

FEATURES

• Controlled Baseline

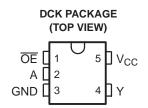
 One Assembly/Test Site, One Fabrication Site

- Enhanced Diminishing Manufacturing Sources (DMS) Support
- Enhanced Product-Change Notification
- Qualification Pedigree (1)
- Supports 5-V V_{CC} Operation
- Inputs Accept Voltages to 5.5 V
- Max t_{pd} of 3.7 ns at 3.3 V
- (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.

DESCRIPTION/ORDERING INFORMATION

This bus buffer gate is designed for 1.65-V to 5.5-V V_{CC} operation.

- Low Power Consumption, 10-μA Max I_{cc}
- ±24-mA Output Drive at 3.3 V
- I_{off} Supports Partial-Power-Down Mode Operation
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)



The SN74LVC1G125 is a single line driver with a 3-state output. The output is disabled when the output-enable (\overline{OE}) input is high.

This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

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.

ORDERING INFORMATION

T _A	PACK	AGE ⁽¹⁾	ORDERABLE PART NUMBER	TOP-SIDE MARKING	
–40°C to 85°C	SOT (SC-70) – DCK	Reel of 3000	CLVC1G125IDCKREP	СМО	
–55°C to 125°C	SOT (SC-70) – DCK	Reel of 3000	CLVC1G125MDCKREP	СМО	

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

INPU	JTS	OUTPUT
ŌĒ	Α	Y
L	Н	Н
L	L	L
н	Х	Z

FUNCTION TABLE

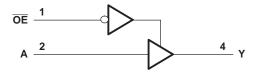


Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

SN74LVC1G125-EP SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

SCES455B-DECEMBER 2003-REVISED JUNE 2006

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
VI	Input voltage range ⁽²⁾		-0.5	6.5	V
Vo	Voltage range applied to any output in the high-impedan	nce or power-off state ⁽²⁾ –0.5		6.5	V
Vo	Voltage range applied to any output in the high or low st	ate ⁽²⁾⁽³⁾	-0.5	V _{CC} + 0.5	V
I _{IK}	Input clamp current	V ₁ < 0		-50	mA
I _{OK}	Output clamp current	V _O < 0		-50	mA
I _O	Continuous output current			±50	mA
	Continuous current through V _{CC} or GND			±100	mA
θ_{JA}	Package thermal impedance ⁽⁴⁾			252	°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 V_{CC} is provided in the recommended operating conditions table.

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

Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT
v	Supply veltoge	Operating	1.65	5.5	V
V _{CC}	Supply voltage	Data retention only	1.5		v
		V _{CC} = 1.65 V to 1.95 V	$0.65 imes V_{CC}$		
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7		V
V _{IH}	High-level input voltage	$V_{CC} = 3 V$ to 3.6 V	2		V
		$V_{CC} = 4.5 \text{ V} \text{ to } 5.5 \text{ V}$	$0.7 imes V_{CC}$		
		$V_{CC} = 1.65 \text{ V} \text{ to } 1.95 \text{ V}$		$0.35 \times V_{\text{CC}}$	
		V _{CC} = 2.3 V to 2.7 V		0.7	V
V _{IL}	Low-level input voltage	$V_{CC} = 3 V$ to 3.6 V		0.8	V
		$V_{CC} = 4.5 \text{ V} \text{ to } 5.5 \text{ V}$		$0.3 imes V_{CC}$	
VI	Input voltage		0	5.5	V
Vo	Output voltage		0	V _{CC}	V
		V _{CC} = 1.65 V		-4	
		V _{CC} = 2.3 V		-8	
I _{OH}	High-level output current	N/ 0.1/		-16	mA
		$V_{CC} = 3 V$		-24	
		V _{CC} = 4.5 V		-32	
		V _{CC} = 1.65 V		4	
		V _{CC} = 2.3 V		8	
I _{OL}	Low-level output current	N/ 0.1/		16	mA
		$V_{CC} = 3 V$		24	
		V _{CC} = 4.5 V		32	
		V_{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V		20	
Δt/Δv	Input transition rise or fall rate	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$		10	ns/V
		V_{CC} = 5 V ± 0.5 V		5	
-		· · · · · · · · · · · · · · · · · · ·	-40	85	•••
T _A	Operating free-air temperature		-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.

SN74LVC1G125-EP SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

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TEXAS INSTRUMENTS www.ti.com

Electrical Characteristics

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

	TEST CONDITIONS	N.	-40 °	C to 85°C		–55°	C to 125°C			
PARAMETER	TEST CONDITIONS	V _{cc}	MIN	TYP ⁽¹⁾	MAX	MIN	TYP ⁽¹⁾	MAX	UNIT	
	I _{OH} = −100 μA	1.65 V to 5.5 V	V _{CC} – 0.1			V _{CC} – 0.1				
	$I_{OH} = -4 \text{ mA}$	1.65 V	1.2			1.2				
M	I _{OH} = -8 mA	2.3 V	1.9			1.9			V	
V _{OH}	I _{OH} = -16 mA	- 3 V	2.4			2.4			v	
	I _{OH} = -24 mA	3 V	2.3			2.3				
	I _{OH} = -32 mA	4.5 V	3.8			3.8				
	I _{OL} = 100 μA	1.65 V to 5.5 V			0.1			0.1	0.1	
	$I_{OL} = 4 \text{ mA}$	1.65 V			0.45			0.45	0.3 0.4	
M	$I_{OL} = 8 \text{ mA}$	2.3 V			0.3			0.3		
V _{OL}	I _{OL} = 16 mA	- 3 V			0.4			0.4		
	I _{OL} = 24 mA	- 3V			0.55			0.60		
	I _{OL} = 32 mA	4.5 V			0.55			0.60		
I _I A or OE inputs	$V_{I} = 5.5 V \text{ or GND}$	0 V to 5.5 V			±5			±5	μA	
I _{off}	$V_{I} \text{ or } V_{O} = 5.5 \text{ V}$	0			±10			±10	μΑ	
I _{OZ}	V _O = 0 to 5.5 V	3.6 V			10			10	μΑ	
I _{CC}	$V_1 = 5.5 \text{ V or GND},$ $I_0 = 0$	1.65 V to 5.5 V			10			10	μA	
ΔI_{CC}	One input at $V_{CC} - 0.6 V$, Other inputs at V_{CC} or GND	3 V to 5.5 V			500			500	μA	
Ci	$V_{I} = V_{CC}$ or GND	3.3 V		4			4		pF	

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

Switching Characteristics

over recommended operating free-air temperature range of -40° C to 85° C , C_L = 15 pF (unless otherwise noted) (see Figure 1)

PARAMETER		TO (OUTPUT)	V _{CC} = ± 0.1		$\begin{array}{c} \mathrm{V_{CC}} \texttt{=} \texttt{ 2.5 V} \\ \pm \texttt{ 0.2 V} \end{array}$		$V_{CC} = 3.3 V \\ \pm 0.3 V$		V_{CC} = 5 V ± 0.5 V		UNIT
	(INPUT)	(001P01)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	А	Y	1.9	6.9	0.7	4.6	0.6	3.7	0.5	3.4	ns

Switching Characteristics

over recommended operating free-air temperature range of -40° C to 85° C, C_L = 30 pF or 50 pF (unless otherwise noted) (see Figure 2)

PARAMETER	FROM	TO		V _{CC} = 1.8 V ± 0.15 V		2.5 V V _{CC} = 3.3 V 2 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V		UNIT	
	(INPUT)	(OUTPUT)	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	А	Y	2.8	9	1.2	5.5	1	4.5	1	4	ns
t _{en}	ŌĒ	Y	3.3	10.1	1.5	6.6	1	5.3	1	5	ns
t _{dis}	ŌĒ	Y	1.3	9.2	1	5	1	5	1	4.2	ns



Switching Characteristics

over recommended operating free-air temperature range of -55° C to 125° C, C_L = 50 pF (unless otherwise noted) (see Figure 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 3 ± 0.3	V_{CC} = 3.3 V ± 0.3 V		V _{CC} = 5 V ± 0.5 V	
	(INPUT)	(001-01)	MIN	MAX	MIN	MAX	
t _{pd}	А	Y	1	4.9	1	4	ns
t _{en}	OE	Y	1	5.8	1	5	ns
t _{dis}	OE	Y	1	5	1	4.2	ns

Operating Characteristics

 $T_A = 25^{\circ}C$

	PARAMETER		TEST CONDITIONS	V _{CC} = 1.8 V TYP	V _{CC} = 2.5 V TYP	V _{CC} = 3.3 V TYP	V _{CC} = 5 V TYP	UNIT
C	Power dissipation	Outputs enabled	f = 10 MHz	18	18	19	21	۶
Cpd	capacitance	Outputs disabled		2	2	2	4	рг

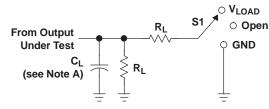
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PARAMETER MEASUREMENT INFORMATION

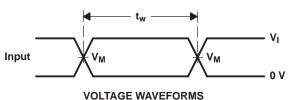


TEST	S1
t _{PLH} /t _{PHL}	Open
t _{PLZ} /t _{PZL}	V _{LOAD}
t _{PHZ} /t _{PZH}	GND

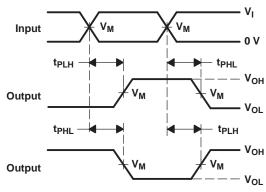
LOAD	CIRCUIT	

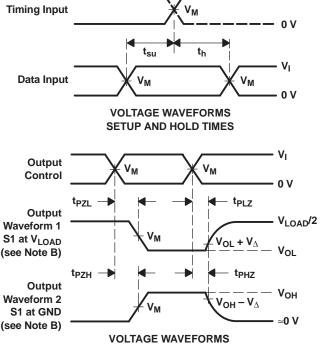
N	INF	INPUTS			•	-	
V _{CC}	VI	t _r /t _f	VM	V _{LOAD}	CL	RL	V_{Δ}
$\textbf{1.8 V} \pm \textbf{0.15 V}$	V _{CC}	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	15 pF	1 Μ Ω	0.15 V
$\textbf{2.5 V} \pm \textbf{0.2 V}$	V _{CC}	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	15 pF	1 Μ Ω	0.15 V
3.3 V \pm 0.3 V	3 V	≤2.5 ns	1.5 V	6 V	15 pF	1 Μ Ω	0.3 V
5 V \pm 0.5 V	V _{CC}	≤2.5 ns	V _{CC} /2	$2 \times V_{CC}$	15 pF	1 Μ Ω	0.3 V

Timing Input

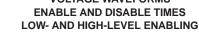


PULSE DURATION





VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES INVERTING AND NONINVERTING OUTPUTS

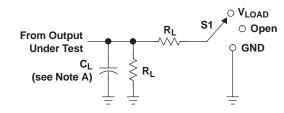


- NOTES: A. CL includes probe and jig capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
 - C. All input pulses are supplied by generators having the following characteristics: PRR \leq 10 MHz, Z_O = 50 Ω .
 - 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

SN74LVC1G125-EP SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT SCES455B-DECEMBER 2003-REVISED JUNE 2006

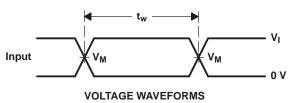
PARAMETER MEASUREMENT INFORMATION



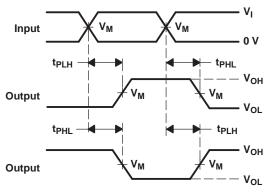
LOAD CIRCUIT

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

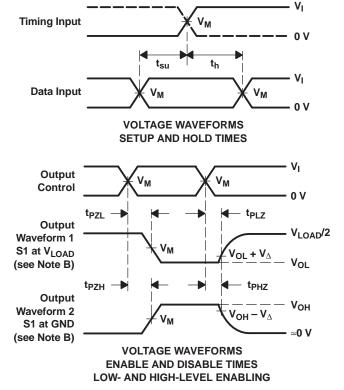
V _{CC}	IN	PUTS			CL	RL	
	VI	t _r /t _f	VM	V _{LOAD}			V_{Δ}
1.8 V \pm 0.15 V	V _{CC}	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$\textbf{2.5 V} \pm \textbf{0.2 V}$	Vcc	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
3.3 V \pm 0.3 V	3 V	≤2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
5 V \pm 0.5 V	V _{CC}	≤2.5 ns	V _{CC} /2	$2 \times V_{CC}$	50 pF	500 Ω	0.3 V



PULSE DURATION







- NOTES: A. CL 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 Ω .
 - 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 2. Load Circuit and Voltage Waveforms



11-Apr-2013

PACKAGING INFORMATION

Orderable Device	Status	Package Type	Package Drawing	Pins	•	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
	(1)		Drawing		Qty	(2)		(3)		(4)	
CLVC1G125IDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	СМО	Samples
CLVC1G125MDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	СМО	Samples
CLVC1G125MDCKREPG4	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	СМО	Samples
V62/04735-01XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	СМО	Samples
V62/04735-02XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	СМО	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)

⁽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.

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PACKAGE OPTION ADDENDUM

11-Apr-2013

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74LVC1G125-EP :

Catalog: SN74LVC1G125

• Automotive: SN74LVC1G125-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





QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
CLVC1G125IDCKREP	SC70	DCK	5	3000	179.0	8.4	2.2	2.5	1.2	4.0	8.0	Q3
CLVC1G125MDCKREP	SC70	DCK	5	3000	179.0	8.4	2.2	2.5	1.2	4.0	8.0	Q3

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PACKAGE MATERIALS INFORMATION

26-Jan-2013



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CLVC1G125IDCKREP	SC70	DCK	5	3000	203.0	203.0	35.0
CLVC1G125MDCKREP	SC70	DCK	5	3000	203.0	203.0	35.0

DCK (R-PDSO-G5)

PLASTIC SMALL-OUTLINE PACKAGE



- 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. Mold flash and protrusion shall not exceed 0.15 per side.
 - D. Falls within JEDEC MO-203 variation AA.



LAND PATTERN DATA



NOTES:

- A. All linear dimensions are in millimeters.B. This drawing is subject to change without notice.
- C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
- D. Publication IPC-7351 is recommended for alternate designs.
- E. 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. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC-7525 for other stencil recommendations.



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