

TYPES SN54ALS245A, SN54AS245, SN74ALS245A, SN74AS245 OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

D2661, DECEMBER 1982—REVISED DECEMBER 1983

- 3-State Outputs Drive Bus Lines Directly
- P-N-P Inputs Reduce Dc Loading
- 'AS Version in Development. Data Will Be Provided As It Becomes Available. Contact the Factory for Latest Information
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

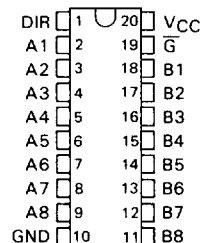
These octal bus transceivers are designed for synchronous two-way communication between data buses. The control function implementation minimizes external timing requirements.

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 ($\overline{G}$) can be used to disable the device so that the buses are effectively isolated.

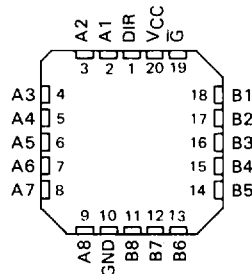
The - 1 version of the SN74ALS245A is identical to the standard version except that the recommended maximum I_{OL} is increased to 48 milliamperes. There is no - 1 version of the SN54ALS245A.

The SN54ALS245A and SN54AS245 are characterized for operation over the full military temperature range of - 55°C to 125°C. The SN74ALS245A and SN74AS245 are characterized for operation from 0°C to 70°C.

SN54ALS245A, SN54AS245 . . . J PACKAGE
SN74ALS245A, SN74AS245 . . . N PACKAGE
(TOP VIEW)



SN54ALS245A, SN54AS245 . . . FH PACKAGE
SN74ALS245A, SN74AS245 . . . FN PACKAGE
(TOP VIEW)



FUNCTION TABLE

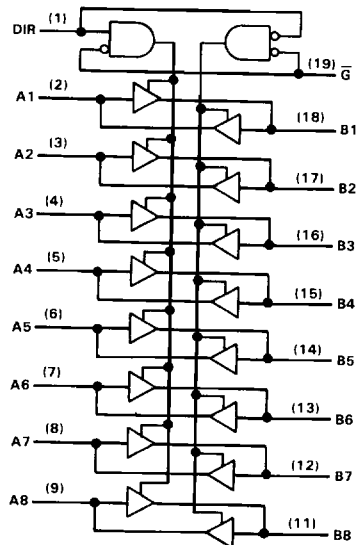
ENABLE $\overline{G}$	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

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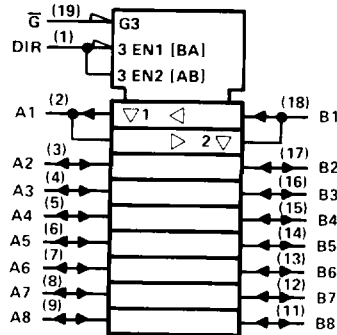
ALS AND AS CIRCUITS

TYPES SN54ALS245A, SN74ALS245A
OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

logic diagram (positive logic)



logic symbol



Pin numbers shown are for J and N packages.

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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: SN54ALS245A	-55°C to 125°C
SN74ALS245A	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

	SN54ALS245A			SN74ALS245A			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
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 SN74ALS245A-1 only.

TYPES SN54ALS245A, SN74ALS245A **OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS**

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

PARAMETER		TEST CONDITIONS		SN54ALS245A			SN74ALS245A			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} = 24 mA								
		(I _{OL} = 48 mA for -1 versions)					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}		V _{CC} = 5.5 V	Outputs high	30 48			30 45			mA
			Outputs low	36 60			36 55			
			Outputs disabled	38 63			38 58			

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

[‡]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} .

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 4.5 V to 5.5 V, CL = 50 pF, R1 = 500 Ω, R2 = 500 Ω, TA = MIN to MAX				UNIT
			SN54ALS245A		SN74ALS245A		
			MIN	MAX	MIN	MAX	
tPLH	A or B	B or A	3	15	3	10	ns
tPHL			3	13	3	10	
tPZH	$\overline{G}$	A or B	5	25	5	20	ns
tPZL			5	25	5	20	
tPHZ	$\overline{G}$	A or B	2	12	2	10	ns
tPLZ			4	18	4	15	

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

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ALS AND AS CIRCUITS

TYPES SN54AS245, SN74AS245
OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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: SN54AS245	-55°C to 125°C
SN74AS245	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

		SN54AS245			SN74AS245			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			32			48	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		SN54AS245			SN74AS245			UNIT
				MIN	TYP ¹	MAX	MIN	TYP ¹	MAX	
V_{IK}		$V_{CC} = 4.5 \text{ V}, I_I = -18 \text{ mA}$				-1.2			-1.2	V
V_{OH}		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}, I_{OH} = -2 \text{ mA}$		$V_{CC} - 2$			$V_{CC} - 2$			V
		$V_{CC} = 4.5 \text{ V}, I_{OH} = -3 \text{ mA}$		2.4	3.2		2.4	3.2		
		$V_{CC} = 4.5 \text{ V}, I_{OH} = -12 \text{ mA}$		2.4						
		$V_{CC} = 4.5 \text{ V}, I_{OH} = -15 \text{ mA}$					2.4			
V_{OL}		$V_{CC} = 4.5 \text{ V}, I_{OL} = 32 \text{ mA}$		0.25	0.5					V
		$V_{CC} = 4.5 \text{ V}, I_{OL} = 48 \text{ mA}$					0.35	0.5		
I_I	Control inputs	$V_{CC} = 5.5 \text{ V}, V_I = 7 \text{ V}$			0.1			0.1		mA
	A or B ports	$V_{CC} = 5.5 \text{ V}, V_I = 5.5 \text{ V}$			0.1			0.1		
I_{IH}	Control inputs				20			20		μA
	A or B ports ²	$V_{CC} = 5.5 \text{ V}, V_I = 2.7 \text{ V}$			50			50		
I_{IL}	Control inputs	$V_{CC} = 5.5 \text{ V}, V_I = 0.4 \text{ V}$			-0.1			-0.1		mA
	A or B ports ²				-0.75			-0.75		
$I_{O\frac{1}{2}}$		$V_{CC} = 5.5 \text{ V}, V_O = 2.25 \text{ V}$		-30	-112		-30	-112		mA
I_{CC}		$V_{CC} = 5.5 \text{ V}$	Outputs high		62			62		mA
			Outputs low		95			95		
			Outputs disabled		79			79		

¹All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

²For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

³The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

PRODUCT PREVIEW

TYPES SN54AS245, SN74AS245
OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

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
			SN54AS245			SN74AS245			
			MIN	TYP [†]	MAX	MIN	TYP [†]	MAX	
t _{PLH}	A or B	B or A	6			6			ns
t _{PHL}			5			5			
t _{PZH}	$\overline{G}$	A or B	8			8			ns
t _{PZL}			8			8			
t _{PHZ}	$\overline{G}$	A or B	4.5			4.5			ns
t _{PLZ}			5			5			

†All typical values are at $V_{CC} = 5\text{ V, }T_A = 25^{\circ}\text{C.}$
 NOTE 1: For load circuit and voltage waveforms, see page 1-12.