

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

DECEMBER 1983 — REVISED MARCH 1988

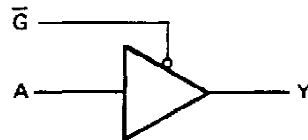
- Quad Bus Buffers
- 3-State Outputs
- Separate Control for Each Channel

description

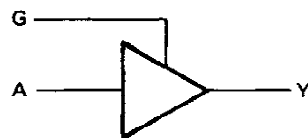
These bus buffers feature three-state outputs that, when enabled, have the low impedance characteristics of a TTL output with additional drive capability at high logic levels to permit driving heavily loaded bus lines without external pull-up resistors, when disabled, both output transistors are turned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

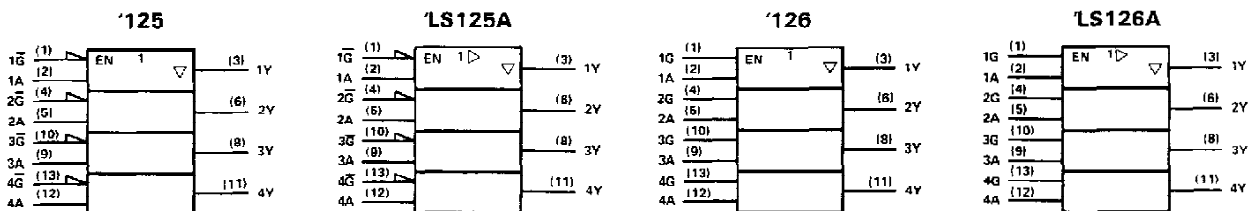
'125, 'LS125A



'126, 'LS126A

positive logic $Y = A$

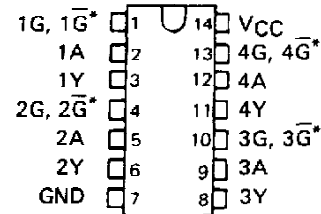
logic symbols†



†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.

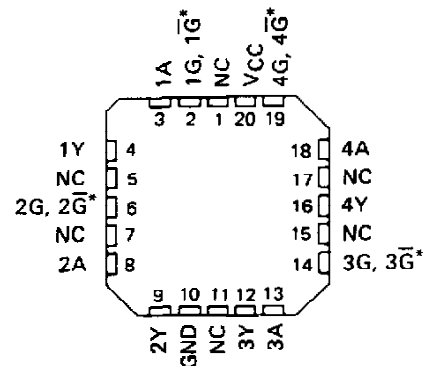
SN54125, SN54126, SN54LS125A,
SN54LS126A . . . J OR W PACKAGE
SN74125, SN74126 . . . N PACKAGE
SN74LS125A, SN74LS126A . . . D OR N PACKAGE

(TOP VIEW)



SN54LS125A, SN54LS126A . . . FK PACKAGE

(TOP VIEW)

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

NC — No internal connection

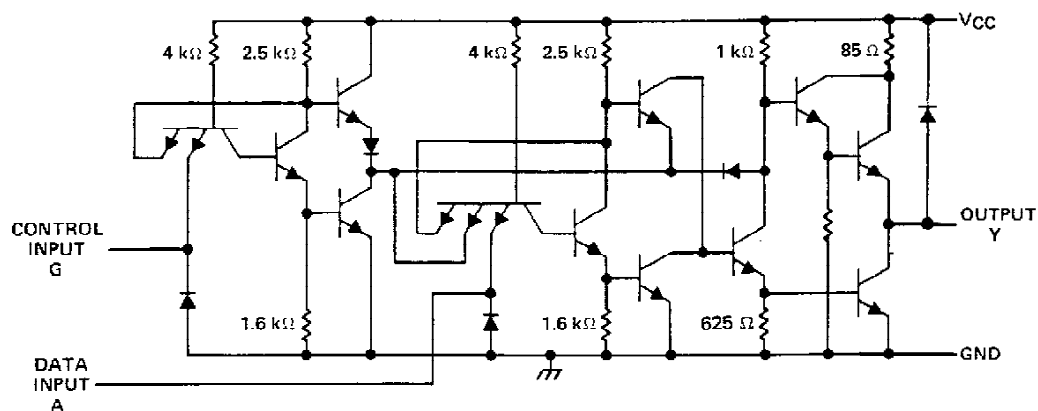
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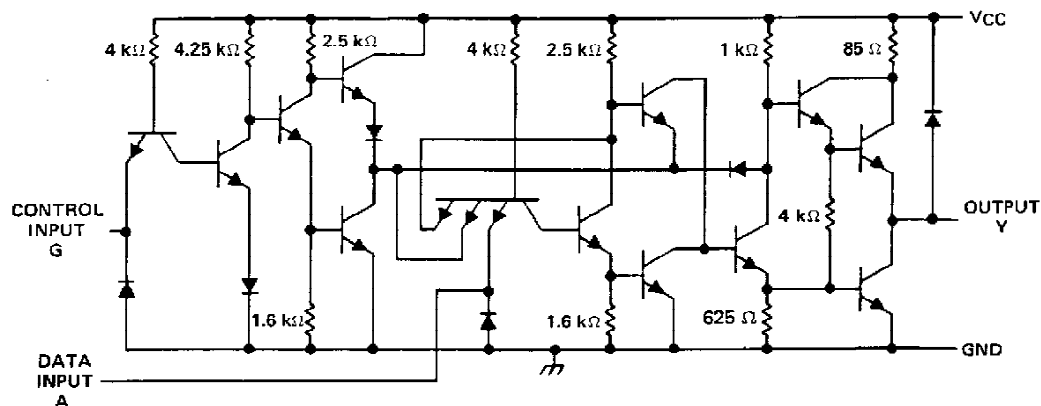
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SN54125, SN54126, SN74125, SN74126 **QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS**

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

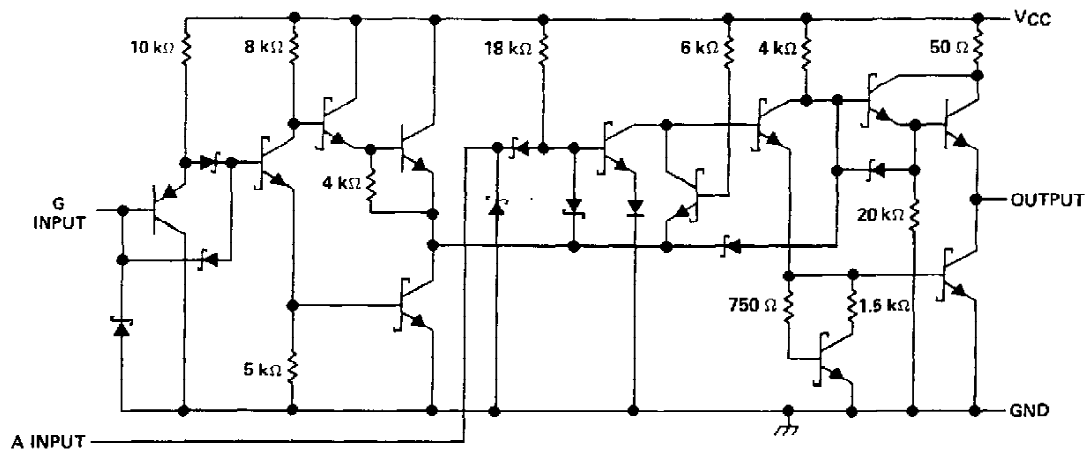
NOTE 1: Voltage values are with respect to network ground terminal.

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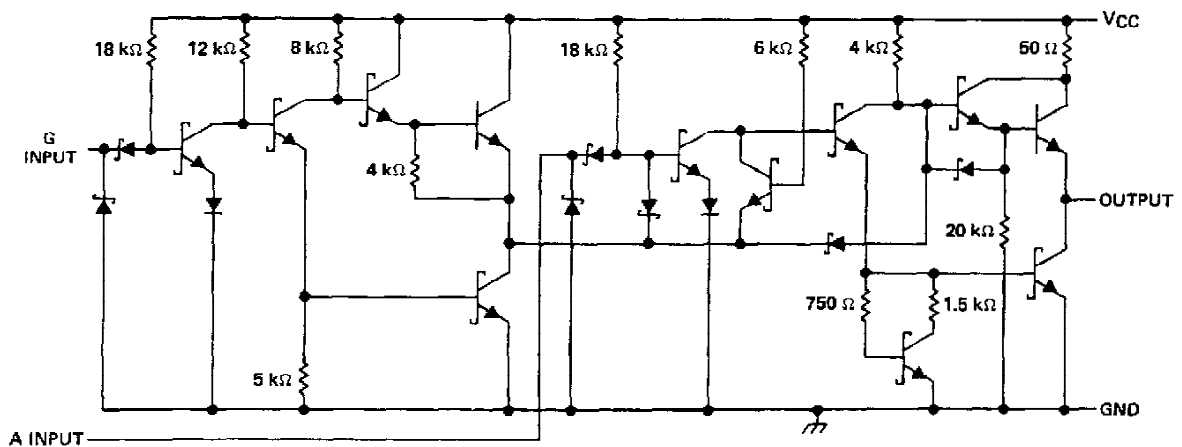
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SN54LS125A, SN54LS126A, SN74LS125A, SN74LS126A **QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS**

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

QUADRUPLE BUS BUFFERS WITH 3-STATE OUTPUTS

recommended operating conditions

	SN54125, SN54126			SN74125, SN74126			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.8			0.8	V
I _{OH} High-level output current			-2			-5.2	mA
I _{OL} Low-level output current			16			16	mA
T _A 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 _{IK}	V _{CC} = MIN, I _I = -12 mA				1.5			1.5	V
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = 0.8 V	I _{OH} = -2 mA	2.4	3.3					V
		I _{OH} = -5.2 mA				2.4	3.1		V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = 0.8 V, I _{OL} = 16 mA				0.4			0.4	V
I _{OZ}	V _{CC} = MAX, V _{IH} = 2 V, V _{IL} = 0.8 V	V _O = 2.4 V			40			40	μA
		V _O = 0.4 V			-40			-40	μA
I _I	V _{CC} = MAX, V _I = 6.5 V			1			1		mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V			40			40		μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V			-1.6			-1.6		mA
I _{OS} §	V _{CC} = MAX		-30		-70	-28		-70	mA
I _{CC}	V _{CC} = 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_{CC} = 5 V, T_A = 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_{CC} = 5 V, T_A = 25°C (see note 3)

PARAMETER	TEST CONDITIONS	SN54/74125			SN54/74126			UNIT
		MIN	TYP	MAX	MIN	TYP	MAX	
t _{PLH}	R _L = 400 Ω, C _L = 50 pF		8	13		8	13	ns
t _{PHL}			12	18		12	18	ns
t _{PZH}			11	17		11	18	ns
t _{PZL}			16	25		16	25	ns
t _{PHZ}	R _L = 400 Ω, C _L = 5 pF		5	8		10	16	ns
t _{PLZ}			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 _{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High-level input voltage	2			2			V
V _{IL}	Low-level input voltage			0.7			0.8	V
I _{OH}	High-level output current			-1			-2.6	mA
I _{OL}	Low-level output current			12			24	mA
T _A	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 _{IK}	V _{CC} = MIN, I _I = -18 mA				-1.5			-1.5	V
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V	V _{IL} = 0.7 V, I _{OH} = -1 mA	2.4						V
		V _{IL} = 0.8 V, I _{OH} = -2.6 mA				2.4			
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V	V _{IL} = 0.7 V, I _{OL} = 12 mA		0.25	0.4				V
		V _{IL} = 0.8 V, I _{OL} = 12 mA				0.25	0.4		
		V _{IL} = 0.8 V, I _{OL} = 24 mA				0.35	0.5		
I _{OZ}	V _{CC} = MAX, V _{IH} = 2 V	V _{IL} = 0.7 V	V _O = 2.4 V		20				µA
			V _O = 0.4 V		-20				
		V _{IL} = 0.8 V	V _O = 2.4 V			20			
			V _O = 0.4 V			-20			
I _I	V _{CC} = MAX, V _I = 7 V			0.1				0.1	mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V			20				20	µA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V	'LS125A-G inputs		-0.2				-0.2	mA
		'LS125A-A inputs; 'LS126A All inputs		-0.4				-0.4	mA
I _{OS} §	V _{CC} = MAX		-40		-225	-40		-225	mA
I _{CC}	V _{CC} = 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_{CC} = 5 V, T_A = 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_{CC} = 5 V, T_A = 25°C (see note 3)

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

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

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