

HD74LVC139

Dual 2-to-4-line Decoders / Demultiplexers

REJ03D0350-0300Z
(Previous ADE-205-069B (Z))
Rev.3.00
Jul. 23, 2004

Description

The HD74LVC139 has two independent two-to-four-line decoders each with a single active low enable input in a 16 pin package. Data on the select inputs cause one of the four normally high outputs to go low. Low voltage and high-speed operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

Features

- $V_{CC} = 2.0\text{ V to }5.5\text{ V}$
- All inputs $V_{IH}(\text{Max.}) = 5.5\text{ V}$ ($@V_{CC} = 0\text{ V to }5.5\text{ V}$)
- Typical V_{OL} ground bounce $< 0.8\text{ V}$ ($@V_{CC} = 3.3\text{ V}$, $T_a = 25^\circ\text{C}$)
- Typical V_{OH} undershoot $> 2.0\text{ V}$ ($@V_{CC} = 3.3\text{ V}$, $T_a = 25^\circ\text{C}$)
- High output current $\pm 24\text{ mA}$ ($@V_{CC} = 3.0\text{ V to }5.5\text{ V}$)
- Ordering Information

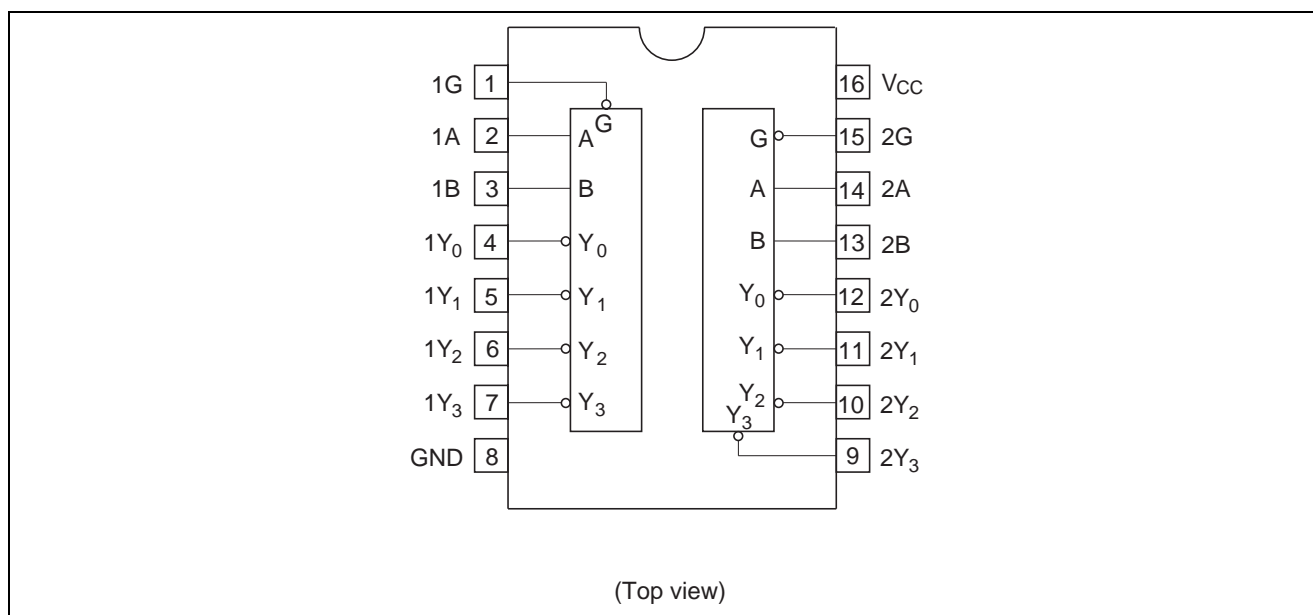
| Part Name | Package Type | Package Code | Package Abbreviation | Taping Abbreviation (Quantity) |
|----------------|--------------------|--------------|----------------------|--------------------------------|
| HD74LVC139FPEL | SOP-16 pin (JEITA) | FP-16DAV | FP | EL (2,000 pcs/reel) |
| HD74LVC139TELL | TSSOP-16 pin | TTP-16DAV | T | ELL (2,000 pcs/reel) |

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

Function Table

| Input | | | | | | |
|--------|------------|---|---------|-------|-------|-------|
| Enable | Select | | Outputs | | | |
| G | B | A | Y_0 | Y_1 | Y_2 | Y_3 |
| H | X | X | H | H | H | H |
| L | L | L | L | H | H | H |
| L | L | H | H | L | H | H |
| L | H | L | H | H | L | H |
| L | H | H | H | H | H | L |
| H: | High level | | | | | |
| L: | Low level | | | | | |
| X: | Immaterial | | | | | |

Pin Arrangement



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Conditions |
|------------------------------|-----------------------|------------------------|------|-------------------------------|
| Supply voltage | V_{CC} | -0.5 to 6.0 | V | |
| Input diode current | I_{IK} | -50 | mA | $V_I = -0.5\text{ V}$ |
| Input voltage | V_I | -0.5 to 6.0 | V | |
| Output diode current | I_{OK} | -50 | mA | $V_O = -0.5\text{ V}$ |
| | | 50 | | $V_O = V_{CC} + 0.5\text{ V}$ |
| Output voltage | V_O | -0.5 to $V_{CC} + 0.5$ | V | |
| Output current | I_O | ± 50 | mA | |
| V_{CC} , GND current / pin | I_{CC} or I_{GND} | 100 | mA | |
| Storage temperature | Tstg | -65 to 150 | °C | |

Note: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

| Item | Symbol | Ratings | Unit | Conditions |
|--------------------------------------|------------|-------------------|------|---------------------------|
| Supply voltage | V_{CC} | 1.5 to 5.5 | V | Data retention |
| | | 2.0 to 5.5 | | At operation |
| Input / output voltage | V_I | 0 to 5.5 | V | G, A, B |
| | V_O | 0 to V_{CC} | V | Y_0 to Y_3 |
| Operating temperature | T_a | -40 to 85 | °C | |
| Output current | I_{OH} | -12 | mA | $V_{CC} = 2.7$ V |
| | | -24 ^{*2} | | $V_{CC} = 3.0$ V to 5.5 V |
| | I_{OL} | 12 | mA | $V_{CC} = 2.7$ V |
| | | 24 ^{*2} | | $V_{CC} = 3.0$ V to 5.5 V |
| Input rise / fall time ^{*1} | t_r, t_f | 10 | ns/V | |

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform: Refer to test circuit of switching characteristics.

2. Duty cycle $\leq 50\%$

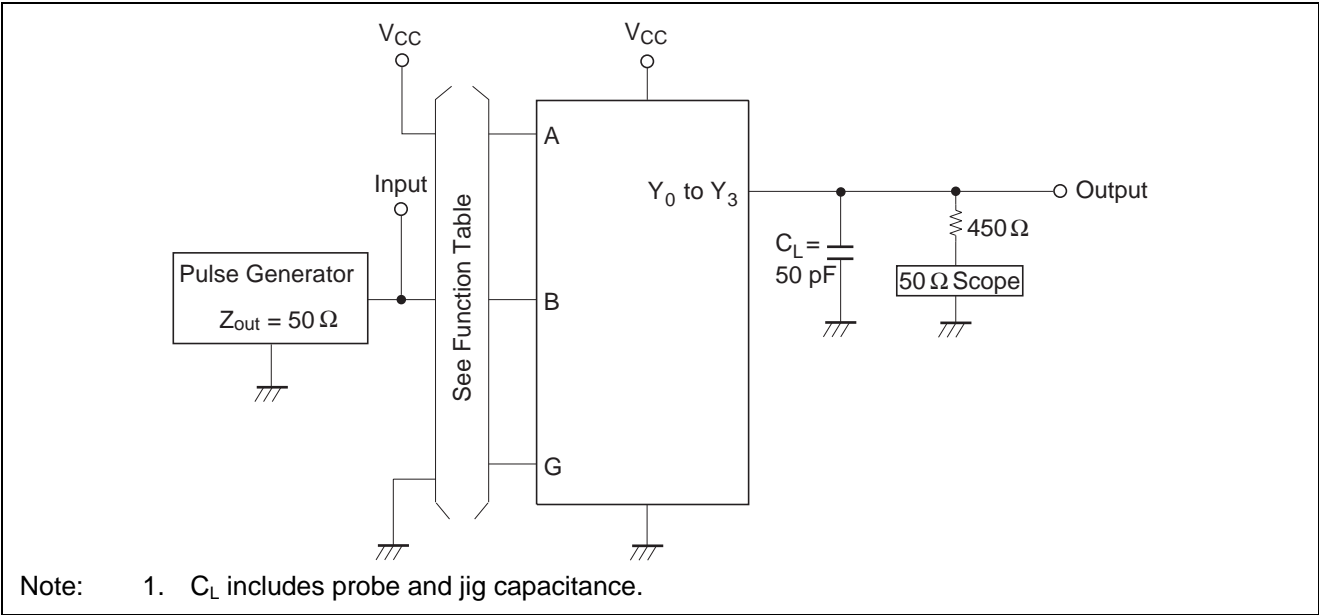
Electrical Characteristics

| Item | Symbol | V _{CC} (V) | Ta = −40 to 85°C | | Unit | Test Conditions |
|--------------------------|------------------|---------------------|----------------------|----------------------|------|--|
| | | | Min | Max | | |
| Input voltage | V _{IH} | 2.7 to 3.6 | 2.0 | — | V | |
| | | 4.5 to 5.5 | V _{CC} ×0.7 | — | | |
| | V _{IL} | 2.7 to 3.6 | — | 0.8 | V | |
| | | 4.5 to 5.5 | — | V _{CC} ×0.3 | | |
| Output voltage | V _{OH} | 2.7 to 5.5 | V _{CC} −0.2 | — | V | I _{OH} = −100 μA |
| | | 2.7 | 2.2 | — | | I _{OH} = −12 mA |
| | | 3.0 | 2.4 | — | | I _{OH} = −24 mA |
| | | 3.0 | 2.0 | — | | |
| | | 4.5 | 3.8 | — | | |
| | V _{OL} | 2.7 to 5.5 | — | 0.2 | V | I _{OL} = 100 μA |
| | | 2.7 | — | 0.4 | | I _{OL} = 12 mA |
| | | 3.0 | — | 0.55 | | I _{OL} = 24 mA |
| | | 4.5 | — | 0.55 | | |
| | Input current | I _{IN} | 0 to 5.5 | — | ±5.0 | μA |
| Quiescent supply current | I _{CC} | 5.5 | — | 20 | μA | V _{IN} = V _{CC} or GND |
| | ΔI _{CC} | 3.0 to 3.6 | — | 500 | μA | V _{IN} = one input at (V _{CC} −0.6)V, other inputs at V _{CC} or GND |

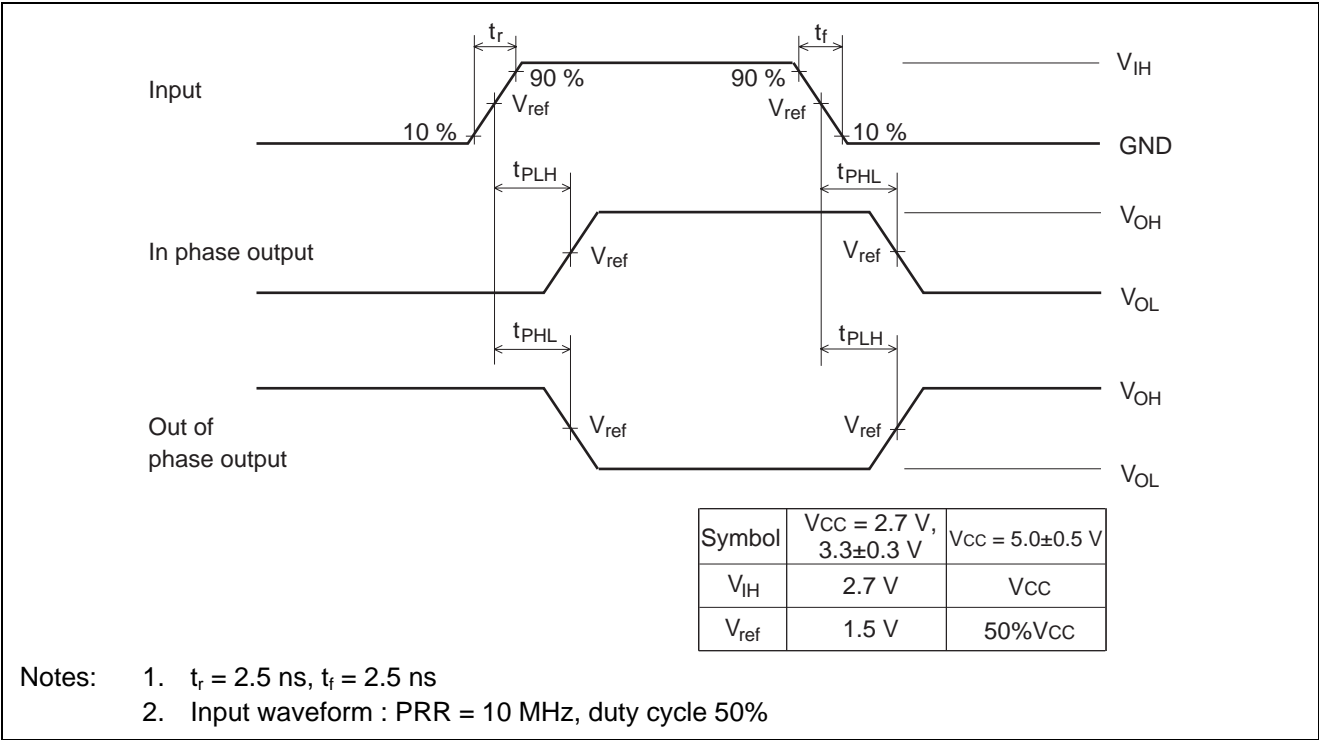
Switching Characteristics

| Item | Symbol | V_{CC} (V) | $T_a = -40$ to 85°C | | | Unit | From (Input) | To (Output) |
|------------------------|-----------|---------------|-----------------------------------|------|------|------|--------------|----------------|
| | | | Min | Typ | Max | | | |
| Propagation delay time | t_{PLH} | 2.7 | — | 7.0 | 10.0 | ns | G, A, B | Y_0 to Y_3 |
| | t_{PHL} | 3.3 \pm 0.3 | 1.5 | 5.0 | 9.0 | | | |
| | | 5.0 \pm 0.5 | — | 3.5 | 7.5 | | | |
| Input capacitance | C_{IN} | 2.7 | — | 3.0 | — | pF | | |
| Output capacitance | C_O | 2.7 | — | 15.0 | — | pF | | |

Test Circuit



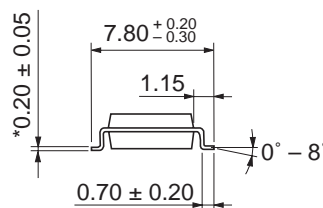
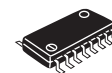
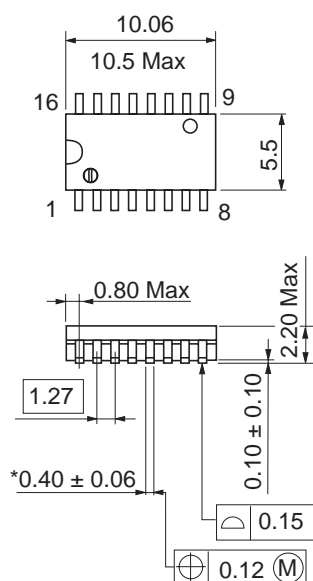
Waveforms



Package Dimensions

As of January, 2003

Unit: mm

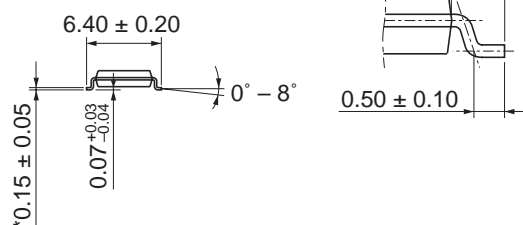
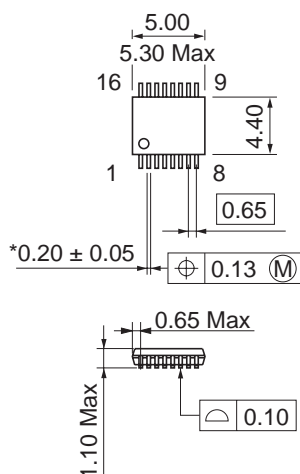


*Ni/Pd/Au plating

| | |
|------------------------|----------|
| Package Code | FP-16DAV |
| JEDEC | — |
| JEITA | Conforms |
| Mass (reference value) | 0.24 g |

As of January, 2003

Unit: mm



*Ni/Pd/Au plating

| | |
|------------------------|-----------|
| Package Code | TTP-16DAV |
| JEDEC | — |
| JEITA | — |
| Mass (reference value) | 0.05 g |

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Tel: <44> (1628) 585 100, Fax: <44> (1628) 585 900

Renesas Technology Europe GmbH

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