Pin Descriptions

Pin Name	Description
NC	No connection
A	Data Input
GND	Ground
Y	Data Output
Vcc	Supply Voltage

Logic Diagram
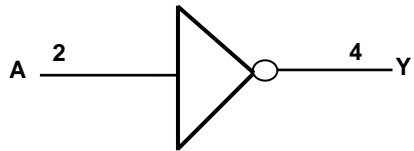
Function Table

Inputs	Output
A	Y
H	L
L	H

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Absolute Maximum Ratings (Note 3)

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	±50	mA
	Continuous current through Vdd or GND	±100	mA
T_J	Operating Junction Temperature	-40 to 150	°C
T_{STG}	Storage Temperature	-65 to 150	°C

Note: 3. 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.

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Recommended Operating Conditions (Note 4)

Symbol	Parameter		Min	Max	Unit
V_{CC}	Operating Voltage	Operating	1.4	5.5	V
		Data retention only	1.2		V
V_{IH}	High-level Input Voltage	V_{CC} = 1.4 V to 1.95 V	0.65 X V_{CC}		V
		V_{CC} = 2.3 V to 2.7 V	1.7		
		V_{CC} = 3 V to 3.6 V	2		
		V_{CC} = 4.5 V to 5.5 V	0.7 X V_{CC}		
V_{IL}	Low-level input voltage	V_{CC} = 1.4 V to 1.95 V		0.35 X V_{CC}	V
		V_{CC} = 2.3 V to 2.7 V		0.7	
		V_{CC} = 3 V to 3.6 V		0.8	
		V_{CC} = 4.5 V to 5.5 V		0.3 X V_{CC}	
V_I	Input Voltage		0	5.5	V
V_O	Output Voltage		0	V_{CC}	V
I_{OH}	High-level output current	Vcc=1.4 V		-3	mA
		V_{CC} = 1.65 V		-4	
		V_{CC} = 2.3 V		-8	
		V_{CC} = 3 V		-16	
				-24	
		V_{CC} = 4.5 V		-32	
I_{OL}	Low-level output current	Vcc=1.4 V		3	mA
		V_{CC} = 1.65 V		4	
		V_{CC} = 2.3 V		8	
		V_{CC} = 3 V		16	
				24	
		V_{CC} = 4.5 V		32	
Δt/ΔV	Input transition rise or fall rate	V_{CC} = 1.4 to 3V		20	ns/V
		V_{CC} = 3.3 V ± 0.3 V		10	
		V_{CC} = 5 V ± 0.5 V		5	
T_A	Operating free-air temperature		-40	85	ºC

Note: 4. Unused inputs should be held at Vcc or Ground.

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Electrical Characteristics (All typical values are at Vcc = 3.3V, T$_A$ = 25°C)

Over recommended free-air temperature range (unless otherwise noted)

Symbol	Parameter	Test Conditions	Vcc	Min	Typ.	Max	Unit
V$_{OH}$	High Level Output Voltage	I$_{OH}$ = -100µA	1.4 V to 5.5V	V$_{CC}$ – 0.1			V
		I$_{OH}$ = -3mA	1.4 V	1.05			
		I$_{OH}$ = -4mA	1.65 V	1.2			
		I$_{OH}$ = -8mA	2.3V	1.9			
		I$_{OH}$ = -16mA	3 V	2.4			
		I$_{OH}$ = -24mA		2.3			
		I$_{OH}$ = -32mA	4.5 V	3.8			
V$_{OL}$	High-level Input Voltage	I$_{OL}$ = 100µA	1.4 V to 5.5V			0.1	V
		I$_{OL}$ = 3mA	1.4V			.4	
		I$_{OL}$ = 4mA	1.65 V			0.45	
		I$_{OL}$ = 8mA	2.3V			0.3	
		I$_{OL}$ = 16mA	3 V			0.4	
		I$_{OL}$ = 24mA				0.55	
		I$_{OL}$ = 32mA	4.5			0.55	
I$_I$	Input Current	V$_I$ = 5.5 V or GND	0 to 5.5 V			± 5	µA
I$_{OFF}$	Power Down Leakage Current	V$_I$ or V$_O$ = 5.5V	0			± 10	µA
I$_{CC}$	Supply Current	V$_I$ = 5.5V of GND I$_O$=0	1.4 V to 5.5V			10	µA
C$_i$	Input Capacitance	V$_i$ = V$_{CC}$ – or GND	3.3		3.5		pF
θ$_{JA}$	Thermal Resistance Junction-to-Ambient	SOT25	(Note 5)		204		°C/W
		SOT353	(Note 5)		371		
		DFN1410	(Note 5)		430		
θ$_{JC}$	Thermal Resistance Junction-to-Case	SOT25	(Note 5)		52		°C/W
		SOT353	(Note 5)		143		
		DFN1410	(Note 5)		190		

Note: 5. Test condition for SOT25, SOT353, and DFN1410: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

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Switching Characteristics

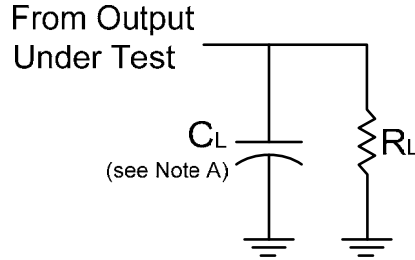Over recommended free-air temperature range, CL = 15pF (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)	Vcc = 1.5 V ± 0.1V		Vcc = 1.8 V ± 0.15V		Vcc = 2.5 V ± 0.2V		Vcc = 3.3 V ± 0.3V		Vcc = 5 V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
t_{pd}	A	Y	2	6.4	1.4	4.4	0.8	3.3	0.5	2.7	0.5	2.7	ns

Over recommended free-air temperature range, CL = 30 or 50pF as noted (see Figure 2)

Parameter	From (Input)	TO (OUTPUT)	Vcc = 1.5 V ± 0.1V		Vcc = 1.8 V ± 0.15V		Vcc = 2.5 V ± 0.2V		Vcc = 3.3 V ± 0.3V		Vcc = 5 V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
t_{pd}	A	Y	3	7.5	2.1	5.2	1.1	4.1	0.8	3.4	0.9	3.3	ns

Operating Characteristics

T_A = 25 ºC

Parameter		Test Conditions	Vcc = 1.5 V	Vcc = 1.8 V	Vcc = 2.5 V	Vcc = 3.3 V	Vcc = 5 V	Unit
			TYP	TYP	TYP	TYP	TYP	
C_{pd}	Power dissipation capacitance	f = 10 MHz	16	16	18	18	20	pF

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Parameter Measurement Information

From Output
Under Test

C_L
(see Note A)

R_L

Vcc	Inputs		V_M	C_L	R_L
	V_I	t_r/t_f			
1.5V±0.1V	V_{CC}	≤2ns	$V_{CC}/2$	15pF	1MΩ
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
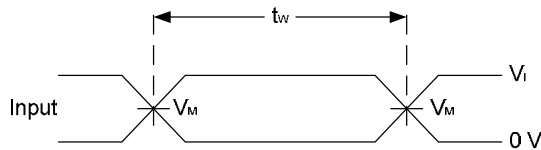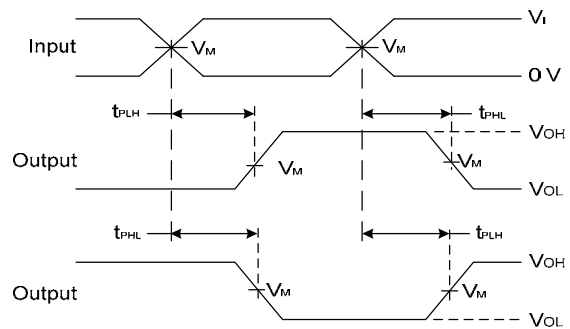
**Voltage Waveform
Pulse Duration**

**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_{PLH} and t_{PHL} are the same as t_{PD}.

Figure 1. Load Circuit and Voltage Waveforms

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Parameter Measurement Information (Continued)
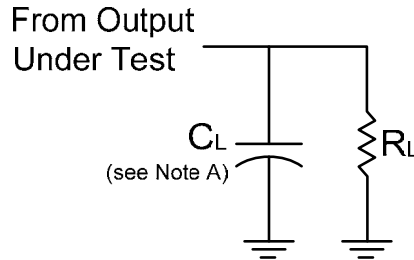
Vcc	Inputs		V_M	C_L	R_L
	V_I	t_r/t_f			
1.5V±0.1V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	1KΩ
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	1KΩ
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	30pF	500Ω
3.3V±0.3V	3V	≤2.5ns	1.5V	50pF	500Ω
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	50pF	500Ω
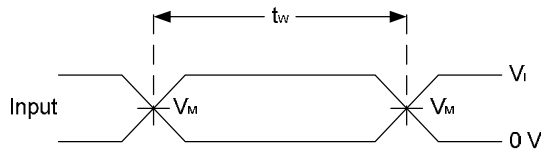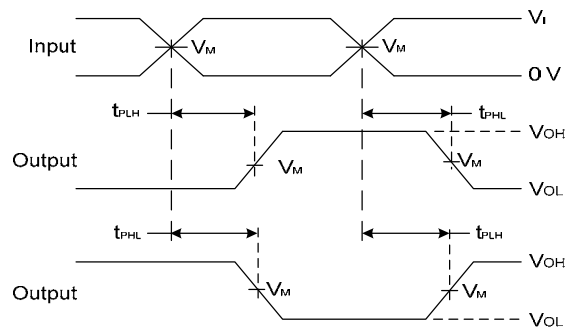
**Voltage Waveform
Pulse Duration**

**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 ≤ 10 MHz.
   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

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Ordering Information

74LVCE1G 04 XXX - 7

Logic Device	Function	Package	Packing

74 : Logic Prefix
LVCE : 1.4 to 5.5V
Family
1G : One gate

04 : 1-Input
Inverter-Gate

W5 : SOT25
SE : SOT353
FZ4 : DFN1410
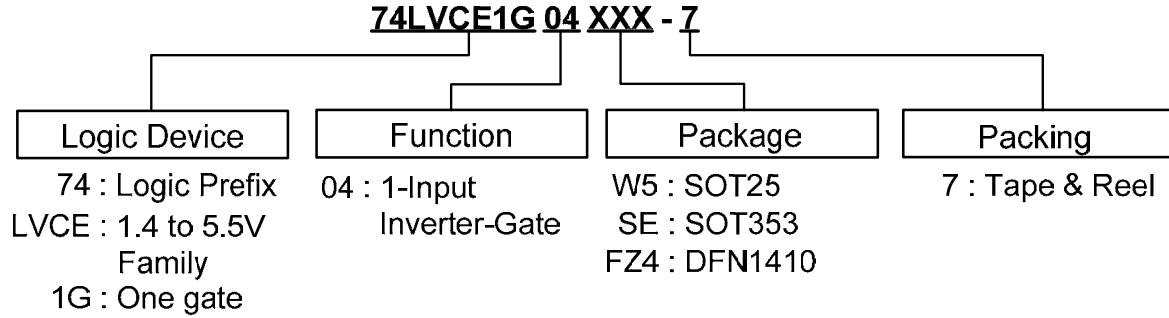
7 : Tape & Reel

Device	Package Code	Packaging (Note 5)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVCE1G04W5-7	W6	SOT25	3000/Tape & Reel	-7
74LVCE1G04SE-7	SE	SOT353	3000/Tape & Reel	-7
74LVCE1G04FZ4-7	FZ4	DFN1410	5000/Tape & Reel	-7

Note: 6. 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.

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Marking Information

(1) SOT25 and SOT353

(Top View)
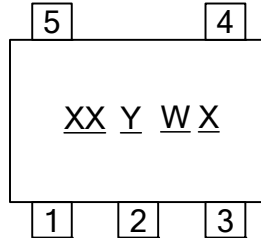
5		4

XX Y W X

1	2	3

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
74LVCE1G04W5	SOT25	PU
74LVCE1G04SE	SOT353	PV

(2) DFN1410H4-6

(Top View)
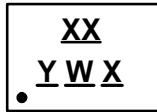
XX
Y W X

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
74LVCE1G04FZ4	DFN1410	PU

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Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SOT25

Land Pattern Recommendation (Unit:mm)

VIEW"A"

Gauge Plane

VIEW"A"

(2) Package Type: SOT353

Land Pattern Recommendation (unit:mm) Top View

Detail"A"

Gauge Plane

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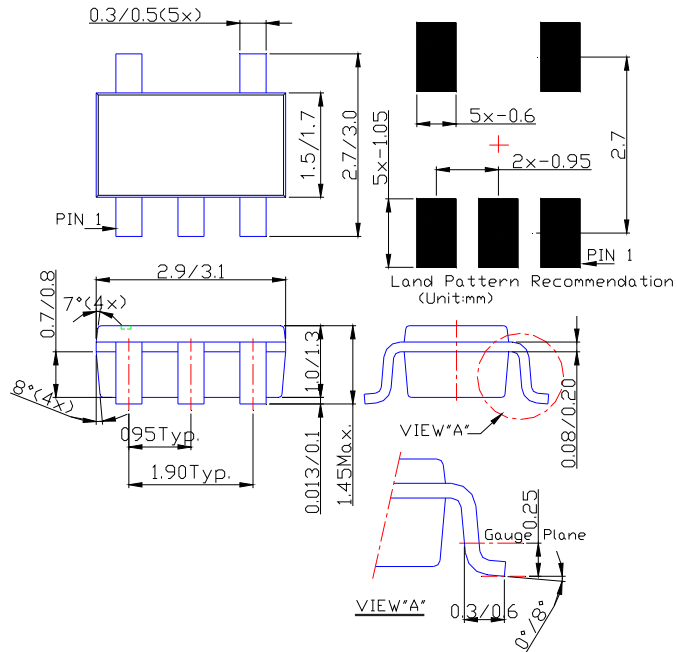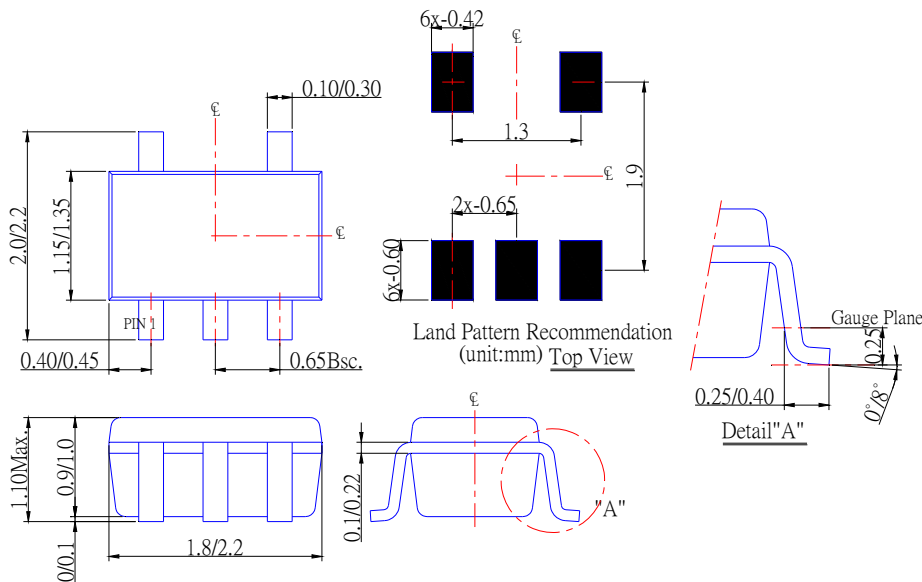
Package Outline Dimensions (All Dimensions in mm)

(3) Package Type: DFN1410

Side View

Bottom View

Top View

Land Pattern Recommendation
(mm)

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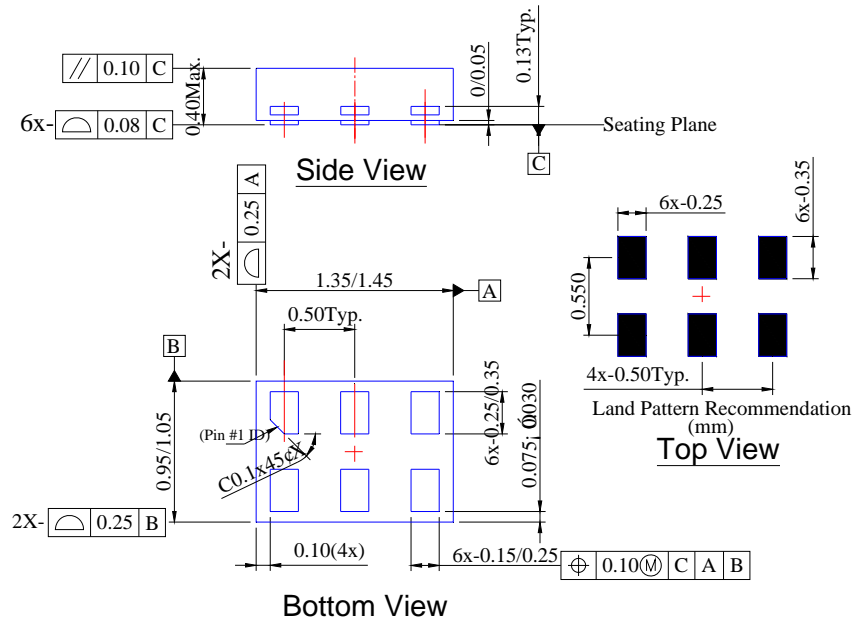
Taping Orientation (Note 7)

For DFN1410

Top cover tape thickness 0.10mm Max.

Embossed Carrier

Cavity

Direction of feed
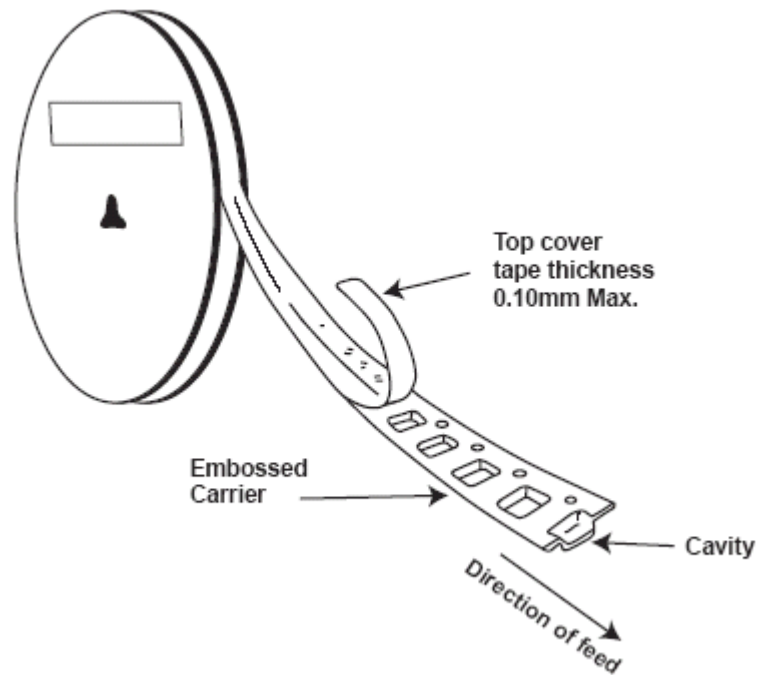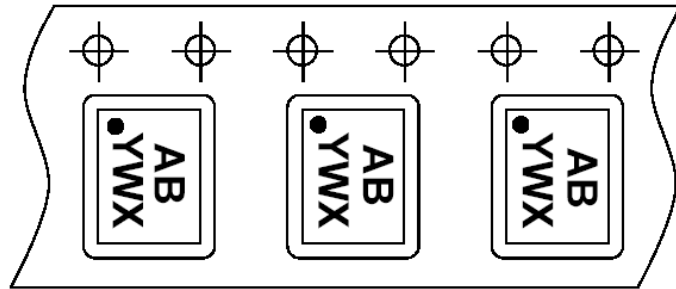
Note: 7. The taping orientation of the other package type can be found on our website at http://www.diodes.com/datasheets/ap02007.pdf

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