

SN54LS245, SN74LS245

OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

OCTOBER 1976—REVISED MARCH 1988

- Bi-directional Bus Transceiver in a High-Density 20-Pin Package
- 3-State Outputs Drive Bus Lines Directly
- PNP Inputs Reduce D-C Loading on Bus Lines
- Hysteresis at Bus Inputs Improve Noise Margins
- Typical Propagation Delay Times, Port-to-Port . . . 8 ns

TYPE	I _{OL} (SINK CURRENT)	I _{OH} (SOURCE CURRENT)
SN54LS245	12 mA	-12 mA
SN74LS245	24 mA	-15 mA

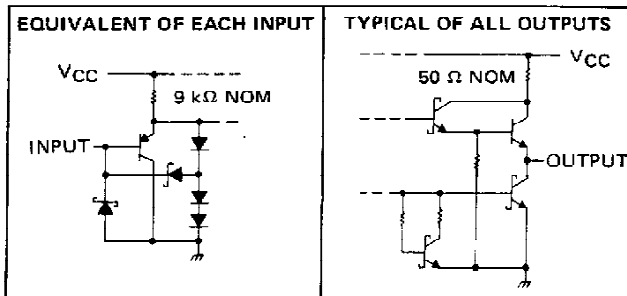
description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control function implementation minimizes external timing requirements.

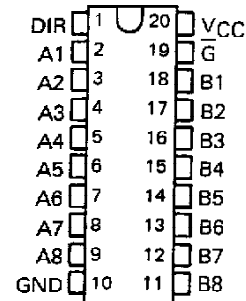
The devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction control (DIR) input. The enable input (\bar{G}) can be used to disable the device so that the buses are effectively isolated.

The SN54LS245 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74LS245 is characterized for operation from 0°C to 70°C .

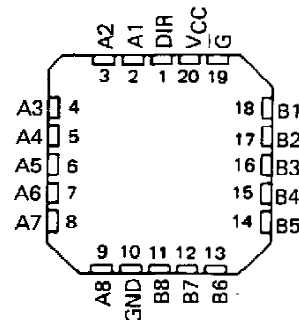
schematics of inputs and outputs



SN54LS245 . . . J OR W PACKAGE
SN74LS245 . . . DW OR N PACKAGE
(TOP VIEW)



SN54LS245 . . . FK PACKAGE
(TOP VIEW)



FUNCTION TABLE

ENABLE \bar{G}	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

H = high level, L = low level, X = irrelevant

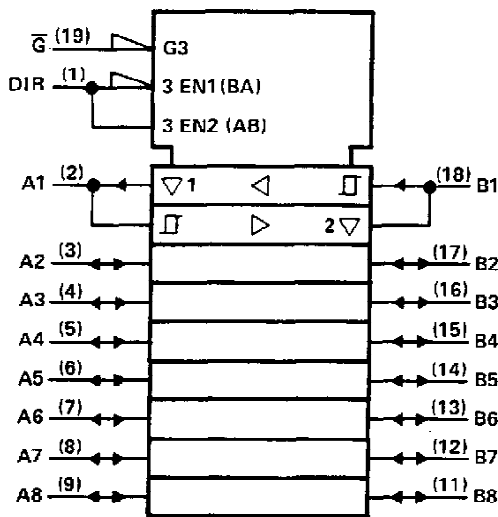
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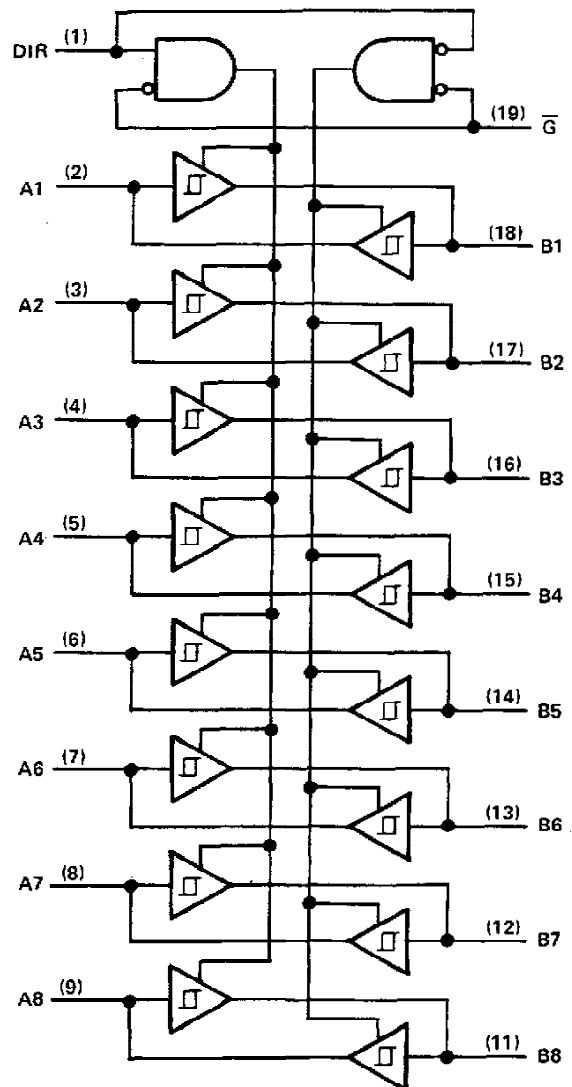
SN54LS245, SN74LS245 **OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS**

logic symbol†



†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.
 Pin numbers shown are for DW, J, N, and W packages.

logic diagram (positive logic)



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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage	7 V
Off-state output voltage	5.5 V
Operating free-air temperature range: SN54LS245	-55°C to 125°C
SN74LS245	0°C to 70°C
Storage temperature range	-65°C to 150°C

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

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SN54LS245, SN74LS245

OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

recommended operating conditions

PARAMETER	SN54LS245			SN74LS245			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	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

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

PARAMETER		TEST CONDITIONS†	SN54LS245			SN74LS245			UNIT
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
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	$V_{CC} = \text{MIN.}$, $I_I = -18 \text{ mA}$			-1.5			-1.5	V
	Hysteresis ($V_{T+} - V_{T-}$) A or B input	$V_{CC} = \text{MIN.}$	0.2	0.4		0.2	0.4		V
V_{OH}	High-level output voltage	$V_{CC} = \text{MIN.}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = V_{IL \text{ max}}$, $I_{OH} = -3 \text{ mA}$	2.4	3.4		2.4	3.4		V
		$I_{OH} = \text{MAX}$	2			2			
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN.}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = V_{IL \text{ max}}$, $I_{OL} = 12 \text{ mA}$			0.4			0.4	V
		$I_{OL} = 24 \text{ mA}$						0.5	
I_{OZH}	Off-state output current, high-level voltage applied	$V_{CC} = \text{MAX.}$, \bar{G} at 2 V, $V_O = 2.7 \text{ V}$			20			20	μA
I_{OZL}	Off-state output current, low-level voltage applied	$V_O = 0.4 \text{ V}$			-200			-200	
I_I	Input current at maximum input voltage	$V_{CC} = \text{MAX.}$, $V_I = 6.5 \text{ V}$			0.1			0.1	mA
					0.1			0.1	
I_{IH}	High-level input current	$V_{CC} = \text{MAX.}$, $V_{IH} = 2.7 \text{ V}$			20			20	μA
I_{IL}	Low-level input current	$V_{CC} = \text{MAX.}$, $V_{IL} = 0.4 \text{ V}$			-0.2			-0.2	mA
I_{OS}	Short-circuit output current§	$V_{CC} = \text{MAX.}$	-40		-225	-40		-225	mA
I_{CC}	Supply current	$V_{CC} = \text{MAX.}$, Outputs open			48			48	mA
	Total, outputs high				70			70	
	Total, outputs low				62			62	
	Outputs at Hi-Z				64			64	95

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

‡All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

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

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output		8	12	ns
t_{PHL}	Propagation delay time, high-to-low-level output		8	12	ns
t_{PZL}	Output enable time to low level		27	40	ns
t_{PZH}	Output enable time to high level		25	40	ns
t_{PLZ}	Output disable time from low level		15	25	ns
t_{PHZ}	Output disable time from high level		15	28	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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