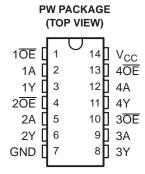


FEATURES

- Controlled Baseline
 - One Assembly/Test Site, One Fabrication Site
- Enhanced Diminishing Manufacturing Sources (DMS) Support
- Enhanced Product-Change Notification
- Qualification Pedigree (1)
- Operates From 1.65 V to 3.6 V
- Inputs Accept Voltages to 5.5 V
- Max t_{nd} of 4.8 ns at 3.3 V
- Typical V_{OLP} (Output Ground Bounce) <0.8 V at V_{CC} = 3.3 V, T_A = 25°C
- (1) Component qualification in accordance with JEDEC and industry standards to ensure reliable operation over an extended temperature range. This includes, but is not limited to, Highly Accelerated Stress Test (HAST) or biased 85/85, temperature cycle, autoclave or unbiased HAST, electromigration, bond intermetallic life, and mold compound life. Such qualification testing should not be viewed as justifying use of this component beyond specified performance and environmental limits.

- Typical V_{OHV} (Output V_{OH} Undershoot) >2 V at V_{CC} = 3.3 V, T_A = 25°C
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)



DESCRIPTION/ORDERING INFORMATION

This quadruple bus buffer gate is designed for 1.65-V to 3.6-V V_{CC} operation.

The SN74LVC125A features independent line drivers with 3-state outputs. Each output is disabled when the associated output-enable (\overline{OE}) input is high.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

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	PAC	KAGE ⁽¹⁾	ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	TSSOP - PW	Reel of 2000	SN74LVC125AIPWREP	C125AEP
–55°C to 125°C	TSSOP – PW	Reel of 2000	SN74LVC125AMPWREP (2)	125AMEP
-55°C 10 125°C	SOIC - D	Reel of 2500	SN74LVC125AMDREP	125AMEP

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

(2) Product Preview

FUNCTION TABLE (EACH BUFFER)

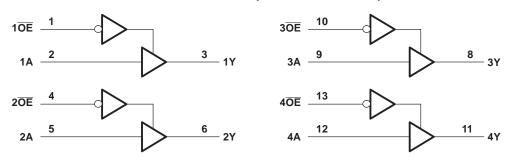
INP	JTS	OUTPUT
ŌĒ	Α	Y
L	Н	Н
L	L	L
Н	X	Z



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LOGIC DIAGRAM (POSITIVE LOGIC)



Absolute Maximum Ratings(1)

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

			MIN	MAX	UNIT
V_{CC}	Supply voltage range		-0.5	6.5	V
V_{I}	Input voltage range (2)	-0.5	6.5	V	
Vo	Output voltage range ⁽²⁾⁽³⁾		-0.5	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
Io	Continuous output current			±50	mA
	Continuous current through V _{CC} or GND			±100	mA
θ_{JA}	Package thermal impedance (4)		113	°C/W	
T _{stg}	Storage temperature range	-65	150	°C	

⁽¹⁾ 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.

⁽²⁾ The input and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

⁽³⁾ The value of VCC is provided in the recommended operating conditions table.

⁽⁴⁾ The package thermal impedance is calculated in accordance with JESD 51-7.



SN74LVC125A-EP QUADRUPLE BUS BUFFER GATE WITH 3-STATE OUTPUTS

Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT	
V	Cupply voltage	Operating	1.65	3.6	V	
V _{CC}	Supply voltage	Data retention only	1.5		V	
		V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}			
V_{IH}	High-level input voltage	$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7		V	
		V _{CC} = 2.7 V to 3.6 V	2			
		V _{CC} = 1.65 V to 1.95 V	0.	$35 \times V_{CC}$		
V_{IL}	Low-level input voltage	V _{CC} = 2.3 V to 2.7 V		0.7	V	
		V _{CC} = 2.7 V to 3.6 V		0.8		
VI	Input voltage	,	0	5.5	V	
Vo	Output voltage		0	V _{CC}	V	
		V _{CC} = 1.65 V		-4		
	Library and and an annual annual and annual and annual and annual and annual an	V _{CC} = 2.3 V		-8	mA	
I _{OH}	High-level output current	V _{CC} = 2.7 V		-12	ША	
		V _{CC} = 3 V		-24		
		V _{CC} = 1.65 V		4		
	Lave lavel autout average	V _{CC} = 2.3 V		8		
I _{OL}	Low-level output current	V _{CC} = 2.7 V		12	mA	
		V _{CC} = 3 V	24			
Δt/Δν	Input transition rise or fall rate			8	ns/V	
_	Operation for a six terms and the	I suffix	-40	85	00	
T _A	Operating free-air temperature	M suffix	-55	125	°C	

⁽¹⁾ 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	TYP ⁽¹⁾	MAX	UNIT
	I _{OH} = -100 μA	1.65 V to 3.0	6 V V _{CC} – 0.2			
	I _{OH} = -4 mA	1.65 V	1.2			
V	$I_{OH} = -8 \text{ mA}$	2.3 V	1.7			V
V _{OH}	12 1	2.7 V	2.2			V
	$I_{OH} = -12 \text{ mA}$	3 V	2.4			
	I _{OH} = -24 mA	3 V	2.2			
	I _{OL} = 100 μA	1.65 V to 3.0	6 V		0.2	
	I _{OL} = 4 mA	1.65 V			0.45	
V_{OL}	I _{OL} = 8 mA	2.3 V			0.7	V
	I _{OL} = 12 mA	2.7 V			0.4	
	I _{OL} = 24 mA	3 V			0.55	
I _I	V _I = 5.5 V or GND	3.6 V			±5	μΑ
I _{OZ}	$V_O = V_{CC}$ or GND	3.6 V			±10	μΑ
I _{cc}	$V_I = V_{CC}$ or GND, $I_O = 0$	3.6 V			10	μΑ
ΔI_{CC}	One input at V _{CC} – 0.6 V, Other inputs	at V _{CC} or GND 2.7 V to 3.6	S V		500	μΑ
C _i	V _I = V _{CC} or GND	3.3 V		5		pF

⁽¹⁾ All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

SN74LVC125A-EP QUADRUPLE BUS BUFFER GATE WITH 3-STATE OUTPUTS

SCAS739C-DECEMBER 2003-REVISED DECEMBER 2006



Switching Characteristics

over -40°C to 85°C (I-temp) operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	TO (OUTPUT)	V _{CC} = 1	.65 V	V _{CC} =	2.3 V	V _{CC} =	2.7 V	V _{CC} = 3 ± 0.3	3.3 V 3 V	UNIT
(INPUT)	(OUTPUT)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
t _{pd}	Α	Y		12.3		6.3		5.5		4.8	ns
t _{en}	ŌĒ	Y		14.3		7.4		6.6		5.4	ns
t _{dis}	ŌĒ	Y		11.1		5.6		5		4.6	ns
t _{sk(o)}										1	ns

Switching Characteristics

over -55°C to 125°C (M-temp) operating free-air temperature range (unless otherwise noted) (see Figure 1)

PARAMETER	METER FROM		V _{CC} = 1.	.65 V	V _{CC} =	2.3 V	V _{CC} =	2.7 V	V _{CC} = 3 ± 0.3	3.3 V 3 V	UNIT
(INPUT)	(OUTPUT)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX		
t _{pd}	Α	Y		12.3		8		7		5.8	ns
t _{en}	ŌĒ	Y		14.3		9		8.5		6.5	ns
t _{dis}	ŌĒ	Y		11.1		5.6		6		5.6	ns
t _{sk(o)}										1	ns

Operating Characteristics

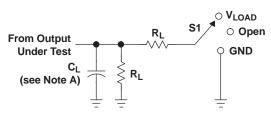
 $T_A = 25^{\circ}C$

	PARAMETER	TEST CONDITIONS	V _{CC} = 1.8 V	V _{CC} = 2.5 V	V _{CC} = 3.3 V	UNIT
PARAMETER		TEOT CONDITIONS	TYP	TYP	TYP	Oitii
C_{pd}	Power dissipation capacitance per gate	f = 10 MHz	7.4	11.3	15	pF

SN74LVC125A-EP



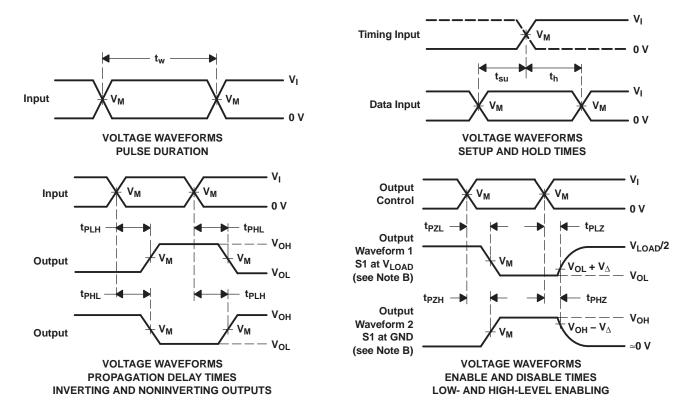
PARAMETER MEASUREMENT INFORMATION



TEST	S1
t _{PLH} /t _{PHL}	Open
t _{PLZ} /t _{PZL}	V _{LOAD}
t _{PHZ} /t _{PZH}	GND

LOAD CIRCUIT

	INPUTS		.,	V		_	.,	
V _{CC}	VI	t _r /t _f	V _M	V _{LOAD}	CL	R _L	V_Δ	
1.8 V \pm 0.15 V	V _{CC}	≤2 ns	V _{CC} /2	2×V _{CC}	30 pF	1 k Ω	0.15 V	
2.5 V \pm 0.2 V	V _{CC}	≤2 ns	V _{CC} /2	2 × V _{CC}	30 pF	500 Ω	0.15 V	
2.7 V	2.7 V	≤2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V	
3.3 V \pm 0.3 V	2.7 V	≤2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V	



- NOTES: A. C_L includes probe and jig capacitance.
 - B. 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.
 - C. All input pulses are supplied by generators having the following characteristics: PRR \leq 10 MHz, $Z_O = 50 \Omega$.
 - D. The outputs are measured one at a time, with one transition per measurement.
 - E. t_{PLZ} and t_{PHZ} are the same as t_{dis}.
 - F. t_{PZL} and t_{PZH} are the same as t_{en}.
 - G. t_{PLH} and t_{PHL} are the same as t_{pd} .
 - H. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms





11-Apr-2013

PACKAGING INFORMATION

Orderable Device	Status	Package Type	U	Pins	U		Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
	(1)		Drawing		Qty	(2)		(3)		(4)	
SN74LVC125AIPWREP	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	C125AEP	Samples
SN74LVC125AMDREP	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	125AMEP	Samples
V62/04656-01XE	ACTIVE	TSSOP	PW	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	C125AEP	Samples
V62/04656-02YE	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	125AMEP	Samples

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

⁽⁴⁾ Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.





11-Apr-2013

OTHER QUALIFIED VERSIONS OF SN74LVC125A-EP:

• Automotive: SN74LVC125A-Q1

NOTE: Qualified Version Definitions:

• Catalog - TI's standard catalog product

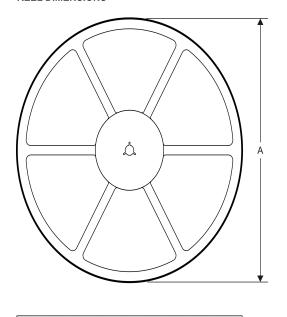
• Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

PACKAGE MATERIALS INFORMATION

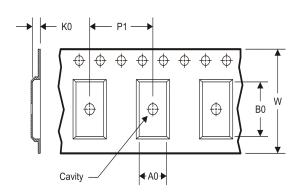
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TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
В0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

TAPE AND REEL INFORMATION

*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC125AIPWREP	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74LVC125AMDREP	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1

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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC125AIPWREP	TSSOP	PW	14	2000	367.0	367.0	35.0
SN74LVC125AMDREP	SOIC	D	14	2500	333.2	345.9	28.6

D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AB.



D (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M—1994.
- B. This drawing is subject to change without notice.
 - Sody length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
- E. Falls within JEDEC MO-153



PW (R-PDSO-G14)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



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