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

DECEMBER 1983 — REVISED MARCH 1988

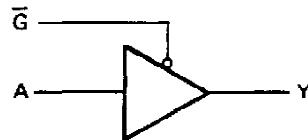
- Quad Bus Buffers
- 3-State Outputs
- Separate Control for Each Channel

## **description**

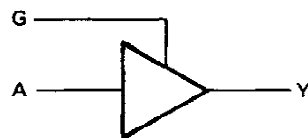
These bus buffers feature three-state outputs that, when enabled, have the low impedance characteristics of a TTL output with additional drive capability at high logic levels to permit driving heavily loaded bus lines without external pull-up resistors, when disabled, both output transistors are turned 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

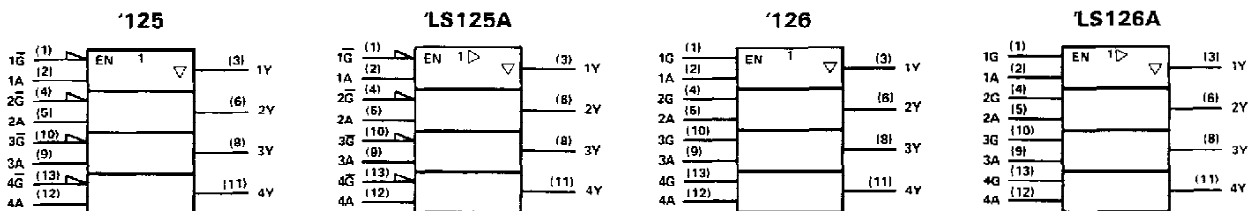


'126, 'LS126A



positive logic  $Y = A$

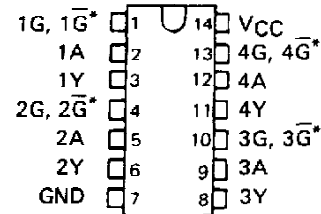
## **logic symbols†**



†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.

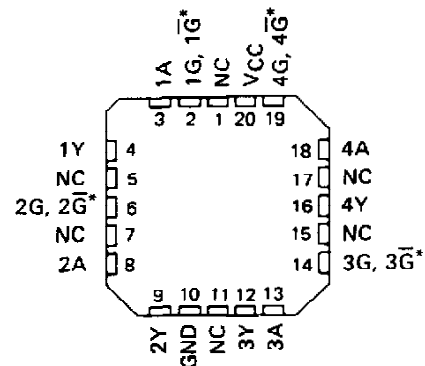
SN54125, SN54126, SN54LS125A,  
SN54LS126A . . . J OR W PACKAGE  
SN74125, SN74126 . . . N PACKAGE  
SN74LS125A, SN74LS126A . . . D OR N PACKAGE

(TOP VIEW)



SN54LS125A, SN54LS126A . . . FK PACKAGE

(TOP VIEW)



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

NC — No internal connection

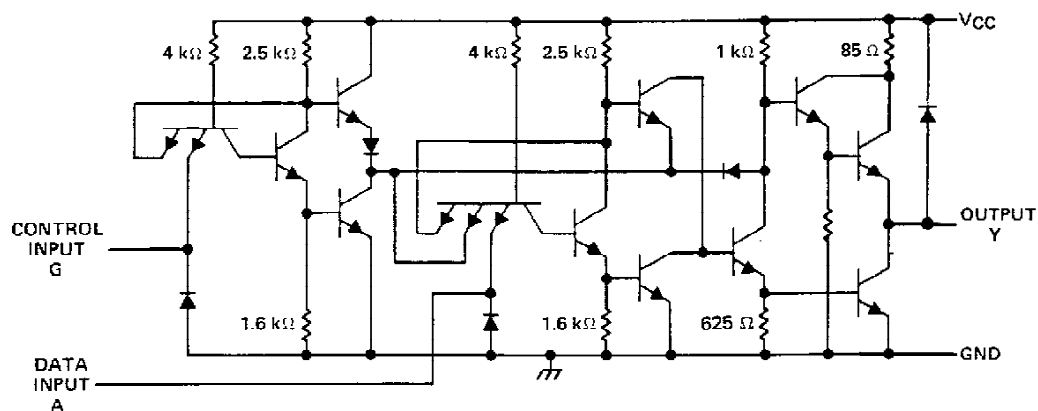
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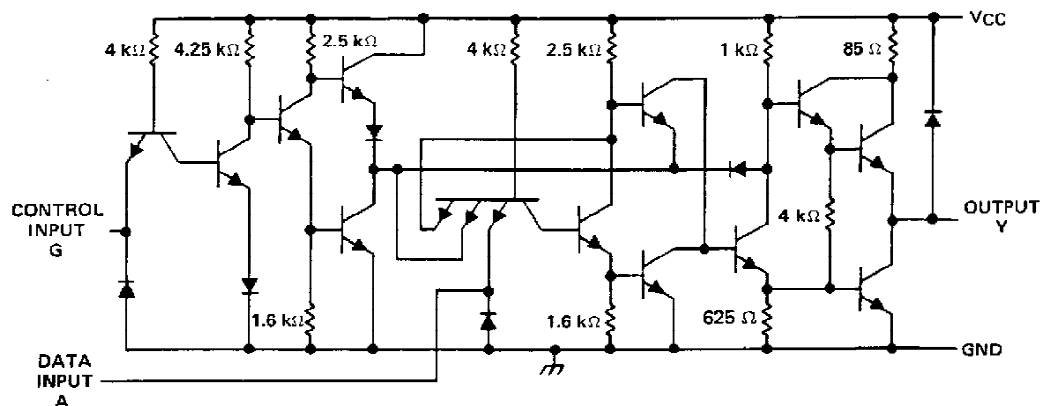
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# **SN54125, SN54126, SN74125, SN74126** **QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS**

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

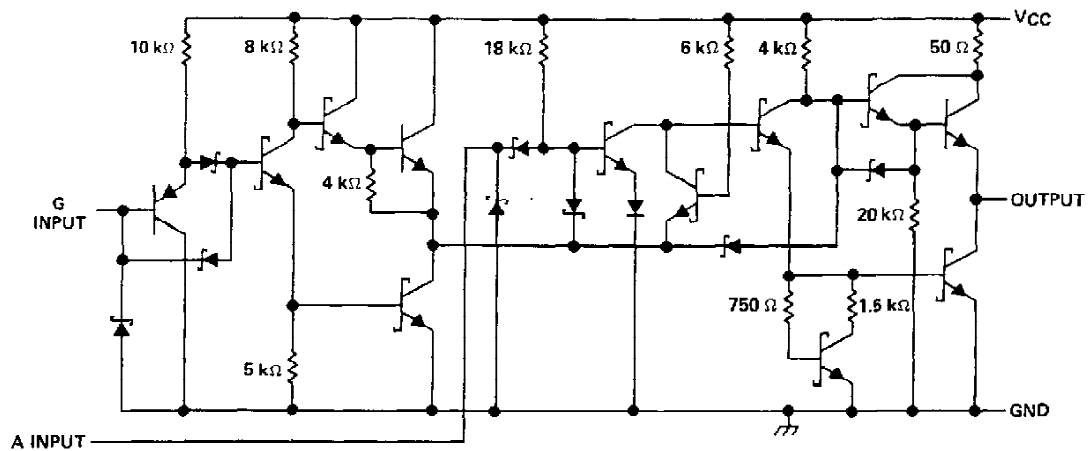
NOTE 1: Voltage values are with respect to network ground terminal.

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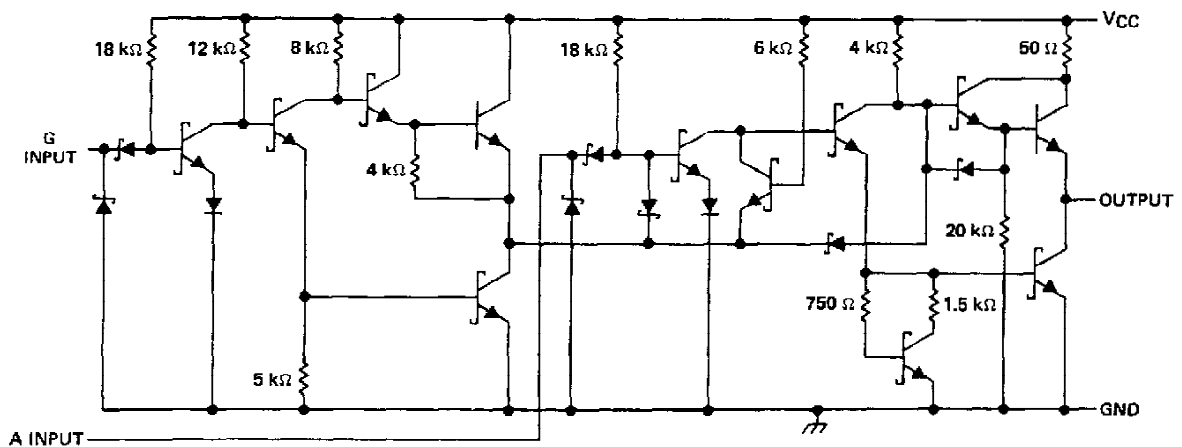
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# SN54LS125A, SN54LS126A, SN74LS125A, SN74LS126A QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS

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.

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# 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.

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# 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.

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