1.65V to 5.5V
- ±24mA Output Drive at 3.0V
- CMOS low power consumption
- IOFF 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 (C101)
- Latch-Up Exceeds 100mA per JESD 78, Class II
- Range of Package Options
- SOT26, SOT363, and DFN1010 Available in “Green” Molding Compound (no Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

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 Assignments



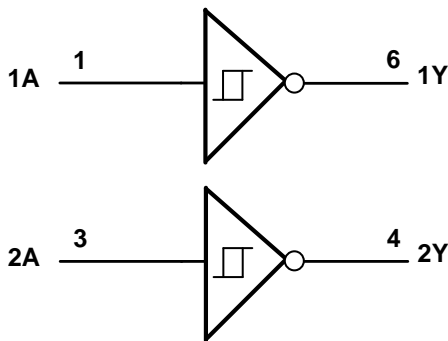
### Applications

- 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

**Pin Descriptions**

Pin Name	Pin NO.	Description
1A	1	Data Input
GND	2	Ground
2A	3	Data Input
2Y	4	Data Output
V <sub>CC</sub>	5	Supply Voltage
1Y	6	Data Output

**Logic Diagram**



**Function Table**

Inputs	Output
A	Y
H	L
L	H

### 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
$V_{CC}$	Supply Voltage Range	-0.5 to 6.5	V
$V_I$	Input Voltage Range	-0.5 to 6.5	V
$V_O$	Voltage applied to output in high impedance or $I_{OFF}$ state	-0.5 to 6.5	V
$V_O$	Voltage applied to output in high or low state.	-0.3 to $V_{CC} + 0.5$	V
$I_{IK}$	Input Clamp Current $V_I < 0$	-50	mA
$I_{OK}$	Output Clamp Current	-50	mA
$I_O$	Continuous output current	$\pm 50$	mA
	Continuous current through Vdd or GND	$\pm 100$	mA
$T_J$	Operating Junction Temperature	-40 to 150	$^{\circ}C$
$T_{STG}$	Storage Temperature	-65 to 150	$^{\circ}C$

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	
$V_{CC}$	Operating Voltage	Operating	1.65	5.5	V
		Data retention only	1.5		V
$V_I$	Input Voltage	0	5.5	V	
$V_O$	Output Voltage	0	$V_{CC}$	V	
$I_{OH}$	High-level output current	$V_{CC} = 1.65V$		-4	mA
		$V_{CC} = 2.3V$		-8	
		$V_{CC} = 3V$		-16	
		$V_{CC} = 4.5V$		-24	
$I_{OL}$	Low-level output current	$V_{CC} = 1.65V$		4	mA
		$V_{CC} = 2.3V$		8	
		$V_{CC} = 3V$		16	
		$V_{CC} = 4.5V$		24	
$\Delta t/\Delta V$	Input transition rise or fall rate	$V_{CC} = 1.8V \pm 0.15V, 2.5V \pm 0.2V$		20	ns/V
		$V_{CC} = 3.3V \pm 0.3V$		10	
		$V_{CC} = 5V \pm 0.5V$		5	
$T_A$	Operating free-air temperature	-40	125	$^{\circ}C$	

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

### Electrical Characteristics

Symbol	Parameter	Test Conditions	V <sub>CC</sub>	40°C to 85°C		-40°C to 125°C		Unit
				Min	Max	Min	Max	
V <sub>T+</sub>	Positive-going input threshold Voltage		1.8V	0.70	1.50	0.70	1.70	V
			2.3V	1.00	1.80	1.00	2.00	
			3V	1.30	2.20	1.30	2.40	
			4.5V	1.90	3.10	1.90	3.30	
			5.5V	2.20	3.60	2.20	3.80	
V <sub>T-</sub>	Negative-going input threshold Voltage		1.65V	0.25	0.90	0.39	1.10	V
			2.3V	0.40	1.15	0.25	0.87	
			3V	0.60	1.50	0.40	1.35	
			4.5V	1.00	2.00	0.60	1.70	
			5.5V	1.20	2.30	1.00	2.50	
ΔV <sub>T</sub>	Hysteresis (V <sub>T+</sub> - V <sub>T-</sub> )		1.8V	0.15	1.00	0.37	1.20	μA
			2.3V	0.25	1.10	0.15	1.30	
			3V	0.40	1.20	0.40	1.40	
			4.5V	0.60	1.50	0.60	1.70	
			5.5V	0.70	1.70	0.70	1.90	
V <sub>OH</sub>	High Level Output Voltage	I <sub>OH</sub> = -100 μA	1.65V to 4.5V	V <sub>CC</sub> - 0.1		V <sub>CC</sub> - 0.1	V	
		I <sub>OH</sub> = -4 mA	1.65V	1.2		0.95		
		I <sub>OH</sub> = -8 mA	2.3V	1.9		1.7		
		I <sub>OH</sub> = -16 mA	3V	2.4		1.9		
		I <sub>OH</sub> = -24 mA		2.3		2.0		
		I <sub>OH</sub> = -32 mA	4.5V	3.8		3.4		
V <sub>OL</sub>	Low-Level Output Voltage	I <sub>OL</sub> = 100 μA	1.65V to 4.5V		0.1	0.10	V	
		I <sub>OL</sub> = 4 mA	1.65V		0.45	0.70		
		I <sub>OL</sub> = 8 mA	2.3V		0.3	0.45		
		I <sub>OL</sub> = 16 mA	3V		0.4	0.60		
		I <sub>OL</sub> = 24 mA			0.55	0.80		
		I <sub>OL</sub> = 32 mA	4.5		0.55	0.80		
I <sub>I</sub>	Input Current	V <sub>I</sub> = 5.5 V or GND	0 to 5.5V		± 5	± 20	μA	
I <sub>OFF</sub>	Power Down Leakage Current	V <sub>I</sub> or V <sub>O</sub> = 5.5V	0		± 10	± 20	μA	
I <sub>CC</sub>	Supply Current	V <sub>I</sub> = 5.5V of GND I <sub>O</sub> =0	1.65V to 5.5V		10	40	μA	

### 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
$C_I$	Input Capacitance	$V_I = V_{CC} - \text{or GND}$	3.3		4		pF
$\theta_{JA}$	Thermal Resistance Junction-to-Ambient	SOT26	(Note 4)		204		$^\circ C/W$
		SOT363			371		
		DFN1010			430		
$\theta_{JC}$	Thermal Resistance Junction-to-Case	SOT26	(Note 4)		52		$^\circ C/W$
		SOT363			143		
		DFN1010			190		

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

### Switching Characteristics

$T_A = -40^\circ C$  to  $85^\circ C$ ,  $C_L = 30$  or  $50pF$  (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8V \pm 0.15V$		$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		$V_{CC} = 5V \pm 0.5V$		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
$t_{pd}$	A	Y	0.5	11.0	0.5	6.5	0.5	6.0	0.5	4.3	ns

$T_A = -40^\circ C$  to  $125^\circ C$ ,  $C_L = 30$  or  $50pF$  (see Figure 1)

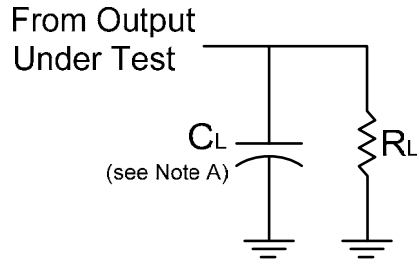
Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8V \pm 0.15V$		$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		$V_{CC} = 5V \pm 0.5V$		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
$t_{pd}$	A	Y	0.5	12.0	0.5	7.2	0.50	6.7	0.5	4.7	ns

### Operating Characteristics

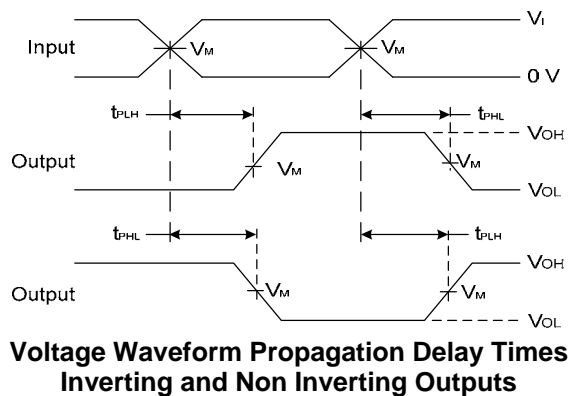
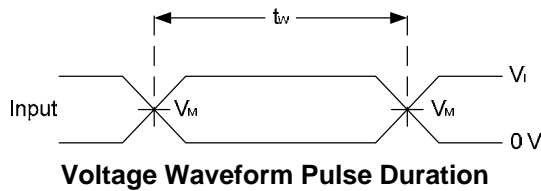
$T_A = 25^\circ C$

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	17	19	20	21	pF

**Parameter Measurement Information**



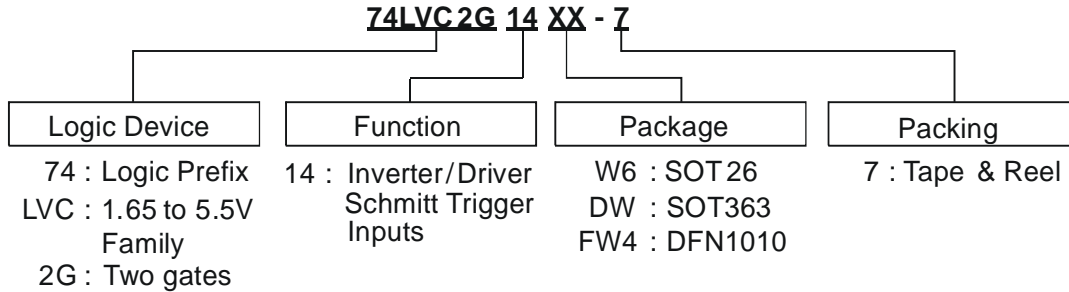
V <sub>CC</sub>	Inputs		V <sub>M</sub>	C <sub>L</sub>	R <sub>L</sub>
	V <sub>I</sub>	t <sub>r</sub> /t <sub>f</sub>			
1.8V±0.15 V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30 pF	1 KΩ
2.5V±0.2 V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30 pF	500 Ω
3.3V±0.3 V	3 V	≤2.5ns	1.5 V	50 pF	500 Ω
5V±0.5 V	V <sub>CC</sub>	≤2.5ns	V <sub>CC</sub> /2	50 pF	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 ≤ 10 MHz.
  - C. Inputs are measured separately one transition per measurement.
  - D. t<sub>PLH</sub> and t<sub>PHL</sub> are the same as t<sub>PD</sub>.

### Ordering Information

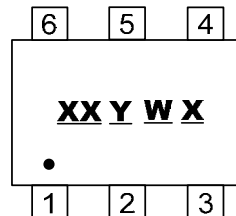


Device	Package Code	Packaging (Note 5)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVC2G14W6-7	W6	SOT26	3000/Tape & Reel	-7
74LVC2G14DW-7	DW	SOT363	3000/Tape & Reel	-7
74LVC2G14FW4-7	FW4	DFN1010	5000/Tape & Reel	-7

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) SOT26, SOT363

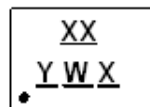


**XX** : Identification code  
**Y** : Year 0~9  
**W** : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents 52 and 53 week  
**X** : A~Z : Internal Code

Part Number	Package	Identification Code
74LVC2G14W6	SOT26	Z5
74LVC2G14DW	SOT363	Z5

#### (2) DFN1010

##### (Top View)

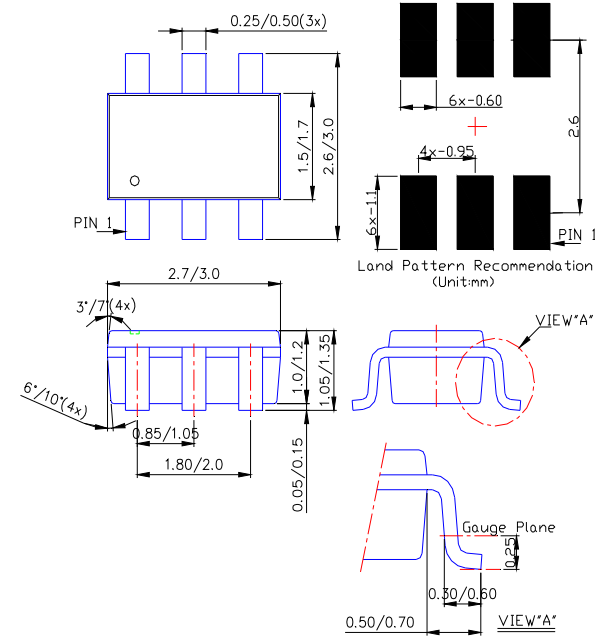


**XX** : Identification Code  
**Y** : Year : 0~9  
**W** : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents 52 and 53 week  
**X** : A~Z : Internal code

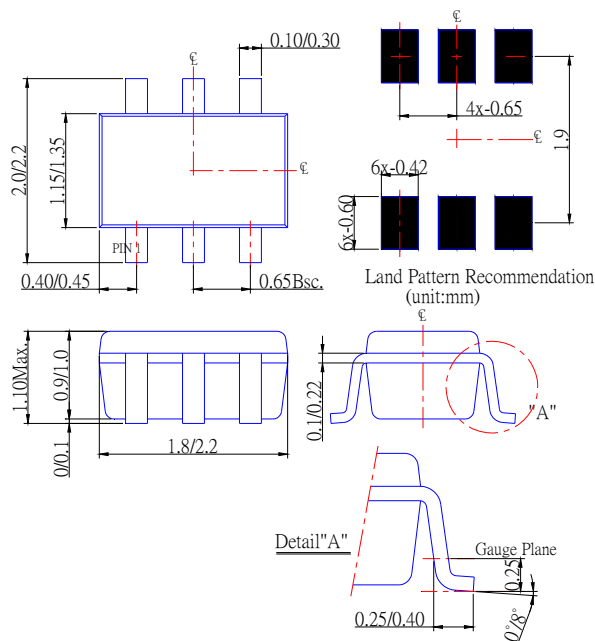
Part Number	Package	Identification Code
74LVC2G14FW4	DFN1010	Z5

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

**(1) Package Type: SOT26**



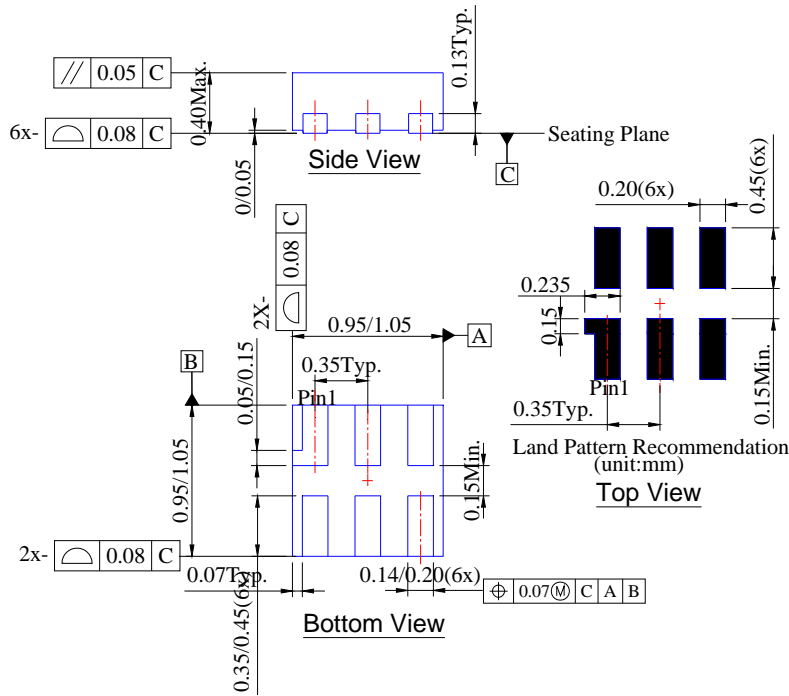
**(2) Package Type: SOT363**





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

**(3) Package Type: DFN1010**



NEW PRODUCTS

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Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)