

# **SN54125, SN54126, SN54LS125A, SN54LS126A, SN74125, SN74126, SN74LS125A, SN74LS126A** **QUADRUPLER BUS BUFFERS WITH 3-STATE OUTPUTS**

DECEMBER 1983 — REVISED MARCH 1988

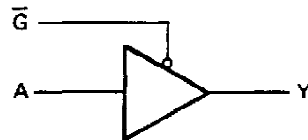
- Quad Bus Buffers
- 3-State Outputs
- Separate Control for Each Channel

## **description**

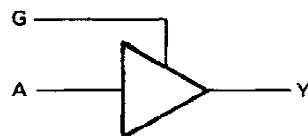
These bus buffers feature three-state outputs that, when enabled, have the low impedance characteristics of a TTL output with additional drive capability at high logic levels to permit driving heavily loaded bus lines without external pull-up resistors, when disabled, both output transistors are turned off presenting a high-impedance state to the bus so the output will act neither as a significant load nor as a driver. The '125 and 'LS125A outputs are disabled when  $\overline{G}$  is high. The '126 and 'LS126A outputs are disabled when G is low.

## **logic diagram (each gate)**

'125, 'LS125A

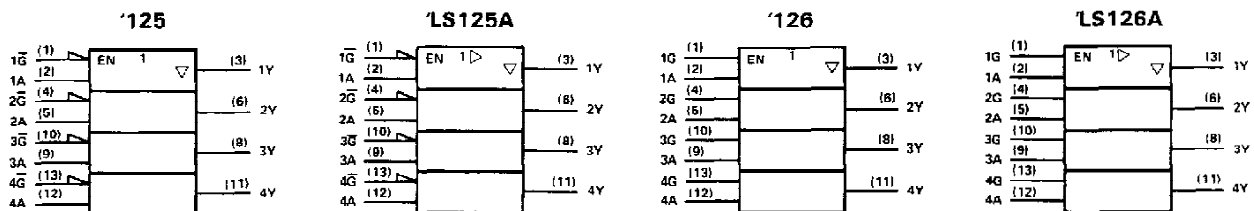


'126, 'LS126A



positive logic  $Y = A$

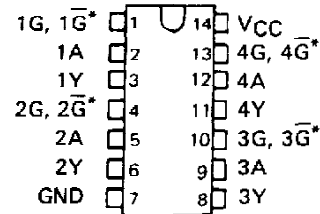
## **logic symbols†**



†These symbols are in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12. Pin numbers shown are for D, J, N, and W packages.

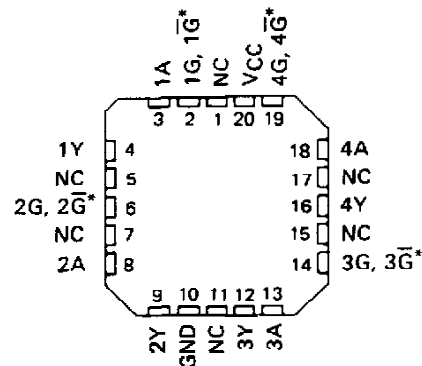
SN54125, SN54126, SN54LS125A,  
SN54LS126A . . . J OR W PACKAGE  
SN74125, SN74126 . . . N PACKAGE  
SN74LS125A, SN74LS126A . . . D OR N PACKAGE

(TOP VIEW)



SN54LS125A, SN54LS126A . . . FK PACKAGE

(TOP VIEW)



\* $\overline{G}$  on '125 and 'LS125A; G on 126 and 'LS126A

NC — No internal connection

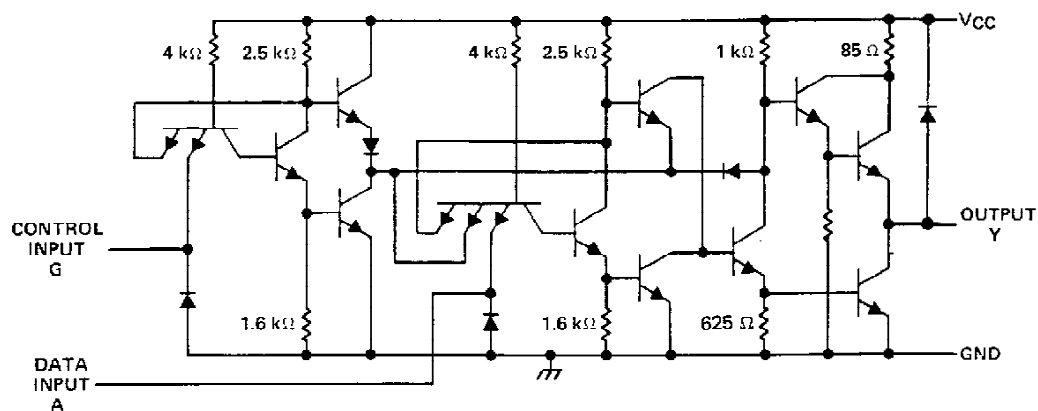
PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS  
INSTRUMENTS

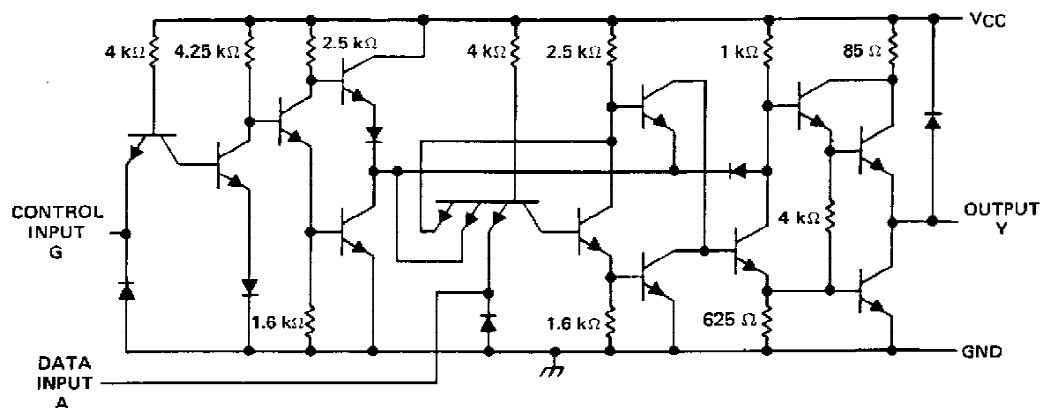
POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

# **SN54125, SN54126, SN74125, SN74126** **QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS**

schematics (each gate)



'125 CIRCUITS



'126 CIRCUITS

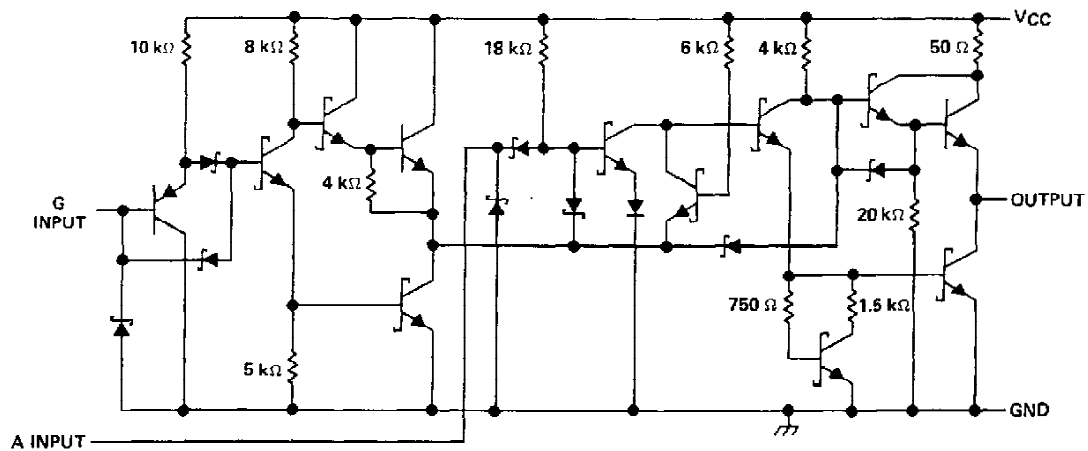
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, $V_{CC}$ (See Note 1)	7 V
Input voltage	5.5 V
Operating free-air temperature range: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

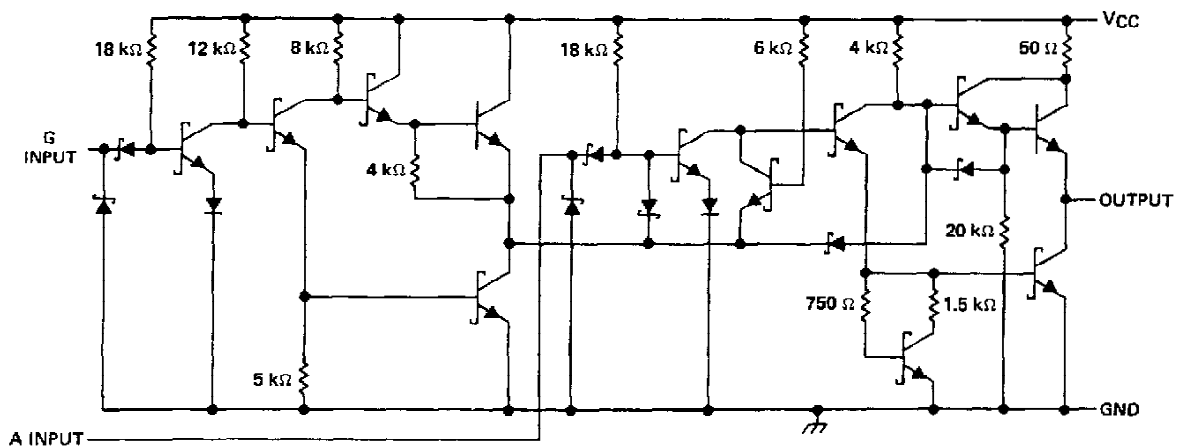
NOTE 1: Voltage values are with respect to network ground terminal.

# **SN54LS125A, SN54LS126A, SN74LS125A, SN74LS126A** **QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS**

schematics (each gate)



'LS125A CIRCUITS



'LS126A CIRCUITS

Resistor values shown are nominal.

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	7 V
Operating free-air temperature range: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminals.

**TEXAS**  
**INSTRUMENTS**

POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

# SN54125, SN54126, SN74125, SN74126

## QUADRUPLER BUS BUFFERS WITH 3-STATE OUTPUTS

### recommended operating conditions

	SN54125, SN54126			SN74125, SN74126			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub> High-level input voltage	2			2			V
V <sub>IL</sub> Low-level input voltage			0.8			0.8	V
I <sub>OH</sub> High-level output current			-2			-5.2	mA
I <sub>OL</sub> Low-level output current			16			16	mA
T <sub>A</sub> Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS †		SN54125, SN54126			SN74125, SN74126			UNIT
			MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA				1.5			1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V	I <sub>OH</sub> = -2 mA	2.4	3.3					V
		I <sub>OH</sub> = -5.2 mA				2.4	3.1		V
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 16 mA				0.4			0.4	V
I <sub>OZ</sub>	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V, V <sub>IL</sub> = 0.8 V	V <sub>O</sub> = 2.4 V			40			40	µA
		V <sub>O</sub> = 0.4 V			-40			-40	µA
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 6.5 V			1			1		mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V			40			40		µA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V			-1.6			-1.6		mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX		-30		-70	-28		-70	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, (see Note 2)	'125		32	54		32	54	mA
		'126		36	62		36	62	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time.

NOTE 2: Data inputs = 0 V; output control = 4.5 V for '125 and 0 V for '126.

### switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 3)

PARAMETER	TEST CONDITIONS	SN54/74125			SN54/74126			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
t <sub>PLH</sub>	R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 50 pF		8	13		8	13	ns
t <sub>PHL</sub>			12	18		12	18	ns
t <sub>PZH</sub>			11	17		11	18	ns
t <sub>PZL</sub>			16	25		16	25	ns
t <sub>PHZ</sub>	R <sub>L</sub> = 400 Ω, C <sub>L</sub> = 5 pF		5	8		10	16	ns
t <sub>PLZ</sub>			7	12		12	18	ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

TEXAS  
INSTRUMENTS

POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

# SN54LS125A, SN54LS126A, SN74LS125A, SN74LS126A QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS

## recommended operating conditions

		SN54LS125A SN54LS126A			SN74LS125A SN74LS126A			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage			0.7			0.8	V
I <sub>OH</sub>	High-level output current			-1			-2.6	mA
I <sub>OL</sub>	Low-level output current			12			24	mA
T <sub>A</sub>	Operating free-air temperature	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS †		SN54LS125A SN54LS126A			SN74LS125A SN74LS126A			UNIT
			MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V <sub>IK</sub>	V <sub>CC</sub> = MIN, I <sub>I</sub> = -18 mA				-1.5			-1.5	V
V <sub>OH</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V	V <sub>IL</sub> = 0.7 V, I <sub>OH</sub> = -1 mA	2.4						V
		V <sub>IL</sub> = 0.8 V, I <sub>OH</sub> = -2.6 mA				2.4			
V <sub>OL</sub>	V <sub>CC</sub> = MIN, V <sub>IH</sub> = 2 V	V <sub>IL</sub> = 0.7 V, I <sub>OL</sub> = 12 mA	0.25	0.4					V
		V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 12 mA				0.25	0.4		
		V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 24 mA				0.35	0.5		
I <sub>OZ</sub>	V <sub>CC</sub> = MAX, V <sub>IH</sub> = 2 V	V <sub>IL</sub> = 0.7 V	V <sub>O</sub> = 2.4 V		20				µA
			V <sub>O</sub> = 0.4 V		-20				
		V <sub>IL</sub> = 0.8 V	V <sub>O</sub> = 2.4 V			20			
			V <sub>O</sub> = 0.4 V			-20			
I <sub>I</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 7 V			0.1				0.1	mA
I <sub>IH</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7 V			20				20	µA
I <sub>IL</sub>	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	'LS125A-G inputs		-0.2				-0.2	mA
		'LS125A-A inputs; 'LS126A All inputs		-0.4				-0.4	mA
I <sub>OS</sub> §	V <sub>CC</sub> = MAX		-40		-225	-40		-225	mA
I <sub>CC</sub>	V <sub>CC</sub> = MAX, (see Note 2)	'LS125A	11	20		11	20		mA
		'LS126A	12	22		12	22		

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

§ Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

NOTE 2: Data inputs = 0 V; Output controls = 4.5 V for 'LS125A and 0 V for 'LS126A.

## switching characteristics; V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C (see note 3)

PARAMETER	TEST CONDITIONS	SN54/74LS125A			SN54/74LS126A			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
t <sub>PLH</sub>	R <sub>L</sub> = 667 Ω, C <sub>L</sub> = 45 pF	9	15		9	15		ns
t <sub>PHL</sub>		7	18		8	18		ns
t <sub>PZH</sub>		12	20		16	25		ns
t <sub>PZL</sub>		15	25		21	35		ns
t <sub>PHZ</sub>	R <sub>L</sub> = 667 Ω, C <sub>L</sub> = 5 pF		20			25		ns
t <sub>PLZ</sub>			20			25		ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

TEXAS  
INSTRUMENTS

POST OFFICE BOX 656012 • DALLAS, TEXAS 75265

## IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

TI warrants performance of its semiconductor products and related software 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, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

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

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI 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.