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# HD74HCT620/HD74HCT623

Octal Bus Transceivers (with inverted 3-state outputs)/  
Octal Bus Transceivers (with 3-state outputs)

## HITACHI

ADE-205-561 (Z)  
1st. Edition  
Sep. 2000

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### Description

This octal 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 A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the enable inputs ( $\overline{\text{GBA}}$  and GAB).

The enable inputs can be used to disable the device so that the buses are affectively isolated.

The dual-enable configuration gives these devices the capability to store data by simultaneous enabling of  $\overline{\text{GBA}}$  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. The 8-bit codes appearing on the two sets of buses will be identical for the HD74HCT623 or complementary for the HD74HCT620.

### Features

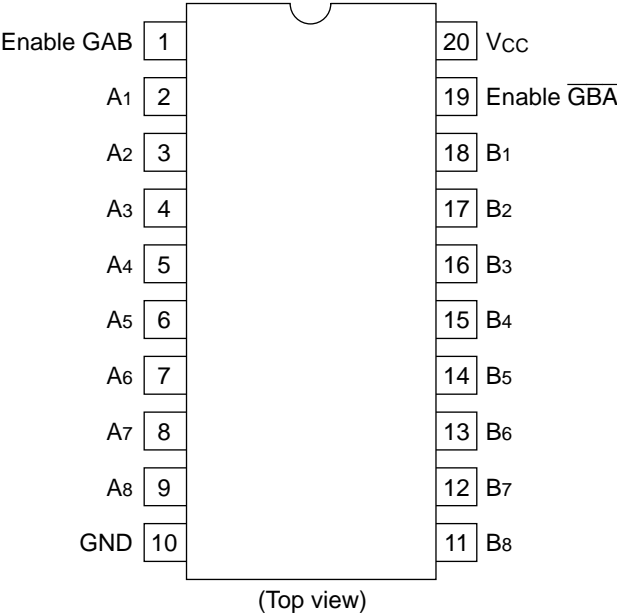
- LSTTL Output Logic Level Compatibility as well as CMOS Output Compatibility
- High Speed Operation:  $t_{pd}$  (Bus to Bus) = 15 ns typ ( $C_L = 50$  pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 4.5$  to 5.5 V
- Low Input Current: 1  $\mu\text{A}$  max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu\text{A}$  max ( $T_a = 25^\circ\text{C}$ )

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## Function Table

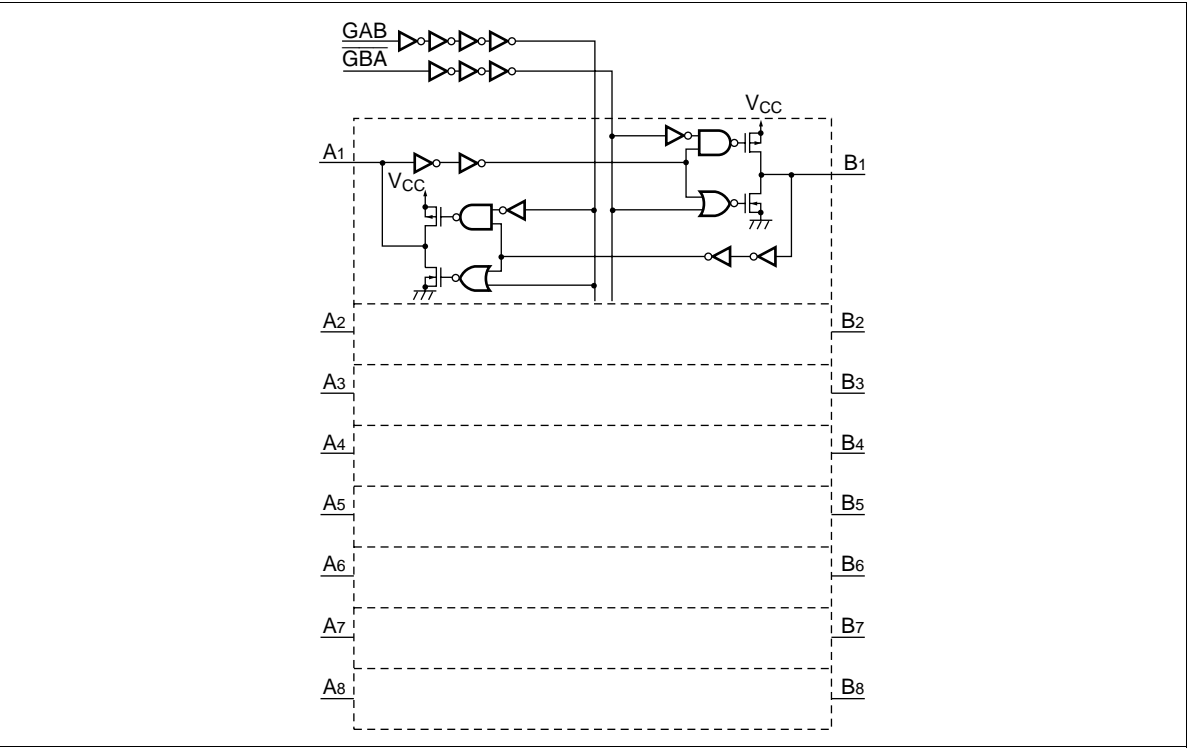
| Enable Input            |     | Operation   |                                     |
|-------------------------|-----|---|-------------------------------------|
| $\overline{\text{GBA}}$ | GAB | HD74HCT620  | HD74HCT623                          |
| L                       | L   | $\overline{\text{B}}$ data to A bus   | B data to A bus                     |
| H                       | H   | $\overline{\text{A}}$ data to B bus   | A data to B bus                     |
| H                       | L   | Isolation   | Isolation                           |
| L                       | H   | $\overline{\text{B}}$ data to A bus,<br>$\overline{\text{A}}$ data to B bus | B data to A bus,<br>A data to B bus |

## Pin Arrangement





HD74HCT623



Absolute Maximum Ratings

| Item                                | Symbol               | Rating                 | Unit |
|-------------------------------------|----------------------|------------------------|------|
| Supply voltage range                | $V_{CC}$             | -0.5 to +7.0           | V    |
| Input voltage                       | $V_{IN}$             | -0.5 to $V_{CC} + 0.5$ | V    |
| Output voltage                      | $V_{OUT}$            | -0.5 to $V_{CC} + 0.5$ | V    |
| DC current drain per pin            | $I_{OUT}$            | $\pm 35$               | mA   |
| DC current drain per $V_{CC}$ , GND | $I_{CC}$ , $I_{GND}$ | $\pm 75$               | mA   |
| DC input diode current              | $I_{IK}$             | $\pm 20$               | mA   |
| DC output diode current             | $I_{OK}$             | $\pm 20$               | mA   |
| Power dissipation per package       | $P_T$                | 500                    | mW   |
| Storage temperature                 | Tstg                 | -65 to +150            | °C   |

## DC Characteristics

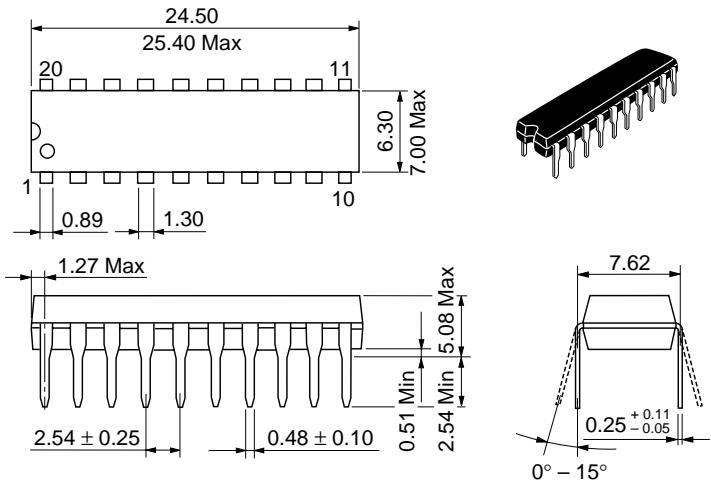
| Item                     | Symbol          | Ta = 25°C |     |      | Ta = -40 to +85°C |      | Unit | Test Conditions     |  |
|--------------------------|-----------------|-----------|-----|------|-------------------|------|------|---------------------|--|
|                          |                 | Min       | Typ | Max  | Min               | Max  |      | V <sub>CC</sub> (V) |  |
| Input voltage            | V <sub>IH</sub> | 2.0       | —   | —    | 2.0               | —    | V    | 4.5 to 5.5          |  |
|                          | V <sub>IL</sub> | —         | —   | 0.8  | —                 | 0.8  | V    | 4.5 to 5.5          |  |
| Output voltage           | V <sub>OH</sub> | 4.4       | —   | —    | 4.4               | —    | V    | 4.5                 | Vin = V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> = -20 µA      |
|                          |                 | 4.18      | —   | —    | 4.13              | —    |      | 4.5                 | I <sub>OH</sub> = -6 mA  |
|                          | V <sub>OL</sub> | —         | —   | 0.1  | —                 | 0.1  | V    | 4.5                 | Vin = V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OL</sub> = 20 µA       |
|                          |                 | —         | —   | 0.26 | —                 | 0.33 |      | 4.5                 | I <sub>OL</sub> = 6 mA   |
| Off-state output current | I <sub>OZ</sub> | —         | —   | ±0.5 | —                 | ±5.0 | µA   | 5.5                 | Vin = V <sub>IH</sub> or V <sub>IL</sub> , Vout = V <sub>CC</sub> or GND |
| Input current            | I <sub>in</sub> | —         | —   | ±0.1 | —                 | ±1.0 | µA   | 5.5                 | Vin = V <sub>CC</sub> or GND   |
| Quiescent supply current | I <sub>CC</sub> | —         | —   | 4.0  | —                 | 40   | µA   | 5.5                 | Vin = V <sub>CC</sub> or GND, Iout = 0 µA                                |

AC Characteristics (C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)

| Item                   | Symbol           | Ta = 25°C |     |     | Ta = -40 to +85°C |     | Unit | Test Conditions     |  |
|------------------------|------------------|-----------|-----|-----|-------------------|-----|------|---------------------|--|
|                        |                  | Min       | Typ | Max | Min               | Max |      | V <sub>CC</sub> (V) |  |
| Propagation delay time | t <sub>PLH</sub> | —         | 13  | 20  | —                 | 25  | ns   | 4.5                 |  |
|                        | t <sub>PHL</sub> | —         | 16  | 20  | —                 | 25  |      | 4.5                 |  |
| Output enable time     | t <sub>ZH</sub>  | —         | 16  | 30  | —                 | 38  | ns   | 4.5                 |  |
|                        | t <sub>ZL</sub>  | —         | 16  | 30  | —                 | 38  |      | 4.5                 |  |
| Output disable time    | t <sub>HZ</sub>  | —         | 19  | 30  | —                 | 38  | ns   | 4.5                 |  |
|                        | t <sub>LZ</sub>  | —         | 21  | 30  | —                 | 38  |      | 4.5                 |  |
| Output rise/fall time  | t <sub>TLH</sub> | —         | 4   | 12  | —                 | 15  | ns   | 4.5                 |  |
|                        | t <sub>THL</sub> | —         | —   | —   | —                 | —   |      | —                   |  |
| Input capacitance      | C <sub>in</sub>  | —         | 5   | 10  | —                 | 10  | pF   | —                   |  |

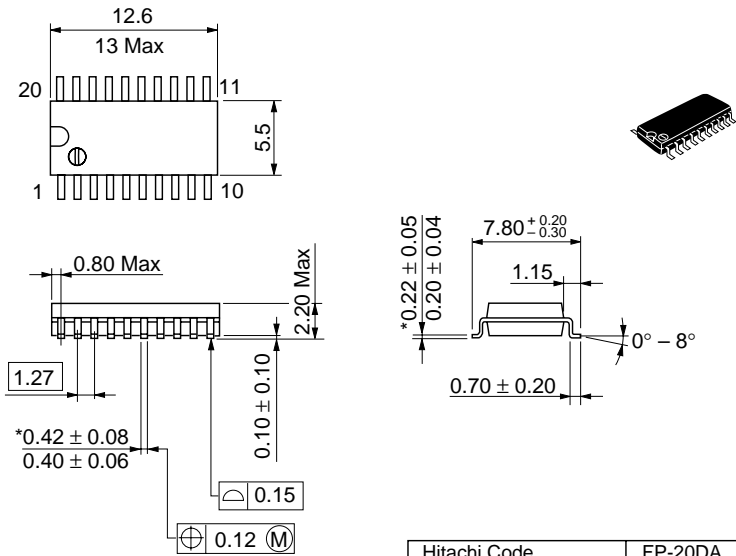
Package Dimensions

Unit: mm



|                        |          |
|------------------------|----------|
| Hitachi Code           | DP-20N   |
| JEDEC                  | —        |
| EIAJ                   | Conforms |
| Mass (reference value) | 1.26 g   |

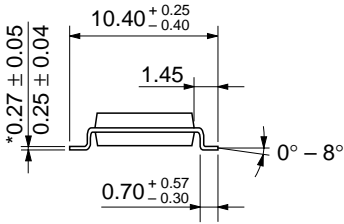
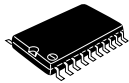
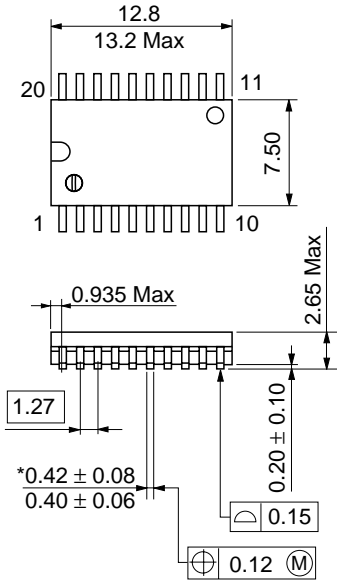
Unit: mm



\*Dimension including the plating thickness  
Base material dimension

|                        |          |
|------------------------|----------|
| Hitachi Code           | FP-20DA  |
| JEDEC                  | —        |
| EIAJ                   | Conforms |
| Mass (reference value) | 0.31 g   |

Unit: mm



\*Dimension including the plating thickness  
Base material dimension

|                        |          |
|------------------------|----------|
| Hitachi Code           | FP-20DB  |
| JEDEC                  | Conforms |
| EIAJ                   | —        |
| Mass (reference value) | 0.52 g   |

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