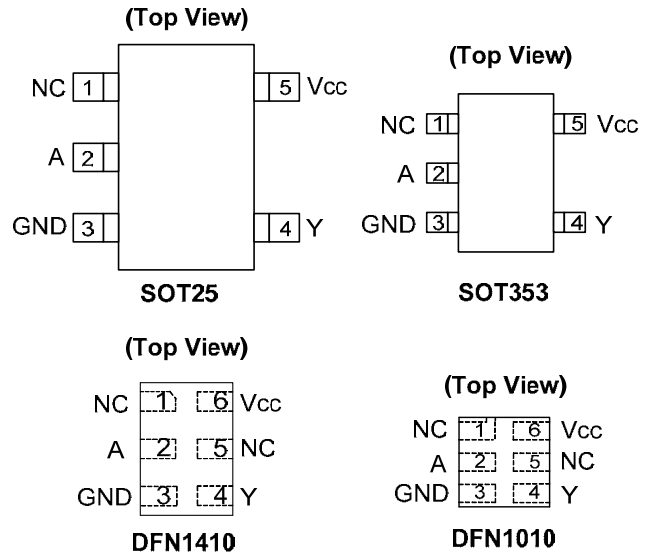


### Description

The 74LVC1G14 is a single 1-input Schmitt-trigger inverter 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:

$$Y = \overline{A}$$

### Pin Assignments



### 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 II
- Range of Package Options
- SOT25, SOT353, DFN1410, and DFN1010: Available in “Green” Molding Compound (no Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

### Applications

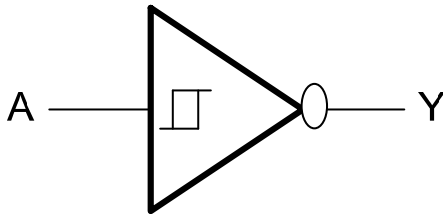
- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
  - PCs, networking, notebooks, netbooks, PDAs
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box
  - Cell Phones, Personal Navigation / GPS
  - MP3 players ,Cameras,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

Notes: 1. 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
GND	Ground
Y	Data Output
V <sub>CC</sub>	Supply Voltage

**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 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 $V_{DD}$ 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**  $T_A = -40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  (All typical values are at  $V_{CC} = 3.3\text{V}$ ,  $T_A = 25^{\circ}\text{C}$ )

Symbol	Parameter	Test Conditions	$V_{CC}$	Min	Typ.	Max	Unit
$V_{T+}$	Positive-going input threshold voltage		1.65V	0.70		1.20	
			2.3V	1.11		1.60	
			3V	1.50		2.00	
			4.5V	2.16		2.74	
			5.5V	2.61		3.33	
$V_{T-}$	Negative-going input threshold voltage		1.65V	0.30		0.72	
			2.3V	0.58		1.00	
			3V	0.80		1.30	
			4.5V	1.21		1.95	
			5.5V	1.45		2.35	
$\Delta V_T$	Hysteresis ( $V_{T+} - V_{T-}$ )		1.65V	0.30		0.62	
			2.3V	0.40		0.80	
			3V	0.35		1.00	
			4.5V	0.55		1.10	
			5.5V	0.60		1.20	
$V_{OH}$	High Level Output Voltage	$I_{OH} = -100\mu\text{A}$	1.65V to 5.5V	$V_{CC} - 0.1$			V
		$I_{OH} = -4\text{mA}$	1.65V	1.2			
		$I_{OH} = -8\text{mA}$	2.3V	1.9			
		$I_{OH} = -16\text{mA}$	3V	2.4			
		$I_{OH} = -24\text{mA}$		2.3			
		$I_{OH} = -32\text{mA}$	4.5V	3.8			
$V_{OL}$	High-level Input Voltage	$I_{OL} = 100\mu\text{A}$	1.65V to 5.5V			0.1	V
		$I_{OL} = 4\text{mA}$	1.65V			0.45	
		$I_{OL} = 8\text{mA}$	2.3V			0.3	
		$I_{OL} = 16\text{mA}$	3V			0.4	
		$I_{OL} = 24\text{mA}$				0.55	
		$I_{OL} = 32\text{mA}$	4.5			0.55	
$I_I$	Input Current	$V_I = 5.5\text{V}$ or GND	0 to 5.5V			$\pm 5$	$\mu\text{A}$
$I_{OFF}$	Power Down Leakage Current	$V_I$ or $V_O = 5.5\text{V}$	0			$\pm 10$	$\mu\text{A}$
$I_{CC}$	Supply Current	$V_I = 5.5\text{V}$ of GND $I_O = 0$	1.65V to 5.5V			10	$\mu\text{A}$
$\Delta I_{CC}$	Additional Supply Current	Input at $V_{CC} - 0.6\text{V}$	3V to 5.5V			500	$\mu\text{A}$

**Electrical Characteristics**     $T_A = -40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$     (All typical values are at  $V_{CC} = 3.3\text{V}$ ,  $T_A = 25^{\circ}\text{C}$ )

Symbol	Parameter	Test Conditions	$V_{CC}$	Min	Typ.	Max	Unit
$V_{T+}$	Positive-going input threshold voltage		1.65V	0.70		1.20	
			2.3V	1.11		1.60	
			3V	1.50		2.00	
			4.5V	2.16		2.74	
			5.5V	2.61		3.33	
$V_{T-}$	Negative-going input threshold voltage		1.65V	0.30		0.75	
			2.3V	0.58		1.03	
			3V	0.80		1.33	
			4.5V	1.21		1.95	
			5.5V	1.45		2.35	
$\Delta V_T$	Hysteresis ( $V_{T+} - V_{T-}$ )		1.65V	0.30		0.62	
			2.3V	0.37		0.80	
			3V	0.32		1.00	
			4.5V	0.50		1.20	
			5.5V	0.55		1.40	
$V_{OH}$	High Level Output Voltage	$I_{OH} = -100\mu\text{A}$	1.65V to 5.5V	$V_{CC} - 0.1$			V
		$I_{OH} = -4\text{mA}$	1.65V	0.95			
		$I_{OH} = -8\text{mA}$	2.3V	1.7			
		$I_{OH} = -16\text{mA}$	3V	1.9			
		$I_{OH} = -24\text{mA}$		2.0			
		$I_{OH} = -32\text{mA}$	4.5V	3.4			
$V_{OL}$	High-level Input Voltage	$I_{OL} = 100\mu\text{A}$	1.65V to 5.5V			0.1	V
		$I_{OL} = 4\text{mA}$	1.65V			0.7	
		$I_{OL} = 8\text{mA}$	2.3V			0.45	
		$I_{OL} = 16\text{mA}$	3V			0.6	
		$I_{OL} = 24\text{mA}$				0.8	
		$I_{OL} = 32\text{mA}$	4.5V			0.8	
$I_I$	Input Current	$V_I = 5.5\text{V}$ or GND	0 to 5.5V			$\pm 100$	$\mu\text{A}$
$I_{OFF}$	Power Down Leakage Current	$V_I$ or $V_O = 5.5\text{V}$	0			$\pm 200$	$\mu\text{A}$
$I_{CC}$	Supply Current	$V_I = 5.5\text{V}$ of GND $I_O = 0$	1.65V to 5.5V			200	$\mu\text{A}$
$\Delta I_{CC}$	Additional Supply Current	Input at $V_{CC} - 0.6\text{V}$	3V to 5.5V			5000	$\mu\text{A}$

### 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		3.5		pF
$\theta_{JA}$	Thermal Resistance Junction-to-Ambient	SOT25	(Note 4)		204		$^\circ C/W$
		SOT353			371		
		DFN1410			430		
		DFN1010			510		
$\theta_{JC}$	Thermal Resistance Junction-to-Case	SOT25	(Note 4)		52		$^\circ C/W$
		SOT353			143		
		DFN1410			190		
		DFN1010			250		

Notes: 4. Test condition for SOT26, SOT363, DFN1410 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  $85^\circ C$ ,  $C_L = 15pF$  as noted (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	1.0	9.9	0.7	5.5	0.7	4.6	0.7	4.4	ns

$T_A = -40^\circ C$  to  $85^\circ C$ ,  $C_L = 30$  or  $50pF$  as noted (see Figure 2)

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	1.0	11	0.7	6.5	0.7	5.5	0.7	5	ns

$T_A = -40^\circ C$  to  $125^\circ C$ ,  $C_L = 15pF$  as noted (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	1.0	12.5	0.7	7.5	0.7	6.5	0.7	5.5	ns

$T_A = -40^\circ C$  to  $125^\circ C$ ,  $C_L = 30$  or  $50pF$  as noted (see Figure 2)

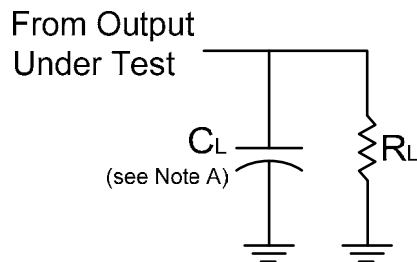
Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8V \pm 0.15V$		$V_{CC} = 2.5V \pm 0.2V$		$V_{CC} = 3.3V \pm 0.3V$		$V_{CC} = 5V \pm 0.5V$		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
$t_{pd}$	A	Y	1.0	14.0	0.7	8.5	0.7	7.0	0.7	6.5	ns

**Operating Characteristics**

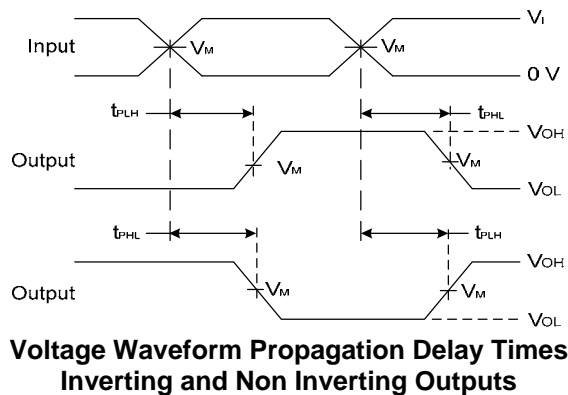
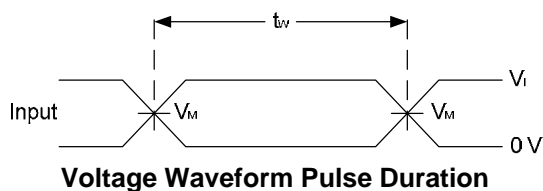
$T_A = 25\text{ }^\circ\text{C}$

Parameter	Test Conditions	$V_{CC} = 1.8\text{V}$	$V_{CC} = 2.5\text{V}$	$V_{CC} = 3.3\text{V}$	$V_{CC} = 5\text{V}$	Unit	
		Typ.	Typ.	Typ.	Typ.		
$C_{pd}$	Power dissipation capacitance	f = 10 MHz	20	21	22	25	pF

**Parameter Measurement Information**



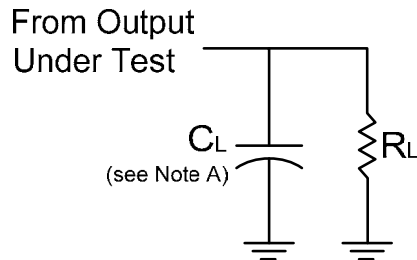
$V_{CC}$	Inputs		$V_M$	$C_L$	$R_L$
	$V_I$	$t_r/t_f$			
$1.8\text{V} \pm 0.15\text{V}$	$V_{CC}$	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	1M $\Omega$
$2.5\text{V} \pm 0.2\text{V}$	$V_{CC}$	$\leq 2\text{ns}$	$V_{CC}/2$	15pF	1M $\Omega$
$3.3\text{V} \pm 0.3\text{V}$	3V	$\leq 2.5\text{ns}$	1.5V	15pF	1M $\Omega$
$5\text{V} \pm 0.5\text{V}$	$V_{CC}$	$\leq 2.5\text{ns}$	$V_{CC}/2$	15pF	1M $\Omega$



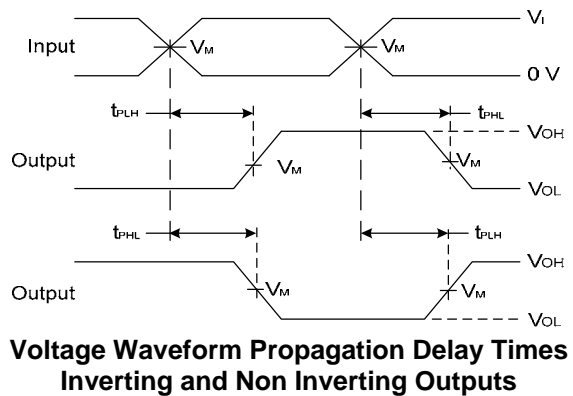
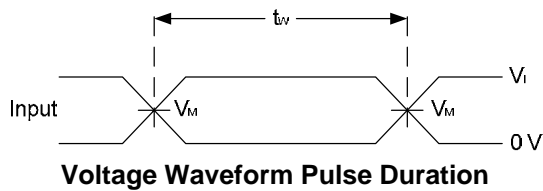
**Figure 1. Load Circuit and Voltage Waveforms**

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

**Parameter Measurement Information (Continued)**



$V_{CC}$	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 $\Omega$
$2.5V \pm 0.2V$	$V_{CC}$	$\leq 2ns$	$V_{CC}/2$	30pF	500 $\Omega$
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	50pF	500 $\Omega$
$5V \pm 0.5V$	$V_{CC}$	$\leq 2.5ns$	$V_{CC}/2$	50pF	500 $\Omega$

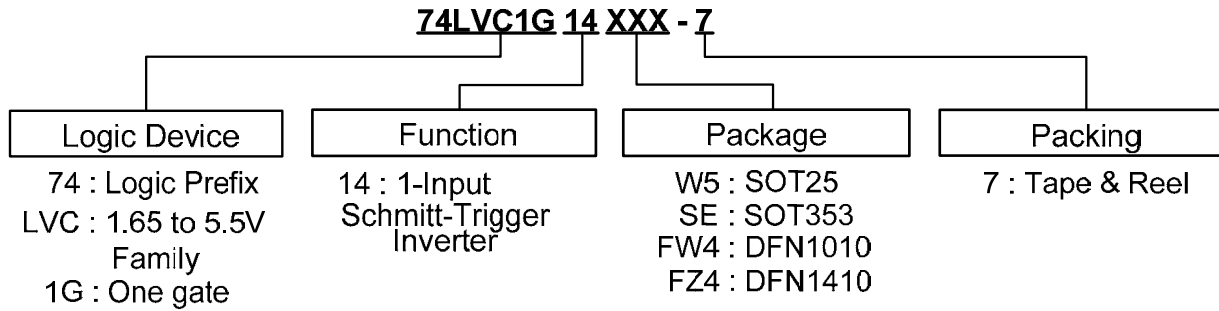


**Figure 2. Load Circuit and Voltage Waveforms**

- 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**



Device	Package Code	Packaging (Note 7)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVC1G14W5-7	W5	SOT25	3000/Tape & Reel	-7
74LVC1G14SE-7	SE	SOT353	3000/Tape & Reel	-7
74LVC1G14FW4-7	FW4	DFN1010	5000/Tape & Reel	-7
74LVC1G14FZ4-7	FZ4	DFN1410	5000/Tape & Reel	-7

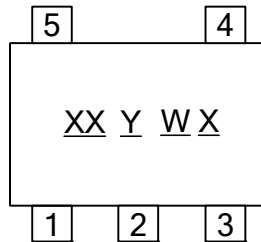
Notes: 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.  
6. The taping orientation is located on our website at <http://www.diodes.com/datasheets/ap02007.pdf>

NEW PRODUCT

**Marking Information**

(1) SOT25, SOT353

(Top View)

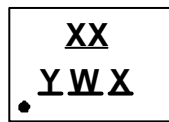


XX : Identification code  
Y : Year 0~9  
W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents  
 52 and 53 week  
X : A~Z : Internal code

Part Number	Package	Identification Code
74LVC1G14W5-7	SOT25	UP
74LVC1G14SE-7	SOT353	UP

(2) DFN1010,DFN1410

(Top View)

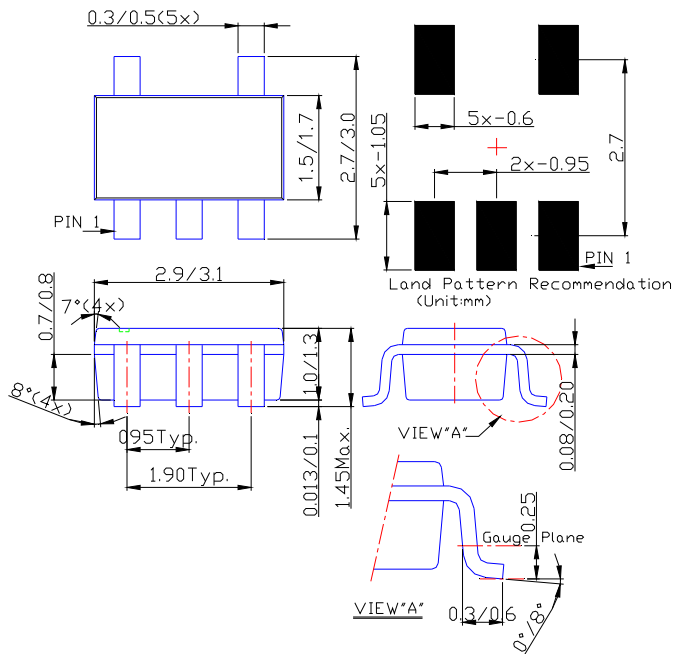


XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents  
 52 and 53 week  
X : A~Z : Internal code

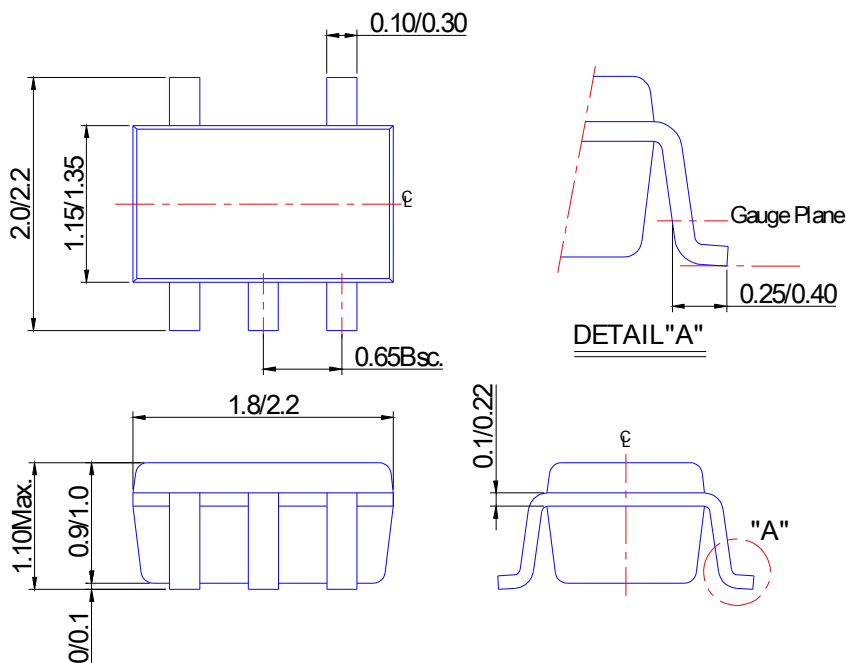
Part Number	Package	Identification Code
74LVC1G14FW4-7	DFN1010	UP
74LVC1G14FZ4-7	DFN1410	UP

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

**(1) Package Type: SOT25**



**(2) Package Type: SOT353**





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