

## 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,  $\bar{G}BA$ ) 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

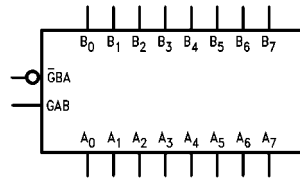
- Designed for asynchronous two-way data flow between busses
- Outputs sink 64 mA
- Dual enable inputs control direction of data flow
- Guaranteed 4000V minimum ESD protection
- 74F620 is an inverting option of the 74F623

#### Ordering Code:

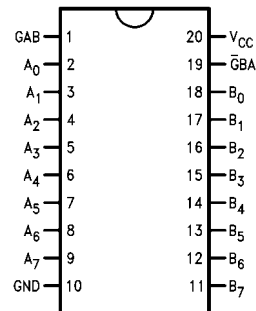
| Order Number | Package Number | Package Description                                                       |
|--------------|----------------|---------------------------------------------------------------------------|
| 74F620PC     | N20A           | 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC 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



## Unit Loading/Fan Out

| Pin Names              | Description                    | U.L.<br>HIGH/LOW | Input $I_{IH}/I_{IL}$<br>Output $I_{OH}/I_{OL}$ |
|------------------------|--------------------------------|------------------|-------------------------------------------------|
| $\overline{G}BA$ , GAB | Enable Inputs                  | 1.0/1.0          | 20 $\mu A$ /–0.6 mA                             |
| $A_0$ – $A_7$          | A Inputs or<br>3-STATE Outputs | 3.5/1.083        | 70 $\mu A$ /–0.4 mA                             |
| $B_0$ – $B_7$          | B Inputs or<br>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,<br>$\overline{A}$ Data to B Bus | B Data to A Bus,<br>A Data to B Bus |

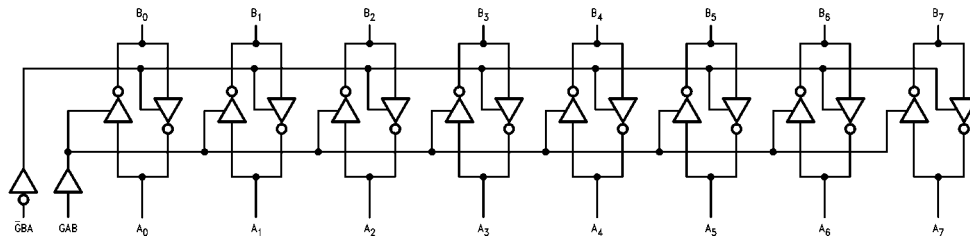
H = HIGH Voltage Level

L = LOW Voltage Level

Z = High Impedance

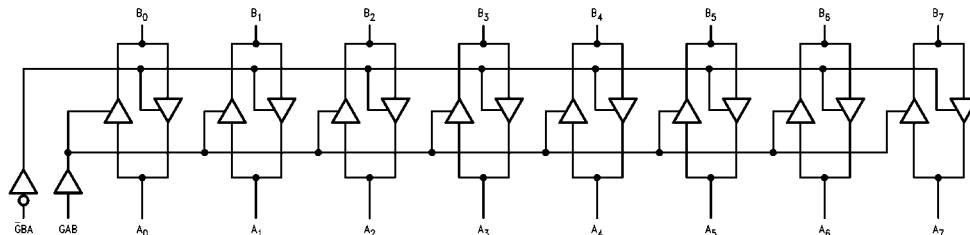
## Logic Diagrams

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 <sub>CC</sub> 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<br>in HIGH State (with V <sub>CC</sub> = 0V) |                                      |
| Standard Output                                                        | –0.5V to V <sub>CC</sub>             |
| 3-STATE Output                                                         | –0.5V to +5.5V                       |
| Current Applied to Output<br>in LOW State (Max)                        | twice the rated I <sub>OL</sub> (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.

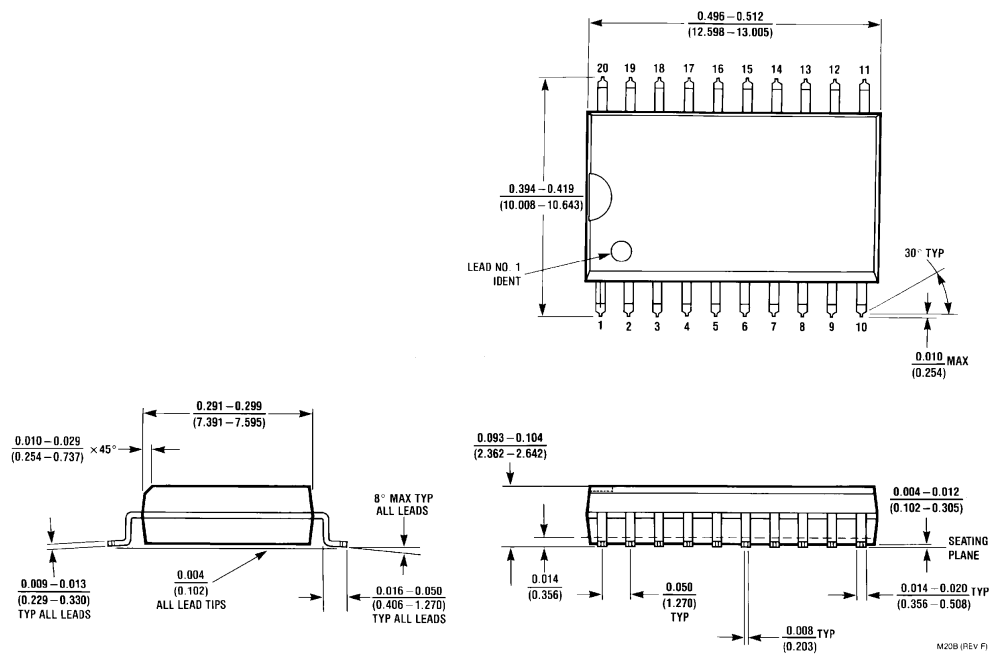
**DC Electrical Characteristics**

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

## AC Electrical Characteristics

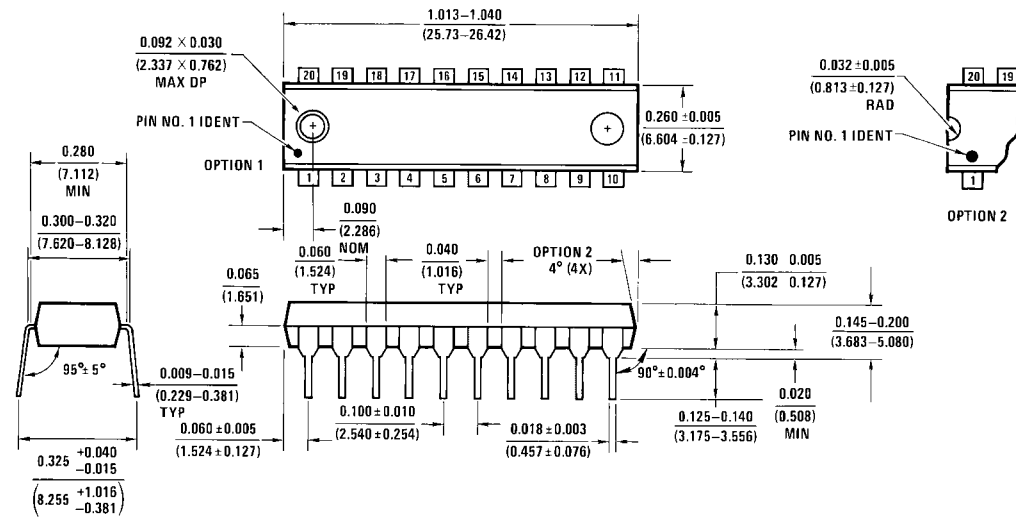
| Symbol           | Parameter                      | T <sub>A</sub> = +25°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |     |     | T <sub>A</sub> = 0°C to +70°C<br>V <sub>CC</sub> = +5.0V<br>C <sub>L</sub> = 50 pF |     | Units |
|------------------|--------------------------------|-----------------------------------------------------------------------------|-----|-----|------------------------------------------------------------------------------------|-----|-------|
|                  |                                | Min                                                                         | Typ | Max | Min                                                                                | Max |       |
| t <sub>PLH</sub> | Propagation Delay              | 2.5                                                                         |     | 7.5 | 2.0                                                                                | 8.0 | ns    |
| t <sub>PHL</sub> | A Input to B Output (74F620)   | 2.0                                                                         |     | 7.0 | 2.0                                                                                | 7.0 |       |
| t <sub>PLH</sub> | Propagation Delay              | 2.5                                                                         |     | 7.5 | 2.0                                                                                | 8.0 | ns    |
| t <sub>PHL</sub> | B Input to A Output (74F620)   | 2.0                                                                         |     | 7.0 | 2.0                                                                                | 7.0 |       |
| t <sub>PLH</sub> | Propagation Delay              | 1.5                                                                         |     | 6.5 | 1.5                                                                                | 7.5 | ns    |
| t <sub>PHL</sub> | A Input to B Output (74F623)   | 2.0                                                                         |     | 7.0 | 2.0                                                                                | 7.5 |       |
| t <sub>PLH</sub> | Propagation Delay              | 1.5                                                                         |     | 6.5 | 1.5                                                                                | 7.5 | ns    |
| t <sub>PHL</sub> | B Input to A Output (74F623)   | 2.0                                                                         |     | 7.0 | 2.0                                                                                | 7.5 |       |
| t <sub>PZH</sub> | Enable Time                    | 2.0                                                                         |     | 7.0 | 2.0                                                                                | 8.0 | ns    |
| t <sub>PZL</sub> | GBA Input to A Output          | 2.5                                                                         |     | 8.0 | 2.0                                                                                | 8.5 |       |
| t <sub>PHZ</sub> | Disable Time                   | 1.5                                                                         |     | 6.5 | 1.5                                                                                | 7.5 |       |
| t <sub>PLZ</sub> | GBA Input to A Output          | 1.0                                                                         |     | 5.5 | 1.0                                                                                | 5.5 |       |
| t <sub>PZH</sub> | Enable Time                    | 2.0                                                                         |     | 7.5 | 2.0                                                                                | 8.5 | ns    |
| t <sub>PZL</sub> | GAB Input to B Output (74F620) | 3.0                                                                         |     | 8.0 | 2.0                                                                                | 8.5 |       |
| t <sub>PHZ</sub> | Disable Time                   | 2.5                                                                         |     | 8.0 | 2.0                                                                                | 9.0 |       |
| t <sub>PLZ</sub> | GAB Input to B Output (74F620) | 2.0                                                                         |     | 7.5 | 2.0                                                                                | 8.0 |       |
| t <sub>PZH</sub> | Enable Time                    | 2.0                                                                         |     | 7.5 | 2.0                                                                                | 8.5 | ns    |
| t <sub>PZL</sub> | GAB Input to B Output (74F623) | 2.5                                                                         |     | 8.0 | 2.0                                                                                | 8.5 |       |
| t <sub>PHZ</sub> | Disable Time                   | 2.0                                                                         |     | 8.0 | 2.0                                                                                | 9.0 |       |
| t <sub>PLZ</sub> | 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

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