



3.3V CMOS HEX BUFFER/DRIVER WITH OPEN-DRAIN OUTPUTS AND 5 VOLT TOLERANT I/O

IDT74LVC07A

FEATURES:

- 0.5 MICRON CMOS Technology
- ESD > 2000V per MIL-STD-883, Method 3015;
> 200V using machine model (C = 200pF, R = 0)
- V_{CC} = 3.3V ±0.3V, Normal Range
- V_{CC} = 2.3V to 3.6V, Extended Range
- CMOS power levels (0.4μW typ. static)
- Rail-to-Rail output swing for increased noise margin
- All inputs, outputs and I/O are 5 Volt tolerant
- Supports hot insertion
- Available in SOIC, SSOP and TSSOP packages

Drive Features for LVC07A:

- High Output Drivers: +24mA
- Reduced system switching noise

DESCRIPTION:

This hex buffer/driver is built using advanced dual metal CMOS technology. The outputs of the LVC07A device are open-drain and 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 24mA.

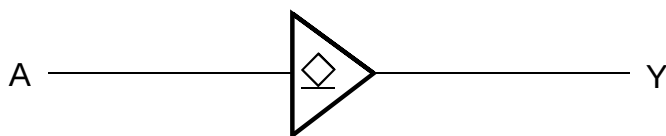
The LVC07A has been designed with a +24mA output driver. This driver is capable of driving a moderate to heavy load while maintaining speed performance.

Inputs can be driven from either 2.5V, 3.3V (LVTTTL), or 5V (CMOS) devices. This feature allows the use of this device as a translator in a mixed-system environment.

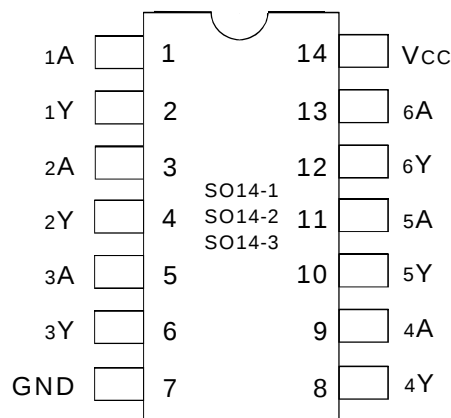
APPLICATIONS:

- 5V and 3.3V mixed voltage systems
- Data communication and telecommunication systems

FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATION



SOIC/ SSOP/ TSSOP
TOP VIEW

FUNCTION TABLE (each buffer/driver)⁽¹⁾

Inputs	Outputs (with pull-up)
xA	xY
H	H
L	L

NOTE:

1. H = HIGH Voltage Level
L = LOW Voltage Level

PIN DESCRIPTION

Pin Names	Description
xA	Data Inputs
xY	Data Outputs

ABSOLUTE MAXIMUM RATINGS ⁽¹⁾

Symbol	Description	Max.	Unit
V _{TERM}	Terminal Voltage with Respect to GND	– 0.5 to +6.5	V
T _{STG}	Storage Temperature	– 65 to +150	°C
I _{OUT}	DC Output Current	– 50 to +50	mA
I _{IK} I _{OK}	Continuous Clamp Current, V _I < 0 or V _O < 0	– 50	mA
I _{CC} I _{SS}	Continuous Current through each V _{CC} or GND	±100	mA

LVC QUAD Link

NOTE:

- Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

CAPACITANCE (T_A = +25°C, f = 1.0MHz)

Symbol	Parameter ⁽¹⁾	Conditions	Typ.	Max.	Unit
C _{IN}	Input Capacitance	V _{IN} = 0V	4.5	6	pF
C _{OUT}	Output Capacitance	V _{OUT} = 0V	5.5	8	pF
C _{I/O}	I/O Port Capacitance	V _{IN} = 0V	6.5	8	pF

LVC QUAD Link

NOTE:

- As applicable to the device type.

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Operating Condition: T_A = – 40°C to +85°C

Symbol	Parameter	Test Conditions		Min.	Typ. ⁽¹⁾	Max.	Unit
V _{IH}	Input HIGH Voltage Level	V _{CC} = 2.3V to 2.7V		1.7	—	—	V
		V _{CC} = 2.7V to 3.6V		2	—	—	
		V _{CC} = 4.5V to 5.5V		0.7 x V _{CC}	—	—	
V _{IL}	Input LOW Voltage Level	V _{CC} = 2.3V to 2.7V		—	—	0.7	V
		V _{CC} = 2.7V to 3.6V		—	—	0.8	
		V _{CC} = 4.5V to 5.5V		—	—	0.3 x V _{CC}	
I _{IH} I _{IL}	Input Leakage Current	V _{CC} = 3.6V	V _I = 0 to 5.5V	—	—	±5	μA
I _{OZH} I _{OZL}	High Impedance Output Current (3-State Output pins)	V _{CC} = 3.6V	V _O = 0 to 5.5V	—	—	±10	μA
I _{OFF}	Input/Output Power Off Leakage	V _{CC} = 0V, V _{IN} or V _O ≤ 5.5V		—	—	±50	μA
V _{IK}	Clamp Diode Voltage	V _{CC} = 2.3V, I _{IN} = – 18mA		—	– 0.7	– 1.2	V
V _H	Input Hysteresis	V _{CC} = 3.3V		—	100	—	mV
I _{CC} I _{CC} I _{CC}	Quiescent Power Supply Current	V _{CC} = 3.6V	V _{IN} = GND or V _{CC}	—	—	10	μA
ΔI _{CC}	Quiescent Power Supply Current Variation	One input at V _{CC} – 0.6V other inputs at V _{CC} or GND		—	—	500	μA

NOTE:

- Typical values are at V_{CC} = 3.3V, +25°C ambient.

OUTPUT DRIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Max.	Unit
VOL	Output LOW Voltage	VCC = 2.3V to 3.6V	IOL = 0.1mA	—	0.2	V
		VCC = 2.3V	IOL = 6mA	—	0.4	
			IOL = 12mA	—	0.7	
		VCC = 2.7V	IOL = 12mA	—	0.4	
		VCC = 3.0V	IOL = 24mA	—	0.55	

NOTE:

1. VIH and VIL must be within the min. or max. range shown in the DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE table for the appropriate VCC range. TA = -40°C to +85°C.

OPERATING CHARACTERISTICS, TA = 25°C

Symbol	Parameter	Test Conditions	VCC = 2.5V±0.2V	VCC = 3.3V±0.3V	VCC = 5V±0.5V	Unit
			Typical	Typical	Typical	
CPD	Power dissipation capacitance per buffer/driver	CL = 0pF, f = 10MHz	2.5	4	7	pF

SWITCHING CHARACTERISTICS ⁽¹⁾

Symbol	Parameter	VCC = 2.5V±0.2V		VCC = 2.7V		VCC = 3.3V±0.3V		VCC = 5V±0.5V		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
tPZL	xA to xY	1	2.8	1	3.3	1	2.9	1	2.6	ns
tPLZ		—	—	—	—	—	—	—	—	
tSK(0)	Output Skew ⁽²⁾	—	—	—	—	—	—	—	500	ps

NOTES:

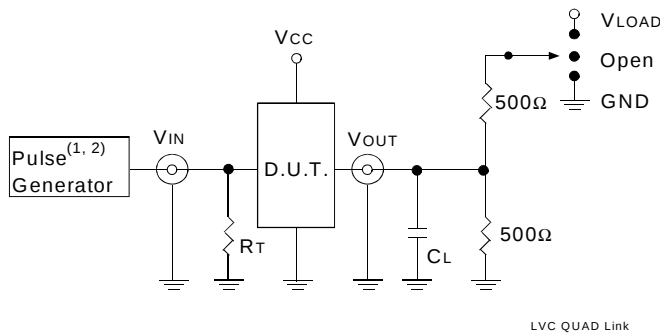
1. See test circuits and waveforms. TA = -40°C to +85°C.
2. Skew between any two outputs of the same package and switching in the same direction.

TEST CIRCUITS AND WAVEFORMS

TEST CONDITIONS

Symbol	V _{CC} (1) = 2.5V±0.2V	V _{CC} (2) = 3.3V±0.3V & 2.7V	V _{CC} (2) = 5V±0.5V	Unit
V _{LOAD}	2 x V _{CC}	6	2 x V _{CC}	V
V _{IH}	V _{CC}	2.7	3.0	V
V _T	V _{CC} / 2	1.5	1.5	V
V _{LZ}	150	300	300	mV
V _{HZ}	150	300	300	mV
C _L	30	50	50	pF

TEST CIRCUITS FOR ALL OUTPUTS



DEFINITIONS:

C_L = Load capacitance: includes jig and probe capacitance.
R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator.

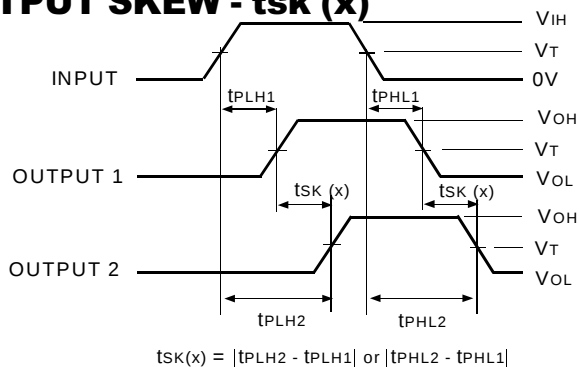
NOTES:

1. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_r ≤ 2ns; t_r ≤ 2ns.
2. Pulse Generator for All Pulses: Rate ≤ 10MHz; t_r ≤ 2.5ns; t_r ≤ 2.5ns.

SWITCH POSITION

Test	Switch
t _{PZL}	V _{LOAD}
t _{PLZ}	V _{LOAD}
t _{PHZ} /t _{PZH}	V _{LOAD}

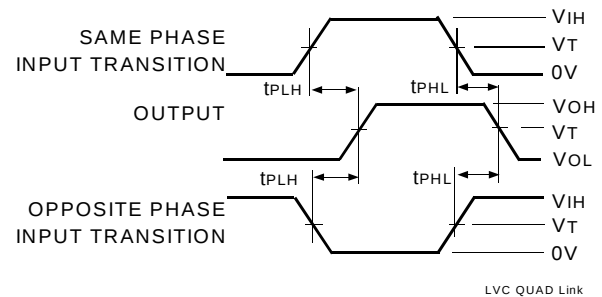
OUTPUT SKEW - t_{SK}(x)



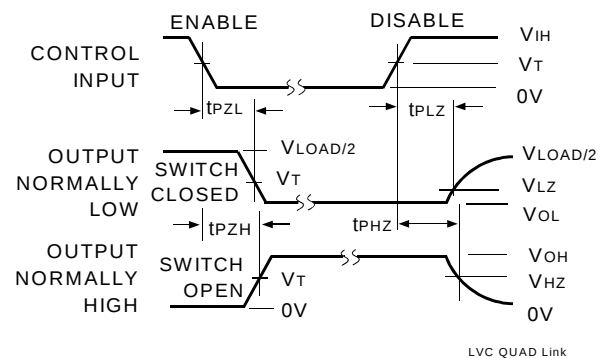
NOTES:

1. For t_{SK}(o) OUTPUT1 and OUTPUT2 are any two outputs.
2. For t_{SK}(b) OUTPUT1 and OUTPUT2 are in the same bank.

PROPAGATION DELAY



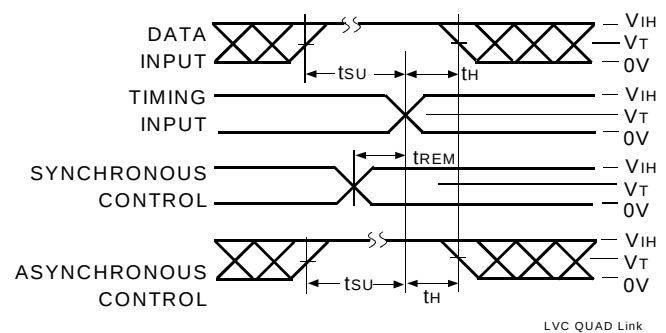
ENABLE AND DISABLE TIMES



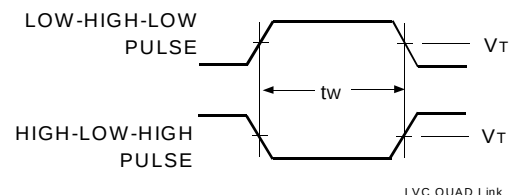
NOTE:

1. Diagram shown for input Control Enable-LOW and input Control Disable-HIGH.

SET-UP, HOLD, AND RELEASE TIMES



PULSE WIDTH



ORDERING INFORMATION

IDT	XX	LVC	XXX	XX	
Temp. Range		Device Type		Package	
				DC	Small Outline IC (SO14-1)
				PY	Shrink Small Outline Package (SO14-2)
				PG	Thin Shrink Small Outline Package (SO14-3)
			07A		Hex Buffer/Driver with Open Drain Outputs, +24mA
			74		– 40°C to +85°C



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