

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

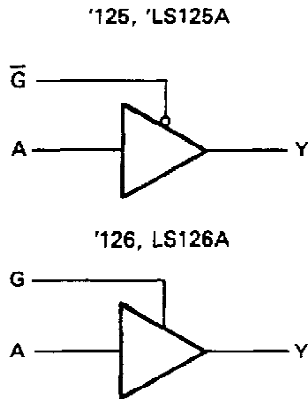
DECEMBER 1983 — REVISED MARCH 1988

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

description

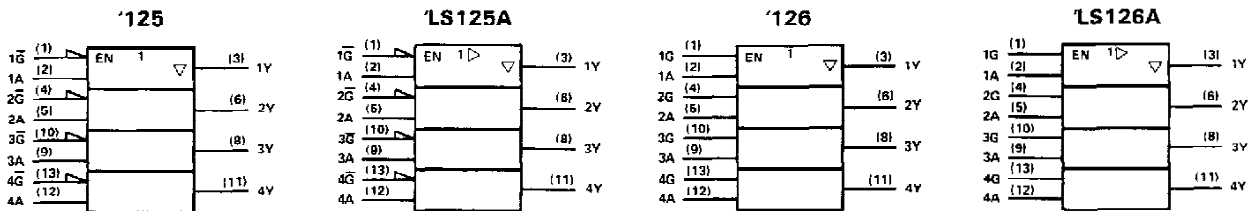
These bus buffers feature three-state outputs that, when enabled, have the low impedance characteristics of a TTL output with additional drive capability at high logic levels to permit driving heavily loaded bus lines without external pull-up resistors, when disabled, both output transistors are turned 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  $\bar{G}$  is high. The '126 and 'LS126A outputs are disabled when G is low.

logic diagram (each gate)



positive logic  $Y = A$

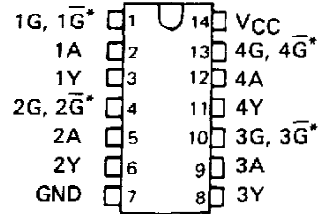
logic symbols †



† 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.

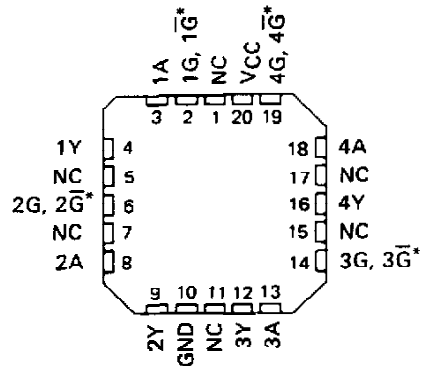
SN54125, SN54126, SN54LS125A,  
SN54LS126A . . . J OR W PACKAGE  
SN74125, SN74126 . . . N PACKAGE  
SN74LS125A, SN74LS126A . . . D OR N PACKAGE

(TOP VIEW)



SN54LS125A, SN54LS126A . . . FK PACKAGE

(TOP VIEW)



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

NC — No internal connection

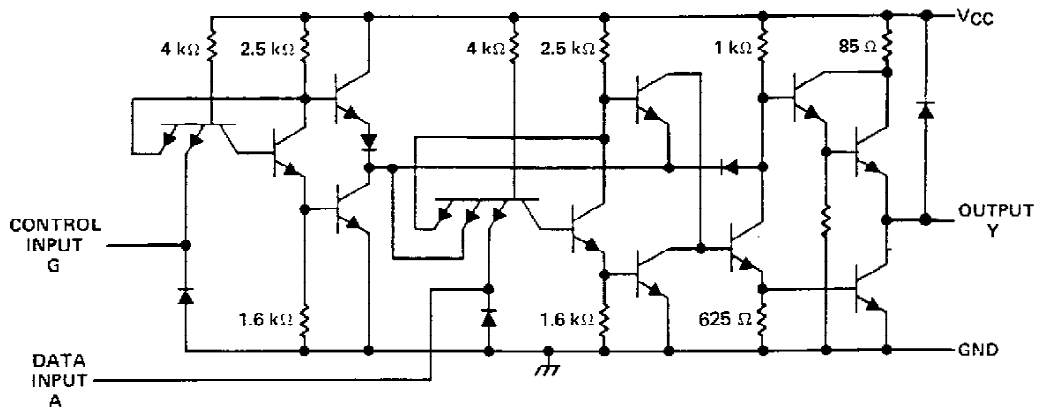
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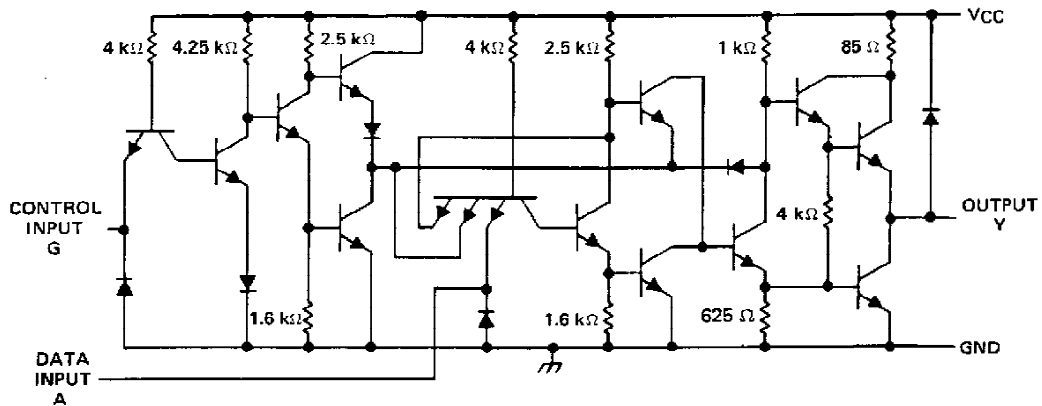
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# SN54125, SN54126, SN74125, SN74126 QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS

schematics (each gate)



'125 CIRCUITS



'126 CIRCUITS

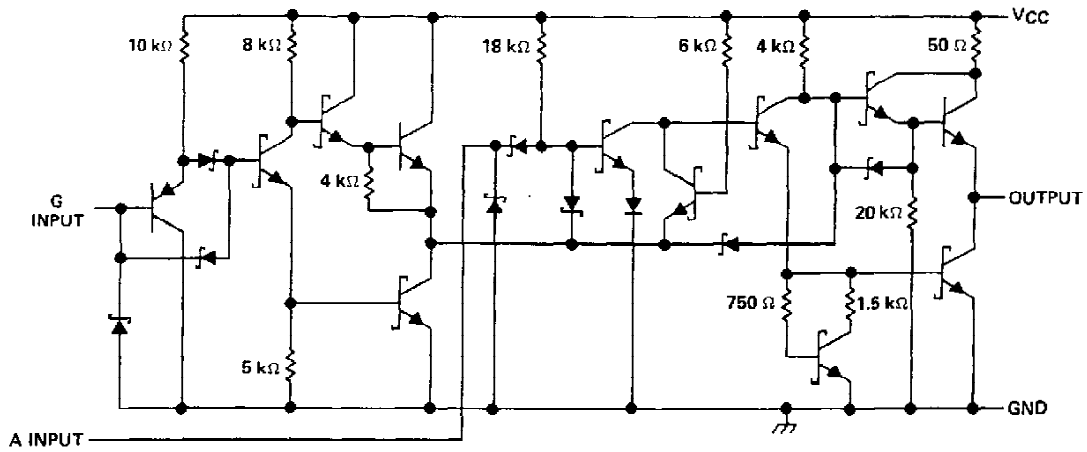
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

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

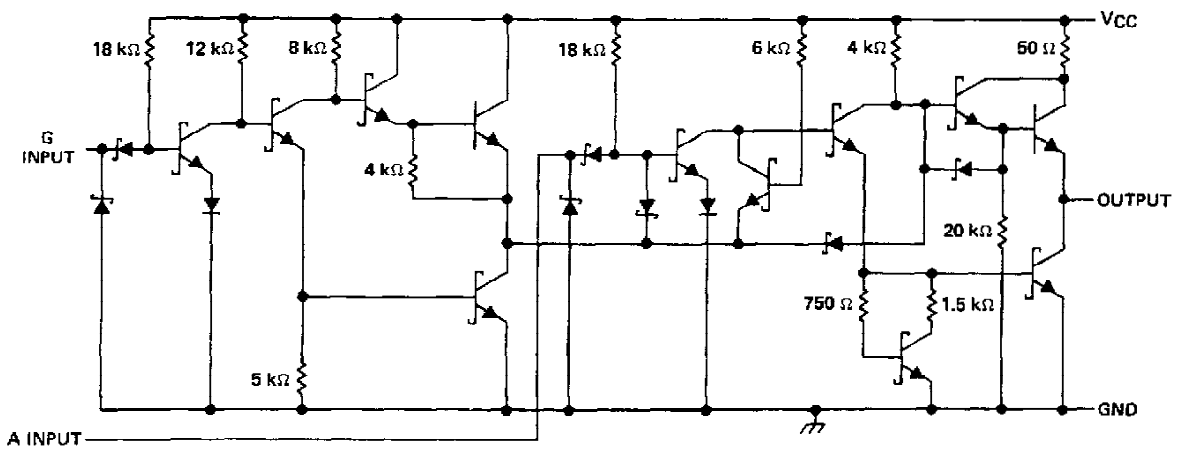
NOTE 1: Voltage values are with respect to network ground terminal.

# 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 QUADRUPLE 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			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 <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				
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				

† 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			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>IIL</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		mA
			'LS126A		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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