

FEATURES

- Controlled Baseline
 - One Assembly/Test Site, One Fabrication Site
- Extended Temperature Performance of -55°C to 125°C
- 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 3.6 ns at 3.3 V
- Low Power Consumption, 10-μA Max I_{cc}
- ±24-mA Output Drive 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

The SN74LVC1G08 performs the Boolean function $Y = A \bullet B$ or $Y = \overline{\overline{A} + \overline{B}}$ in positive logic.

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.

ORDERING INFORMATION

T _A	PACKA	GE ⁽¹⁾	ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C SOT (SC-70) - DCK Reel of 3000		SN74LVC1G08IDCKREP	CEO	
–55°C to 125°C	SOP (SOT-23) – DBV	Reel of 3000	SN74LVC1G08MDBVREP	C08O
-55 C 10 125 C	SOT (SC-70) – DCK	Reel of 3000	SN74LVC1G08MDCKREP	BUB

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

INPU	ITS	OUTPUT
A	В	Y
Н	Н	Н
L	Х	L
Х	L	L

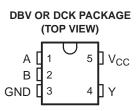
FUNCTION TABLE



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.



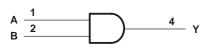
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)



SN74LVC1G08-EP SINGLE 2-INPUT POSITIVE-AND GATE

SCES454C-DECEMBER 2003-REVISED AUGUST 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⁾			6.5	V
Vo	Voltage range applied to any output in the high-imped	-0.5	6.5	V	
Vo	Voltage range applied to any output in the high or low	-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
I _O	Continuous output current			±50	mA
	Continuous current through V _{CC} or GND			±100	mA
0		DBV package		256	0000
θ_{JA}	Package thermal impedance ⁽⁴⁾	DCK package		252	°C/W
T _{stg}	tg Storage temperature range			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 voltogo	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 V to 2.7 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 V to 1.95 V		$0.35 \times V_{CC}$	
\ <i>\</i>		V_{CC} = 2.3 V to 2.7 V		0.7	V
V _{IL}	Low-level input voltage	$V_{CC} = 3 V \text{ to } 3.6 V$		0.8	v
		V_{CC} = 4.5 V to 5.5 V		$0.3 \times V_{CC}$	
VI	Input voltage		0	5.5	V
Vo	Output voltage		0	V _{CC}	V
		V _{CC} = 1.65 V		-4	
	High-level output current	$V_{CC} = 2.3 V$		-8	
I _{OH}		$V_{CC} = 3 V$		-16	mA
		$v_{\rm CC} = 3 v$		-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	$V_{CC} = 3 V$		16	mA
		$v_{\rm CC} = 3 v$		24	
		$V_{CC} = 4.5 V$		32	
		V_{CC} = 1.8 V \pm 0.15 V, 2.5 V \pm 0.2 V		20	
Δt/Δv	Input transition rise or fall rate	$V_{CC}=3.3~V\pm0.3~V$		10	ns/V
		$V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$		5	
т	Operating free air temperature	I temperature	-40	85	°C
T _A	Operating free-air temperature	M temperature	-55	125	-0

(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.

SN74LVC1G08-EP SINGLE 2-INPUT POSITIVE-AND GATE



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Electrical Characteristics

over recommended operating free-air temperature range for both I temp = -40° C to 85° C and M temp = -55° C to 125° C (unless otherwise noted)

PAI	RAMETER	TEST CONDITIONS	V _{cc}	MIN TYP ⁽¹⁾ MAX	UNIT		
		I _{OH} = -100 μA	1.65 V to 5.5 V	V _{CC} – 0.1			
		$I_{OH} = -4 \text{ mA}$	1.65 V	1.2			
v		$I_{OH} = -8 \text{ mA}$	2.3 V	1.9	V		
V _{OH}		$I_{OH} = -16 \text{ mA}$	2.)/	2.4	V		
		$I_{OH} = -24 \text{ mA}$	- 3 V	2.3			
		$I_{OH} = -32 \text{ mA}$	4.5 V	3.8			
		I _{OL} = 100 μA	1.65 V to 5.5 V	0.1	0.1		
		I _{OL} = 4 mA	1.65 V	0.45			
v		I _{OL} = 8 mA	2.3 V	0.3	V		
V _{OL}		I _{OL} = 16 mA	2.)/	0.4	V		
		I _{OL} = 24 mA	- 3 V	0.55			
		I _{OL} = 32 mA	4.5 V	0.55			
I _I	A or B inputs	$V_1 = 5.5 V \text{ or GND}$	0 to 5.5 V	±5	μA		
l _{off}		$V_1 \text{ or } V_0 = 5.5 \text{ V}$	0	±10	μΑ		
I _{CC}		$V_1 = 5.5 \text{ V or GND}, \qquad I_0 = 0$	1.65 V to 5.5 V	10	μΑ		
ΔI_{CC}		One input at V_{CC} – 0.6 V, Other inputs at V_{CC} or GND	3 V to 5.5 V	500	μΑ		
Ci		$V_{I} = V_{CC} \text{ or } GND$	3.3 V	4	pF		

(1) All typical values are at $V_{CC} = 3.3 \text{ V}$, $T_A = 25^{\circ}\text{C}$.

Switching Characteristics

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 1.8 V ± 0.15 V		V_{CC} = 2.5 V \pm 0.2 V		V_{CC} = 3.3 V ± 0.3 V		V_{CC} = 5 V ± 0.5 V		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	Y	1.5	7.2	0.7	4.4	0.8	3.6	0.8	3.4	ns

Switching Characteristics

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

Ĩ	PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 1.8 V ± 0.15 V		V_{CC} = 2.5 V \pm 0.2 V		$V_{CC} = 3.3 V \\ \pm 0.3 V$		V_{CC} = 5 V ± 0.5 V		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
	t _{pd}	A or B	Y	2.4	8	1.1	5.5	1	4.5	1	4	ns

Switching Characteristics

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 1.8 V ± 0.15 V		V_{CC} = 2.5 V \pm 0.2 V		$V_{CC} = 3.3 V \\ \pm 0.3 V$		V_{CC} = 5 V ± 0.5 V		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A or B	Y	2.4	11	1.1	7.5	1	6.5	1	5	ns

Operating Characteristics

 $T_A = 25^{\circ}C$

PARAMETER		TEST CONDITIONS	V _{CC} = 1.8 V V _{CC} = 2.5 V		$V_{CC} = 3.3 V$ $V_{CC} = 5 V$		UNIT
			TYP	TYP	TYP	TYP	UNIT
C _{pd}	Power dissipation capacitance	f = 10 MHz	21	24	26	31	pF

SN74LVC1G08-EP SINGLE 2-INPUT POSITIVE-AND GATE



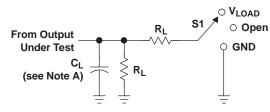
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PARAMETER MEASUREMENT INFORMATION



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

Vм

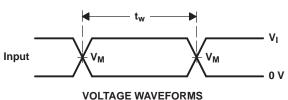
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LOAD CIRC	CUIT
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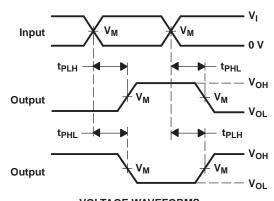
N N	INPUTS		N	V	•		V
V _{CC}	VI	t _r /t _f	VM	V _{LOAD}	CL	RL	V_{Δ}
$1.8~V\pm0.15~V$	V _{CC}	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	15 pF	1 Μ Ω	0.15 V
$\textbf{2.5 V} \pm \textbf{0.2 V}$	V _{CC}	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	15 pF	1 MΩ	0.15 V
3.3 V \pm 0.3 V	3 V	≤2.5 ns	1.5 V	6 V	15 pF	1 MΩ	0.3 V
5 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

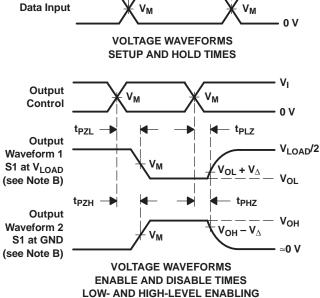
Timing Input

Data Input



PULSE DURATION





t_{su}

VM

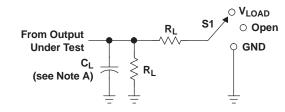
VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES INVERTING AND NONINVERTING OUTPUTS

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

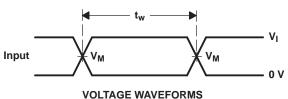
PARAMETER MEASUREMENT INFORMATION



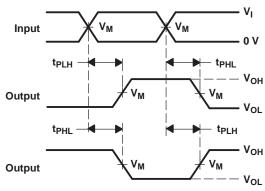
LOAD CIRCUIT

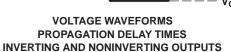
TEST	S1
t _{PLH} /t _{PHL}	Open
t _{PLZ} /t _{PZL}	V _{LOAD}
t _{PHZ} /t _{PZH}	GND

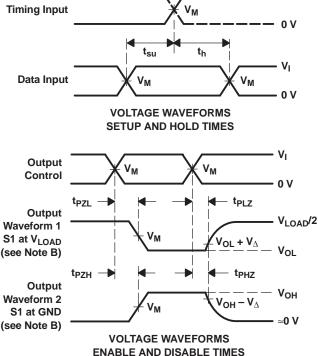
	INF	PUTS		N	•	_	N
V _{CC}	VI	t _r /t _f	VM	V _{LOAD}	CL	RL	V_{Δ}
1.8 V \pm 0.15 V	V _{CC}	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$\textbf{2.5 V} \pm \textbf{0.2 V}$	V _{CC}	≤2 ns	V _{CC} /2	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
3.3 V \pm 0.3 V	3 V	≤2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
5 V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







ENABLE AND DISABLE TIMES LOW- AND HIGH-LEVEL ENABLING

- 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 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

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11-Apr-2013

PACKAGING INFORMATION

Orderable Device	Status	Package Type	Package	Pins	Package	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
	(1)		Drawing		Qty	(2)		(3)		(4)	
1P1G08MDBVREPG4	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	C08O	Samples
SN74LVC1G08IDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CEO	Samples
SN74LVC1G08MDBVREP	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	C08O	Samples
SN74LVC1G08MDCKREP	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	BUB	Samples
V62/04733-01XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	CEO	Samples
V62/04733-02XE	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	BUB	Samples
V62/04733-02YE	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	C08O	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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11-Apr-2013

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OTHER QUALIFIED VERSIONS OF SN74LVC1G08-EP :

- Catalog: SN74LVC1G08
- Automotive: SN74LVC1G08-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
SN74LVC1G08IDCKREP	SC70	DCK	5	3000	179.0	8.4	2.2	2.5	1.2	4.0	8.0	Q3
SN74LVC1G08MDBVREP	SOT-23	DBV	5	3000	179.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
SN74LVC1G08MDCKREP	SC70	DCK	5	3000	179.0	8.4	2.2	2.5	1.2	4.0	8.0	Q3

TEXAS INSTRUMENTS

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PACKAGE MATERIALS INFORMATION

29-May-2013



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC1G08IDCKREP	SC70	DCK	5	3000	203.0	203.0	35.0
SN74LVC1G08MDBVREP	SOT-23	DBV	5	3000	203.0	203.0	35.0
SN74LVC1G08MDCKREP	SC70	DCK	5	3000	203.0	203.0	35.0

DBV (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-178 Variation AA.



DBV (R-PDSO-G5)

PLASTIC SMALL OUTLINE



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.



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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