

DM54ALS621A/DM74ALS621A/ DM54ALS622A/DM74ALS622A Octal Open Collector Output Bus Transceivers

General Description

These advanced low power Schottky devices contain 8 pairs of logic elements configured as octal bus transceivers. They are designed for use in memory, microprocessor systems and in asynchronous bidirectional data buses. Data transmission from the A bus to the B bus or from the B bus to the A bus is selectively controlled by ($\overline{\text{GBA}}$ and GAB) the enable inputs. These inputs are also used to disable the devices so that the buses are effectively isolated.

The dual-enable configuration gives the ALS621A and ALS622A the capability to store data by simultaneous enabling of $\overline{\text{GBA}}$ 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 will remain at their last logic states.

Pull-Up Resistor Equations

$$R_{\text{MAX}} = \frac{V_{\text{CC}}(\text{Min}) - V_{\text{OH}}}{N_1(I_{\text{OH}}) + N_2(I_{\text{IH}})}$$

$$R_{\text{MIN}} = \frac{V_{\text{CC}}(\text{Max}) - V_{\text{OL}}}{I_{\text{OL}} - N_3(I_{\text{IL}})}$$

Where: $N_1(I_{\text{OH}})$ = total maximum output high current for all outputs tied to pull-up resistor

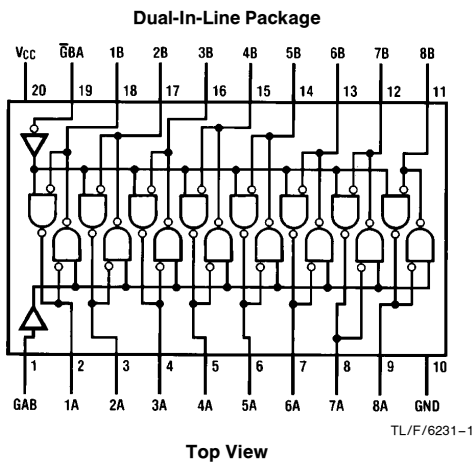
$N_2(I_{\text{IH}})$ = total maximum input high current for all inputs tied to pull-up resistor

$N_3(I_{\text{IL}})$ = total maximum input low current for all inputs tied to pull-up resistor

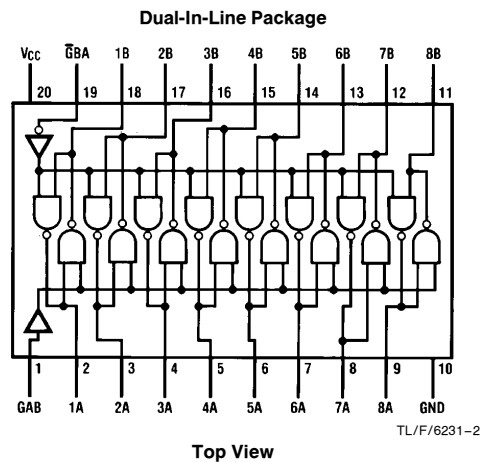
Features

- Advanced oxide-isolated, ion implanted Schottky process
- Choice of true or inverting logic
- Open collector outputs on A and B buses
- Local bus-latch capability
- Switching response specified into $500\Omega/50\text{ pF}$
- Switching specification guaranteed over full temperature and V_{CC} range
- Low output impedance to drive terminated transmission lines to 133Ω

Connection Diagrams



Order Number DM54ALS621AJ or DM74ALS621AJ, N
See NS Package Number J20A or N20A



Order Number DM54ALS622AJ, DM74ALS622AJ, N
See NS Package Number J20A or N20A

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Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage, V_{CC}	7V
Input Voltage	7V
Operating Free Air Temperature Range	
DM54ALS	−55°C to +125°C
DM74ALS	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 sec.)	+300°C

Note: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Recommended Operating Conditions

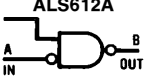
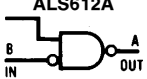
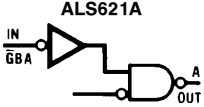
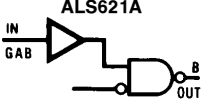
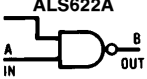
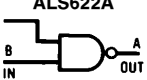
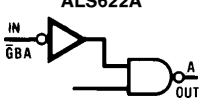
Symbol	Parameter	DM54ALS621A DM54ALS622A			DM74ALS621A DM74ALS622A			Units
		Min	Typ	Max	Min	Typ	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.8			0.8	V
I_{OH}	High Level Output Voltage			5.5			5.5	V
I_{OL}	Low Level Output Current			12			24	mA
	DM74ALS621A-1 and DM74ALS622A-1 Options Only						48	mA
T_A	Operating Free Air Temperature	−55		125	0		70	°C

Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$.

Symbol	Parameter	Conditions		DM54ALS621A DM54ALS622A			DM74ALS621A DM74ALS622A			Units
				Min	Typ	Max	Min	Typ	Max	
V _{IK}	Input Clamp Voltage	V _{CC} = 4.5V, I _{IN} = −18 mA				−1.5			−1.5	V
I _{OH}	High Level Output Voltage	V _{CC} = 4.5V, V _{OH} = 5.5V				0.1			0.1	mA
V _{OL}	Low Level Output Voltage	V _{CC} = 4.5V	I _{OL} = 12 mA		0.25	0.4		0.25	0.4	V
			I _{OL} = 24 mA					0.35	0.5	V
			For 74ALS-1 Option Only I _{OL} = 48 mA					0.35	0.5	V
I _I	Input Current at Max Input Voltage	V _{CC} = 5.5V, V _{IN} = 7V (V _{IN} = 5.5V for A or B Ports)				0.1			0.1	mA
I _{IH}	High Level Input Current	V _{CC} = 5.5V, V _{IN} = 2.7V	A or B Ports			20			20	μA
			Control Inputs			20			20	μA
I _{IL}	Low Level Input Current	V _{CC} = 5.5V, V _{IN} = 0.4V	A or B Ports			−0.1			−0.1	mA
			Control Inputs			−0.1			−0.1	mA
I _{CC}	ALS621A Supply Current	V _{CC} = 5V	Outputs High		29	45		29	40	mA
			Outputs Low		35	53		35	48	
	ALS622A Supply Current	V _{CC} = 5.5V	Outputs High		11	20		11	15	
			Outputs Low		20	33		20	28	

Switching Characteristics over recommended operating free air temperature range (Notes 1 and 2).
All typical values are measured at $V_{CC} = 5V$, $T_A = 25^{\circ}C$.

Symbol	Parameter	Circuit Configuration	DM54ALS621A DM54ALS622A		DM74ALS621A DM74ALS622A		Units
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output		10	45	10	33	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		5	24	5	20	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		10	45	10	33	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		5	24	5	20	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		10	47	10	39	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		12	40	12	35	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		10	47	10	39	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		12	40	12	35	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		18	42	18	35	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		5	23	5	19	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		18	42	18	35	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		5	23	5	19	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		8	45	8	38	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		10	40	10	35	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		18	45	18	38	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		10	40	10	35	ns

Note 1: See Section 5 for test waveforms and output load.

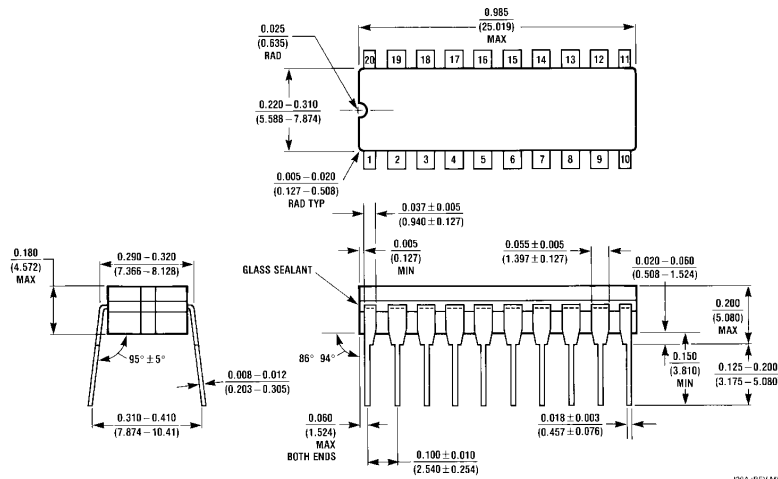
Note 2: Switching characteristic conditions are $V_{CC} = 4.5V$ to $5.5V$, $R_L = 500\Omega$, $C_L = 50$ pF.

Function Table

Enable Inputs		Operation	
$\overline{GBA}$	GAB	ALS621A	ALS622A
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	Hi	Hi
L	H	$\overline{B}$ Data to A Bus	B Data to A Bus
		$\overline{A}$ Data to B Bus	A Data to B Bus

DM54ALS621A/DM74ALS621A/DM54ALS622A/DM74ALS622A Octal Open Collector Output Bus Transceivers

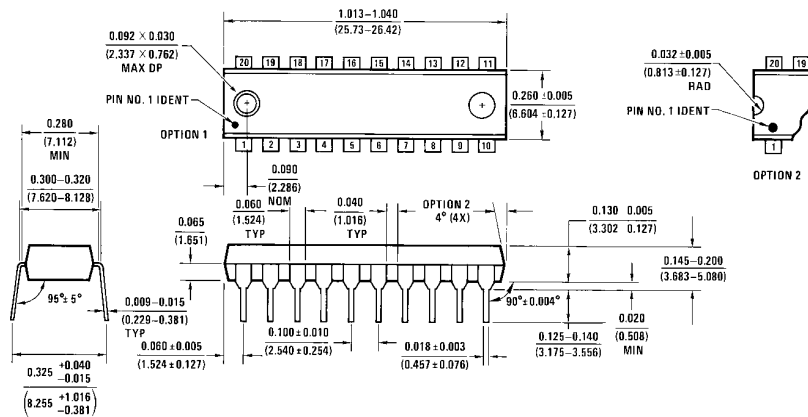
Physical Dimensions inches (millimeters)



J20A (REV M)

Ceramic Dual-In-Line Package (J)

Order Number DM54ALS621AJ, DM54ALS622AJ, DM74ALS621AJ or DM74ALS622AJ
NS Package Number J20A



N20A (REV G)

Molded Dual-In-Line Package (N)

Order Number DM74ALS621AN or DM74ALS622AN
NS Package Number N20A

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National Semiconductor Corporation
1111 West Bardin Road
Arlington, TX 76017
Tel: 1(800) 272-9959
Fax: 1(800) 737-7018

National Semiconductor Europe

Fax: (+49) 0-180-530 85 86
Email: cnjwge@tevm2.nsc.com
Deutsch Tel: (+49) 0-180-530 85 85
English Tel: (+49) 0-180-532 78 32
Français Tel: (+49) 0-180-532 93 58
Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.

19th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: (852) 2737-1600
Fax: (852) 2736-9960

National Semiconductor Japan Ltd.

Tel: 81-043-299-2309
Fax: 81-043-299-2408

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