FAIRCHILD SEMICONDUCTOR™

April 1988
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74F620 • 74F623
Inverting Octal Bus Transceiver with 3-STATE Outputs

General Description

These devices are octal bus transceivers designed for asynchronous two-way data flow between the A and B busses. Both busses are capable of sinking 64 mA and have 3-STATE outputs. Dual enable pins (GAB, $\overline{G}$BA) allow data transmission from the A bus to the B bus or from the B bus to the A bus. The 74F620 is an inverting option of the 74F623.

Features

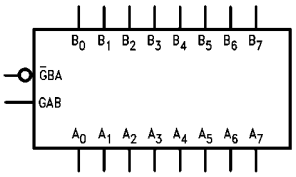
- Designed for asynchronous two-way data flow between busses
- Outputs sink 64 mA
- Dual enable inputs control direction of data flow
- Guaranteed 4000V minimum ESD protection
- 74F620 is an inverting option of the 74F623

Ordering Code:

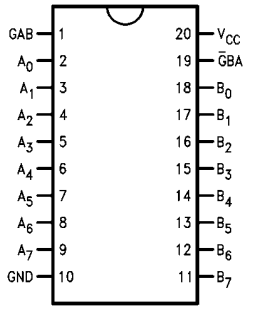
Order Number	Package Number	Package Description
74F620PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
74F623SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
74F623PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Logic Symbol



Connection Diagram



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Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$\overline{G}$BA, GAB	Enable Inputs	1.0/1.0	20 µA/–0.6 mA
A_0–A_7	A Inputs or	3.5/1.083	70 µA/–0.4 mA
	3-STATE Outputs	150/40	–3 mA/64 mA
B_0–B_7	B Inputs or	3.5/1.083	70 µA/–0.4 mA
	3-STATE Outputs	150/40	–3 mA/64 mA

Functional Description

The enable inputs GAB and $\overline{G}$BA control whether data is transmitted from the A bus to the B bus or from the B bus to the A bus. If both $\overline{G}$BA and GAB are disabled ($\overline{G}$BA HIGH and GAB LOW), the outputs are in the high impedance state and data is stored at the A and B busses. When $\overline{G}$BA is active LOW, B data is sent to the A bus. When GAB is active HIGH, data from the A bus is sent to the B bus. If both enable inputs are active ($\overline{G}$BA LOW and GAB HIGH) B data is sent to the A bus while A data is sent to the B bus.

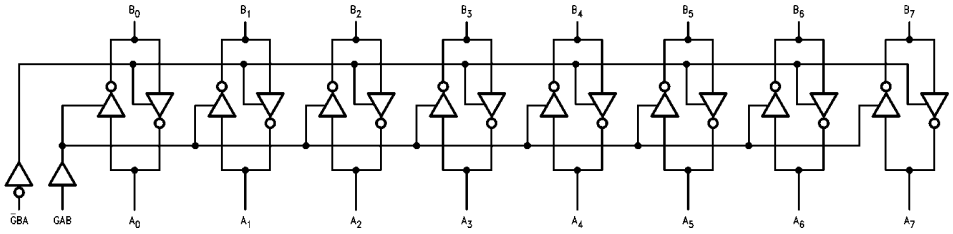
Function Table

Enable Inputs		Operation	
$\overline{G}$BA	GAB	74F620	74F623
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	Z	Z
L	H	$\overline{B}$ Data to A Bus, $\overline{A}$ Data to B Bus	B Data to A Bus, A Data to B Bus

H = HIGH Voltage Level
L = LOW Voltage Level
Z = High Impedance

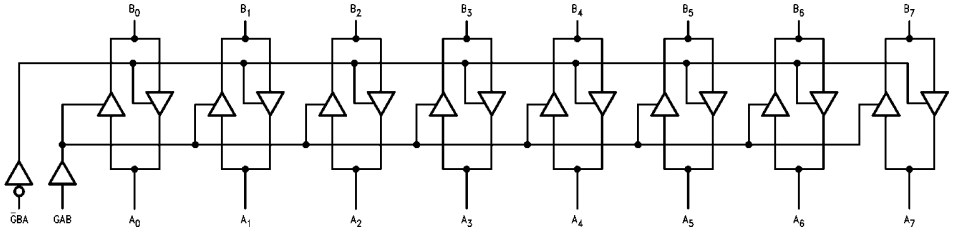
Logic Diagrams

74F620



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

74F623



Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

Absolute Maximum Ratings(Note 1)

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	−55°C to +150°C
V_{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
Voltage Applied to Output	
in HIGH State (with V_{CC} = 0V)	
Standard Output	−0.5V to V_{CC}
3-STATE Output	−0.5V to +5.5V
Current Applied to Output	
in LOW State (Max)	twice the rated I_{OL} (mA)
ESD Last Passing Voltage (Min)	4000V

Recommended Operating Conditions

Free Air Ambient Temperature	0°C to +70°C
Supply Voltage	+4.5V to +5.5V

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

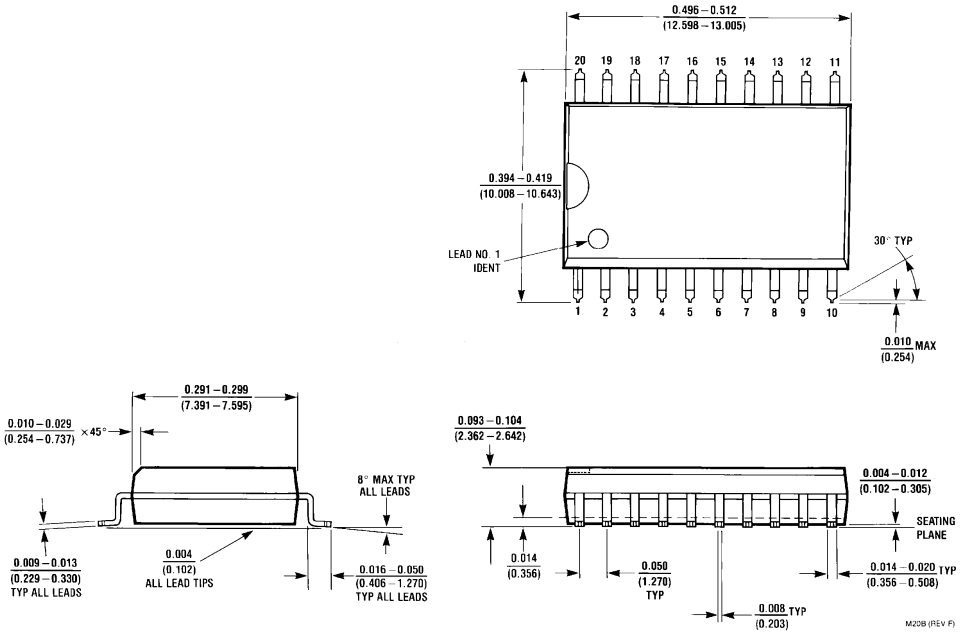
DC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage			−1.2	V	Min	I_{IN} = −18 mA (Non I/O Pins)
V_{OH}	Output HIGH Voltage 10% V_{CC}	2.0			V	Min	I_{OH} = −15 mA (A_n, B_n)
V_{OL}	Output LOW Voltage 10% V_{CC}			0.55	V	Min	I_{OL} = 64 mA (A_n, B_n)
I_{IH}	Input HIGH Current			5.0	µA	Max	V_{IN} = 2.7V
I_{BVI}	Input HIGH Current Breakdown Test			7.0	µA	Max	V_{IN} = 7.0V (GBA, GAB)
I_{BVIT}	Input HIGH Current Breakdown (I/O)			0.5	mA	Max	V_{IN} = 5.5V (A_n, B_n)
I_{CEX}	Output HIGH Leakage Current			50	µA	Max	V_{OUT} = V_{CC}
V_{ID}	Input Leakage Test	4.75			V	0.0	I_{ID} = 1.9 µA All Other Pins Grounded
I_{OD}	Output Leakage Circuit Current			3.75	µA	0.0	V_{IOD} = 150 mV All Other Pins Grounded
I_{IL}	Input LOW Current			−0.6	mA	Max	V_{IN} = 0.5V (Non I/O Pins)
$I_{IH} + I_{OZH}$	Output Leakage Current			70	µA	Max	V_{OUT} = 2.7V (A_n, B_n)
$I_{IL} + I_{OZL}$	Output Leakage Current			−650	µA	Max	V_{OUT} = 0.5V (A_n, B_n)
I_{OS}	Output Short-Circuit Current	−100		−225	mA	Max	V_{OUT} = 0V
I_{ZZ}	Bus Drainage Test			500	µA	0.0V	V_{OUT} = 5.25V
I_{CCH}	Power Supply Current (74F620)			82	mA	Max	V_O = HIGH, V_{IN} = 0.2V
I_{CCL}	Power Supply Current (74F620)			82	mA	Max	V_O = LOW
I_{CCZ}	Power Supply Current (74F620)			95	mA	Max	V_O = HIGH Z
I_{CCH}	Power Supply Current (74F623)			65	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current (74F623)			82	mA	Max	V_O = LOW, V_{IN} = 0.2V
I_{CCZ}	Power Supply Current (74F623)			85	mA	Max	V_O = HIGH Z

AC Electrical Characteristics

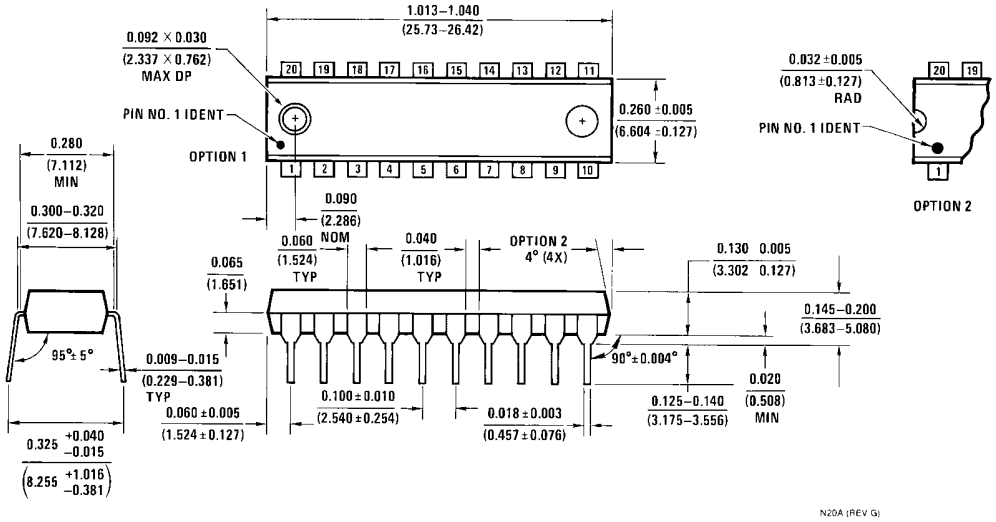
Symbol	Parameter	$T_A = +25°C$, $V_{CC} = +5.0V$, $C_L = 50$ pF			$T_A = 0°C$ to $+70°C$, $V_{CC} = +5.0V$, $C_L = 50$ pF		Units
		Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay	2.5		7.5	2.0	8.0	ns
t_{PHL}	A Input to B Output (74F620)	2.0		7.0	2.0	7.0	
t_{PLH}	Propagation Delay	2.5		7.5	2.0	8.0	ns
t_{PHL}	B Input to A Output (74F620)	2.0		7.0	2.0	7.0	
t_{PLH}	Propagation Delay	1.5		6.5	1.5	7.5	ns
t_{PHL}	A Input to B Output (74F623)	2.0		7.0	2.0	7.5	
t_{PLH}	Propagation Delay	1.5		6.5	1.5	7.5	ns
t_{PHL}	B Input to A Output (74F623)	2.0		7.0	2.0	7.5	
t_{PZH}	Enable Time	2.0		7.0	2.0	8.0	ns
t_{PZL}	$\overline{G}$BA Input to A Output	2.5		8.0	2.0	8.5	
t_{PHZ}	Disable Time	1.5		6.5	1.5	7.5	
t_{PLZ}	$\overline{G}$BA Input to A Output	1.0		5.5	1.0	5.5	
t_{PZH}	Enable Time	2.0		7.5	2.0	8.5	ns
t_{PZL}	GAB Input to B Output (74F620)	3.0		8.0	2.0	8.5	
t_{PHZ}	Disable Time	2.5		8.0	2.0	9.0	
t_{PLZ}	GAB Input to B Output (74F620)	2.0		7.5	2.0	8.0	
t_{PZH}	Enable Time	2.0		7.5	2.0	8.5	ns
t_{PZL}	GAB Input to B Output (74F623)	2.5		8.0	2.0	8.5	
t_{PHZ}	Disable Time	2.0		8.0	2.0	9.0	
t_{PLZ}	GAB Input to B Output (74F623)	2.0		8.0	2.0	8.0	

Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
Package Number M20B

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N20A