

To all our customers

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

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# HD74HC253

Dual 4-to-1-line Data Selectors/Multiplexers (with 3-state outputs)



ADE-205-477 (Z)

1st. Edition

Sep. 2000

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## Description

The large output drive and 3-state features of this device make it ideally suited for interfacing with bus lines in bus organized systems. When the output control input is taken high, the multiplexer outputs are sent into a high impedance state.

When the output control is held low, the associated multiplexer chooses the correct output channel for the given input signals determined by the select A and B inputs.

## Features

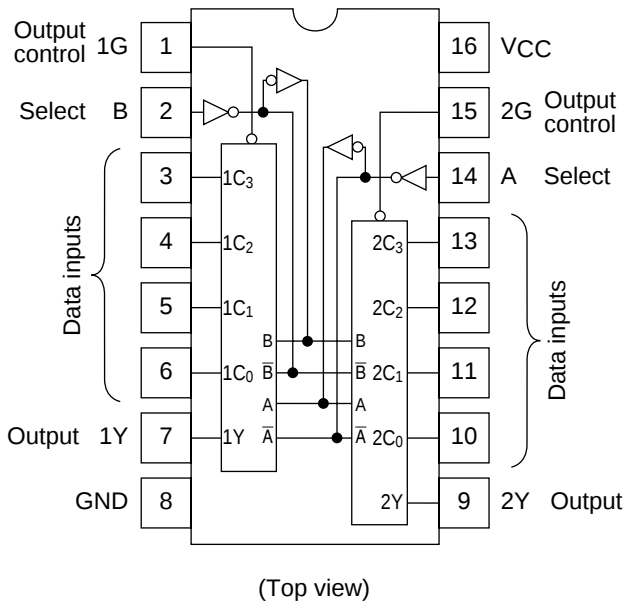
- High Speed Operation:  $t_{pd}$  (Data to Y) = 18 ns typ ( $C_L = 50$  pF)
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 2$  to 6 V
- Low Input Current: 1  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu$ A max ( $T_a = 25^\circ\text{C}$ )

Function Table

| Select inputs |   | Data inputs    |                |                |                | Output Control | Output |
|---------------|---|----------------|----------------|----------------|----------------|----------------|--------|
| B             | A | C <sub>0</sub> | C <sub>1</sub> | C <sub>2</sub> | C <sub>3</sub> | G              | Y      |
| X             | X | X              | X              | X              | X              | H              | Z      |
| L             | L | L              | X              | X              | X              | L              | L      |
| L             | L | H              | X              | X              | X              | L              | H      |
| L             | H | X              | L              | X              | X              | L              | L      |
| L             | H | X              | H              | X              | X              | L              | H      |
| H             | L | X              | X              | L              | X              | L              | L      |
| H             | L | X              | X              | H              | X              | L              | H      |
| H             | H | X              | X              | X              | L              | L              | L      |
| H             | H | X              | X              | X              | H              | L              | H      |

- Notes
- 1. X: irrelevant
  - 2. Address inputs A and B are common to both sections.

Pin Arrangement



## DC Characteristics

| Item                     | Symbol          | V <sub>CC</sub> (V) | Ta = 25°C |     |      | Ta = -40 to +85°C |      | Unit | Test Conditions                                                             |                           |
|--------------------------|-----------------|---------------------|-----------|-----|------|-------------------|------|------|-----------------------------------------------------------------------------|---------------------------|
|                          |                 |                     | Min       | Typ | Max  | Min               | Max  |      |                                                                             |                           |
| Input voltage            | V <sub>IH</sub> | 2.0                 | 1.5       | —   | —    | 1.5               | —    | V    |                                                                             |                           |
|                          |                 | 4.5                 | 3.15      | —   | —    | 3.15              | —    |      |                                                                             |                           |
|                          |                 | 6.0                 | 4.2       | —   | —    | 4.2               | —    |      |                                                                             |                           |
|                          | V <sub>IL</sub> | 2.0                 | —         | —   | 0.5  | —                 | 0.5  | V    |                                                                             |                           |
|                          |                 | 4.5                 | —         | —   | 1.35 | —                 | 1.35 |      |                                                                             |                           |
|                          |                 | 6.0                 | —         | —   | 1.8  | —                 | 1.8  |      |                                                                             |                           |
| Output voltage           | V <sub>OH</sub> | 2.0                 | 1.9       | 2.0 | —    | 1.9               | —    | V    | Vin = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OH</sub> = -20 μA           |                           |
|                          |                 | 4.5                 | 4.4       | 4.5 | —    | 4.4               | —    |      |                                                                             |                           |
|                          |                 | 6.0                 | 5.9       | 6.0 | —    | 5.9               | —    |      |                                                                             |                           |
|                          |                 | 4.5                 | 4.18      | —   | —    | 4.13              | —    |      |                                                                             | I <sub>OH</sub> = -4 mA   |
|                          |                 | 6.0                 | 5.68      | —   | —    | 5.63              | —    |      |                                                                             | I <sub>OH</sub> = -5.2 mA |
|                          | V <sub>OL</sub> | 2.0                 | —         | 0.0 | 0.1  | —                 | 0.1  | V    | Vin = V <sub>IH</sub> or V <sub>IL</sub> I <sub>OL</sub> = 20 μA            |                           |
|                          |                 | 4.5                 | —         | 0.0 | 0.1  | —                 | 0.1  |      |                                                                             |                           |
|                          |                 | 6.0                 | —         | 0.0 | 0.1  | —                 | 0.1  |      |                                                                             |                           |
|                          |                 | 4.5                 | —         | —   | 0.26 | —                 | 0.33 |      |                                                                             | I <sub>OL</sub> = 4 mA    |
|                          |                 | 6.0                 | —         | —   | 0.26 | —                 | 0.33 |      |                                                                             | I <sub>OL</sub> = 5.2 mA  |
| Off-state output current | I <sub>OZ</sub> | 6.0                 | —         | —   | ±0.5 | —                 | ±5.0 | μA   | Vin = V <sub>IH</sub> or V <sub>IL</sub> ,<br>Vout = V <sub>CC</sub> or GND |                           |
| Input current            | I <sub>in</sub> | 6.0                 | —         | —   | ±0.1 | —                 | ±1.0 | μA   | Vin = V <sub>CC</sub> or GND                                                |                           |
| Quiescent supply current | I <sub>CC</sub> | 6.0                 | —         | —   | 4.0  | —                 | 40   | μA   | Vin = V <sub>CC</sub> or GND, Iout = 0 μA                                   |                           |

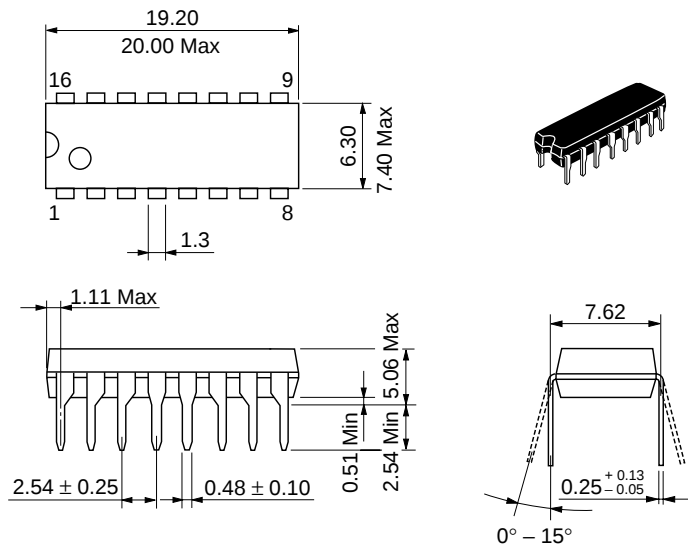
# HD74HC253

AC Characteristics ( $C_L = 50\text{ pF}$ , Input  $t_r = t_f = 6\text{ ns}$ )

| Item                   | Symbol           | V <sub>cc</sub> (V) | Ta = −40 to +85°C |     |     |     |     |    | Unit      | Test Conditions |
|------------------------|------------------|---------------------|-------------------|-----|-----|-----|-----|----|-----------|-----------------|
|                        |                  |                     | Ta = 25°C         |     |     |     |     |    |           |                 |
|                        |                  |                     | Min               | Typ | Max | Min | Max |    |           |                 |
| Propagation delay time | t <sub>PLH</sub> | 2.0                 | —                 | —   | 125 | —   | 155 | ns | Data to Y |                 |
|                        | t <sub>PHL</sub> | 4.5                 | —                 | 18  | 25  | —   | 31  |    |           |                 |
|                        |                  | 6.0                 | —                 | —   | 21  | —   | 26  |    |           |                 |
|                        |                  | 2.0                 | —                 | —   | 160 | —   | 200 |    |           |                 |
|                        |                  | 4.5                 | —                 | 20  | 32  | —   | 40  |    |           |                 |
|                        |                  | 6.0                 | —                 | —   | 27  | —   | 34  |    |           |                 |
| Output enable time     | t <sub>ZL</sub>  | 2.0                 | —                 | —   | 100 | —   | 125 | ns |           |                 |
|                        | t <sub>ZH</sub>  | 4.5                 | —                 | 11  | 20  | —   | 25  |    |           |                 |
|                        |                  | 6.0                 | —                 | —   | 17  | —   | 21  |    |           |                 |
| Output disable time    | t <sub>LZ</sub>  | 2.0                 | —                 | —   | 150 | —   | 190 | ns |           |                 |
|                        | t <sub>HZ</sub>  | 4.5                 | —                 | 15  | 30  | —   | 38  |    |           |                 |
|                        |                  | 6.0                 | —                 | —   | 26  | —   | 33  |    |           |                 |
| Output rise/fall time  | t <sub>TLH</sub> | 2.0                 | —                 | —   | 75  | —   | 95  | ns |           |                 |
|                        | t <sub>THL</sub> | 4.5                 | —                 | 5   | 15  | —   | 19  |    |           |                 |
|                        |                  | 6.0                 | —                 | —   | 13  | —   | 16  |    |           |                 |
| Input capacitance      | C <sub>in</sub>  | —                   | —                 | 5   | 10  | —   | 10  | pF |           |                 |

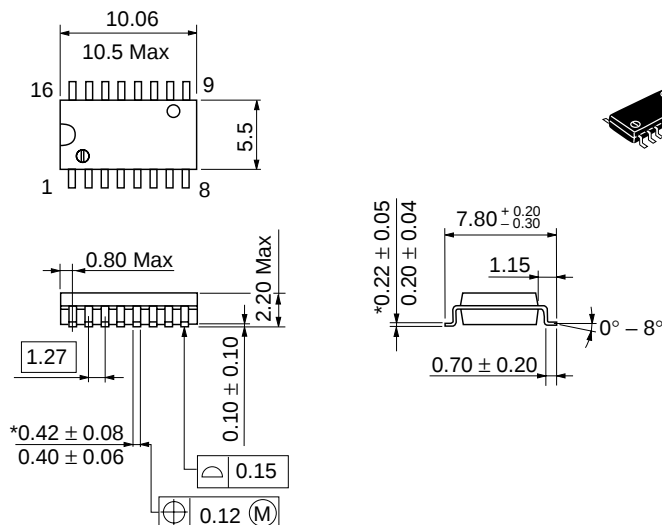
# Package Dimensions

Unit: mm



|                        |          |
|------------------------|----------|
| Hitachi Code           | DP-16    |
| JEDEC                  | Conforms |
| EIAJ                   | Conforms |
| Mass (reference value) | 1.07 g   |

Unit: mm



\*Dimension including the plating thickness  
Base material dimension

|                        |          |
|------------------------|----------|
| Hitachi Code           | FP-16DA  |
| JEDEC                  | —        |
| EIAJ                   | Conforms |
| Mass (reference value) | 0.24 g   |

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# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.

Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

|     |              |                                                                                               |
|-----|--------------|-----------------------------------------------------------------------------------------------|
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## For further information write to:

Hitachi Semiconductor  
(America) Inc.

179 East Tasman Drive,  
San Jose, CA 95134

Tel: <1> (408) 433-1990

Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic Components Group

Dornacher Straße 3  
D-85622 Feldkirchen, Munich

Germany

Tel: <49> (89) 9 9180-0

Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.

Electronic Components Group.

Whitebrook Park

Lower Cookham Road

Maidenhead

Berkshire SL6 8YA, United Kingdom

Tel: <44> (1628) 585000

Fax: <44> (1628) 585160

Hitachi Asia Ltd.

Hitachi Tower

16 Collyer Quay #20-00,

Singapore 049318

Tel: <65>-538-6533/538-8577

Fax: <65>-538-6933/538-3877

URL: <http://www.hitachi.com.sg>

Hitachi Asia Ltd.

(Taipei Branch Office)

4/F, No. 167, Tun Hwa North Road,

Hung-Kuo Building,

Taipei (105), Taiwan

Tel: <886>-(2)-2718-3666

Fax: <886>-(2)-2718-8180

Telex: 23222 HAS-TP

URL: <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.

Group III (Electronic Components)

7/F., North Tower,

World Finance Centre,

Harbour City, Canton Road

Tsim Sha Tsui, Kowloon,

Hong Kong

Tel: <852>-(2)-735-9218

Fax: <852>-(2)-730-0281

URL: <http://www.hitachi.com.hk>

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