National Semiconductor

PRELIMINARY
December 1986

DM54ALS623A/DM74ALS623A Octal TRI-STATE® Bus Transceiver

General Description

This advanced low power Schottky device contains 8 pairs of TRI-STATE logic elements configured as an octal bus transceiver. It is 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 ($\overline{G}$BA and GAB) the enable inputs. These inputs are also used to disable the devices so that the buses are effectively isolated.

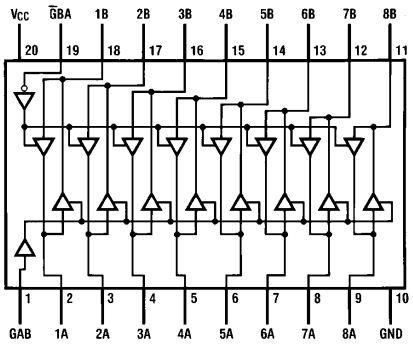
The dual-enable configuration gives the ALS623A the capability to store data by simultaneous enabling of $\overline{G}$BA and GAB. Each output reinforces its input in this transceiver configuration. Thus, when both control inputs are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines will remain at their last logic states.

Features

- Advanced oxide-isolated, ion-implanted Schottky TTL process
- TRI-STATE outputs on A and B buses
- Local bus-latch capability
- Switching response specified into 500Ω/50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range
- Low output impedance to drive terminated transmission lines to 133Ω

Connection Diagram

Dual-In-Line Package



TL/F/8449–1

Top View
Order Number DM54ALS623AJ, DM74ALS623AJ or DM74ALS623AN
See NS Package Number J20A or N20A

Function Table

Enable Inputs		Operation ALS623A
$\overline{G}$BA	GAB	
L	L	$\overline{B}$ Data to A Bus
H	H	$\overline{A}$ Data to B Bus
H	L	Hi-Z
L	H	$\overline{B}$ Data to A Bus, $\overline{A}$ Data to B Bus

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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°

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

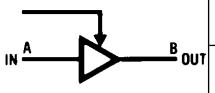
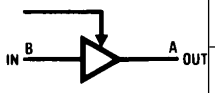
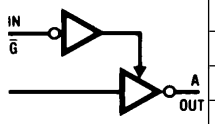
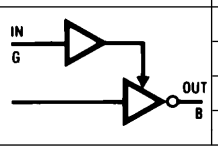
Symbol	Parameter	DM54ALS623A			DM74ALS623A			Units
		Min	Typ	Max	Min	Typ	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.8			0.8	V
I_{OH}	High Level Output Current			−12			−15	mA
I_{OL}	Low Level Output Current			12			24	mA
	DM74ALS623A-1 Option 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°C.

Symbol	Parameter	Conditions		DM54ALS623A			DM74ALS623A			Units
				Min	Typ	Max	Min	Typ	Max	
V_{IK}	Input Clamp Voltage	V_{CC} = 4.5V, I_I = −18 mA				−1.5			−1.5	V
V_{OH}	High Level Output Voltage	V_{CC} = 4.5V, I_{OH} = −3 mA		2.4	3.2		2.4	3.2		V
		V_{CC} = 4.5V, I_{OH} = Max		2			2			V
		I_{OH} = −0.4 mA, V_{OL} = 4.5V to 5.5V		V_{CC} − 2			V_{CC} − 2			V
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_O	Output Drive Current	V_{CC} = 5.5V, V_{OUT} = 2.25V		−30		−112	−30		−112	mA
I_{CC}	Supply Current	V_{CC} = 5.5V	Output High		32	48		32	43	mA
			Output Low		39	55		39	50	mA
			TRI-STATE		42	60		42	55	mA

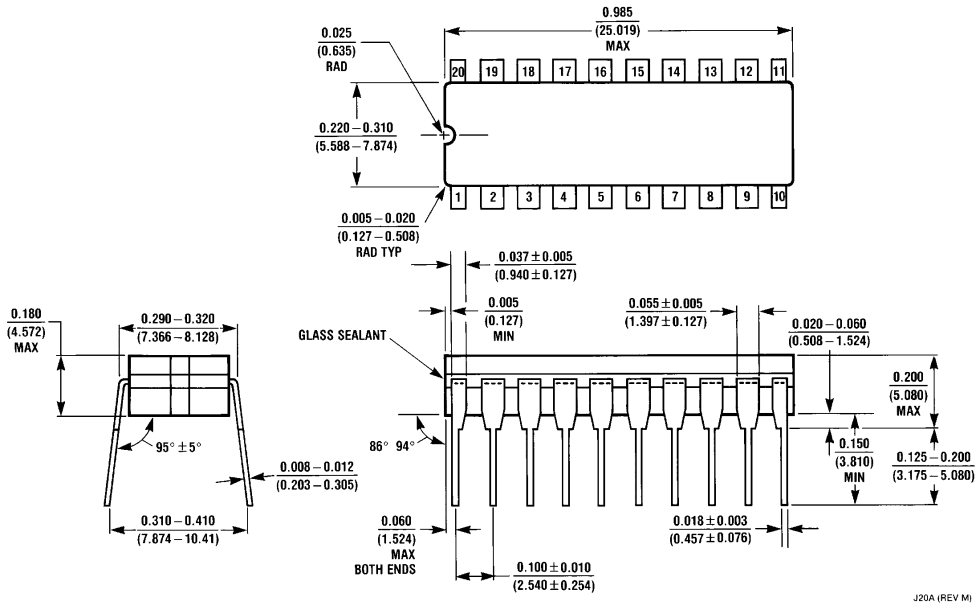
Switching Characteristics over recommended operating free air temperature range (Notes 1 and 2). All typical values are measured at $V_{CC} = 5V$, $T_A = 25°C$.

Symbol	Parameter	Circuit Configuration	DM54ALS623A		DM74ALS623A		Units
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output		2	15	2	13	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		3	13	3	11	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		2	15	2	13	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		3	13	3	11	ns
t_{PZL}	Output Enable Time to Low Level Output		5	25	5	22	ns
t_{PZH}	Output Enable Time to High Level Output		5	25	5	22	ns
t_{PLZ}	Output Disable Time from Low Level Output		2	23	2	19	ns
t_{PHZ}	Output Disable Time from High Level Output		2	19	2	16	ns
t_{PZL}	Output Enable Time to Low Level Output		5	25	5	22	ns
t_{PZH}	Output Enable Time to High Level Output		5	25	5	22	ns
t_{PLZ}	Output Disable Time from Low Level Output		2	23	2	19	ns
t_{PHZ}	Output Disable Time from High Level Output		2	19	2	16	ns

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

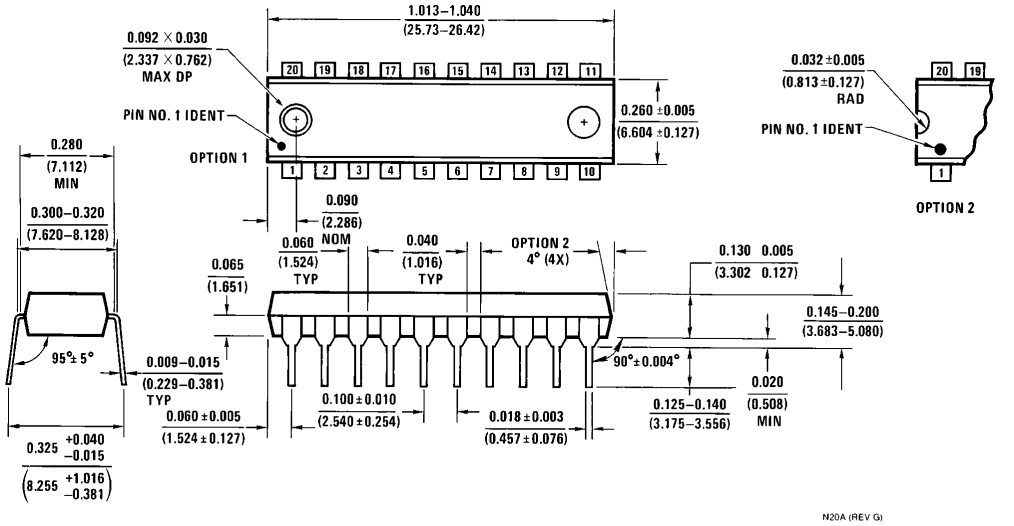
Note 2: Switching characteristic conditions are $V_{CC} = 4.5V$ to $5.5V$, $R_L = 500\Omega$, $C_L = 50$ pF.

Physical Dimensions inches (millimeters)



Ceramic Dual-In-Line Package (J)
Order Number DM54ALS623AJ or DM74ALS623AJ
NS Package Number J20A

Physical Dimensions inches (millimeters) (Continued)



Molded Dual-In-Line Package (N)
Order Number DM74ALS623AN
NS Package Number N20A

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