74LVC2G07

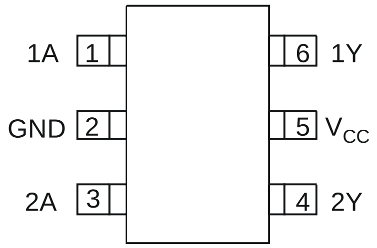
DUAL BUFFERS WITH OPEN DRAIN OUTPUTS

Description

The 74LVC2G07 is a dual buffer gate with open drain outputs. The device is designed for operation with a power supply range of 1.65V 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.

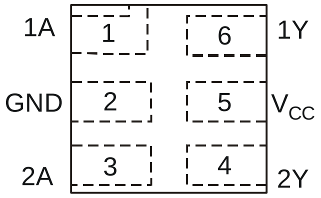
Pin Assignments

(Top View)



SOT26/SOT363

(Top View)



DFN1010

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)

Applications

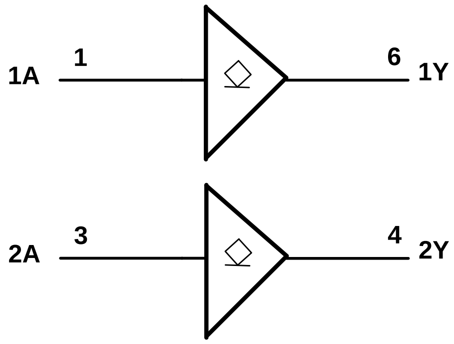
- Voltage Level Shifting
- General Purpose Logic
- Power Down Signal Isolation
- Wide array of products such as:
  - PCs, networking, notebooks, netbooks, PDAs
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box
  - Cell Phones, Personal Navigation / GPS
  - MP3 players ,Cameras,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

Pin Descriptions

Pin Name	Pin NO.	Description
1A	1	Data Input
GND	2	Ground
2A	3	Data Input
2Y	4	Data Output Open Drain
V_{CC}	5	Supply Voltage
1Y	6	Data Output Open Drain

Logic Diagram



Function Table

Inputs	Output
A	**Y**
H	Z
L	L

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 V_O<0	-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

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_{IH}	High-level Input Voltage	V_{CC} = 1.65V to 1.95V	0.65 X V_{CC}		V
		V_{CC} = 2.3V to 2.7V	1.7		
		V_{CC} = 3V to 3.6V	2		
		V_{CC} = 4.5V to 5.5V	0.7 X V_{CC}		
V_{IL}	Low-level input voltage	V_{CC} = 1.65V to 1.95V		0.35 X V_{CC}	V
		V_{CC} = 2.3V to 2.7V		0.7	
		V_{CC} = 3V to 3.6V		0.8	
		V_{CC} = 4.5V to 5.5V		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} = 1.65V		4	mA
		V_{CC} = 2.3V		8	
		V_{CC} = 3V		16	
				24	
		V_{CC} = 4.5V		32	
Δt/ΔV	Input transition rise or fall rate	V_{CC} = 1.8V ± 0.15V, 2.5V ± 0.2V		20	ns/V
		V_{CC} = 3.3V ± 0.3V		10	
		V_{CC} = 5V ± 0.5V		10	
T_A	Operating free-air temperature		-40	125	ºC

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

Electrical Characteristics

Symbol	Parameter	Test Conditions	V_{CC}	40ºC to 85ºC		-40ºC to 125ºC		
				Min	Max	Min	Max	Unit
V_{OL}	Low Level Output Voltage	I_{OL} = 100μA	1.65V to 5.5V		0.1		0.1	V
		I_{OL} = 4mA	1.65V		0.45		0.70	
		I_{OL} = 8mA	2.3V		0.3		0.45	
		I_{OL} = 16mA	3V		0.4		0.60	
		I_{OL} = 24mA			0.55		0.80	
		I_{OL} = 32mA	4.5V		0.55		0.80	
I_I	Input Current	V_I = 5.5V or GND	0 to 5.5V		± 5		± 20	μA
I_{OZ}	Z State Leakage Current	V_O =0 to 5.5V	3.6V		± 10		± 10	μA
I_{OFF}	Power Down Leakage Current	V_I or V_O = 5.5V	0		± 10		± 20	μA
I_{CC}	Supply Current	V_I = 5.5V of GND I_O=0	1.65V to 5.5V		10		40	μA
ΔI_{CC}	Additional Supply Current	Input at V_{CC} –0.6V	3V to 5.5V		500		5000	μA

Package Characteristics (All typical values are at V_{CC} = 3.3V, T_A = 25°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
θ_{JA}	Thermal Resistance Junction-to-Case	SOT26	(Note 4)		204		^{o}C/W
		SOT363			371		
		DFN1010			430		
θ_{JC}	Thermal Resistance Junction-to-Case	SOT26	(Note 4)		52		^{o}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°C to 85°C , CL = 30 or 50pF (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)	V_{CC} = 1.8V ± 0.15V		V_{CC} = 2.5V ± 0.2V		V_{CC} = 3.3V ± 0.3V		V_{CC} = 5V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.5	6.7	0.5	4.3	0.5	3.7	0.5	2.9	ns

T_A=-40°C to 125°C , CL = 30 or 50pF (see Figure 1)

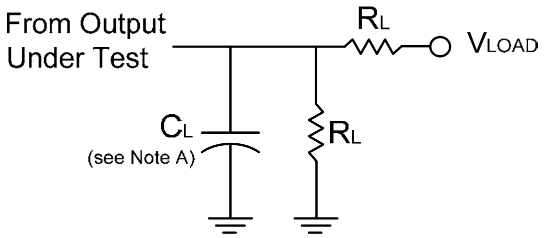
Parameter	From (Input)	TO (OUTPUT)	V_{CC} = 1.8V ± 0.15V		V_{CC} = 2.5V ± 0.2V		V_{CC} = 3.3V ± 0.3V		V_{CC} = 5V ± 0.5V		Unit
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{pd}	A	Y	0.5	8.4	0.5	5.5	0.5	4.7	0.5	3.7	ns

Operating Characteristics

T_A = 25 ºC

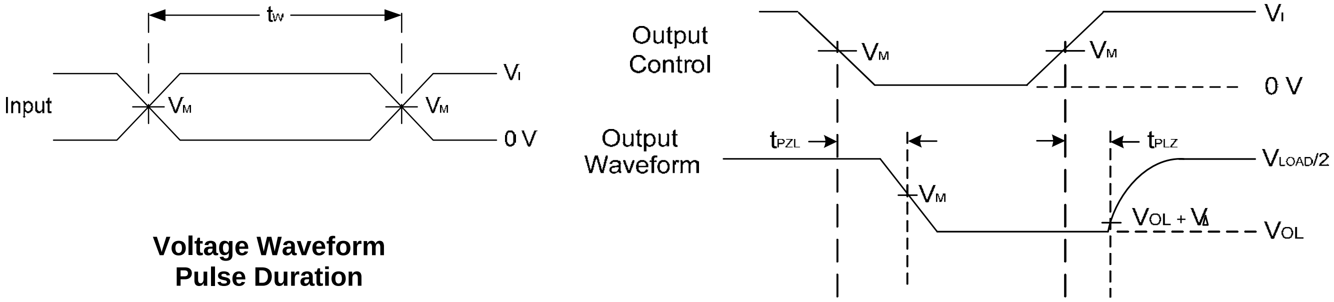
Parameter		Test Conditions	V_{CC} = 1.8V	V_{CC} = 2.5V	V_{CC} = 3.3V	V_{CC}= 5V	Unit
			Typ.	Typ.	Typ.	Typ.	
C_{pd}	Power dissipation capacitance	f = 10 MHz	3	3	4	6	pF

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}	30 pF	1 KΩ	0.15 V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	2 X V_{CC}	30 pF	500 Ω	0.15 V
3.3V±0.3V	3V	≤2.5ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	2 X V_{CC}	50 pF	500 Ω	0.3 V



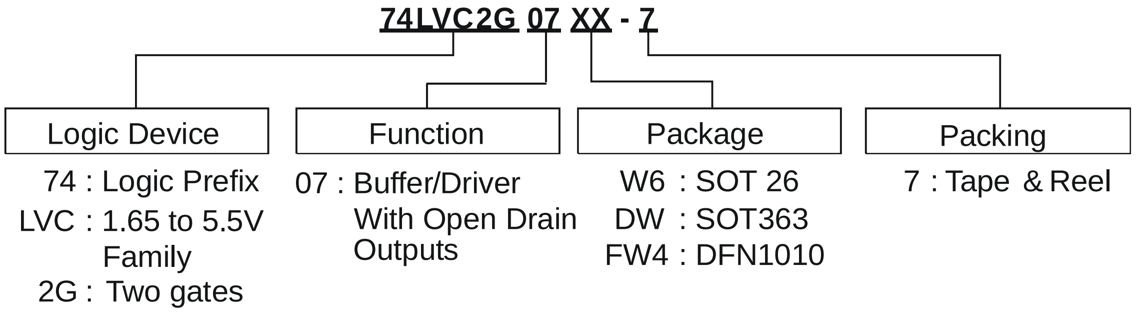
Voltage Waveform
Pulse Duration

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



Logic Device:
74 : Logic Prefix
LVC : 1.65 to 5.5V Family
2G : Two gates

Function:
07 : Buffer/Driver With Open Drain Outputs

Package:
W6 : SOT 26
DW : SOT363
FW4 : DFN1010

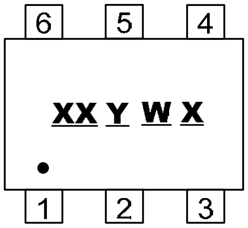
Packing:
7 : Tape & Reel

Device	Package Code	Packaging (Note 5)	7" Tape and Reel	
			Quantity	Part Number Suffix
74LVC2G07W6-7	W6	SOT26	3000/Tape & Reel	-7
74LVC2G07DW-7	DW	SOT363	3000/Tape & Reel	-7
74LVC2G07FW4-7	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

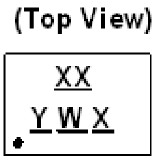
(1) SOT26, SOT363



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
74LVC2G07W6	SOT26	Z4
74LVC2G07DW	SOT363	Z4

(2) DFN1010

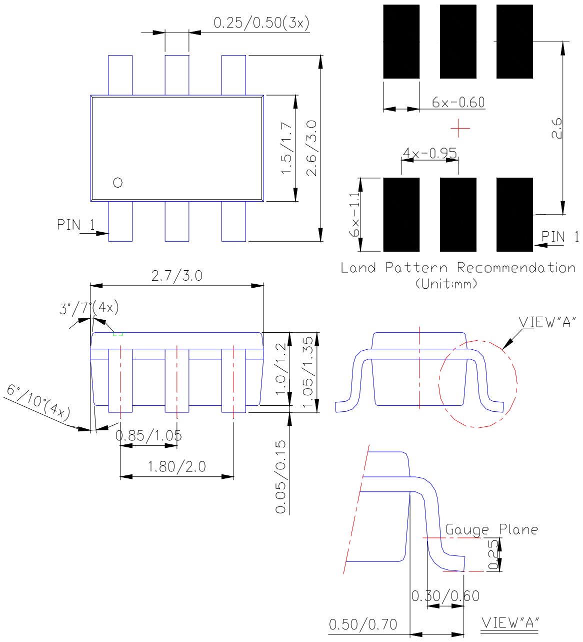


XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents 52 and 53 week
X : A~Z : Internal code

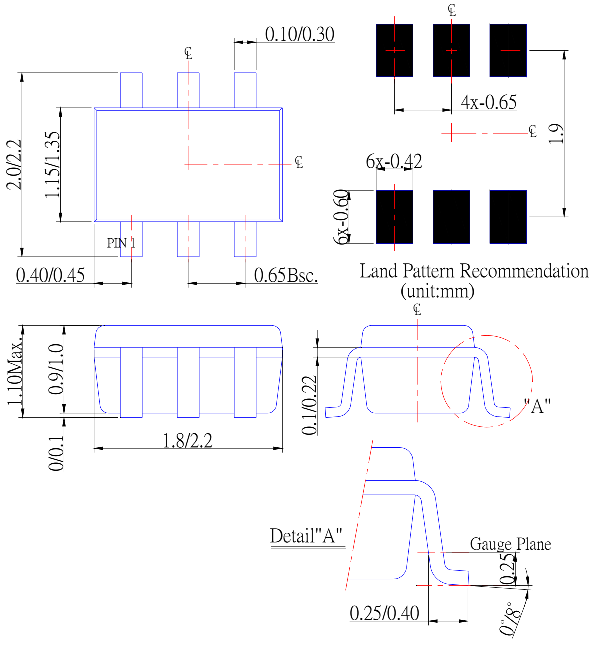
Part Number	Package	Identification Code
74LVC2G07FW4	DFN1010	Z4

Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SOT26

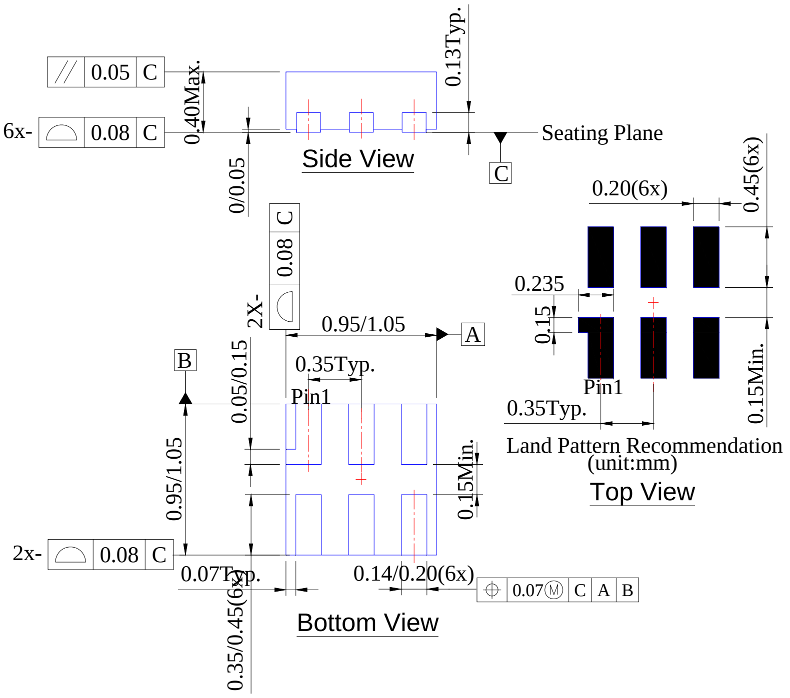


(2) Package Type: SOT363



Package Outline Dimensions (All Dimensions in mm)

(3) Package Type: DFN1010



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