

SN54ALS257, SN54ALS258, SN54AS257, SN54AS258 SN74ALS257, SN74ALS258, SN74AS257, SN74AS258 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

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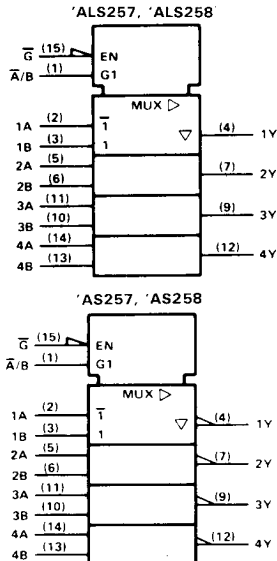
- Three-State Outputs Interface Directly with System Bus
- Provides Bus Interface from Multiple Sources in High-Performance Systems
- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

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 (\bar{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 .

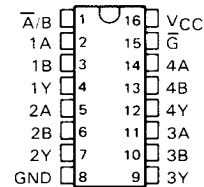
logic symbol†



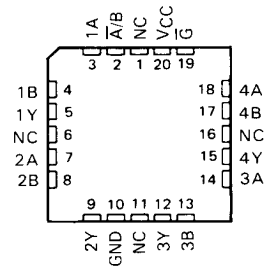
† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

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



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



FUNCTION TABLE

OUTPUT CONTROL \bar{G}	SELECT \bar{A}/\bar{B}	DATA		OUTPUT Y	
		A	B	'ALS257 'AS257	'ALS258 'AS258
H	X	X	X	Z	Z
L	L	L	X	L	H
L	L	L	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

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.

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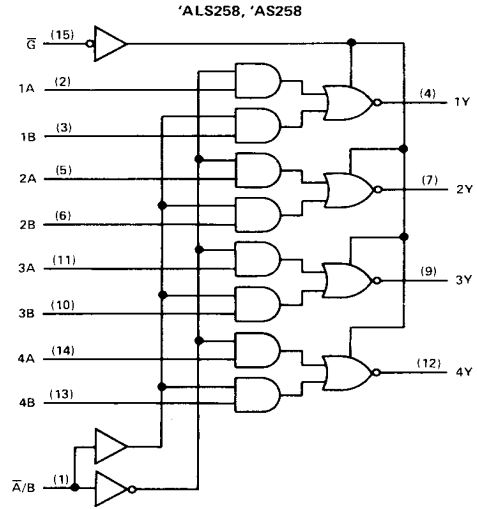
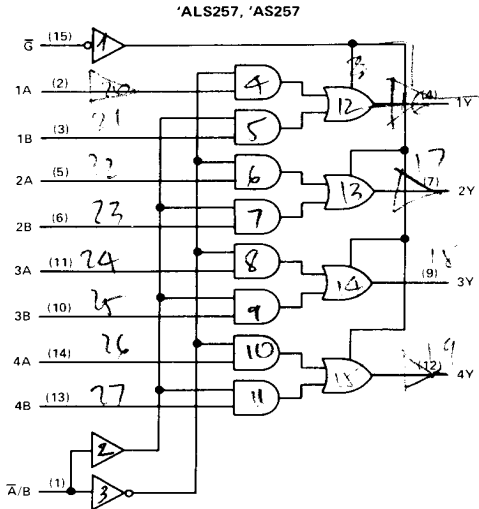
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**SN54ALS257, SN54ALS258, SN54AS257, SN54AS258
 SN74ALS257, SN74ALS258, SN74AS257, SN74AS258
 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS**

logic diagram (positive logic)

2
ALS and AS Circuits



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

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

Supply voltage, VCC	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

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

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			V
I _{OH}	High-level output current				-1			mA
I _{OL}	Low-level output current				12			mA
T _A	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 _{IK}	V _{CC} = 4.5 V,	I _I = -18 mA				-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			μA
I _{OZL}	V _{CC} = 5.5 V,	V _O = 0.4 V				-20			μA
I _I	V _{CC} = 5.5 V,	V _I = 7 V				0.1			mA
I _{IH}	V _{CC} = 5.5 V,	V _I = 2.7 V				20			μA
I _{IL}	V _{CC} = 5.5 V,	V _I = 0.4 V				-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}.


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

'ALS257 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = MIN to MAX				UNIT		
			SN54ALS257		SN74ALS257				
			MIN	MAX	MIN	MAX			
t _{PLH}	A or B	Any Y	√ 2	3.3V	12V	√ 2	3.3V	10V	ns
t _{PHL}			√ 2	3.3V	14V	√ 2	3.3V	12V	
t _{PLH}	\bar{A}/B	Any Y	√ 7	11.6V	21V	√ 7	8V	18V	ns
t _{PHL}			√ 6	10V	25V	√ 6	10V	22V	
t _{PZH}	\bar{C}	Any Y	√ 4	6.6V	20V	√ 4	6.6V	16V	ns
t _{PZL}			√ 5	7.3V	22V	√ 5	8.3V	18V	
t _{PHZ}	\bar{C}	Any Y	√ 2	3.3V	12V	√ 2	3.3V	10V	ns
t _{PLZ}			√ 4	6.6V	35V	√ 4	6.6V	15V	

'ALS258 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = MIN to MAX				UNIT		
			SN54ALS258		SN74ALS258				
			MIN	MAX	MIN	MAX			
t _{PLH}	A or B	Any Y	1	6	12	2	3.3	8	ns
t _{PHL}			2	3.3	9	2	3.3	7	
t _{PLH}	\bar{A}/B	Any Y	5	8.3	28	8	13.3	20	ns
t _{PHL}			8	13.3	25	5	8.3	25	
t _{PZH}	\bar{C}	Any Y	5	8.3	20	5	8.3	18	ns
t _{PZL}			5	8.3	21	5	8.3	18	
t _{PHZ}	\bar{C}	Any Y	2	3.3	12	2	3.3	10	ns
t _{PLZ}			5	8.3	37	5	8.3	18	

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

2 ALS and AS Circuits

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

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			V
I _{OH}	High-level output current				-12			mA
I _{OL}	Low-level output current				32			mA
T _A	Operating free-air temperature	-55			125			°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			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			μA	
I _{OZL}	V _{CC} = 5.5 V, V _O = 0.4 V				-50			μA	
I _I	A, B or \bar{G} \bar{A}/B	V _{CC} = 5.5 V, V _I = 7 V			0.1		0.1	mA	
					0.2		0.2		
I _{IH}	A, B, or \bar{G} \bar{A}/B	V _{CC} = 5.5 V, V _I = 2.7 V			20		20	μA	
					40		40		
I _{IL}	A, B, or \bar{G} \bar{A}/B	V _{CC} = 5.5 V, V _I = 0.4 V			-0.5		-0.5	mA	
					-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.



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

'AS257 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
			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}	\bar{A}/B	Any Y	2	12	2	11	ns
t_{PHL}			2	10.5	2	10	
t_{PZH}	\bar{G}	Any Y	2	8.5	2	7.5	ns
t_{PZL}			2	10.5	2	9.5	
t_{PHZ}	\bar{G}	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}	\bar{A}/B	Any Y	2	11	2	9.5	ns
t_{PHL}			2	11	2	10	
t_{PZH}	\bar{G}	Any Y	2	8.5	2	8	ns
t_{PZL}			2	11	2	10	
t_{PHZ}	\bar{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.