

QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

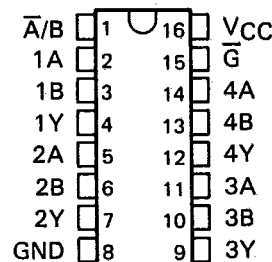
D2661, APRIL 1982—REVISED APRIL 1987

TEXAS INSTR (LOGIC)

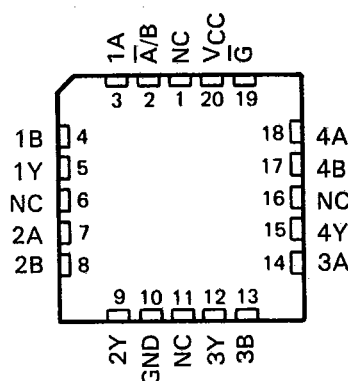
25E D

- Three-State Outputs Interface Directly with System Bus
- Provides Bus Interface from Multiple Sources in High-Performance Systems
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

SN54ALS', SN54AS' ... J PACKAGE
SN74ALS', SN74AS' ... D OR N PACKAGE
(TOP VIEW)



SN54ALS', SN54AS' ... FK PACKAGE
(TOP VIEW)



NC—No internal connection

FUNCTION TABLE

OUTPUT CONTROL $\bar{G}$	INPUTS		OUTPUT Y	
	SELECT $\bar{A}/\bar{B}$	DATA		
		A	B	
H	X	X	X	Z
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

NOTICE

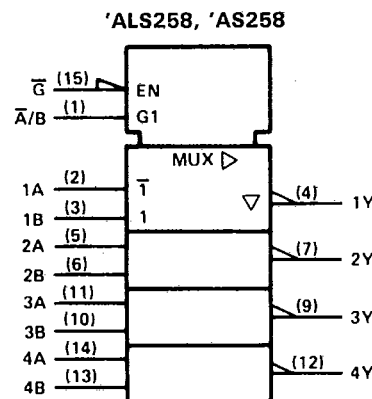
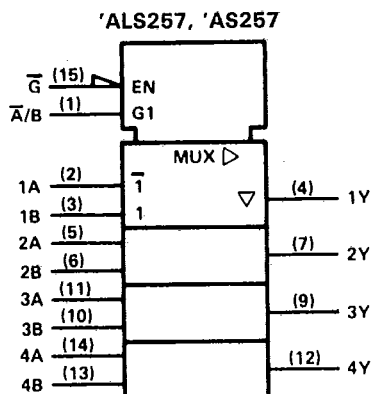
SEE ORDER OF DATA FOR ERRATA INFORMATION

description

These devices are designed to multiplex signals from four-bit data sources to four-output data lines in bus-organized systems. The 3-state outputs will not load the data lines when the output control pin (G) is at a high-logic level.

The SN54' family is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74' family is characterized for operation from 0°C to 70°C .

logic symbol†



† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, and N packages.

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

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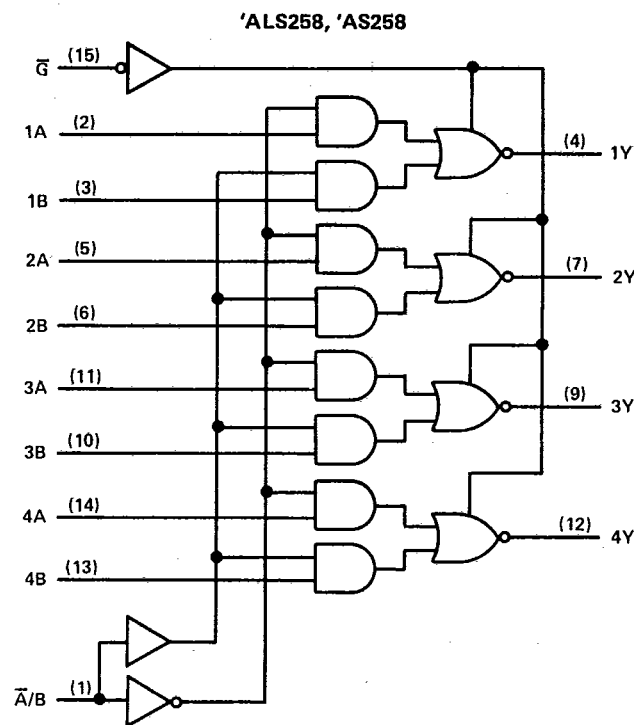
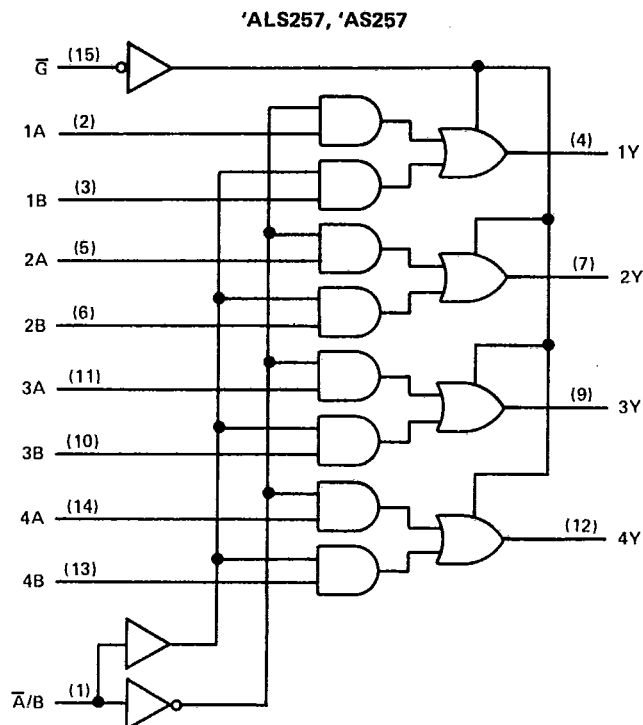
**SN54ALS257, SN54ALS258, SN54AS257, SN54AS258
SN74ALS257, SN74ALS258, SN74AS257, SN74AS258**

QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

8961723 TEXAS INSTR TEXAS INSTR (LOGIC)

25E D: T-66-21-51

logic diagram (positive logic)



Pin numbers shown are for D, J, and N packages.

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

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54ALS', SN54AS	-55°C to 125°C
SN74ALS', SN74AS'	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

		SN54ALS257 SN54ALS258			SN74ALS257 SN74ALS258			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	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		SN54ALS257 SN54ALS258		SN74ALS257 SN74ALS258		UNIT
				MIN	TYP†	MAX	MIN	
V _{IK}		V _{CC} = 4.5 V, I _I = -18 mA		-1.5		-1.5		V
V _{OH}		V _{CC} = 4.5 V to 5.5 V, I _{OH} = -0.4 mA		V _{CC} -2		V _{CC} -2		V
		V _{CC} = 4.5 V, I _{OH} = -1 mA		2.4 3.3				
		V _{CC} = 4.5 V, I _{OH} = -2.6 mA				2.4 3.2		
V _{OL}		V _{CC} = 4.5 V, I _{OL} = 12 mA		0.25 0.4		0.25 0.4		V
		V _{CC} = 4.5 V, I _{OL} = 24 mA				0.35 0.5		
I _{OZH}		V _{CC} = 5.5 V, V _O = 2.7 V		20		20		μA
I _{OZL}		V _{CC} = 5.5 V, V _O = 0.4 V		-20		-20		μA
I _I		V _{CC} = 5.5 V, V _I = 7 V		0.1		0.1		mA
I _{IH}		V _{CC} = 5.5 V, V _I = 2.7 V		20		20		μA
I _{IL}		V _{CC} = 5.5 V, V _I = 0.4 V		-0.1		-0.1		mA
I _O ‡		V _{CC} = 5.5 V, V _O = 2.25 V		-30 -112		-30 -112		mA
I _{CC}	‘ALS257	V _{CC} = 5.5 V	Outputs high	3 6		3 6		mA
			Outputs low	8 12		8 12		
			Outputs disabled	9 14		9 14		
	‘ALS258	V _{CC} = 5.5 V	Outputs high	2.5 4		2.5 4		
			Outputs low	7 11		7 11		
			Outputs disabled	8 13		8 13		

†All typical values are at V_{CC} = 5 V, T_A = 25°C.

‡The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

SN54ALS257, SN54ALS258, SN74ALS257, SN74ALS258
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

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TEXAS INSTR (LOGIC)

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'ALS257 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 4.5 V to 5.5 V, CL = 50 pF, R1 = 500 Ω, R2 = 500 Ω, TA = MIN to MAX				UNIT
			SN54ALS257		SN74ALS257		
			MIN	MAX	MIN	MAX	
tPLH	A or B	Any Y	2	12	2	10	ns
tPHL			2	14	2	12	
tPLH	A̅/B	Any Y	7	21	7	18	ns
tPHL			6	25	6	22	
tPZH	G̅	Any Y	4	20	4	16	ns
tPZL			5	22	5	18	
tPHZ	G̅	Any Y	2	12	2	10	ns
tPLZ			4	35	3	15	

'ALS258 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 4.5 V to 5.5 V, CL = 50 pF, R1 = 500 Ω, R2 = 500 Ω, TA = MIN to MAX				UNIT
			SN54ALS258		SN74ALS258		
			MIN	MAX	MIN	MAX	
tPLH	A or B	Any Y	1	12	2	8	ns
tPHL			2	9	2	7	
tPLH	A̅/B	Any Y	5	28	8	20	ns
tPHL			8	25	5	25	
tPZH	G̅	Any Y	5	20	5	18	ns
tPZL			5	21	5	18	
tPHZ	G̅	Any Y	2	12	2	10	ns
tPLZ			5	37	4	18	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of *ALS/AS Logic Data Book, 1986*.

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SN54AS257, SN54AS258, SN74AS257, SN74AS258 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

TEXAS INSTR (LOGIC)

25E D ■ 8961723 0083854 7 ■

recommended operating conditions

		SN54AS257 SN54AS258			SN74AS257 SN74AS258			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	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			-12			-15	mA
I _{OL}	Low-level output current			32			48	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	SN54AS257 SN54AS258			SN74AS257 SN74AS258			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V _{IK}		V _{CC} = 4.5 V, I _I = -18 mA			-1.2			-1.2	V
V _{OH}		V _{CC} = 4.5 V to 5.5 V, I _{OH} = -2 mA	V _{CC} - 2			V _{CC} - 2			V
		V _{CC} = 4.5 V, I _{OH} = -12 mA	2.4	3.3					
		V _{CC} = 4.5 V, I _{OH} = -15 mA				2.4	3.2		
V _{OL}		V _{CC} = 4.5 V, I _{OL} = 32 mA	0.25	0.5					V
		V _{CC} = 4.5 V, I _{OL} = 48 mA				0.35	0.5		
I _{OZH}		V _{CC} = 5.5 V, V _O = 2.7 V			50			50	μA
I _{OZL}		V _{CC} = 5.5 V, V _O = 0.4 V			-50			-50	μA
I _I	A, B or $\bar{G}$	V _{CC} = 5.5 V, V _I = 7 V			0.1			0.1	mA
	$\bar{A}/B$				0.2			0.2	
I _{IH}	A, B, or $\bar{G}$	V _{CC} = 5.5 V, V _I = 2.7 V			20			20	μA
	$\bar{A}/B$				40			40	
I _{IL}	A, B, or $\bar{G}$	V _{CC} = 5.5 V, V _I = 0.4 V			-0.5			-0.5	mA
	$\bar{A}/B$				-1			-1	
I _O ‡		V _{CC} = 5.5 V, V _O = 2.25 V	-30		-112	-30		-112	mA
I _{CC}	'AS257	V _{CC} = 5.5 V	Outputs high		12.1	19.7	12.1	19.7	mA
			Outputs low		19	30.6	19	30.6	
			Outputs disabled		19.7	31.9	19.7	31.9	
	'AS258	V _{CC} = 5.5 V	Outputs high		8.4	13.5	8.4	13.5	
			Outputs low		15.2	24.6	15.2	24.6	
			Outputs disabled		15.5	25.2	15.5	25.2	

†All typical values are at V_{CC} = 5 V, T_A = 25°C.

‡The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

TEXAS INSTR (LOGIC)

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'AS257 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T _A = MIN to MAX				UNIT
			SN54AS257		SN74AS257		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Any Y	1	6.5	1	5.5	ns
t _{PHL}			1	7	1	6	
t _{PLH}	A̅/B	Any Y	2	12	2	11	ns
t _{PHL}			2	10.5	2	10	
t _{PZH}	G̅	Any Y	2	8.5	2	7.5	ns
t _{PZL}			2	10.5	2	9.5	
t _{PHZ}	G̅	Any Y	1.5	8	1.5	6.5	ns
t _{PLZ}			2	8	2	7	

'AS258 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$ $C_L = 50 \text{ pF},$ $R_1 = 500 \Omega,$ $R_2 = 500 \Omega,$ $T_A = \text{MIN to MAX}$				UNIT
			SN54AS258		SN74AS258		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Any Y	1	5.5	1	5	ns
t_{PHL}			1	5	1	4	
t_{PLH}	$\overline{A}/B$	Any Y	2	11	2	9.5	ns
t_{PHL}			2	11	2	10	
t_{PZH}	$\overline{G}$	Any Y	2	8.5	2	8	ns
t_{PZL}			2	11	2	10	
t_{PHZ}	$\overline{G}$	Any Y	1.5	7	1.5	6	ns
t_{PLZ}			2	8.5	2	6.5	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of *ALS/AS Logic Data Book, 1986*.