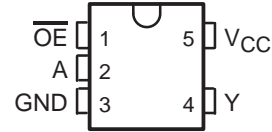


SN74AHCT1G125 SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

SCLS378F – AUGUST 1997 – REVISED JANUARY 2000

- **EPIC™ (Enhanced-Performance Implanted CMOS) Process**
- **Inputs Are TTL-Voltage Compatible**
- **Latch-Up Performance Exceeds 250 mA Per JESD 17**
- **Package Options Include Plastic Small-Outline Transistor (DBV, DCK) Packages**

DBV OR DCK PACKAGE
(TOP VIEW)



description

The SN74AHCT1G125 is a single bus buffer gate/line driver with 3-state output. The output is disabled when the output-enable (\overline{OE}) input is high. When \overline{OE} is low, true data is passed from the A input to the Y output.

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.

The SN74AHCT1G125 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

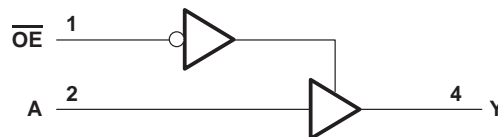
INPUTS		OUTPUT
\overline{OE}	A	Y
L	H	H
L	L	L
H	X	Z

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



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.

EPIC is a trademark of Texas Instruments Incorporated.

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.

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 2000, Texas Instruments Incorporated

SN74AHCT1G125

SINGLE BUS BUFFER GATE

WITH 3-STATE OUTPUT

SCLS378F – AUGUST 1997 – REVISED JANUARY 2000

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

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input voltage range, V_I (see Note 1)	–0.5 V to 7 V
Output voltage range, V_O (see Note 1)	–0.5 V to $V_{CC} + 0.5$ V
Input clamp current, I_{IK} ($V_I < 0$)	–20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	±25 mA
Continuous current through V_{CC} or GND	±50 mA
Package thermal impedance, θ_{JA} (see Note 2): DBV package	347°C/W
DCK package	389°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 voltage ratings may be exceeded if the input and output current ratings are observed.
 2. The package thermal impedance is calculated in accordance with JESD 51.

recommended operating conditions (see Note 3)

	MIN	MAX	UNIT
V_{CC} Supply voltage	4.5	5.5	V
V_{IH} High-level input voltage	2		V
V_{IL} Low-level input voltage		0.8	V
V_I Input voltage	0	5.5	V
V_O Output voltage	0	V_{CC}	V
I_{OH} High-level output current		–8	mA
I_{OL} Low-level output current		8	mA
$\Delta t/\Delta v$ Input transition rise or fall rate		20	ns/V
T_A Operating free-air temperature	–40	85	°C

NOTE 3: 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}	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
V_{OH}	$I_{OH} = -50 \mu\text{A}$	4.5 V	4.4	4.5		4.4		V
	$I_{OH} = -8 \text{ mA}$					3.8		
V_{OL}	$I_{OL} = 50 \mu\text{A}$	4.5 V			0.1		0.1	V
	$I_{OL} = 8 \text{ mA}$				0.36		0.44	
I_I	$V_I = V_{CC}$ or GND	0 V to 5.5 V			±0.1		±1	μA
I_{OZ}	$V_O = V_{CC}$ or GND	5.5 V			±0.25		±2.5	μA
I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			1		10	μA
ΔI_{CC}^\ddagger	One input at 3.4 V, Other input at V_{CC} or GND	5.5 V			1.35		1.5	mA
C_i	$V_I = V_{CC}$ or GND	5 V		4	10		10	pF
C_o	$V_O = V_{CC}$ or GND	5 V		10				pF

‡ This is the increase in supply current for each input at one of the specified TTL voltage levels rather than 0 V or V_{CC} .



SN74AHCT1G125
SINGLE BUS BUFFER GATE
WITH 3-STATE OUTPUT

SCLS378F – AUGUST 1997 – REVISED JANUARY 2000

switching characteristics over recommended operating free-air temperature range,
 $V_{CC} = 5\text{ V} \pm 0.5\text{ V}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
				MIN	TYP	MAX			
t_{PLH}	A	Y	$C_L = 15\text{ pF}$	3.8	5.5	1	6.5	ns	
t_{PHL}				3.8	5.5	1	6.5		
t_{PZH}	\overline{OE}	Y	$C_L = 15\text{ pF}$	3.6	5.1	1	6	ns	
t_{PZL}				3.6	5.1	1	6		
t_{PHZ}	\overline{OE}	Y	$C_L = 15\text{ pF}$	4.6	6.8	1	8	ns	
t_{PLZ}				4.6	6.8	1	8		
t_{PLH}	A	Y	$C_L = 50\text{ pF}$	5.3	7.5	1	8.5	ns	
t_{PHL}				5.3	7.5	1	8.5		
t_{PZH}	\overline{OE}	Y	$C_L = 50\text{ pF}$	5.1	7.1	1	8	ns	
t_{PZL}				5.1	7.1	1	8		
t_{PHZ}	\overline{OE}	Y	$C_L = 50\text{ pF}$	6.1	8.8	1	10	ns	
t_{PLZ}				6.1	8.8	1	10		

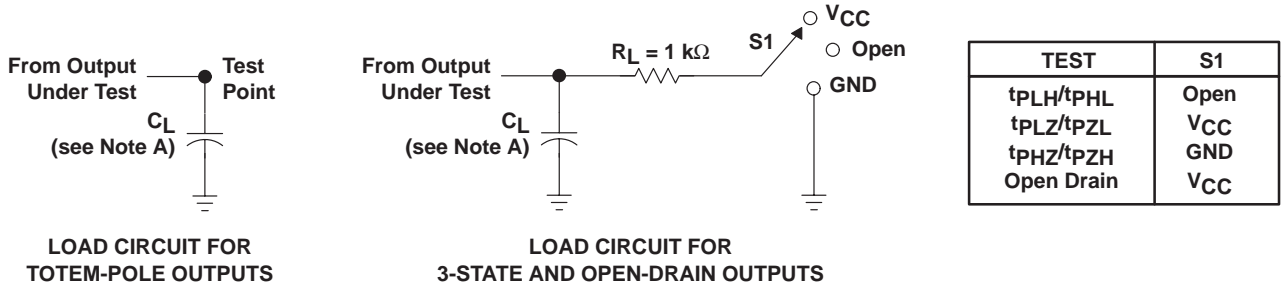
operating characteristics, $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
C_{pd} Power dissipation capacitance	No load, $f = 1\text{ MHz}$	14	pF

SN74AHCT1G125 SINGLE BUS BUFFER GATE WITH 3-STATE OUTPUT

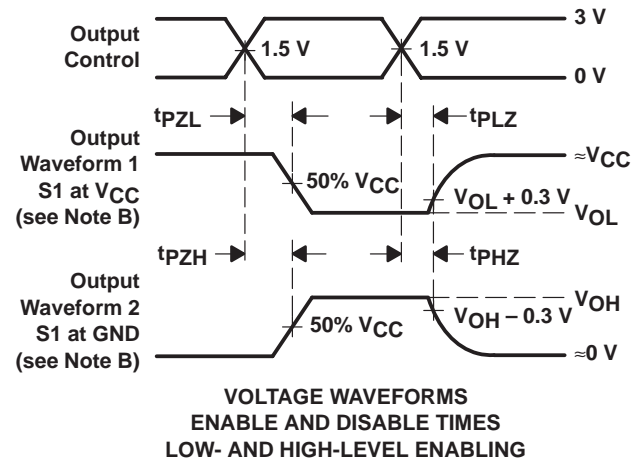
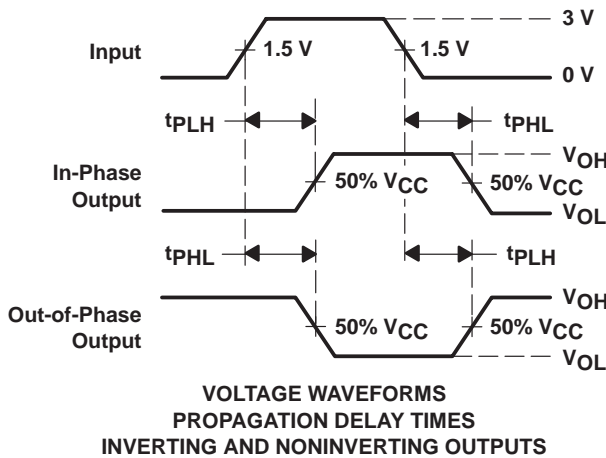
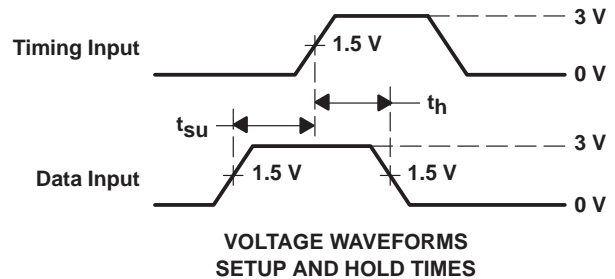
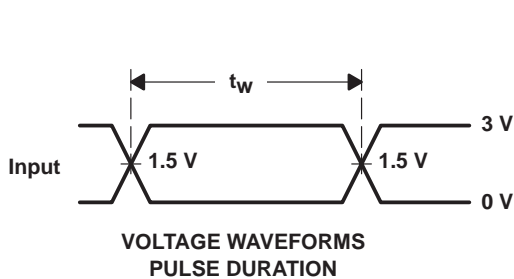
SCLS378F – AUGUST 1997 – REVISED JANUARY 2000

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT FOR TOTEM-POLE OUTPUTS

LOAD CIRCUIT FOR 3-STATE AND OPEN-DRAIN OUTPUTS



- 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: $PRR \leq 1\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 3\text{ ns}$, $t_f \leq 3\text{ ns}$.
 - D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.