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T-52-31-00

National Semiconductor

DM74AS620 Octal Bus Transceiver

General Description

This octal bus transceiver is designed for asynchronous two-way communication between data buses. The control function implementation allows for maximum flexibility in timing.

This device allows data transmission from the 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.

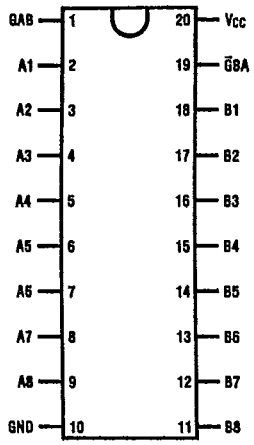
The dual-enable configuration gives the octal bus transceivers the capability of storing data by simultaneous enabling of $\overline{G}$BA and GAB. Each output reinforces its input in this transceiver configuration. Thus, when both control inputs are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (16 in all) will remain at their last states.

Features

- Local bus-latch capability
- Choice of true or inverting logic
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V_{CC} range

Connection Diagram

Dual-In-Line Package



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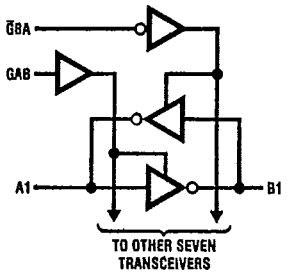
Top View

Order Number DM74AS620WM or DM74AS620N
See NS Package Number M20B or N20A

Logic Diagram



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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	Isolation
L	H	$\overline{B}$ Data to A Bus, $\overline{A}$ Data to B Bus

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Absolute Maximum Ratings

Supply Voltage	7V
Input Voltage (I/O ports)	5.5V
Input Voltage (all other inputs)	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Typical θ_{JA}	
N Package	51.5°C/W
M Package	69.0°C/W

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	Min	Typ	Max.	Units
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	High Level Input Voltage	2			V
V_{IL}	Low Level Input Voltage			0.8	V
I_{OH}	High Level Output Current			−15	mA
I_{OL}	Low Level Output Current			64	mA
T_A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units
V_{IK}	Input Clamp Voltage	V_{CC} = 4.5V, I_I = −18 mA				−1.2	V
V_{OH}	Output High Voltage	V_{CC} = 4.5V to 5.5V, I_{OH} = −2 mA		V_{CC} − 2			V
		V_{CC} = 4.5V, I_{OH} = −3 mA		2.4	3.2		
		V_{CC} = 4.5V, I_{OH} = Max		2			
V_{OL}	Output Low Voltage	V_{CC} = 4.5V, I_{OL} = Max			0.35	0.55	V
I_I	Input Current at Max Input Voltage	V_{CC} = 5.5V, V_I = 7V	Control Inputs			0.1	mA
		V_{CC} = 5.5V, V_I = 5.5V	A or B Ports			0.1	
I_{IH}	High Level Input Current	V_{CC} = 5.5V, V_I = 2.7V	Control Inputs			20	μA
			A or B Ports (Note 3)			70	
I_{IL}	Low Level Input Current	V_{CC} = 5.5V, V_I = 0.4V	Control Inputs			−0.5	mA
			A or B Ports (Note 3)			−0.75	
I_O	Output Drive Current	V_{CC} = 5.5V, V_O = 2.25V (Note 2)		−50		−150	mA
I_{CC}	Supply Current	V_{CC} = 5.5V	Outputs High		35	57	mA
			Outputs Low		74	122	
			Outputs Disabled		48	77	

Note 1: All typical values are at V_{CC} = 5V, T_A = 25°C.

Note 2: The output conditions have been chosen to produce a current that closely approximates one half of the true short circuit output current, I_{OS}.

Note 3: For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

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AS620 Switching Characteristics over recommended free air temperature range (Note 1)

Symbol	Parameter	Conditions	From (Input) To (Output)	Min	Max	Units
t_{PLH}	Propagation Delay Time Low to High Level Output	V_{CC} = 4.5V to 5.5V C_L = 50 pF R1 = 500Ω R2 = 500Ω T_A = Min to Max	A to B	1	7	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		A to B	2	6	ns
t_{PLH}	Propagation Delay Time Low to High Level Output		B to A	1	7	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		B to A	2	6	ns
t_{PZH}	Output Enable Time to High Level Output		$\overline{G}$BA to A	2	8	ns
t_{PZL}	Output Enable Time to Low Level Output		$\overline{G}$BA to A	2	9	ns
t_{PHZ}	Output Disable Time from High Level Output		$\overline{G}$BA to A	1	6	ns
t_{PLZ}	Output Disable Time from Low Level Output		$\overline{G}$BA to A	2	12	ns
t_{PZH}	Output Enable Time to High Level Output		GAB to B	2	8	ns
t_{PZL}	Output Enable Time to Low Level Output		GAB to B	2	9	ns
t_{PHZ}	Output Disable Time from High Level Output		GAB to B	1	6	ns
t_{PLZ}	Output DisableTime from Low Level Output		GAB to B	2	13	ns

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