

Description

The 74LVCE1G07 is a single inverter gate with an open drain output. The device is designed for operation with a power supply range of 4V to 5.5V. The input is 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 open-drain output can be connected to other open drain outputs to implement active-low wired-OR or active-high wired-AND functions. The maximum sink current is 32 mA.

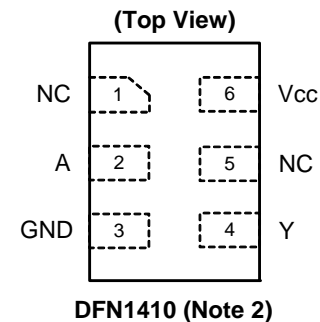
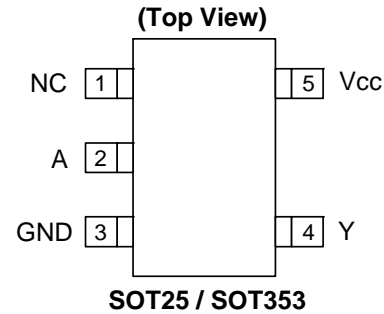
Features

- Wide Supply Voltage Range from 1.65 to 5.5V
- ± 24 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)
- Latch-Up Exceeds 100mA per JESD 78, Class II
- Range of Package Options
- Direct Interface with TTL Levels
- SOT25, SOT353, and DFN1410: Assembled with "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.

2. Pin 2 and pin 5 of the DFN1410 package are internally connected.

Pin Assignments



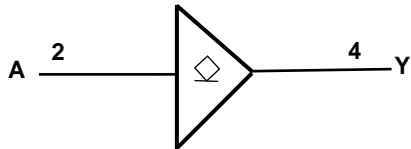
Applications

- 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
NC	No connection
A	Data Input
GND	Ground
Y	Data Output Open Drain
Vcc	Supply Voltage

Logic Diagram



Function Table

Inputs	Output
A	Y
H	Z
L	L

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	$^{\circ}C$
T_{STG}	Storage Temperature	-65 to 150	$^{\circ}C$

Notes: 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.

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 _{OL}	Low-level output current	V _{CC} =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 V to 3.0 V		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	°C

Notes: 4. Unused inputs should be held at V_{CC} or Ground.

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

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

Symbol	Parameter	Test Conditions	Vcc	Min	Typ	Max	Unit
V_{OL}	Low Level Output Voltage	$I_{OL} = 100 \mu A$	1.4 V to 5.5 V			0.1	V
		$I_{OL} = 3 \text{ mA}$	1.4 V			0.4	
		$I_{OL} = 4 \text{ mA}$	1.65 V			0.45	
		$I_{OL} = 8 \text{ mA}$	2.3 V			0.3	
		$I_{OL} = 16 \text{ mA}$	3 V			0.4	
		$I_{OL} = 24 \text{ mA}$				0.55	
		$I_{OL} = 32 \text{ mA}$	4.5 V			0.55	
I_I	Input Current	$V_I = 5.5 \text{ V}$ or GND	0 to 5.5 V			± 5	μA
I_{OZ}	Z State Leakage Current	$V_O = 5.5V$	3.6 V			± 10	μA
I_{OFF}	Power Down Leakage Current	V_I or $V_O = 5.5V$	0 V			± 10	μA
I_{CC}	Supply Current	$V_I = 5.5 \text{ V}$ or GND $I_O = 0$	1.4 V to 5.5 V			10	μA
ΔI_{CC}	Additional Supply Current	Input at $V_{CC} - 0.6 \text{ V}$	3 V to 5.5 V			500	μA
C_{ii}	Input Capacitance	$V_I = V_{CC}$ or GND	3.3V		4		pF
C_O	Output Capacitance	$V_O = V_{CC}$ or GND	3.3V		5		pF
θ_{JA}	Thermal Resistance Junction-to-Case	SOT25	(Note 5)		204		$^\circ C/W$
		SOT353	(Note 5)		371		
		DFN1410	(Note 5)		430		
θ_{JC}	Thermal Resistance Junction-to-Case	SOT25	(Note 5)		52		$^\circ C/W$
		SOT353	(Note 5)		143		
		DFN1410	(Note 5)		190		

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

Switching Characteristics

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

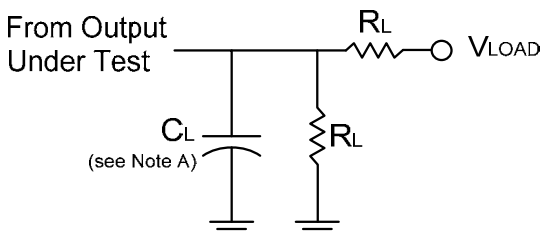
Parameter	From (Input)	TO (OUTPUT)	Vcc = 1.5 V ± 0.1V		Vcc = 1.8 V ± 0.15V		Vcc = 2.5 V ± 0.2V		Vcc = 3.3 V ± 0.3V		Vcc = 5 V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	A	Y	1.5	9.9	1	5.8	0.8	4.4	0.8	3.4	0.8	3.1	ns

Operating Characteristics

T_A = 25 °C

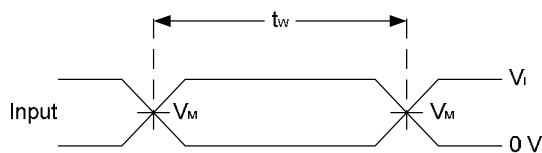
Parameter		Test Conditions	Vcc = 1.5 V	Vcc = 1.8 V	Vcc = 2.5 V	Vcc = 3.3 V	Vcc = 5 V	Unit
			TYP	TYP	TYP	TYP	TYP	
C _{pd}	Power dissipation capacitance	f = 10 MHz	3	3	3	4	6	pF

Parameter Measurement Information

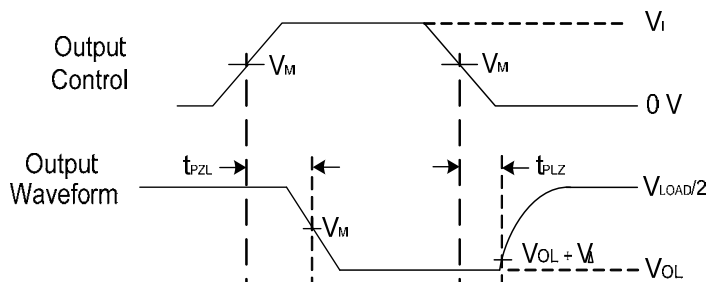


TEST	Condition
t_{PLZ} (see Notes D and E)	Vload
t_{PZL} (see Notes D and F)	Vload

V _{CC}	Inputs		V _M	V _{LOAD}	C _L	R _L	V _Δ
	V _I	t _r /t _f					
1.8V±0.15V	V _{CC}	≤2ns	V _{CC} /2	2 X V _{CC}	30pF	1KΩ	0.15V
2.5V±0.2V	V _{CC}	≤2ns	V _{CC} /2	2 X V _{CC}	30pF	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.5V	V _{CC}	≤2.5ns	V _{CC} /2	2 X V _{CC}	50pF	500Ω	0.3V



Voltage Waveform Pulse Duration

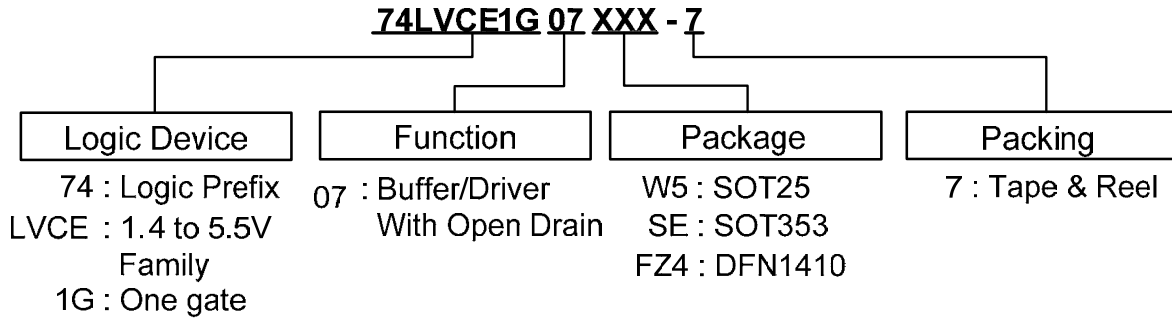


Voltage Waveform Propagation Delay Times

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. The inputs are measured one at a time with one transition per measurement.
 - D. For the open drain device t_{PLZ} and t_{PZL} are the same as t_{PD}
 - E. t_{PZL} is measured at V_M.
 - F. t_{PLZ} is measured at V_{OL} + V_Δ

Ordering Information



Device	Package Code	Packaging (Note 6)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVCE1G07W5-7	W5	SOT25	3000/Tape & Reel	-7
74LVCE1G07SE-7	SE	SOT353	3000/Tape & Reel	-7
74LVCE1G07FZ4-7	FZ4	DFN1410	5000/Tape & Reel	-7



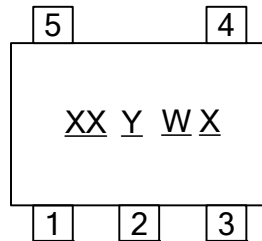
Notes: 6. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

NEW PRODUCT

Marking Information

(1) SOT25 and SOT353

(Top View)

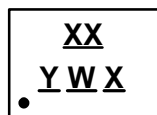


XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
X : A~Z : Internal code

Part Number	Package	Identification Code
74LVCE1G07W5	SOT25	PN
74LVCE1G07SE	SOT353	PN

(3) DFN1410

(Top View)

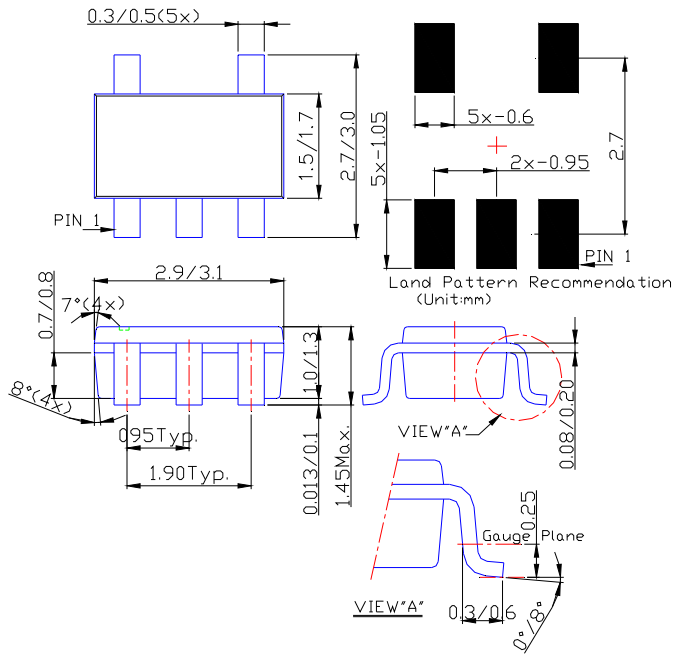


XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
 a~z : 27~52 week; z represents
 52 and 53 week
X : A~Z : Internal code

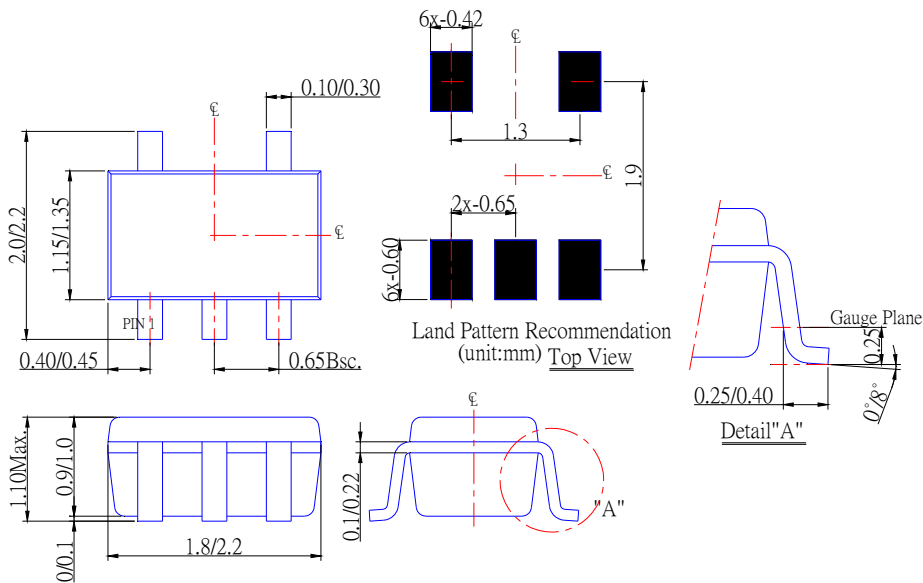
Part Number	Package	Identification Code
74LVCE1G07FZ4	DFN1410	PN

Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SOT25

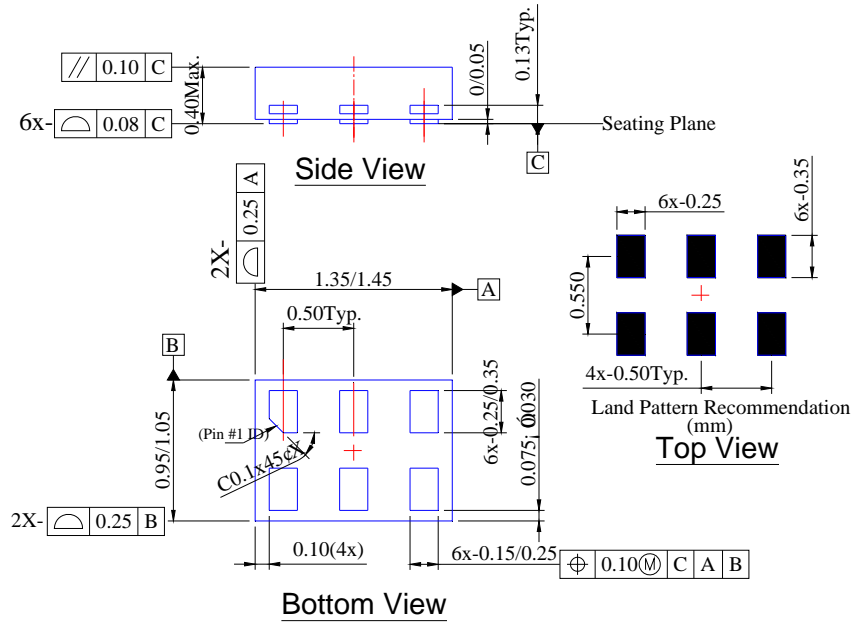


(2) Package Type: SOT353



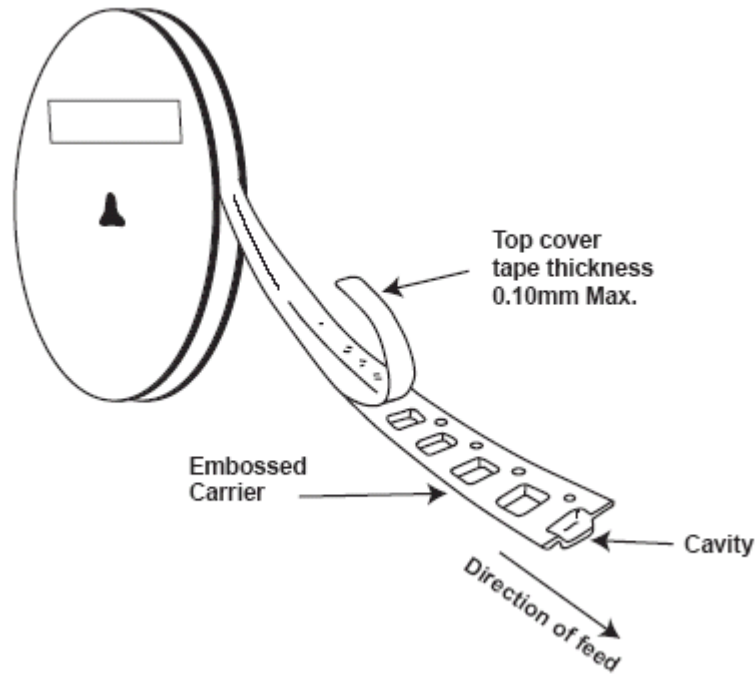
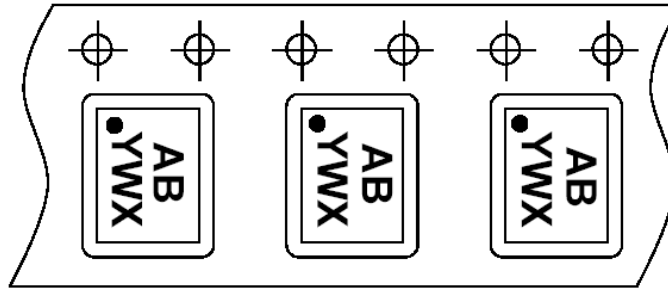
Package Outline Dimensions (Continued)

(3) Package Type: DFN1410



Taping Orientation (Note 7)

For DFN1410



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

NEW PRODUCT

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