

T-66-21-51

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

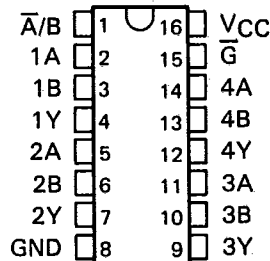
**QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS**

D2661, APRIL 1982—REVISED APRIL 1987

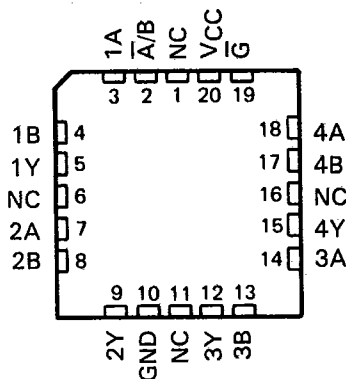
TEXAS INSTR (LOGIC) 25E D

- 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 $\bar{A}/B$	DATA		'ALS257	'ALS258
		A	B	'AS257	'AS258
H	X	X	X	Z	Z
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

**NOTICE**

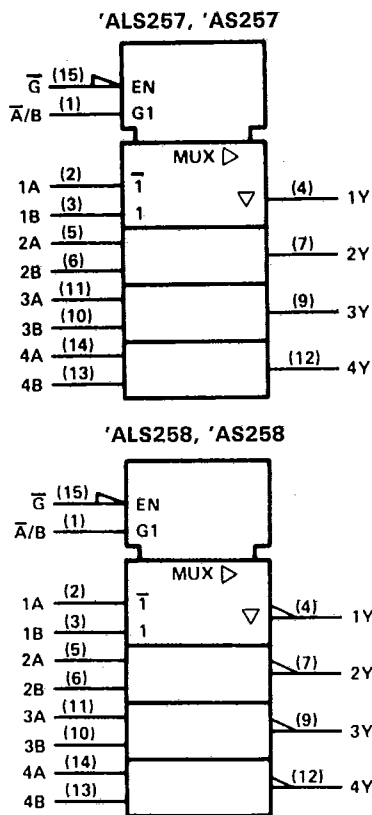
SEE ORDER OF DATA FOR ERRATA INFORMATION

**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.

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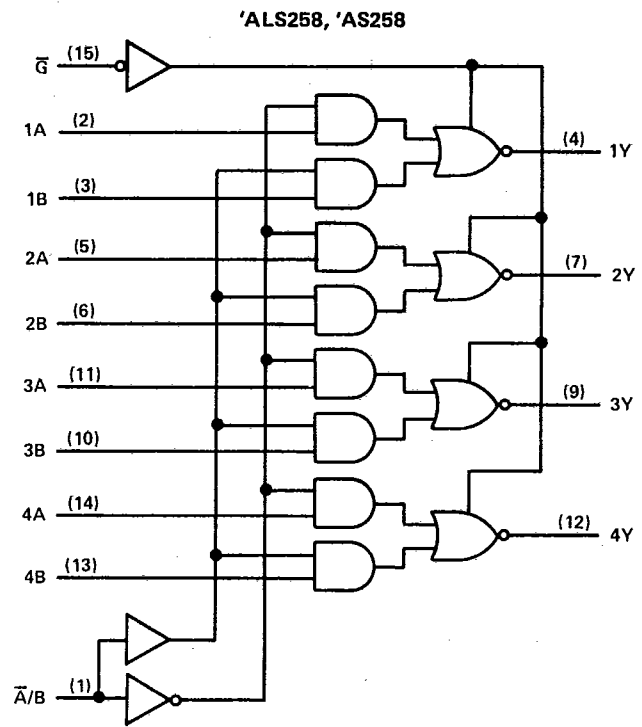
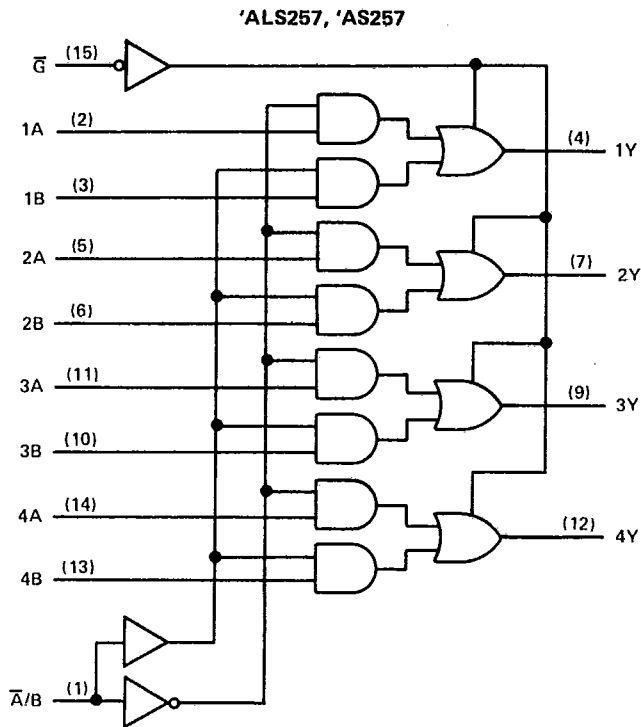
**SN54ALS257, SN54ALS258, SN54AS257, SN54AS258  
SN74ALS257, SN74ALS258, SN74AS257, SN74AS258**

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

8961723 TEXAS INSTR TEXAS INSTR (LOGIC)

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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 <sub>CC</sub>	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V <sub>IH</sub>	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage				0.7			V
I <sub>OH</sub>	High-level output current				-1			mA
I <sub>OL</sub>	Low-level output current				12			mA
T <sub>A</sub>	Operating free-air temperature	-55			125			°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	TYP†	MAX		
V <sub>IK</sub>	V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = -18 mA				-1.5			V	
V <sub>OH</sub>	V <sub>CC</sub> = 4.5 V to 5.5 V, I <sub>OH</sub> = -0.4 mA	V <sub>CC</sub> -2			V <sub>CC</sub> -2			V	
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -1 mA	2.4 3.3							
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -2.6 mA				2.4 3.2				
V <sub>OL</sub>	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 12 mA	0.25 0.4			0.25 0.4			V	
	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 24 mA				0.35 0.5				
I <sub>OZH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.7 V				20			μA	
I <sub>OZL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0.4 V				-20			μA	
I <sub>I</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 7 V				0.1			mA	
I <sub>IH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V				20			μA	
I <sub>IL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V				-0.1			mA	
I <sub>O‡</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.25 V	-30			-112			mA	
I <sub>CC</sub>	'ALS257	V <sub>CC</sub> = 5.5 V	Outputs high		3 6		3 6		mA
			Outputs low		8 12		8 12		
			Outputs disabled		9 14		9 14		
	'ALS258	V <sub>CC</sub> = 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<sub>CC</sub> = 5 V, T<sub>A</sub> = 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<sub>OS</sub>.

**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)	V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX				UNIT
			SN54ALS257		SN74ALS257		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Any Y	2	12	2	10	ns
t <sub>PHL</sub>			2	14	2	12	
t <sub>PLH</sub>	$\bar{A}/B$	Any Y	7	21	7	18	ns
t <sub>PHL</sub>			6	25	6	22	
t <sub>PZH</sub>	$\bar{G}$	Any Y	4	20	4	16	ns
t <sub>PZL</sub>			5	22	5	18	
t <sub>PHZ</sub>	$\bar{G}$	Any Y	2	12	2	10	ns
t <sub>PLZ</sub>			4	35	3	15	

**'ALS258 switching characteristics (see Note 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX				UNIT
			SN54ALS258		SN74ALS258		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Any Y	1	12	2	8	ns
t <sub>PHL</sub>			2	9	2	7	
t <sub>PLH</sub>	$\bar{A}/B$	Any Y	5	28	8	20	ns
t <sub>PHL</sub>			8	25	5	25	
t <sub>PZH</sub>	$\bar{G}$	Any Y	5	20	5	18	ns
t <sub>PZL</sub>			5	21	5	18	
t <sub>PHZ</sub>	$\bar{G}$	Any Y	2	12	2	10	ns
t <sub>PLZ</sub>			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)

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**recommended operating conditions**

	SN54AS257 SN54AS258			SN74AS257 SN74AS258			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub> Supply voltage	4.5	5	5.5	4.5	5	5.5	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			-12			-15	mA
I <sub>OL</sub> Low-level output current			32			48	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	SN54AS257 SN54AS258		SN74AS257 SN74AS258		UNIT		
		MIN	TYP†	MAX	MIN		TYP†	MAX
V <sub>IK</sub>	V <sub>CC</sub> = 4.5 V, I <sub>I</sub> = -18 mA			-1.2		-1.2	V	
V <sub>OH</sub>	V <sub>CC</sub> = 4.5 V to 5.5 V, I <sub>OH</sub> = -2 mA	V <sub>CC</sub> -2			V <sub>CC</sub> -2		V	
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -12 mA	2.4	3.3					
	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = -15 mA				2.4	3.2		
V <sub>OL</sub>	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 32 mA	0.25	0.5				V	
	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 48 mA				0.35	0.5		
I <sub>OZH</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.7 V			50		50	μA	
I <sub>OZL</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 0.4 V			-50		-50	μA	
I <sub>I</sub>	A, B or $\bar{G}$			0.1		0.1	mA	
	$\bar{A}/\bar{B}$	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 7 V		0.2		0.2		
I <sub>IH</sub>	A, B, or $\bar{G}$			20		20	μA	
	$\bar{A}/\bar{B}$	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 2.7 V		40		40		
I <sub>IL</sub>	A, B, or $\bar{G}$			-0.5		-0.5	mA	
	$\bar{A}/\bar{B}$	V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0.4 V		-1		-1		
I <sub>O‡</sub>	V <sub>CC</sub> = 5.5 V, V <sub>O</sub> = 2.25 V	-30		-112	-30		mA	
I <sub>CC</sub>	'AS257	V <sub>CC</sub> = 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 <sub>CC</sub> = 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<sub>CC</sub> = 5 V, T<sub>A</sub> = 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<sub>OS</sub>.

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 <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX				UNIT
			SN54AS257		SN74AS257		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Any Y	1	6.5	1	5.5	ns
t <sub>PHL</sub>			1	7	1	6	
t <sub>PLH</sub>	$\bar{A}/B$	Any Y	2	12	2	11	ns
t <sub>PHL</sub>			2	10.5	2	10	
t <sub>PZH</sub>	$\bar{G}$	Any Y	2	8.5	2	7.5	ns
t <sub>PZL</sub>			2	10.5	2	9.5	
t <sub>PHZ</sub>	$\bar{G}$	Any Y	1.5	8	1.5	6.5	ns
t <sub>PLZ</sub>			2	8	2	7	

'AS258 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX				UNIT
			SN54AS258		SN74AS258		
			MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	Any Y	1	5.5	1	5	ns
t <sub>PHL</sub>			1	5	1	4	
t <sub>PLH</sub>	$\bar{A}/B$	Any Y	2	11	2	9.5	ns
t <sub>PHL</sub>			2	11	2	10	
t <sub>PZH</sub>	$\bar{G}$	Any Y	2	8.5	2	8	ns
t <sub>PZL</sub>			2	11	2	10	
t <sub>PHZ</sub>	$\bar{G}$	Any Y	1.5	7	1.5	6	ns
t <sub>PLZ</sub>			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*.