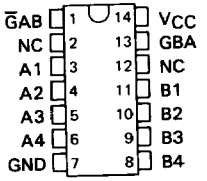
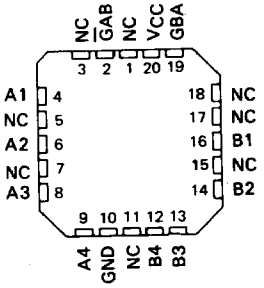
- **2-Way Asynchronous Communication between Data Buses**
- **P-N-P Inputs Reduce DC Loading**
- **Low-Power Version of 'ALS242, and 'ALS243**
- **Three-State Outputs**
- **Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs**
- **Dependable Texas Instruments Quality and Reliability**

SN54ALS1242, SN54ALS1243 . . . J PACKAGE
SN74ALS1242, SN74ALS1243 . . . N PACKAGE
(TOP VIEW)



SN54ALS1242, SN54ALS1243 . . . FH PACKAGE
SN74ALS1242, SN74ALS1243 . . . FN PACKAGE
(TOP VIEW)



NC — No internal connection

description

These quadruple bus transceivers are designed for two-way communication between data buses. The control function implementation allows for maximum flexibility in timing.

These devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the enable inputs (GBA and $\overline{GAB}$).

The enable inputs can be used to disable the device so that the buses are effectively isolated.

The dual-enable configuration gives the 'ALS1242 and 'ALS1243 the capability to store data by simultaneous enabling of $\overline{GAB}$ and GBA. Each output reinforces its input in this transceiver configuration. Thus, when both control inputs are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (8 in all) will remain at their last states. The 4-bit codes appearing on the two sets of buses will be complementary for the 'ALS1242 or identical for the 'ALS1243.

The -1 versions of the SN74ALS' parts are identical to the standard versions except that the recommended maximum I_{OL} is increased to 24 milliamperes. There are no -1 versions of the SN54ALS' parts.

The SN54ALS1242 and SN54ALS1243 are characterized for operation over the full military temperature range of −55 °C to 125 °C. The SN74ALS1242 and SN74ALS1243 are characterized for operation from 0 °C to 70 °C.

FUNCTION TABLE

$\overline{GAB}$	GBA	'ALS1242	'ALS1243
L	L	$\overline{A}$ to B	A to B
H	H	$\overline{B}$ to A	B to A
H	L	Isolation	Isolation
L	H	Latch A and B ($A = \overline{B}$)	Latch A and B ($A = B$)

2

ALS AND AS CIRCUITS

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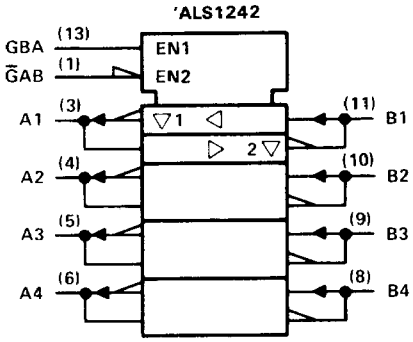
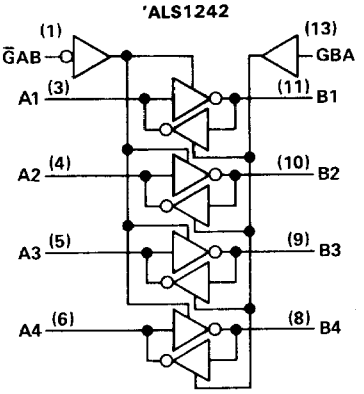
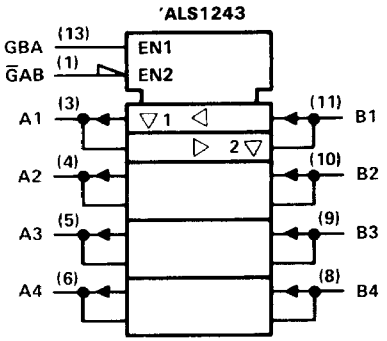
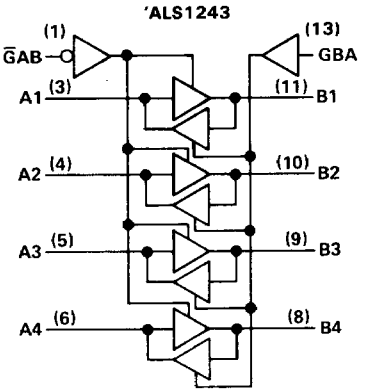
logic symbols



logic diagrams (positive logic)







Pin numbers shown are for J and N packages.

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

Supply voltage, V_{CC} . . . . . 7 V
Input voltage: All inputs . . . . . 7 V
I/O ports . . . . . 5.5 V
Operating free-air temperature range: SN54ALS1242, SN54ALS1243 . . . . . −55°C to 125°C
SN74ALS1242, SN74ALS1243 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

recommended operating conditions

		SN54ALS1242 SN54ALS1243			SN74ALS1242 SN74ALS1243			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			8			16	mA
							24†	
T_A	Operating free-air temperature	−55		125	0		70	°C

†The extended limits apply only if V_{CC} is maintained between 4.75 V and 5.25 V.
The 24-mA limit applies for the SN74ALS1242-1 and SN74ALS1243-1 only.

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS		SN54ALS1242 SN54ALS1243			SN74ALS1242 SN74ALS1243			UNIT
				MIN	TYP‡	MAX	MIN	TYP‡	MAX	
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} = −3 mA	2.4	3.2		2.4	3.2		
		V_{CC} = 4.5 V,	I_{OH} = −12 mA	2						
		V_{CC} = 4.5 V,	I_{OH} = −15 mA				2			
V_{OL}		V_{CC} = 4.5 V,	I_{OL} = 8 mA		0.25	0.4		0.25	0.4	V
		V_{CC} = 4.5 V, (I_{OL} = 24 mA for −1 versions)	I_{OL} = 16 mA					0.35	0.5	
I_I	Control inputs	V_{CC} = 5.5 V,	V_I = 7 V			0.1			0.1	mA
	A or B ports	V_{CC} = 5.5 V,	V_I = 5.5 V			0.1			0.1	
I_{IH}	Control inputs	V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	μA
	A or B ports§					20			20	
I_{IL}	Control inputs	V_{CC} = 5.5 V,	V_I = 0.4 V			−0.1			−0.1	mA
	A or B ports§					−0.1			−0.1	
I_O¶		V_{CC} = 5.5 V,	V_O = 2.25 V	−30		−112	−30		−112	mA
I_{CC}	'ALS1242	V_{CC} = 5.5 V	Outputs high		6.5			6.5		mA
			Outputs low		10			10		
			Outputs disabled		12			12		
	'ALS1243		Outputs high		8			8		
			Outputs low		12			12		
			Outputs disabled		14			14		

‡All typical values are at V_{CC} = 5 V, T_A = 25°C.
§For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.
¶The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

Additional information on these products can be obtained from the factory as it becomes available.

'ALS1242 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
			SN54ALS1242			SN74ALS1242			
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
t_{PLH}	A or B	B or A		9			9		ns
t_{PHL}				9			9		
t_{PZH}	$\overline{G}$AB	B		17			17		ns
t_{PZL}				19			19		
t_{PHZ}	$\overline{G}$AB	B		7			7		ns
t_{PLZ}				6			6		
t_{PZH}	GBA	A		17			17		ns
t_{PZL}				19			19		
t_{PHZ}	GBA	A		7			7		ns
t_{PLZ}				6			6		

'ALS1242 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
			SN54ALS1243			SN74ALS1243			
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
t_{PLH}	A or B	B or A		11			11		ns
t_{PHL}				11			11		
t_{PZH}	$\overline{G}$AB	B		19			19		ns
t_{PZL}				21			21		
t_{PHZ}	$\overline{G}$AB	B		9			9		ns
t_{PLZ}				8			8		
t_{PZH}	GBA	A		19			19		ns
t_{PZL}				21			21		
t_{PHZ}	GBA	A		9			9		ns
t_{PLZ}				8			8		

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

NOTE 2: For load circuit and voltage waveforms, see page 1-12.

Additional information on these products can be obtained from the factory as it becomes available.