

### 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:

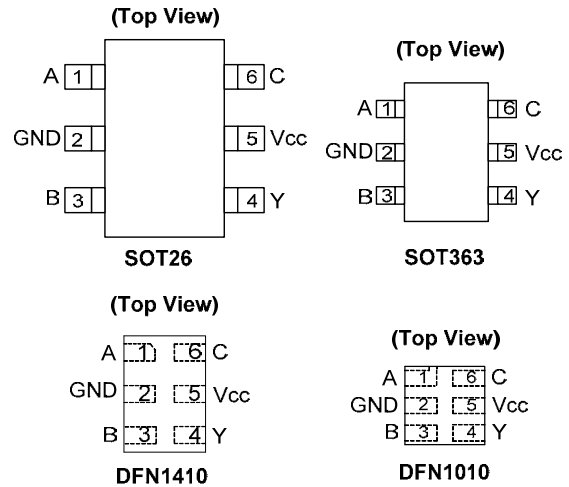
$$Y = A \cdot B \cdot C \quad \text{or} \quad Y = \overline{\overline{A + B + C}}$$

### 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 II
- Range of Package Options
- SOT26, SOT363, DFN140, 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



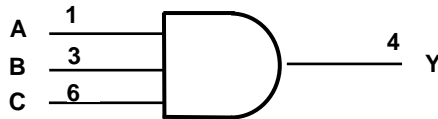
### Applications

- 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	Description
A	Data Input
GND	Ground
B	Data Input
Y	Data Output
V <sub>CC</sub>	Supply Voltage
C	Data Input

**Logic Diagram**



**Function Table**

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

**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 <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
	Continuous current through V <sub>DD</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	
		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	
		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<sub>CC</sub> 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
$V_{OH}$	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	
		$I_{OL} = 32\text{mA}$	4.5V			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
$V_{OH}$	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			0.70	
		$I_{OL} = 8\text{mA}$	2.3V			0.45	
		$I_{OL} = 16\text{mA}$	3V			0.60	
		$I_{OL} = 24\text{mA}$				0.80	
		$I_{OL} = 32\text{mA}$	4.5V			0.80	
$I_I$	Input Current	$V_I = 5.5\text{V}$ or GND	0 to 5.5V			$\pm 20$	$\mu\text{A}$
$I_{OFF}$	Power Down Leakage Current	$V_I$ or $V_O = 5.5\text{V}$	0			$\pm 20$	$\mu\text{A}$
$I_{CC}$	Supply Current	$V_I = 5.5\text{V}$ of GND $I_O = 0$	1.65V to 5.5V			40	$\mu\text{A}$
$\Delta I_{CC}$	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  $V_{CC} = 3.3\text{V}$ ,  $T_A = 25^{\circ}\text{C}$ )

Symbol	Parameter	Test Conditions	$V_{CC}$	Min	Typ.	Max	Unit
$C_I$	Input Capacitance	$V_I = V_{CC}$ – or GND	3.3		3.5		pF
$\theta_{JA}$	Thermal Resistance Junction-to-Ambient	SOT26	(Note 4)		204		$^{\circ}\text{C/W}$
		SOT363		371			
		DFN1410		430			
		DFN1010		510			
$\theta_{JC}$	Thermal Resistance Junction-to-Case	SOT26	(Note 4)		52		$^{\circ}\text{C/W}$
		SOT363		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

$T_A = -40\text{ }^\circ\text{C to } 85\text{ }^\circ\text{C}$ ,  $C_L = 15\text{ pF}$  (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8\text{V} \pm 0.15\text{V}$		$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$		$V_{CC} = 5\text{V} \pm 0.5\text{V}$		Unit
			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

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

Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8\text{V} \pm 0.15\text{V}$		$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$		$V_{CC} = 5\text{V} \pm 0.5\text{V}$		Unit
			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

$T_A = -40\text{ }^\circ\text{C to } 125\text{ }^\circ\text{C}$ ,  $C_L = 15\text{ pF}$  (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8\text{V} \pm 0.15\text{V}$		$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$		$V_{CC} = 5\text{V} \pm 0.5\text{V}$		Unit
			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

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

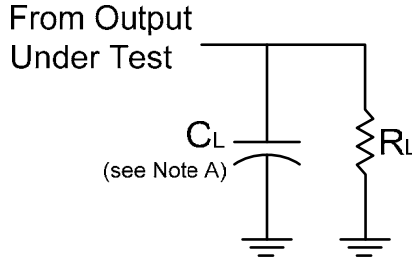
Parameter	From (Input)	TO (OUTPUT)	$V_{CC} = 1.8\text{V} \pm 0.15\text{V}$		$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$		$V_{CC} = 5\text{V} \pm 0.5\text{V}$		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
$t_{pd}$	Any	Y	1.0	20.7	0.7	7.5	0.7	5.9	0.7	4.2	ns

### Operating Characteristics

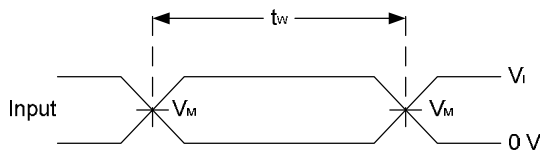
$T_A = 25\text{ }^\circ\text{C}$

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	$f = 10\text{ MHz}$	17	18	19	22	pF

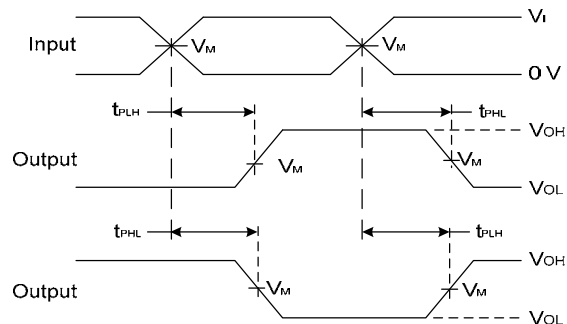
**Parameter Measurement Information**



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



**Voltage Waveform  
Pulse Duration**

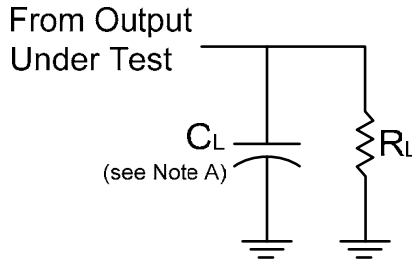


**Voltage Waveform  
Propagation Delay Times  
Inverting and Non Inverting Outputs**

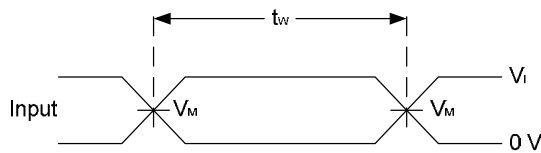
- Notes:
- A. Includes test lead and test apparatus capacitance.
  - B. All pulses are supplied at pulse repetition rate  $\leq 10$  MHz
  - C. Inputs are measured separately one transition per measurement
  - D.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{PD}$

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

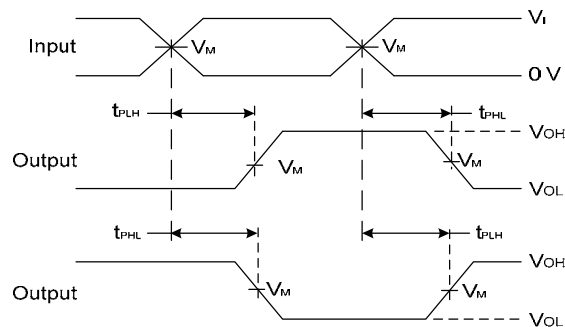
**Parameter Measurement Information (Continued)**



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±0.15V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	1KΩ
2.5V±0.2V	V <sub>CC</sub>	≤2ns	V <sub>CC</sub> /2	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V <sub>CC</sub>	≤2.5ns	V <sub>CC</sub> /2	50pF	500Ω



**Voltage Waveform  
Pulse Duration**



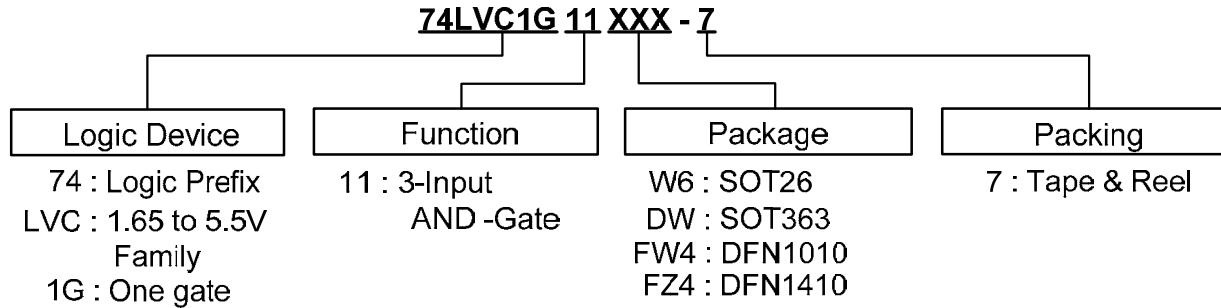
**Voltage Waveform  
Propagation Delay Times  
Inverting and Non Inverting Outputs**

- Notes:
- A. Includes test lead and test apparatus capacitance.
  - B. All pulses are supplied at pulse repetition rate ≤ 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>

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



### Ordering Information



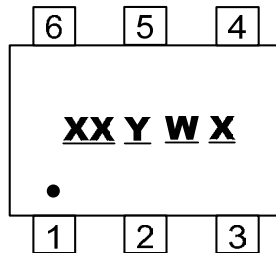
Device	Package Code	Packaging (Note 7)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVC1G11W6-7	W6	SOT26	3000/Tape & Reel	-7
74LVC1G11DW-7	DW	SOT363	3000/Tape & Reel	-7
74LVC1G11FW4-7	FW4	DFN1010	5000/Tape & Reel	-7
74LVC1G11FZ4-7	FW4	DFN1410	5000/Tape & Reel	-7

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) SOT26, SOT363

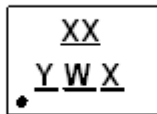


XX : Identification code  
Y : Year 0~9  
W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents  
 52 and 53 week  
X : A~Z : Internal Code

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

(2) DFN1010,DFN1410

(Top View)

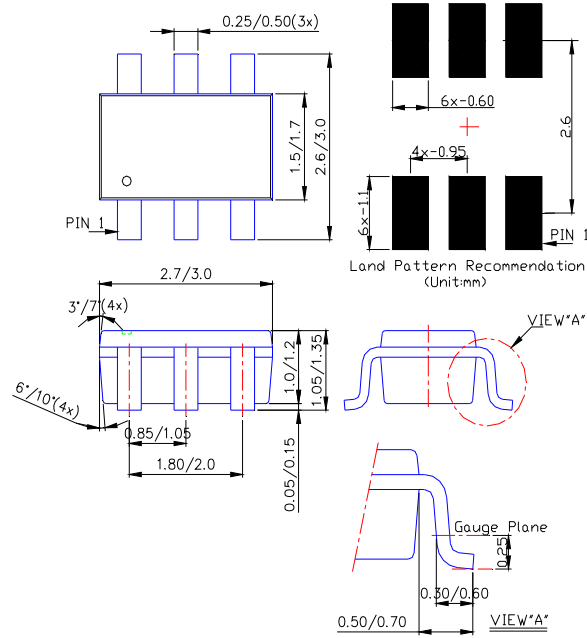


XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents  
 52 and 53 week  
X : A~Z : Internal code

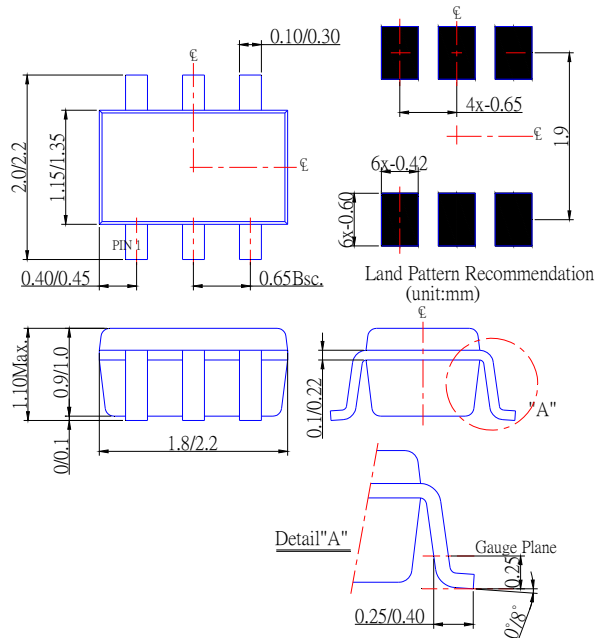
Part Number	Package	Identification Code
74LVC1G11FW4	DFN1010	TV
74LVC1G11FZ4	DFN1410	TV

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

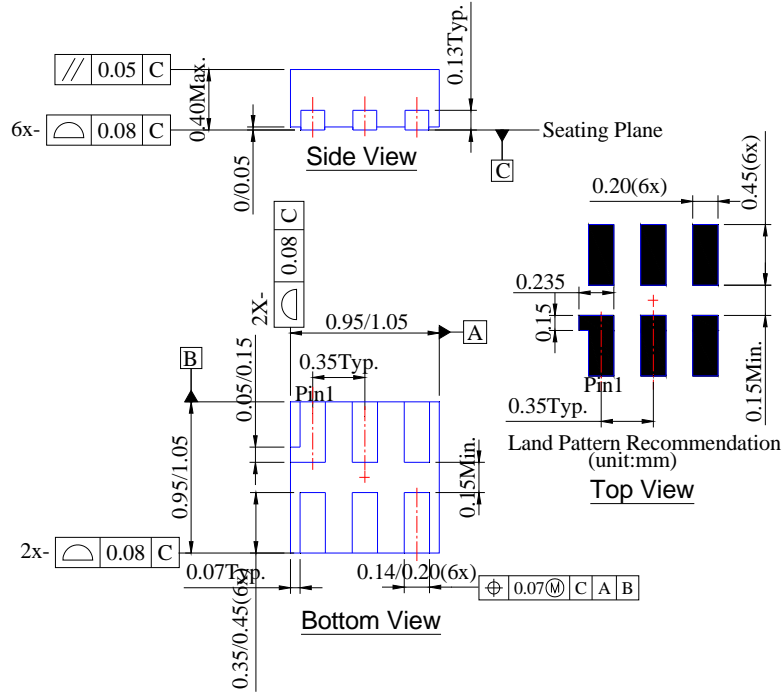
**(1) Package Type: SOT26**



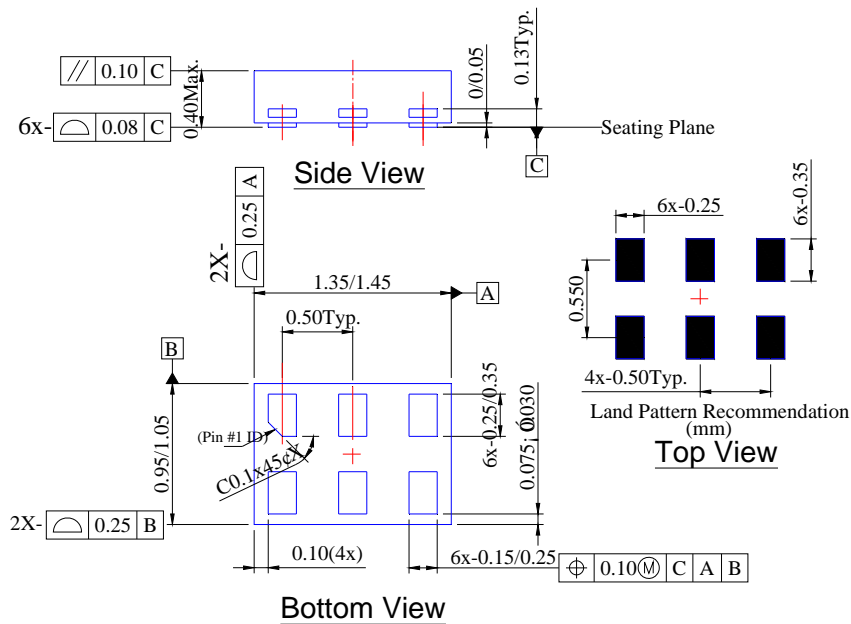
**(2) Package Type: SOT363**



**(3) Package Type: DFN1010**



**(4) Package Type DFN1410**



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