National Semiconductor

PRELIMINARY

DM54ALS1620/DM74ALS1620 Octal TRI-STATE® Bus Transceivers

General Description

This advanced low power Schottky device contains 8 pairs of TRI-STATE log 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 ALS1620 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

- Low power version of ALS620
- Advanced oxide-isolated, ion implanted Schottky process
- TRI-STATE outputs on A and B buses
- PNP input design reduces input loading
- 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

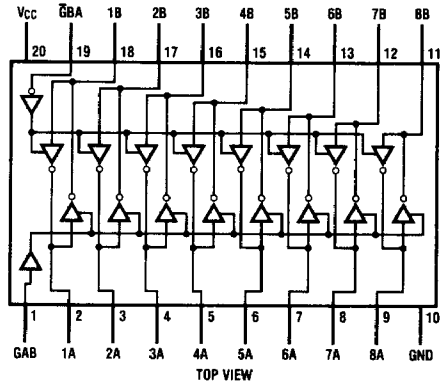
Absolute Maximum Ratings (Note 1)

Supply Voltage, V_{CC}	7V
Input Voltage	7V
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 seconds)	+300°C

Note 1: 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.

Connection Diagram

Dual-In-Line Package



TL/F/6264-1

54ALS1620 (J) **74ALS1620 (J, N)**

Function Table

Enable Inputs		Operation
$\overline{G}$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

Recommended Operating Conditions

Symbol	Parameter	DM54ALS1620			DM74ALS1620			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			8			16	mA
	DM74ALS1620-1						24	mA
T_A	Operating Free Air Temperature Range	−55		125	0		70	°C

*Applies to 74ALS-1 options.

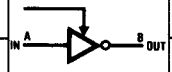
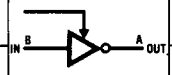
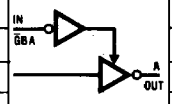
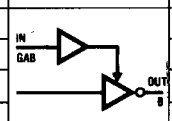
Electrical Characteristics over recommended operating free air temperature range.

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

Symbol	Parameter	Conditions		DM54ALS1620			DM74ALS1620			Units
				Min	Typ	Max	Min	Typ	Max	
V_{IK}	Input Clamp Voltage	$V_{CC} = 45V$, $I_{IN} = -18$ 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			
		$I_{OH} = -0.4$ mA, $V_{OL} = 4.5V$ to 5.5V		$V_{CC} - 2$			$V_{CC} - 2$			
V_{OL}	Low Level Output Voltage	$V_{CC} = 4.5V$	DM54/74ALS $I_{OL} = 8$ mA		0.25	0.4		0.25	0.4	V
			DM74ALS $I_{OL} = 16$ mA (Note 3)					0.35	0.5	
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	$V_{CC} = 5.5V$, $V_{IN} = 2.7V$				20			20	mA
I_{IL}	Low Level Input Current	$V_{CC} = 5.5V$, $V_{IN} = 0.4V$				−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	$V_{CC} = 5.5V$	Outputs High		14			14		mA
			Outputs Low		19			19		
			TRI-STATE		21			21		

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	DM54ALS1620			DM74ALS1620			Units
			Min	Typ	Max	Min	Typ	Max	
t_{PLH}	Propagation Delay Time, Low to High Level Output			9			9		ns
t_{PHL}	Propagation Delay Time, High to Low Level Output			6			6		ns
t_{PLH}	Propagation Delay Time, Low to High Level Output			9			9		ns
t_{PHL}	Propagation Delay Time, High to Low Level Output			6			6		ns
t_{PZL}	Output Enable Time to Low Level			17			17		ns
t_{PZH}	Output Enable Time to High Level			14			14		ns
t_{PLZ}	Output Disable Time from Low Level			11			11		ns
t_{PHZ}	Output Disable Time from High Level			7			7		ns
t_{PZL}	Output Enable Time to Low Level			17			17		ns
t_{PZH}	Output Enable Time to High Level			14			14		ns
t_{PLZ}	Output Disable Time from Low Level			11			11		ns
t_{PHZ}	Output Disable Time from High Level			7			7		ns

Note 1: See Section 1 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.

Note 3: $I_{OL} = 24$ mA for -1 option.