

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.

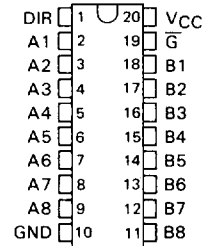
The devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction control (DIR) input. The enable input (\bar{G}) can be used to disable the device so that the buses are effectively isolated.

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.

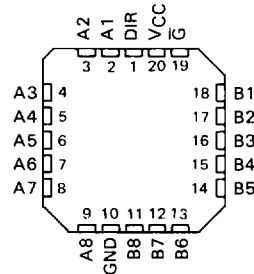
SN54ALS245A, SN54AS245 . . . J PACKAGE
SN74ALS245A, SN74AS245 . . . N PACKAGE

(TOP VIEW)



SN54ALS245A, SN54AS245 . . . FH PACKAGE
SN74ALS245A, SN74AS245 . . . FN PACKAGE

(TOP VIEW)



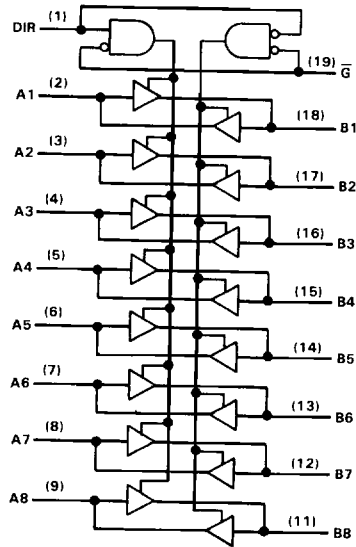
FUNCTION TABLE

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

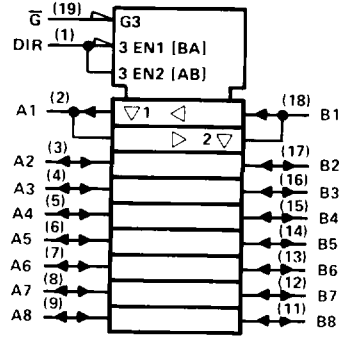
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ALS AND AS CIRCUITS

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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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							V
I_{OH} High-level output current			0.8			0.8	mA
I_{OL} Low-level output current			-12			-15	mA
			12			24	
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		mA	
	A or B ports	V _{CC} = 5.5 V, V _I = 5.5 V		0.1			
I _{IH}	Control inputs	V _{CC} = 5.5 V, V _I = 2.7 V		20		μA	
	A or B ports [‡]			20			
I _{IL}	Control inputs	V _{CC} = 5.5 V, V _I = 0.4 V		-0.1		mA	
	A or B ports [‡]			-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 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_{O5}.

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
			SN54ALS245A		SN74ALS245A		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	B or A	3	15	3	10	ns
t _{PHL}			3	13	3	10	
t _{PZH}	G	A or B	5	25	5	20	ns
t _{PZL}			5	25	5	20	
t _{PHZ}	G	A or B	2	12	2	10	ns
t _{PLZ}			4	18	4	15	

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

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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}	$V_{CC} = 4.5 V, I_I = -18 mA$			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5 V \text{ to } 5.5 V, I_{OH} = -2 mA$	$V_{CC}-2$			$V_{CC}-2$			V
	$V_{CC} = 4.5 V, I_{OH} = -3 mA$	2.4	3.2		2.4	3.2		
	$V_{CC} = 4.5 V, I_{OH} = -12 mA$	2.4						
	$V_{CC} = 4.5 V, I_{OH} = -15 mA$				2.4			
V_{OL}	$V_{CC} = 4.5 V, I_{OL} = 32 mA$		0.25	0.5				V
	$V_{CC} = 4.5 V, I_{OL} = 48 mA$				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 ²					50	50	
I_{IL}	Control inputs	$V_{CC} = 5.5 V, V_I = 0.4 V$				-0.1	-0.1	mA
	A or B ports ²					-0.75	-0.75	
I_{O5}	$V_{CC} = 5.5 V, V_O = 2.25 V$	-30		-112	-30		-112	mA
I_{CC}	$V_{CC} = 5.5 V$	Outputs high		62		62		mA
		Outputs low		95		95		
		Outputs disabled		79		79		

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

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} .

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PRODUCT PREVIEW

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

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V.}$ $C_L = 50 \text{ pF.}$ $R_1 = 500 \Omega,$ $R_2 = 500 \Omega,$ $T_A = \text{MIN to MAX}$						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}	\bar{G}	A or B	8			8			ns
t_{PZL}			8			8			
t_{PHZ}	\bar{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.

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