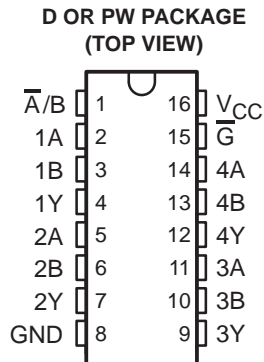


SN74LVC157A-Q1

QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

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- Qualification in Accordance With AEC-Q100†
- Qualified for Automotive Applications
- Customer-Specific Configuration Control Can Be Supported Along With Major-Change Approval
- ESD Protection Exceeds 2000 V Per MIL-STD-883, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)
- Operates From 2 V to 3.6 V
- Inputs Accept Voltages to 5.5 V
- Max t_{pd} of 5.4 ns at 3.3 V
- Typical V_{OLP} (Output Ground Bounce) <math><0.8\text{ V}</math> at $V_{CC} = 3.3\text{ V}$, $T_A = 25^\circ\text{C}$
- Typical V_{OHV} (Output V_{OH} Undershoot) >math>>2\text{ V}</math> at $V_{CC} = 3.3\text{ V}$, $T_A = 25^\circ\text{C}$



† Contact factory for details. Q100 qualification data available on request.

description/ordering information

The SN74LVC157A quadruple 2-line to 1-line data selector/multiplexer is designed for 2.7-V to 3.6-V V_{CC} operation.

The device features a common strobe (\bar{G}) input. When \bar{G} is high, all outputs are low. When \bar{G} is low, a 4-bit word is selected from one of two sources and is routed to the four outputs. The device provides true data.

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

ORDERING INFORMATION

T_A	PACKAGE‡		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 125°C	SOIC – D	Tape and reel	SN74LVC157AQDRQ1	L157AQ1
	TSSOP – PW	Tape and reel	SN74LVC157AQPWRQ1	L157AQ1

‡ Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE

INPUTS				OUTPUT Y
\bar{G}	\bar{A}/\bar{B}	A	B	
H	X	X	X	L
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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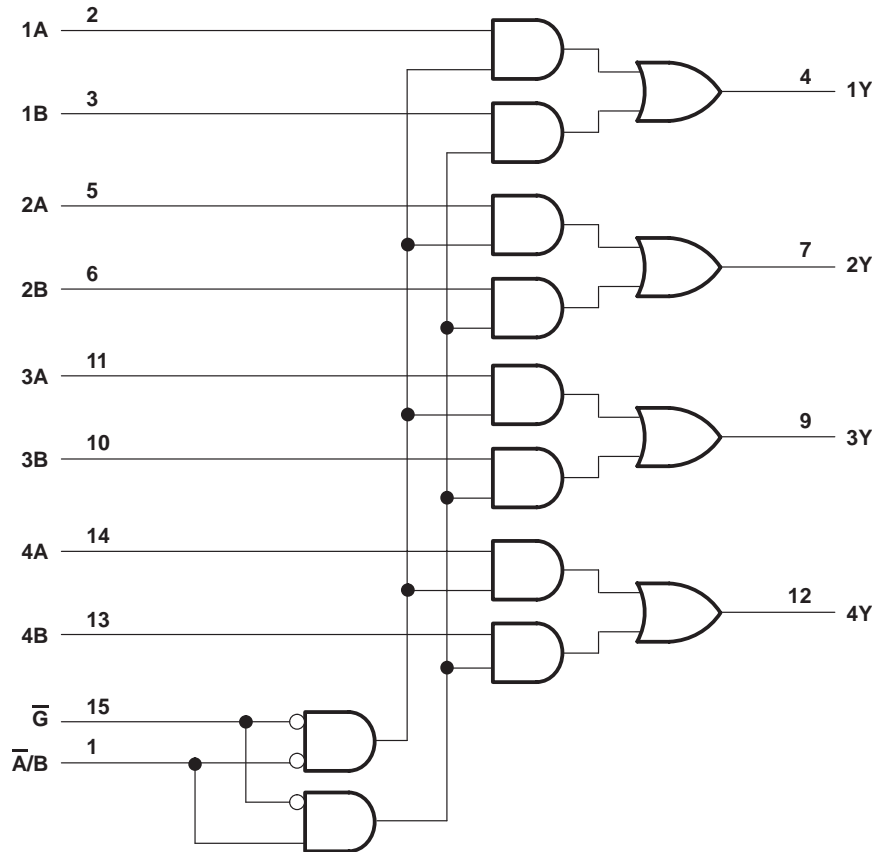
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QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

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logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)[†]

Supply voltage range, V_{CC}	-0.5 V to 6.5 V
Input voltage range, V_I (see Note 1)	-0.5 V to 6.5 V
Output voltage range, V_O (see Notes 1 and 2)	-0.5 V to $V_{CC} + 0.5$ V
Input clamp current, I_{IK} ($V_I < 0$)	-50 mA
Output clamp current, I_{OK} ($V_O < 0$)	-50 mA
Continuous output current, I_O	± 50 mA
Continuous current through V_{CC} or GND	± 100 mA
Package thermal impedance, θ_{JA} (see Note 3): D package	73°C/W
..... PW package	108°C/W
Storage temperature range, T_{stg}	-65°C to 150°C

[†] Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

- NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.
 2. The value of V_{CC} is provided in the recommended operating conditions table.
 3. The package thermal impedance is calculated in accordance with JESD 51-7.



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recommended operating conditions (see Note 4)

		MIN	MAX	UNIT
V _{CC}	Supply voltage	Operating		V
		2	3.6	
		Data retention only		
		1.5		
V _{IH}	High-level input voltage	V _{CC} = 2.7 V to 3.6 V		V
V _{IL}	Low-level input voltage	V _{CC} = 2.7 V to 3.6 V		V
V _I	Input voltage	0	5.5	V
V _O	Output voltage	0	V _{CC}	V
I _{OH}	High-level output current	V _{CC} = 2.7 V		mA
		-12		
		V _{CC} = 3 V		
		-24		
I _{OL}	Low-level output current	V _{CC} = 2.7 V		mA
		12		
		V _{CC} = 3 V		
		24		
Δt/Δv	Input transition rise or fall rate		10	ns/V
T _A	Operating free-air temperature	-40	125	°C

NOTE 4: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V _{CC}	MIN	MAX	UNIT
V _{OH}	I _{OH} = -100 μA	2.7 V to 3.6 V	V _{CC} -0.2		V
	I _{OH} = -12 mA	2.7 V	2.2		
		3 V	2.4		
	I _{OH} = -24 mA	3 V	2.2		
V _{OL}	I _{OL} = 100 μA	2.7 V to 3.6 V	0.2		V
	I _{OL} = 12 mA	2.7 V	0.4		
	I _{OL} = 24 mA	3 V	0.55		
I _I	All inputs V _I = 5.5 V or GND	3.6 V	±5		μA
I _{CC}	V _I = V _{CC} or GND, I _O = 0	3.6 V	10		μA
ΔI _{CC}	One input at V _{CC} - 0.6 V, Other inputs at V _{CC} or GND	2.7 V to 3.6 V	500		μA

switching characteristics over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 2.7 V		V _{CC} = 3.3 V ± 0.3 V		UNIT
			MIN	MAX	MIN	MAX	
t _{pd}	A or B	Y	6.2		0.8	5.4	ns
	$\overline{A/B}$		8.2		0.8	7	
	\overline{G}		7.8		0.8	6.5	

operating characteristics, T_A = 25°C

PARAMETER	TEST CONDITIONS	V _{CC} = 2.5 V	V _{CC} = 3.3 V	UNIT
		TYP	TYP	
C _{pd}	f = 10 MHz	15	16	pF

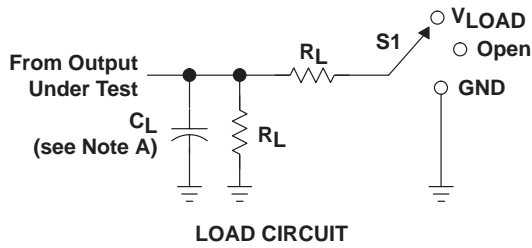


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QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER

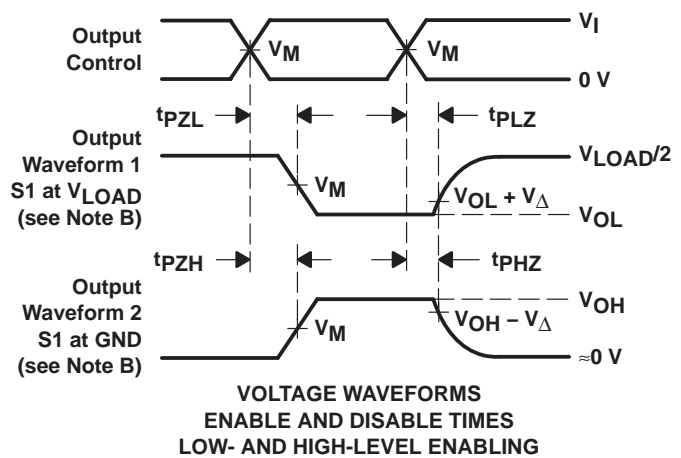
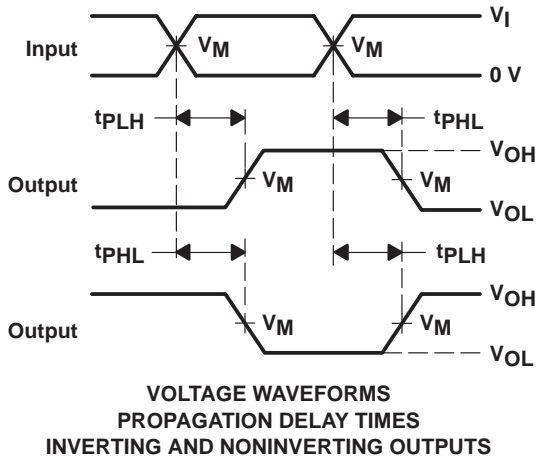
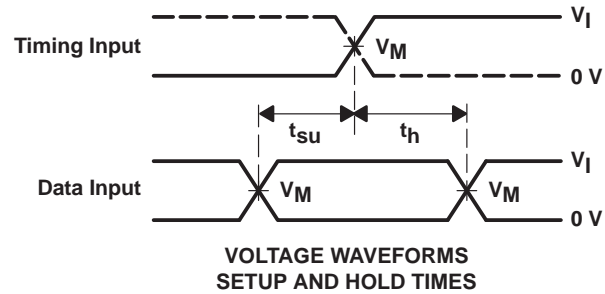
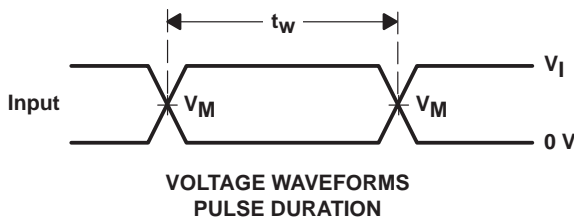
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PARAMETER MEASUREMENT INFORMATION



TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
2.7 V	2.7 V	≤ 2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
$3.3 \text{ V} \pm 0.3 \text{ V}$	2.7 V	≤ 2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V

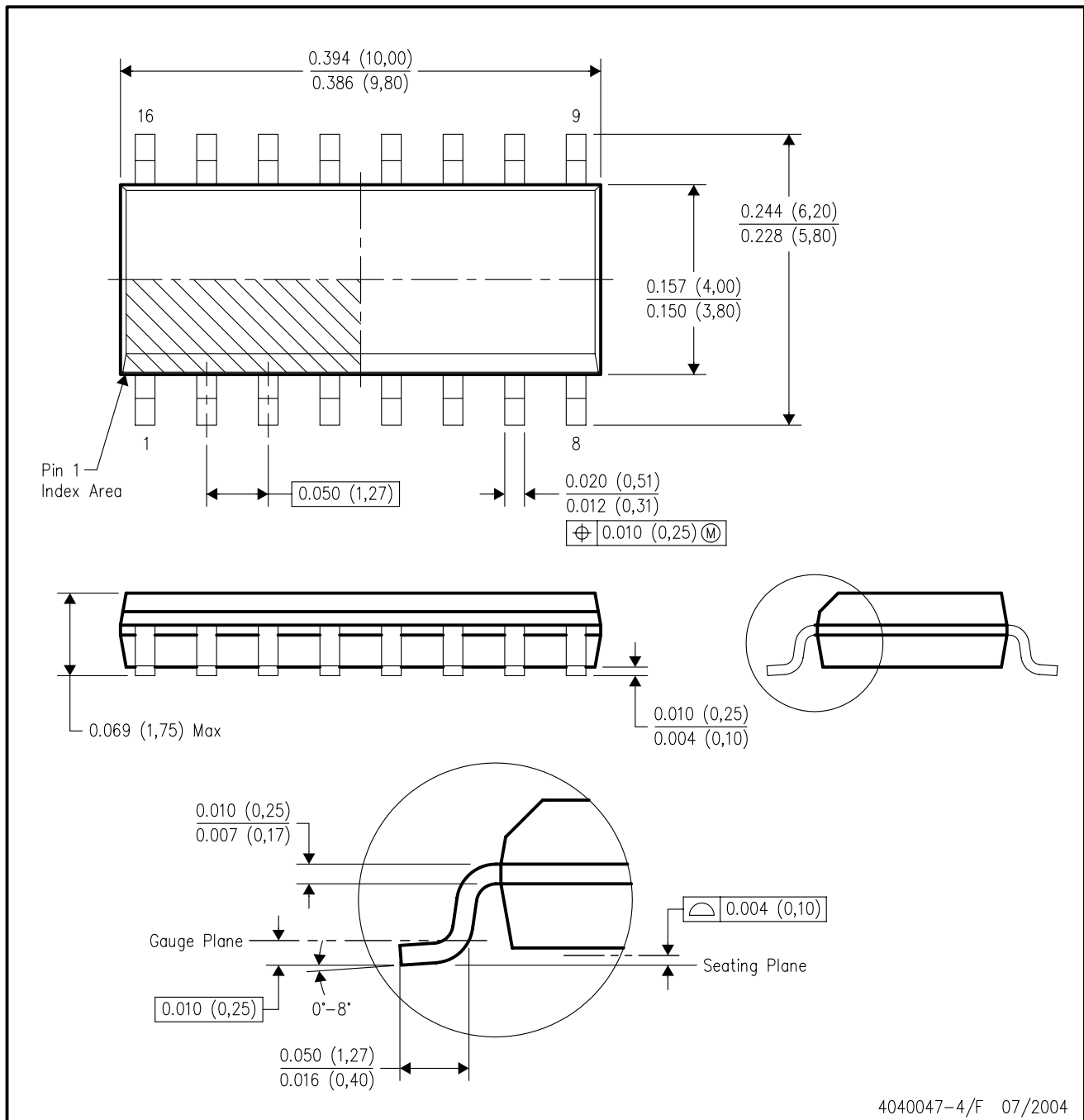


- NOTES:
- C_L includes probe and jig capacitance.
 - Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
 - All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$.
 - The outputs are measured one at a time, with one transition per measurement.
 - t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - t_{PZL} and t_{PZH} are the same as t_{en} .
 - t_{PLH} and t_{PHL} are the same as t_{pd} .
 - All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms

D (R-PDSO-G16)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - D. Falls within JEDEC MS-012 variation AC.

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



4040064/F 01/97

- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

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