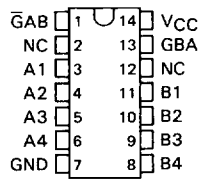
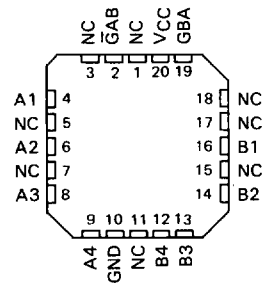
- **2-Way Asynchronous Communication Between Data Buses**
- **P-N-P Inputs Reduce Loading**
- **Dependable Texas Instruments Quality and Reliability**

SN54' . . . J PACKAGE
SN74' . . . N PACKAGE
(TOP VIEW)



SN54' . . . FH PACKAGE
SN74' . . . FN PACKAGE
(TOP VIEW)



NC—No Internal connection

description

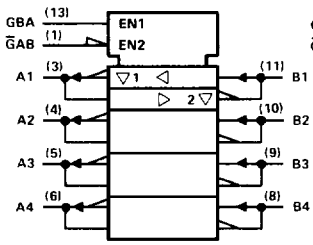
These four-data-line transceivers are designed for asynchronous two-way communications between data buses. The SN74ALS' devices can be used to drive terminated lines down to 133 ohms.

The -1 versions of the SN74ALS' parts are identical to the standard versions except that the recommended maximum I_{OL} is increased to 48 milliamperes. There are no -1 versions of the SN54ALS' parts.

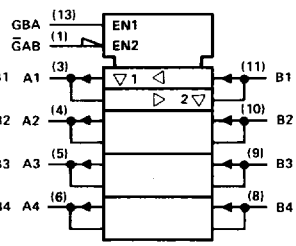
The SN54' family is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74' family is characterized for operation from 0°C to 70°C.

logic symbol

'ALS242A, 'AS242

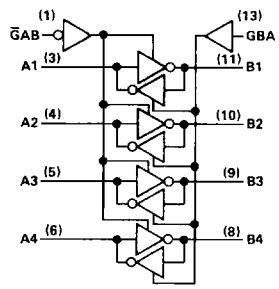


'ALS243A, 'AS243

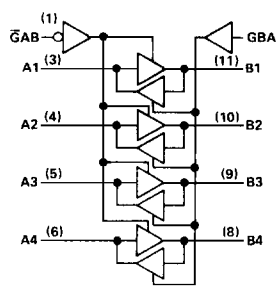


logic diagrams (positive logic)

'ALS242A, 'AS242



'ALS243A, 'AS243



Pin numbers shown are for J and N packages.

FUNCTION TABLE

INPUTS		'ALS242A	'ALS243A
GAB	GBA	'AS242	'AS243
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

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: SN54ALS242A, SN54ALS243A . . . . . −55°C to 125°C
SN74ALS242A, SN74ALS243A . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

recommended operating conditions

		SN54ALS242A SN54ALS243A			SN74ALS242A SN74ALS243A			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			12			24	mA
							48†	
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 48-mA limit applies for the SN74ALS242A-1 and SN74ALS243A-1 only.

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

PARAMETER		TEST CONDITIONS		SN54ALS242A SN54ALS243A			SN74ALS242A SN74ALS243A			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} = 12 mA		0.25	0.4		0.25	0.4	V
		V_{CC} = 4.5 V, (I_{OL} = 48 mA for −1 versions)	I_{OL} = 24 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}	'ALS242A	V_{CC} = 5.5 V	Outputs high		10	20		10	16	mA
			Outputs low		14	26		14	21	
			Outputs disabled		15	27		15	22	
	'ALS243A		Outputs high		15	30		15	25	
			Outputs low		20	35		20	30	
			Outputs disabled		21	37		21	32	

‡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}.

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'ALS242A 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
			SN54AS242A		SN74AS242A		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	3	15	3	11	ns
t_{PHL}			2	14	2	10	
t_{PZH}	$\overline{G}$AB	B	4	22	4	18	ns
t_{PZL}			7	25	7	21	
t_{PHZ}	$\overline{G}$AB	B	2	16	2	14	ns
t_{PLZ}			4	28	4	22	
t_{PZH}	GBA	A	4	22	4	18	ns
t_{PZL}			7	25	7	21	
t_{PHZ}	GBA	A	2	16	2	14	ns
t_{PLZ}			4	28	4	22	

'ALS243 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
			SN54ALS243A		SN74ALS243A		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	4	15	4	11	ns
t_{PHL}			4	15	4	11	
t_{PZH}	$\overline{G}$AB	B	7	25	7	20	ns
t_{PZL}			7	25	7	20	
t_{PHZ}	$\overline{G}$AB	B	2	16	2	14	ns
t_{PLZ}			3	27	3	22	
t_{PZH}	GBA	A	7	25	7	20	ns
t_{PZL}			7	25	7	20	
t_{PHZ}	GBA	A	2	16	2	14	ns
t_{PLZ}			3	27	3	22	

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

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: SN54AS242, SN54AS243 . . . . . −55 °C to 125 °C
SN74AS242, SN74AS243 . . . . . 0 °C to 70 °C
Storage temperature range . . . . . −65 °C to 150 °C

recommended operating conditions

		SN54AS242 SN54AS243			SN74AS242 SN74AS243			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			48			64	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		SN54AS242 SN54AS243			SN74AS242 SN74AS243			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} = −3 mA	2.4	3.4		2.4	3.4		
		V_{CC} = 4.5 V,	I_{OH} = −12 mA	2.4						
		V_{CC} = 4.5 V,	I_{OH} = −15 mA				2.4			
V_{OL}		V_{CC} = 4.5 V,	I_{OL} = 48 mA			0.55				V
		V_{CC} = 4.5 V,	I_{OL} = 64 mA						0.55	
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‡					50			50	
I_{IL}	Control inputs	V_{CC} = 5.5 V,	V_I = 0.4 V			−0.5			−0.5	mA
	'AS242 A or B ports‡					−0.5			−0.5	
	'AS243 A or B ports‡					−1			−1	
I_O§		V_{CC} = 5.5 V,	V_O = 2.25 V	−50		−150	−50		−150	mA
I_{CC}	'AS242	V_{CC} = 5.5 V	Outputs high		18	28		18	28	mA
			Outputs low		38	60		38	60	
			Outputs disabled		25	39		25	39	
	'AS243		Outputs high		28	44		28	44	
			Outputs low		47	74		47	74	
			Outputs disabled		35	56		35	56	

†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}.

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'AS242 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
			SN54AS242		SN74AS242		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	2	7	2	6.5	ns
t_{PHL}			2	6	2	5.7	
t_{PZH}	$\overline{G}$AB	B	2	9	2	5.5	ns
t_{PZL}			2	8.5	2	7.5	
t_{PHZ}	$\overline{G}$AB	B	2	7	2	6.5	ns
t_{PLZ}			2	12.5	2	9.5	
t_{PZH}	GAB	A	3	7	3	6	ns
t_{PZL}			3	9	3	8	
t_{PHZ}	GAB	A	3	8.5	3	6	ns
t_{PLZ}			3	13.5	3	10.5	

'AS243 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
			SN54AS243		SN74AS243		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	3	9	3	7.5	ns
t_{PHL}			3	8	3	6.5	
t_{PZH}	$\overline{G}$AB	B	2	10	2	9	ns
t_{PZL}			2	9	2	7.5	
t_{PHZ}	$\overline{G}$AB	B	2	7	2	6.5	ns
t_{PLZ}			2	11	2	9	
t_{PZH}	GAB	A	3	11	3	10.5	ns
t_{PZL}			3	9.5	3	8.5	
t_{PHZ}	GAB	A	3	7.5	3	7	ns
t_{PLZ}			3	14	3	11	

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