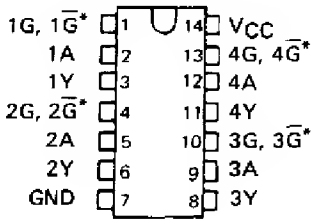
SDLS044

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

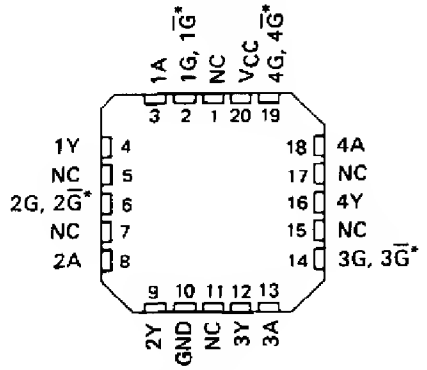
DECEMBER 1983 – REVISED MARCH 1988

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

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)



*G̅ on '125 and 'LS125A; G on 126 and 'LS126A

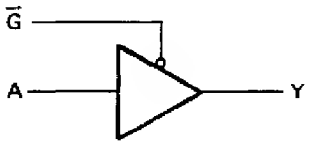
NC – No internal connection

description

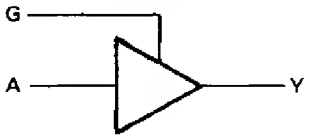
These bus buffers feature three-state outputs that, when enabled, have the low impedence characteristics of a TTL output with additional drive capability at high logic levels to permit driving heavily loaded bus lines without external pull-up resistors, when disabled, both output transistors are turned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



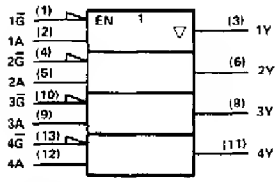
'126, LS126A



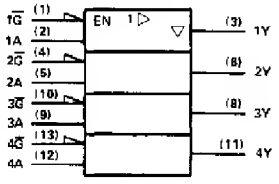
positive logic Y = A

logic symbols†

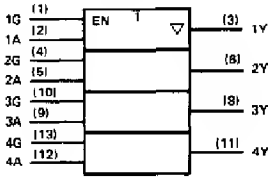
'125



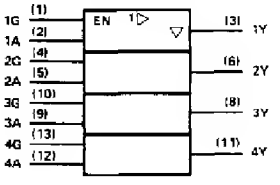
'LS125A



'126



'LS126A



†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.

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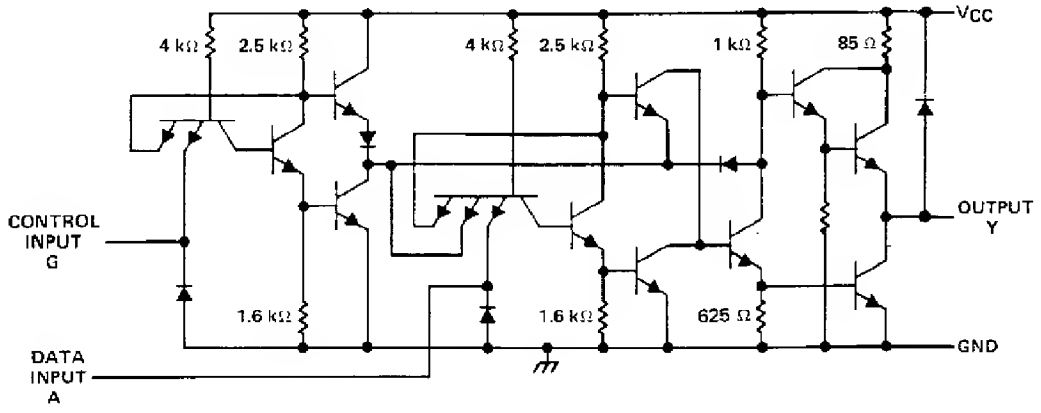
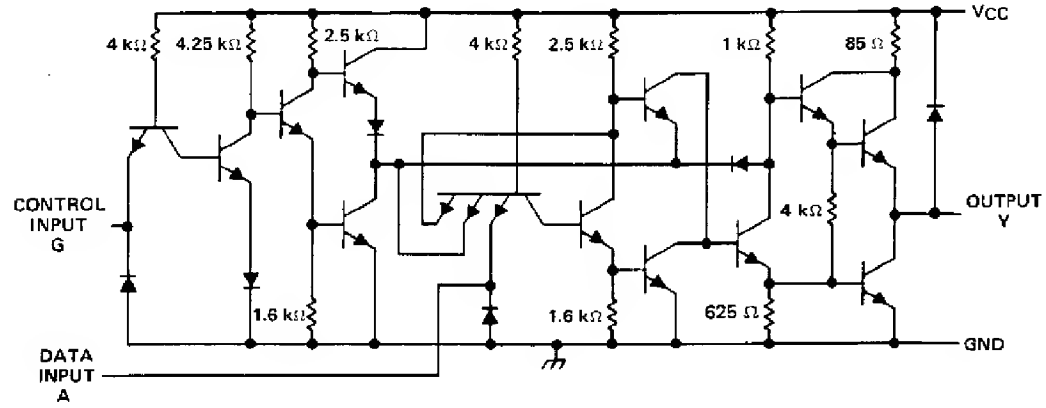
schematics (each gate)



'125 CIRCUITS



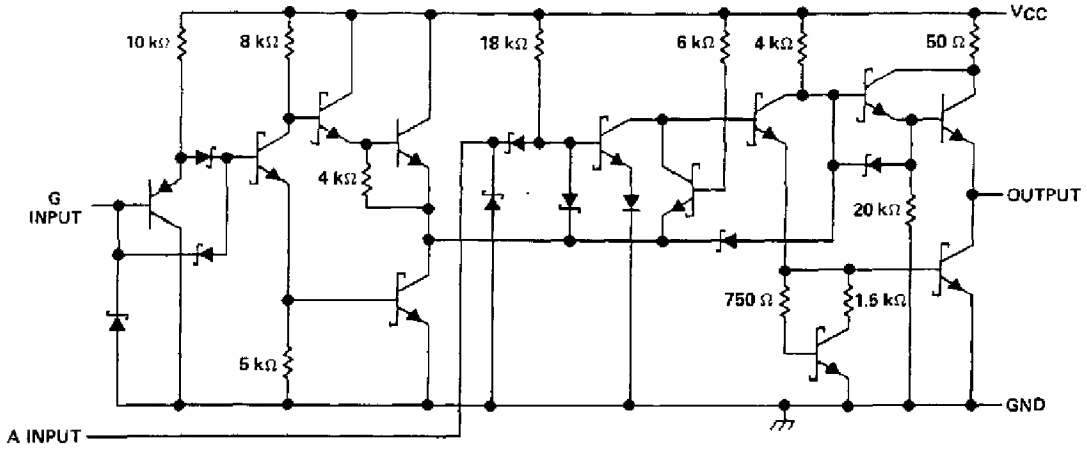
'126 CIRCUITS

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

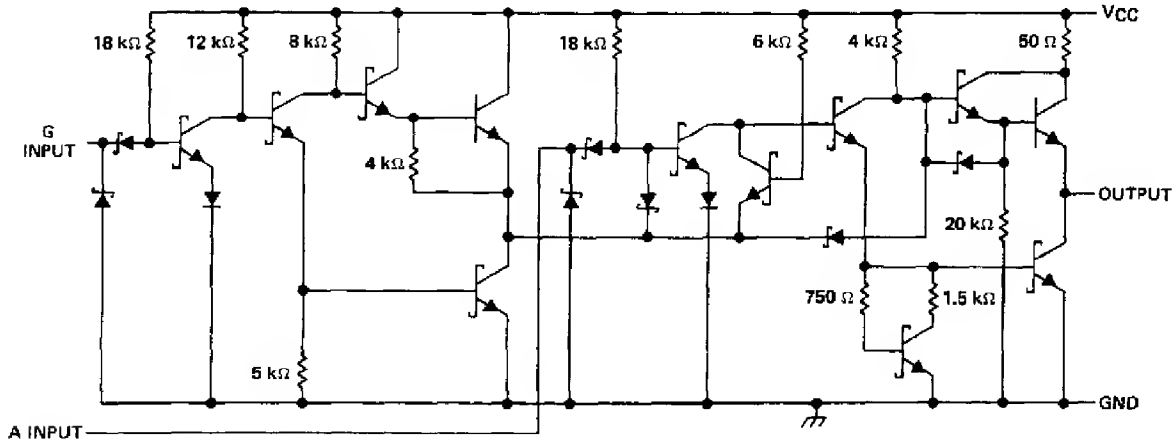
Supply voltage, V_{CC} (See Note 1)	7 V
Input voltage	5.5 V
Operating free-air temperature range: SN54'	−55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	−65°C to 150°C

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

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.

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_{IL} = 0.8 V	V_{IH} = 2 V,	I_{OH} = −2 mA	2.4	3.3					V
			I_{OH} = −5.2 mA				2.4	3.1		
V_{OL}	V_{CC} = MIN, I_{OL} = 16 mA	V_{IH} = 2 V,	V_{IL} = 0.8 V,			0.4			0.4	V
I_{OZ}	V_{CC} = MAX, V_{IL} = 0.8 V	V_{IH} = 2 V,	V_O = 2.4 V			40			40	μA
			V_O = 0.4 V			−40			−40	
I_I	V_{CC} = MAX,	V_I = 5.5 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	

† 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.

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-$\overline{G}$ 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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