TYPES SN54LS242, SN54LS243, SN74LS242, SN74LS243
QUADRUPLE BUS TRANSCEIVERS

- **Two-Way Asynchronous Communication Between Data Buses**

- **P-N-P Inputs Reduce D-C Loading**

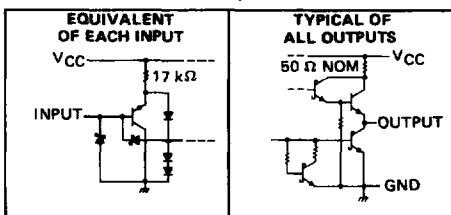- **Hysteresis (Typically 400 mV) at Inputs Improves Noise Margin**

description

These four-data-line transceivers are designed for asynchromous two-way communications between data buses. The SN74LS' can be used to drive terminated lines down to 133 ohms.

FUNCTION TABLE (EACH TRANSCEIVER)

CONTROL INPUTS		'LS242 DATA PORT STATUS		'LS243 DATA PORT STATUS	
$\overline{GAB}$	GBA	A	B	A	B
H	H	$\overline{O}$	I	O	I
L	H	*	*	*	*
H	L	ISOLATED		ISOLATED	
L	L	I	$\overline{O}$	I	O

*Possibly destructive oscillation may occur if the transceivers are enabled in both directions at once.
I = Input, O = Output, $\overline{O}$ = Inverting Output.
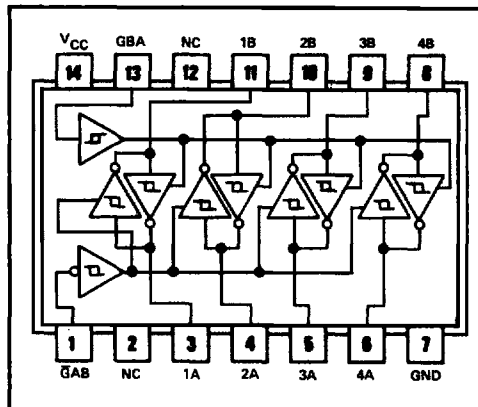
schematics of inputs and outputs

EQUIVALENT OF EACH INPUT

TYPICAL OF ALL OUTPUTS

SN54LS242 . . . J OR W
SN74LS242 . . . J OR N
(TOP VIEW)

SN54LS243 . . . J OR W
SN74LS243 . . . J OR N
(TOP VIEW)
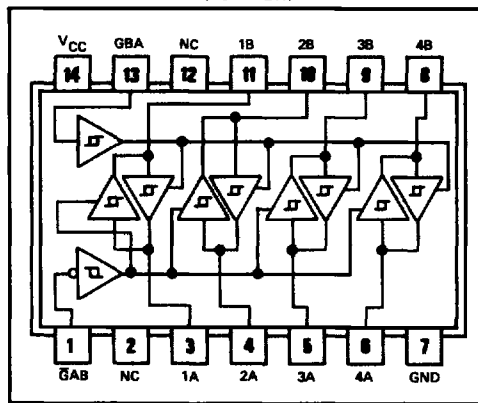
NC—No internal connection

recommended operating conditions

	SN54LS'			SN74LS'			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC} (see Note 1)	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			−12			−15	mA
Low-level output current, I_{OL}			12			24	mA
Operating free-air temperature, T_A	−55		125	0		70	°C

NOTE 1: Voltage values are with respect to network ground terminal.

TYPES SN54LS242, SN54LS243, SN74LS242, SN74LS243
QUADRUPLE BUS TRANSCEIVERS

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

PARAMETER		TEST CONDITIONS[†]		SN54LS' MIN	SN54LS' TYP[‡]	SN54LS' MAX	SN74LS' MIN	SN74LS' TYP[‡]	SN74LS' MAX	UNIT
V_{IH}	High-level input voltage			2			2			V
V_{IL}	Low-level input voltage					0.7			0.8	V
V_{IK}	Input clamp voltage	V_{CC} = MIN,	I_I = −18 mA			−1.5			−1.5	V
	Hysteresis $(V_{T+} - V_{T-})$	V_{CC} = MIN		0.2	0.4		0.2	0.4		V
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = V_{IL} max, I_{OH} = −3 mA		2.4	3.1		2.4	3.1		V
		V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = 0.5 V, I_{OH} = MAX		2			2			
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IH} = 2 V, V_{IL} = V_{IL} max	I_{OL} = 12 mA		0.25	0.4		0.25	0.4	V
			I_{OL} = 24 mA					0.35	0.5	
I_{OZH}	Off-state output current, high-level voltage applied	V_{CC} = MAX, V_{IH} = 2 V,	V_O = 2.7 V			40			40	μA
I_{OZL}	Off-state output current, low-level voltage applied	V_{IL} = V_{IL} max	V_O = 0.4 V			−200			−200	μA
I_I	Input current at maximum input voltage	A or B	V_{CC} = MAX,	V_I = 5.5 V			0.1			0.1	mA
		$\overline{G}AB$ or GBA		V_I = 7 V			0.1			0.1	
I_{IH}	High-level input current, any input	V_{CC} = MAX,	V_I = 2.7 V			20			20	μA
I_{IL}	Low-level input current	A inputs	V_{CC} = MAX, V_I = 0.4 V, $\overline{G}AB$ and GBA at V_{IL} max				−0.2			−0.2	mA
		B inputs	V_{CC} = MAX, V_I = 0.4 V, $\overline{G}AB$ and GBA at 2 V				−0.2			−0.2	
		$\overline{G}AB$ or GBA	V_{CC} = MAX, V_I = 0.4 V				−0.2			−0.2	
I_{OS}	Short-circuit output current[♦]	V_{CC} = MAX		−40		−225	−40		−225	mA
I_{CC}	Supply current	Outputs high	V_{CC} = MAX, Outputs open, See Note 2	'LS242, 'LS243		22	38		22	38	mA
		Outputs low		'LS242, 'LS243		29	50		29	50	
		All outputs disabled		'LS242		29	50		29	50	
				'LS243		32	54		32	54	

[†]For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

[♦]Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

NOTE 2: I_{CC} is measured with transceivers enabled in one direction only, or with all transceivers disabled.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	'LS242 MIN	'LS242 TYP	'LS242 MAX	'LS243 MIN	'LS243 TYP	'LS243 MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 45 pF, R_L = 667 Ω, See Note 3		9	14		12	18	ns
t_{PHL}	Propagation delay time, high-to-low-level output			12	18		12	18	ns
t_{PZL}	Output enable time to low level			20	30		20	30	ns
t_{PZH}	Output enable time to high level			15	23		15	23	ns
t_{PLZ}	Output disable time from low level	C_L = 5 pF, R_L = 667 Ω, See Note 3		15	25		15	25	ns
t_{PHZ}	Output disable time from high level			10	18		10	18	ns

NOTE 3: Load circuit and waveforms are shown on page 3-11.

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