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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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Not recommended
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HD74LS253

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

REJ03D0468-0300

Rev.3.00

Jul.15.2005

This data selector / multiplexer contains inverters and drivers to supply fully complementary, on-ship, binary decoding data selection to AND-OR gates.

Separate output control inputs are provided for each of the two four-line sections. The three-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at high-impedance state) the low-impedance of the single enabled output will drive the bus line to a high or low logic level.

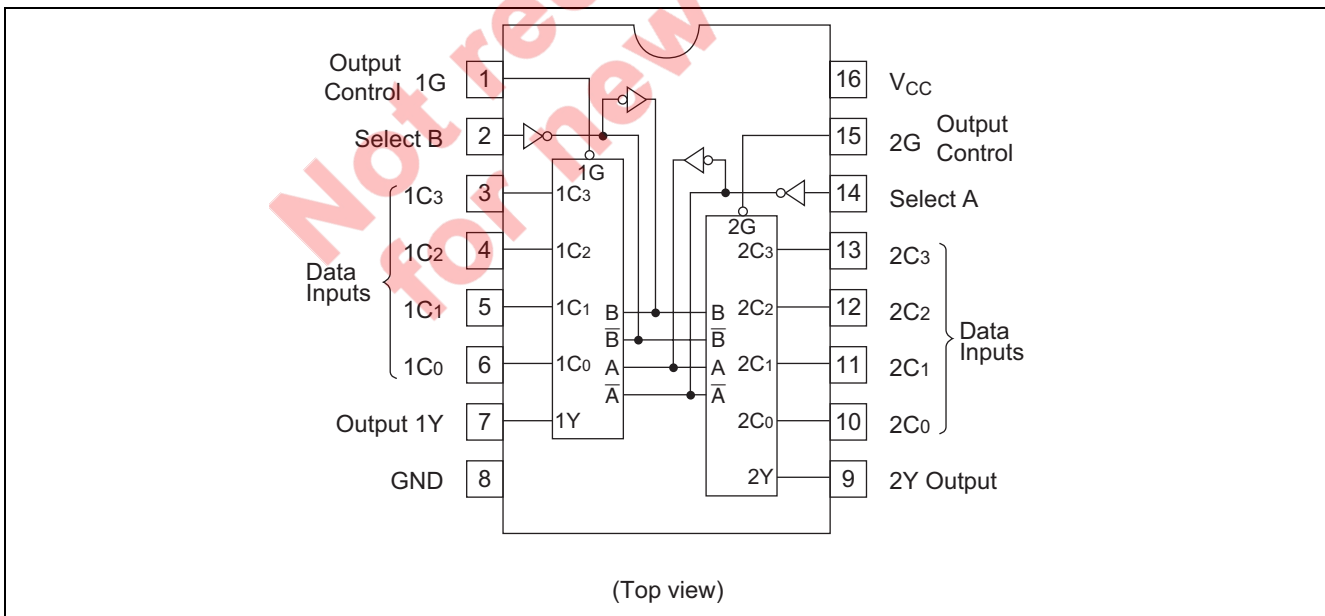
Features

- Ordering Information

| Part Name | Package Type | Package Code (Previous Code) | Package Abbreviation | Taping Abbreviation (Quantity) |
|---------------|--------------------|------------------------------|----------------------|--------------------------------|
| HD74LS253P | DILP-16 pin | PRDP0016AE-B (DP-16FV) | P | — |
| HD74LS253FPEL | SOP-16 pin (JEITA) | PRSP0016DH-B (FP-16DAV) | FP | EL (2,000 pcs/reel) |

Note: Please consult the sales office for the above package availability.

Pin Arrangement

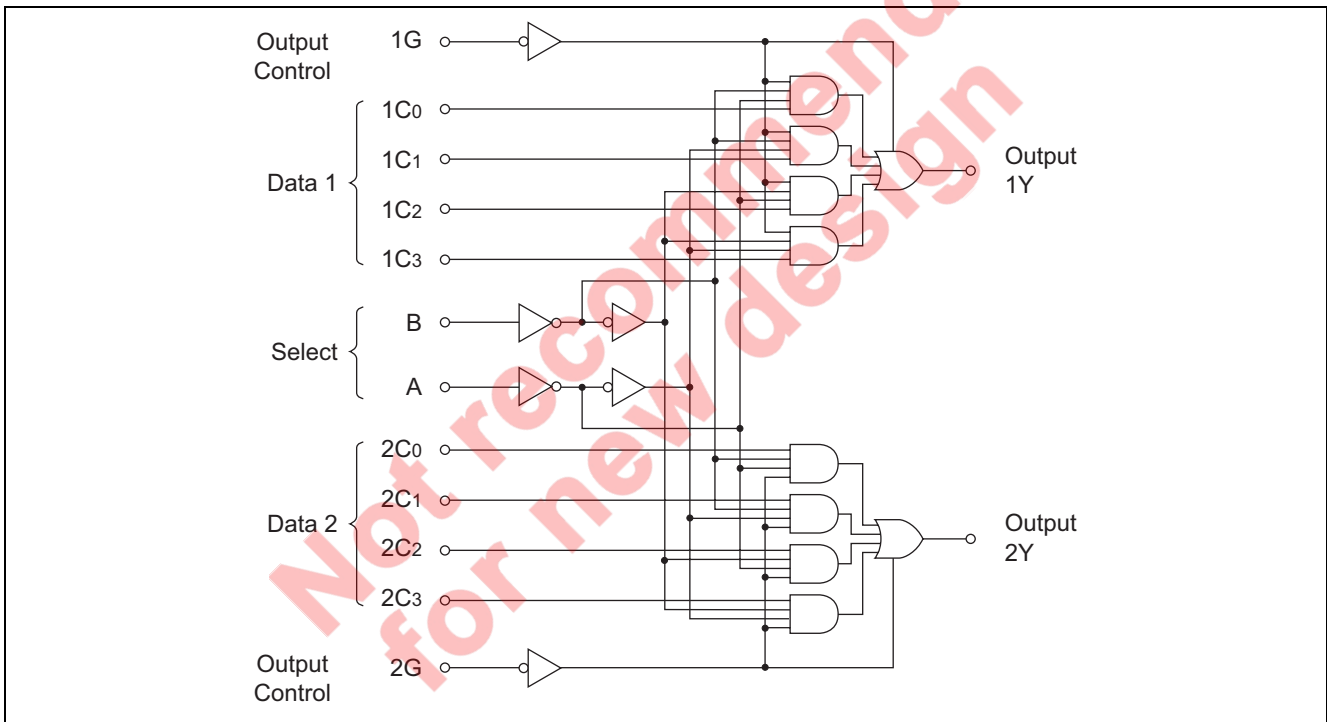


Function Table

| Select inputs | | Data inputs | | | | Output control | Output |
|---------------|---|----------------|----------------|----------------|----------------|----------------|--------|
| B | A | C ₀ | C ₁ | C ₂ | C ₃ | 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. H; high level, L; low level, X; irrelevant
 2. Address inputs A and B are common to both sections.

Block Diagram



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit |
|----------------------------|----------------------|-------------|------|
| Supply voltage | V _{CC} | 7 | V |
| Input voltage | V _{IN} | 7 | V |
| Output voltage (off-state) | V _{O (off)} | 5.5 | V |
| Operating temperature | T _{opr} | -20 to +75 | °C |
| Power dissipation | P _T | 400 | mW |
| Storage temperature | T _{stg} | -65 to +150 | °C |

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

Recommended Operating Conditions

| Item | Symbol | Min | Typ | Max | Unit |
|-----------------------|-----------|------|------|------|------|
| Supply voltage | V_{CC} | 4.75 | 5.00 | 5.25 | V |
| Output current | I_{OH} | — | — | -2.6 | mA |
| | I_{OL} | — | — | 8 | mA |
| Operating temperature | T_{opr} | -20 | 25 | 75 | °C |

Electrical Characteristics

(Ta = -20 to +75 °C)

| Item | Symbol | min. | typ.* | max. | Unit | Condition |
|------------------------------|----------|------|-------|------|------|---|
| Input voltage | V_{IH} | 2.0 | — | — | V | |
| | V_{IL} | — | — | 0.8 | V | |
| Output voltage | V_{OH} | 2.4 | — | — | V | $V_{CC} = 4.75\text{ V}$, $V_{IH} = 2\text{ V}$, $V_{IL} = 0.8\text{ V}$, $I_{OH} = -2.6\text{ mA}$ |
| | V_{OL} | — | — | 0.4 | V | $I_{OL} = 4\text{ mA}$ $V_{CC} = 4.75\text{ V}$, $V_{IH} = 2\text{ V}$, $I_{OL} = 8\text{ mA}$ $V_{IL} = 0.8\text{ V}$ |
| Input current | I_{IH} | — | — | 20 | μA | $V_{CC} = 5.25\text{ V}$, $V_I = 2.7\text{ V}$ |
| | I_{IL} | — | — | -0.4 | mA | $V_{CC} = 5.25\text{ V}$, $V_I = 0.4\text{ V}$ |
| | I_I | — | — | 0.1 | mA | $V_{CC} = 5.25\text{ V}$, $V_I = 7\text{ V}$ |
| Output current | I_{OZ} | — | — | 20 | μA | $V_O = 2.7\text{ V}$ $V_{CC} = 5.25\text{ V}$, $V_{IH} = 2\text{ V}$ |
| | | — | — | -20 | μA | $V_O = 0.4\text{ V}$ |
| Short-circuit output current | I_{OS} | -30 | — | -130 | mA | $V_{CC} = 5.25\text{ V}$ |
| Supply current** | I_{CC} | — | 7 | 12 | mA | Condition A $V_{CC} = 5.25\text{ V}$ |
| | | — | 8.5 | 14 | mA | Condition B |
| Input clamp voltage | V_{IK} | — | — | -1.5 | V | $V_{CC} = 4.75\text{ V}$, $I_{IN} = -18\text{ mA}$ |

Notes: * $V_{CC} = 5\text{ V}$, $T_a = 25^\circ\text{C}$ ** I_{CC} is measured with the outputs open under the following conditions.

A; All inputs grounded, B; Output control at 4.5 V, all inputs grounded.

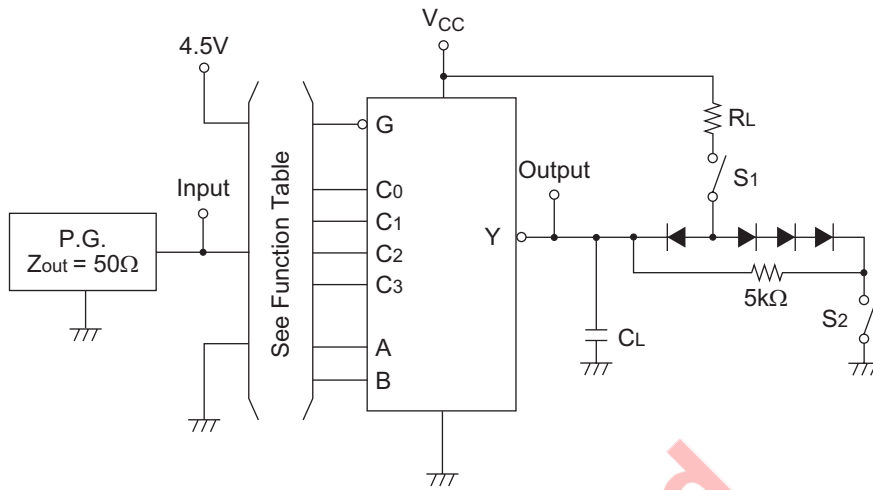
Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

| Item | Symbol | Inputs | Output | min. | typ. | max. | Unit | Condition |
|------------------------|-----------|----------------|--------|------|------|------|------|--|
| Propagation delay time | t_{PLH} | Data | Y | — | 17 | 25 | ns | $C_L = 15\text{ pF}$, $R_L = 2\text{ k}\Omega$ |
| | t_{PHL} | | | — | 13 | 20 | | |
| | t_{PLH} | Select | Y | — | 30 | 45 | | |
| | t_{PHL} | | | — | 21 | 32 | | |
| Output enable time | t_{ZH} | Output Control | Y | — | 15 | 28 | ns | |
| | t_{ZL} | Control | Y | — | 15 | 23 | | |
| Output disable time | t_{HZ} | Output Control | Y | — | 27 | 41 | ns | $C_L = 5\text{ pF}$, $R_L = 2\text{ k}\Omega$ |
| | t_{LZ} | Control | Y | — | 18 | 27 | | |

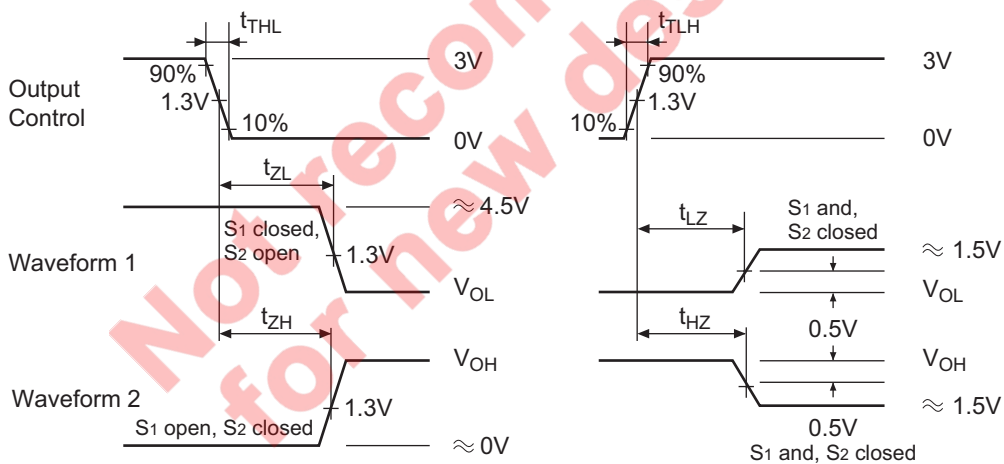
Testing Method

Test Circuit



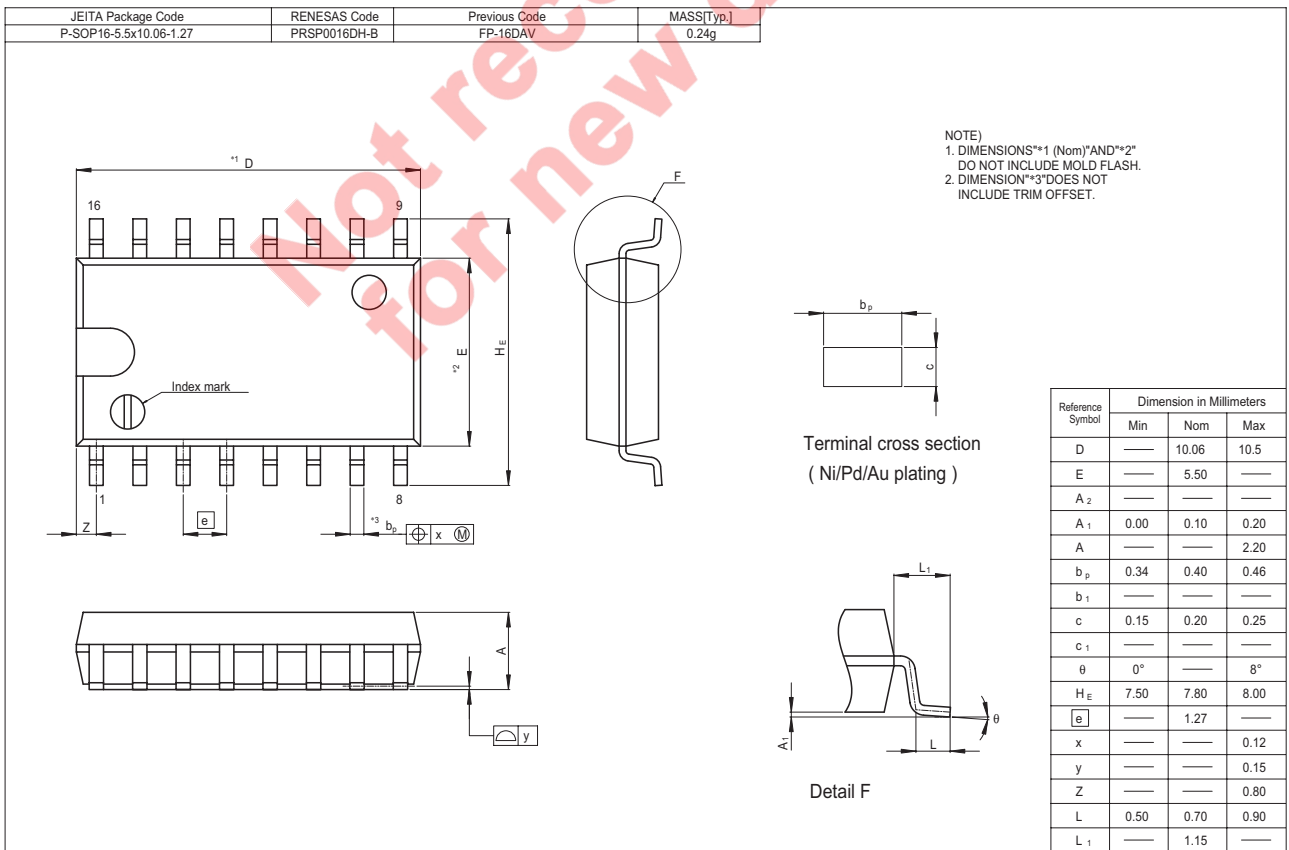
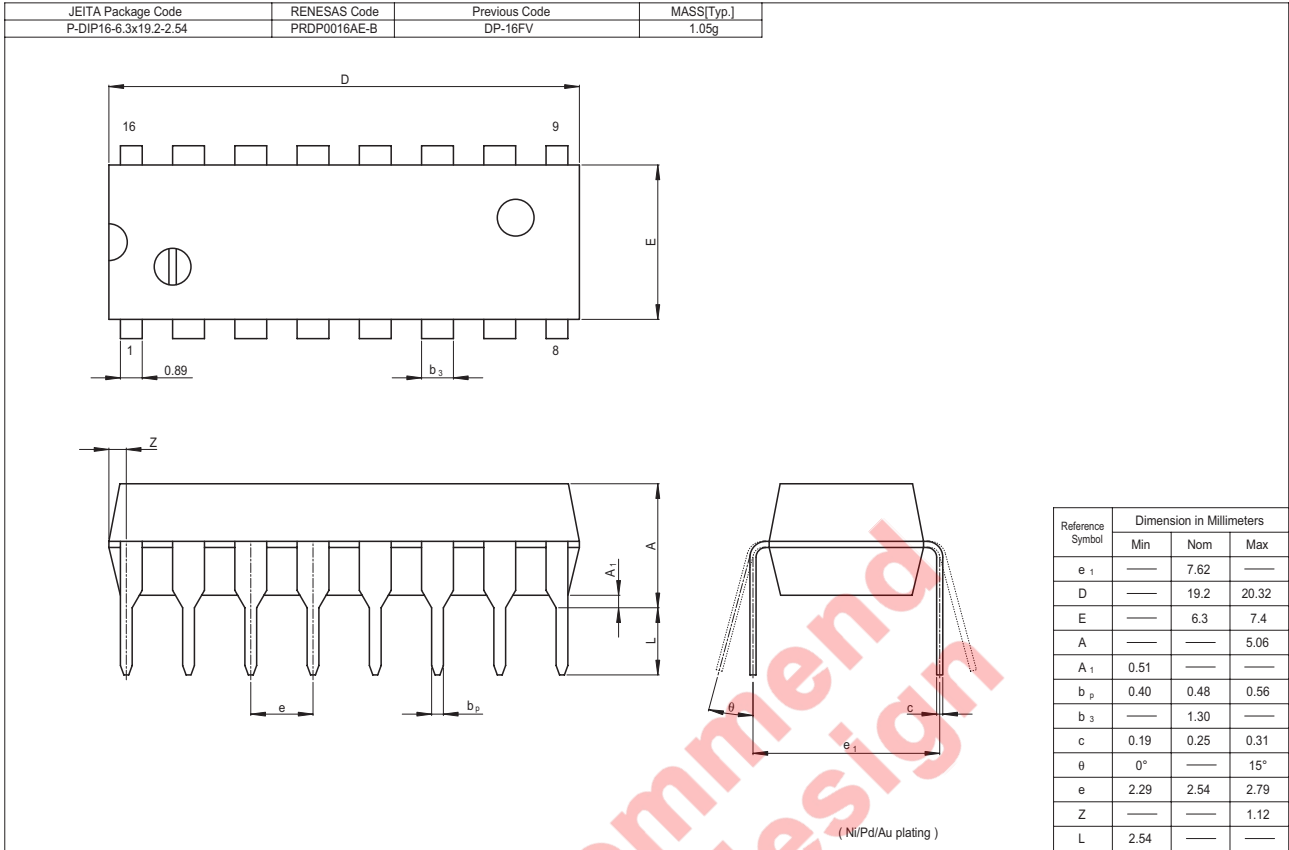
- Notes:
1. C_L includes probe and jig capacitance.
 2. All diodes are 1S2074(H).

Waveform



- Notes:
1. Input pulse; $t_{TLH} \leq 15$ ns, $t_{THL} \leq 6$ ns, PRR = 1 MHz, duty cycle = 50%
 2. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.

Package Dimensions



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