

Octal Transceiver (3-State)

Military Logic Products

Product Specification

FEATURES

- Octal bidirectional bus interface
- 3-State buffer outputs
- PNP inputs for reduced loading
- Hysteresis on all Data inputs

DESCRIPTION

The 54LS245 is an octal transceiver featuring non-inverting 3-State bus compatible outputs in both send and receive directions. The outputs are all capable of sinking 12mA and sourcing up to 15mA, producing very good capacitive drive characteristics. The device features a Chip Enable (CE) input for easy cascading and a Send/Receive (S/R) input for direction control. All data inputs have hysteresis built in to minimize AC noise effects.

ORDERING INFORMATION

DESCRIPTION	ORDER CODE
20-Pin Ceramic DIP	54LS245/BRA
20-Pin Ceramic FlatPack	54LS245/BSA
20-Pin Ceramic LLCC	54LS245/B2A

FUNCTION TABLE

INPUTS		INPUTS/OUTPUTS	
CE	S/R	A _n	B _n
L	L	A = B	INPUT
L	H	INPUT	B = A
H	X	(Z)	(Z)

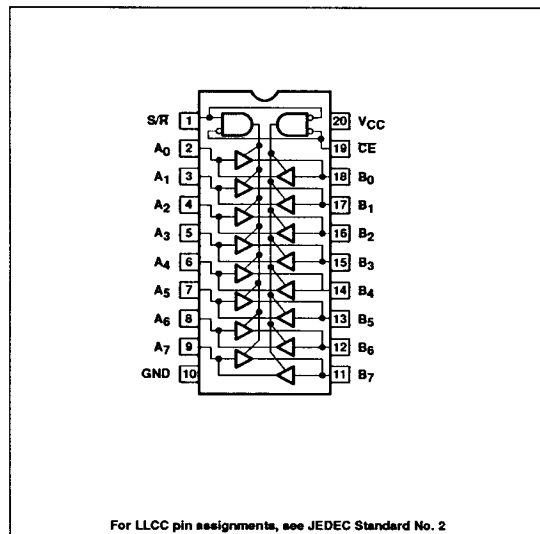
H = High voltage level
L = Low voltage level
X = Don't care
(Z) = High impedance (off) state

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

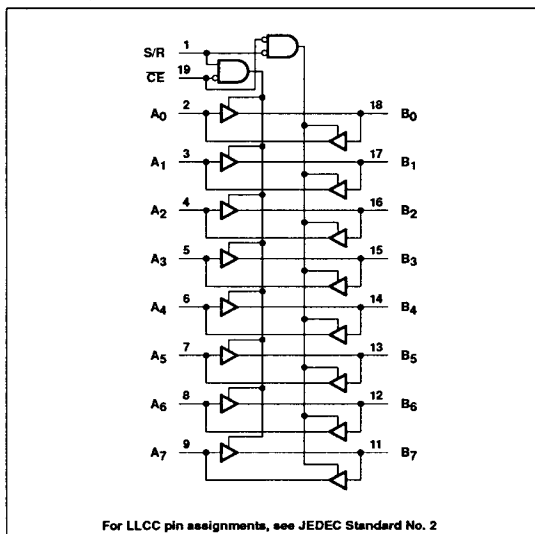
PINS	DESCRIPTION	54LS
All	Inputs	1LSUL
All	Outputs	30LSUL

NOTE: Where a 54LS Unit Load (LSUL) is 20μA I_{IH} and -0.4mA I_{IL}.

PIN CONFIGURATION



LOGIC SYMBOL



Transceiver**54LS245****ABSOLUTE MAXIMUM RATINGS** (Over operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	7.0	V
V_I	Input voltage range	-0.5 to +7.0	V
I_I	Input current range	-30 to +1	mA
V_O	Voltage applied to output in High output state range	-0.5 to + V_{CC}	V
T_{STG}	Storage temperature range	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Nom	Max	
V_{CC}	Supply voltage	4.5	5.0	5.5	V
V_{IH}	High-level input voltage	2.0			V
V_{IL}	Low-level input voltage			+0.7	V
I_{IK}	Input clamp current			-18	mA
I_{OH}	High-level output current			-12	mA
I_{OL}	Low-level output current			12	mA
T_A	Operating free-air temperature range	-55		+125	°C

DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS ¹			LIMITS			UNIT
					Min	Typ ²	Max	
ΔV_T	Hysteresis ($V_{T+} - V_{T-}$) ⁵	$V_{CC} = \text{Min}$			0.2	0.4		V
V_{OH}	High-level output voltage	$V_{CC} = \text{Min}, V_{IH} = \text{Min}, V_{IL} = 0.5V, I_{OH} = \text{Max}$			2.0			V
		$V_{CC} = \text{Min}, V_{IH} = \text{Min}, V_{IL} = \text{Max}, I_{OH} = -3\text{mA}$			2.4	3.4		V
V_{OL}	Low-level output voltage	$V_{CC} = \text{Min}, V_{IH} = \text{Min}, V_{IL} = \text{Max}, I_{OL} = \text{Max}$					0.4	V
V_{IK}	Input clamp voltage	$V_{CC} = \text{Min}, I_I = I_{IK}$					-1.5	V
I_{OZH}	Offstate output current, High-level voltage applied	$V_{CC} = \text{Max}, V_O = 2.7V, CE = 2.0V$					20	μA
I_{OZL}	Offstate output current, Low-level voltage applied	$V_{CC} = \text{Max}, V_O = 0.4V, CE = 2.0V$					-20	μA
I_{IH2}	Input current at maximum input voltage	$V_{CC} = \text{Max}$	$V_I = 5.5V$	A, B inputs			0.1	mA
			$V_I = 7.0V$	S/R, CE inputs			0.1	mA
I_{IH1}	High-level input current	$V_{CC} = \text{Max}, V_I = 2.7V$					20	μA
I_{IL}	Low-level input current	$V_{CC} = \text{Max}, V_I = 0.4V$					-0.2	mA
I_{OS}	Short-circuit output current ³	$V_{CC} = \text{Max}$			-40		-130	mA
I_{CC}	Supply current ⁴ (total)	$V_{CC} = \text{Max}$	I_{CCH} Outputs High			48	70	mA
			I_{CCL} Outputs Low			62	90	mA
			I_{CCZ} Outputs Off			64	95	mA

Transceiver**54LS245****AC ELECTRICAL CHARACTERISTICS** $T_A = 25^\circ\text{C}$, $V_{CC} = 5.0\text{V}$

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITSS		UNIT
			C _L = 50pF		
			Min	Max	
t _{PLH}	Propagation delay	Waveform 1		12	ns
t _{PHL}	Propagation delay	Waveform 1		12	ns
t _{PZH}	Enable to High	Waveform 2		40	ns
t _{PZL}	Enable to Low	Waveform 3		40	ns
t _{PHZ}	Disable from High	Waveform 2, C _L = 5pF ⁶		25	ns
t _{PLZ}	Disable from Low	Waveform 3, C _L = 5pF ⁶		25	ns
t _{PHZ}	Disable from High	Waveform 2, C _L = 50pF		30	ns
t _{PLZ}	Disable from Low	Waveform 3, C _L = 50pF		27	ns

AC ELECTRICAL CHARACTERISTICS $T_A = -55^\circ\text{C}$ and $+125^\circ\text{C}$, $V_{CC} = 5.0\text{V}^5$

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITSS		UNIT
			C _L = 50pF		
			Min	Max	
t _{PLH}	Propagation delay	Waveform 1		16	ns
t _{PHL}	Propagation delay	Waveform 1		16	ns
t _{PZH}	Enable to High	Waveform 2		52	ns
t _{PZL}	Enable to Low	Waveform 3		52	ns
t _{PHZ}	Disable from High	Waveform 2, C _L = 5pF ⁶		33	ns
t _{PLZ}	Disable from Low	Waveform 3, C _L = 5pF ⁶		33	ns
t _{PHZ}	Disable from High	Waveform 2, C _L = 50pF		39	ns
t _{PLZ}	Disable from Low	Waveform 3, C _L = 50pF		35	ns

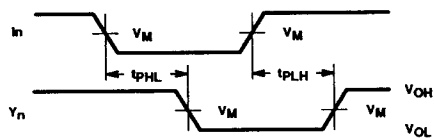
NOTES:

1. For conditions shown as Min or Max, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at $V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$.
3. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.
4. Measure I_{CC} with outputs open.
5. These parameters are guaranteed, but not tested.
6. Guaranteed by the 50pF limits, but not tested.

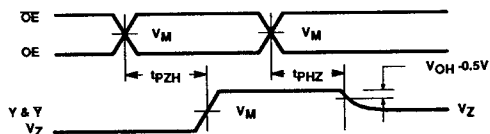
Transceiver

54LS245

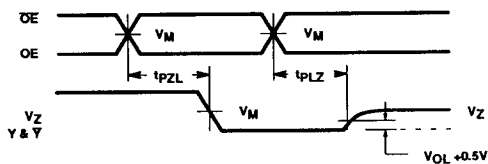
AC WAVEFORMS



Waveform 1. Waveform for Non-Inverting Outputs



Waveform 2. 3-State Enable Time to High Level and Disable Time from High Level



Waveform 3. 3-State Enable Time to Low Level and Disable Time from Low Level

FAMILY	V_M	V_{MZL}	V_{MZH}	V_Z
54LSXXX	1.3V	0.7V	1.9V	1.45V

Transceiver

54LS245

TEST CIRCUIT AND WAVEFORM

