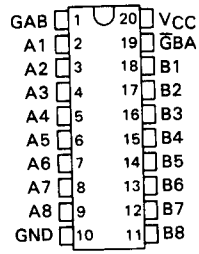
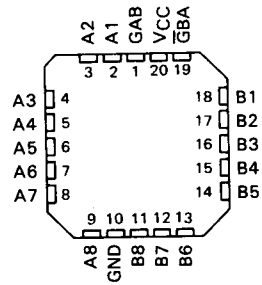
- **Bus Transceivers in High-Density 20-Pin DIPs and the New Plastic and Ceramic Chip Carriers Packages**
- **Local Bus Latch Capability**
- **Choice of True or Inverting Logic**
- **Dependable Texas Instruments Quality and Reliability**
- **Choice of 3-State or Open-Collector Outputs**

DEVICE	OUTPUT	LOGIC
'ALS1620	3-State	Inverting
'ALS1621	Open-Collector	True
'ALS1622	Open-Collector	Inverting
'ALS1623	3-State	True

SN54ALS' . . . J PACKAGE
SN74ALS' . . . N PACKAGE
(TOP VIEW)



SN54ALS' . . . FH PACKAGE
SN74ALS' . . . FN PACKAGE
(TOP VIEW)



description

These octal bus transceivers are designed for asynchronous two-way communication between data buses. The control function implementation allows for maximum flexibility in timing.

These devices allow data transmission from A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the enable inputs ($\overline{G}$BA and GAB).

The enable inputs can be used to disable the device so that the buses are effectively isolated.

The dual-enable configuration gives the 'ALS1620 thru 'ALS1623 the capability to store data by simultaneous enabling of $\overline{G}$BA and GAB. Each output reinforces its input in this transceiver configuration. Thus, when both control inputs are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (16 in all) will remain at their last states. The 8-bit codes appearing on the two sets of buses will be identical for the 'ALS1621 and 'ALS1623 or complementary for the 'ALS1620 and 'ALS1622.

The -1 versions of the SN74ALS' parts are identical to the standard versions except that the recommended maximum I_{OL} is increased to 24 mA. There are no -1 versions of the SN54ALS' parts.

The SN54ALS1620 thru SN54ALS1623 are characterized for operation over the full military temperature range of −55°C to 125°C. The SN74ALS1620 thru SN74ALS1623 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE

ENABLE	INPUTS	OPERATION	
$\overline{G}$BA	GAB	'ALS1620, 'ALS1622	'ALS1621, 'ALS1623
L	L	$\overline{B}$ data to A bus	B data to A bus
H	H	$\overline{A}$ data to B bus	A data to B bus
H	L	Isolation	Isolation
L	H	$\overline{B}$ data to A bus, $\overline{A}$ data to B bus	B data to A bus, A data to B bus

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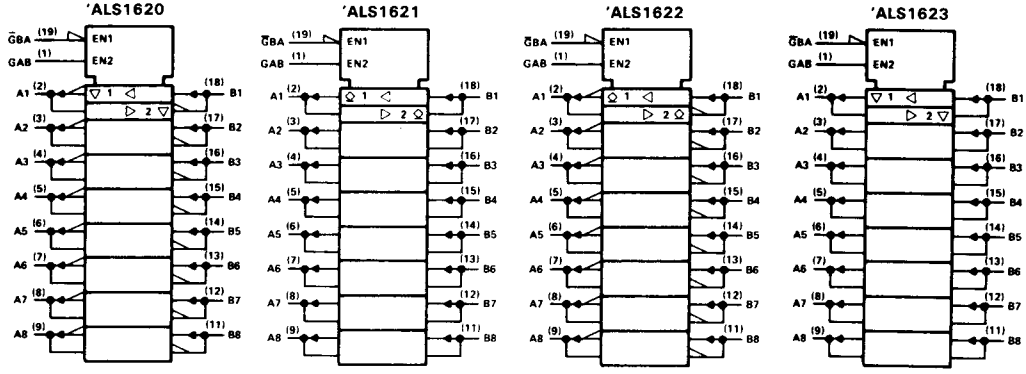
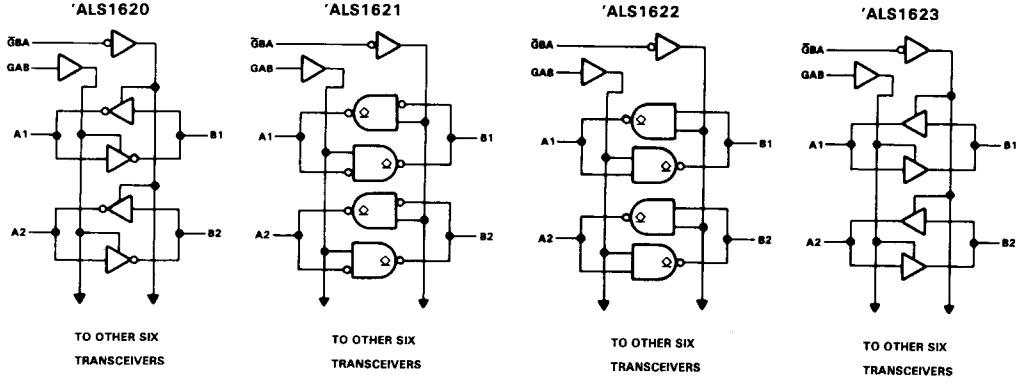
PRODUCT PREVIEW

This document contains information on a product under development. Texas Instruments reserves the right to change or discontinue this product without notice.

logic symbols



functional block diagrams (positive logic)



Pin numbers shown are for J and N packages.

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: SN54ALS1620, SN54ALS1623 . . . . . −55°C to 125°C
SN74ALS1620, SN74ALS1623 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

recommended operating conditions

		SN54ALS1620 SN54ALS1623			SN74ALS1620 SN74ALS1623			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			8			16	mA
							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 24-mA limit applies for the SN74ALS1620-1 and SN74ALS1623-1 only.

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

PARAMETER		TEST CONDITIONS		SN54ALS1620 SN54ALS1623			SN74ALS1620 SN74ALS1623			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} = 8 mA			0.25	0.4		0.25	0.4	V
		V_{CC} = 4.5 V, (I_{OL} = 24 mA for −1 versions)	I_{OL} = 16 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§					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}	'ALS1620	V_{CC} = 5.5 V	Outputs high		14			14		mA
			Outputs low		19			19		
			Outputs disabled		21			21		
	'ALS1623		Outputs high		11			11		
			Outputs low		18			18		
			Outputs disabled		13			13		

‡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_{OS}.

Additional information on these products can be obtained from the factory as it becomes available.

'ALS1620 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX						UNIT
			SN54ALS1620			SN74ALS1620			
			MIN	TYP†	MAX	MIN	TYP†	MAX	
t_{PLH}	A	B		9			9		ns
t_{PHL}				6			6		
t_{PLH}	B	A		9			9		ns
t_{PHL}				6			6		
t_{PZH}	$\overline{G}$BA	A		14			14		ns
t_{PZL}				17			17		
t_{PHZ}	$\overline{G}$BA	A		7			7		ns
t_{PLZ}				11			11		
t_{PZH}	GAB	B		14			14		ns
t_{PZL}				17			17		
t_{PHZ}	GAB	B		7			7		ns
t_{PLZ}				11			11		

'ALS1623 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX						UNIT
			SN54ALS1623			SN74ALS1623			
			MIN	TYP†	MAX	MIN	TYP†	MAX	
t_{PLH}	A	B		8			8		ns
t_{PHL}				8			8		
t_{PLH}	B	A		8			8		ns
t_{PHL}				8			8		
t_{PZH}	$\overline{G}$BA	A		18			18		ns
t_{PZL}				21			21		
t_{PHZ}	$\overline{G}$BA	A		12			12		ns
t_{PLZ}				13			13		
t_{PZH}	GAB	B		18			18		ns
t_{PZL}				21			21		
t_{PHZ}	GAB	B		12			12		ns
t_{PLZ}				13			13		

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

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

Additional information on these products can be obtained from the factory as it becomes available.

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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 and I/O ports . . . . . 7 V
Operating free-air temperature range: SN54ALS1621, SN54ALS1622 . . . . . −55°C to 125°C
SN74ALS1621, SN74ALS1622 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

recommended operating conditions

		SN54ALS1621 SN54ALS1622			SN74ALS1621 SN74ALS1622			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
V_{OH}	High-level output voltage			5.5			5.5	mV
I_{OL}	Low-level output current			8			16	mA
							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 24-mA limit applies for the SN74ALS1621-1 and SN74ALS1622-1 only.

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

PARAMETER		TEST CONDITIONS		SN54ALS1621 SN54ALS1622			SN74ALS1621 SN74ALS1622			UNIT
				MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}		V_{CC} = 4.5 V,	I_I = −18 mA			−1.5			−1.5	V
I_{OH}		V_{CC} = 4.5 V,	V_{OH} = 5.5 V			0.1			0.1	mA
V_{OL}		V_{CC} = 4.5 V,	I_{OL} = 8 mA		0.25	0.4		0.25	0.4	V
		V_{CC} = 4.5 V, (I_{OL} = 24 mA for −1 versions)	I_{OL} = 16 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§					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_{CC}	'ALS1621	V_{CC} = 5.5 V	Outputs high		11			11		mA
			Outputs low		16			16		
	'ALS1622		Outputs high		13			13		
			Outputs low		18			18		

‡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.

Additional information on these products can be obtained from the factory as it becomes available.

'ALS1621 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 680 Ω, T_A = MIN to MAX						UNIT
			SN54ALS1621			SN74ALS1621			
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
t_{PLH}	A	B		22			22		ns
t_{PHL}				14			14		
t_{PLH}	B	A		22			22		ns
t_{PHL}				14			14		
t_{PLH}	$\overline{G}$BA	A		33			33		ns
t_{PHL}				24			24		
t_{PLH}	GAB	B		33			33		ns
t_{PHL}				24			24		

'ALS1622 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 680 Ω, T_A = MIN to MAX						UNIT
			SN54ALS1622			SN74ALS1622			
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
t_{PLH}	A	B		25			25		ns
t_{PHL}				13			13		
t_{PLH}	B	A		25			25		ns
t_{PHL}				13			13		
t_{PLH}	$\overline{G}$BA	A		31			31		ns
t_{PHL}				28			28		
t_{PLH}	GAB	B		31			31		ns
t_{PHL}				28			28		

‡All typical values are at V_{CC} = 5 V, T_A = 25°C.
NOTE 1: For load circuit and voltage waveforms, see page 1-12.

Additional information on these products can be obtained from the factory as it becomes available.

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