

HD74LS139

Dual 2-line-to-4-line Decoders / Demultiplexers

REJ03D0435-0200

Rev.2.00

Feb.18.2005

The HD74LS139 comprises two individual two-line-to-four-line decoder in a single package. The active-low enable input can be used as a data line in demultiplexing applications.

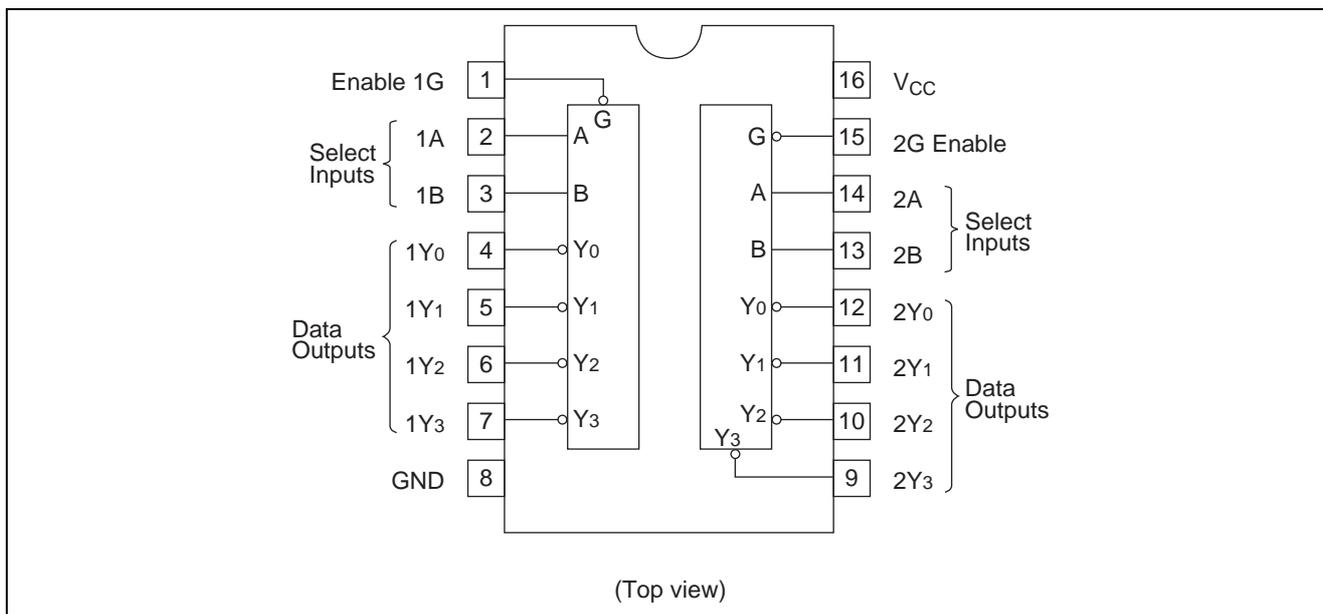
Features

- Ordering Information

| Part Name | Package Type | Package Code (Previous Code) | Package Abbreviation | Taping Abbreviation (Quantity) |
|---------------|--------------------|------------------------------|----------------------|--------------------------------|
| HD74LS139P | DILP-16 pin | PRDP0016AE-B (DP-16FV) | P | — |
| HD74LS139FPEL | SOP-16 pin (JEITA) | PRSP0016DH-B (FP-16DAV) | FP | EL (2,000 pcs/reel) |
| HD74LS139RPEL | SOP-16 pin (JEDEC) | PRSP0016DG-A (FP-16DNV) | RP | EL (2,500 pcs/reel) |

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

Pin Arrangement

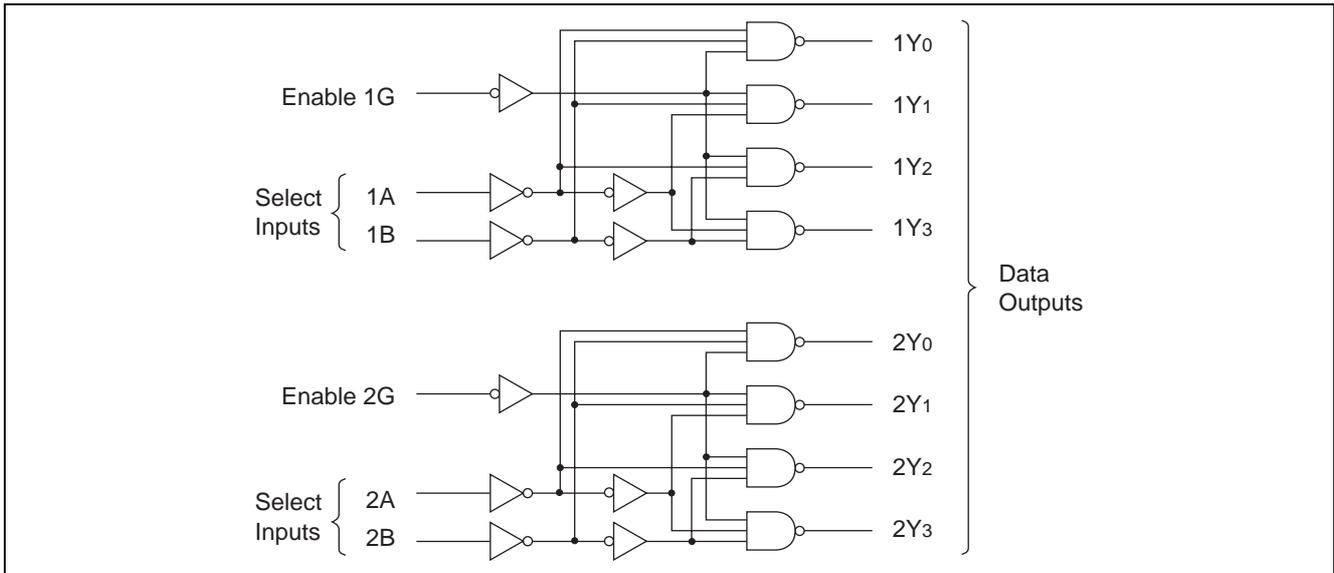


Function Table

| Inputs | | | Outputs | | | |
|--------|--------|---|----------------|----------------|----------------|----------------|
| Enable | Select | | | | | |
| 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 ; irrelevant

Block Diagram



Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit |
|---------------------|------------------|-------------|------|
| Supply voltage | V _{CC} | 7 | V |
| Input voltage | V _{IN} | 7 | V |
| 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} | — | — | -400 | μA |
| | 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} | 2.7 | — | — | V | V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V, I _{OH} = -400 μA |
| | V _{OL} | — | — | 0.4 | V | V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V |
| — | | — | 0.5 | | | |
| Input current | I _{IH} | — | — | 20 | μA | V _{CC} = 5.25 V, V _I = 2.7 V |
| | I _{IL} | — | — | -0.4 | mA | V _{CC} = 5.25 V, V _I = 0.4 V |
| | I _I | — | — | 0.1 | mA | V _{CC} = 5.25 V, V _I = 7 V |
| Short-circuit output current | I _{OS} | -5 | — | -42 | mA | V _{CC} = 5.25 V |
| Supply current | I _{CC} | — | 6.8 | 11 | mA | V _{CC} = 5.25 V, Outputs enabled and open |
| Input clamp voltage | V _{IK} | — | — | -1.5 | V | V _{CC} = 4.75 V, I _{IN} = -18 mA |

Note: * V_{CC} = 5 V, Ta = 25°C

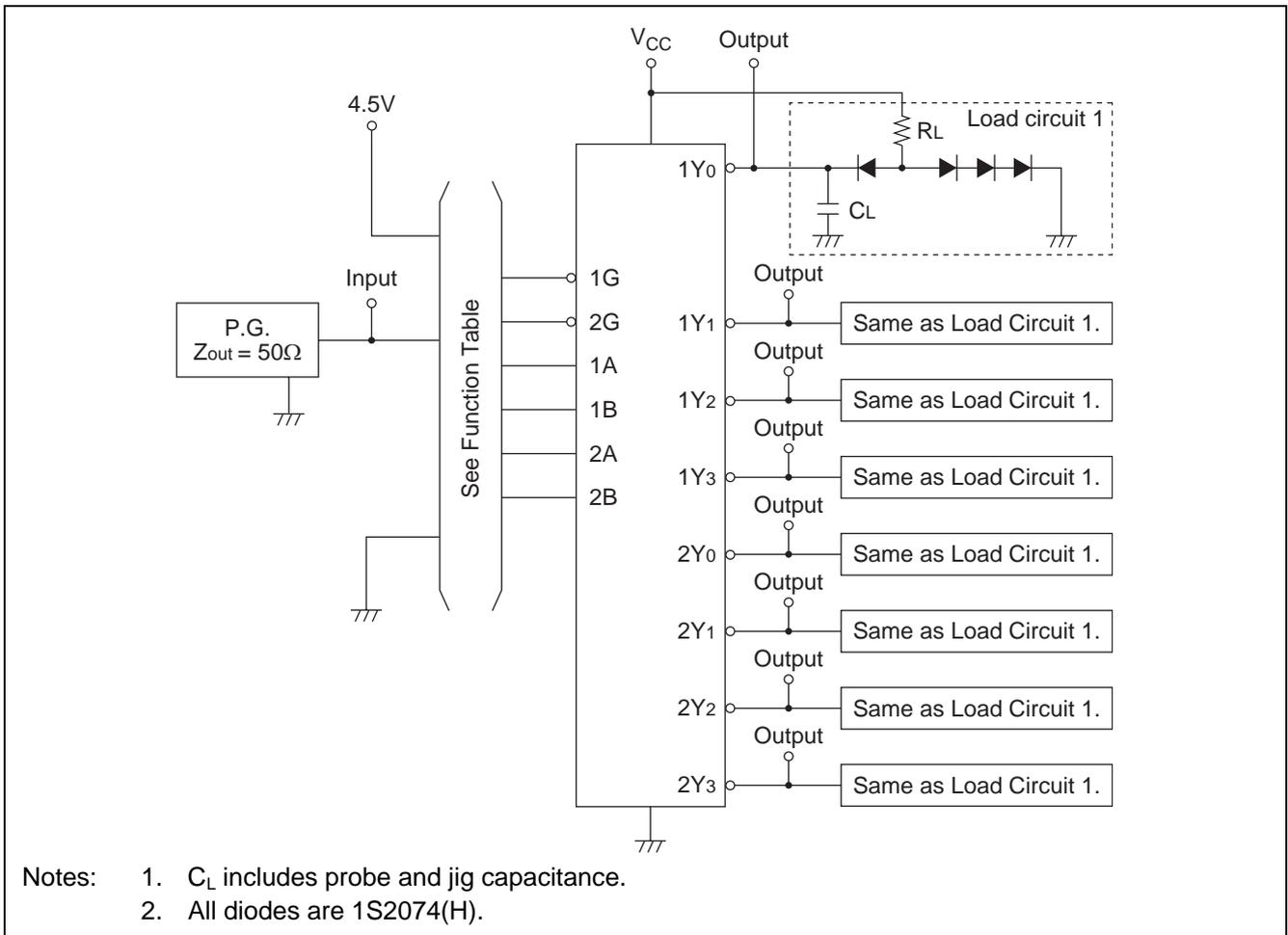
Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

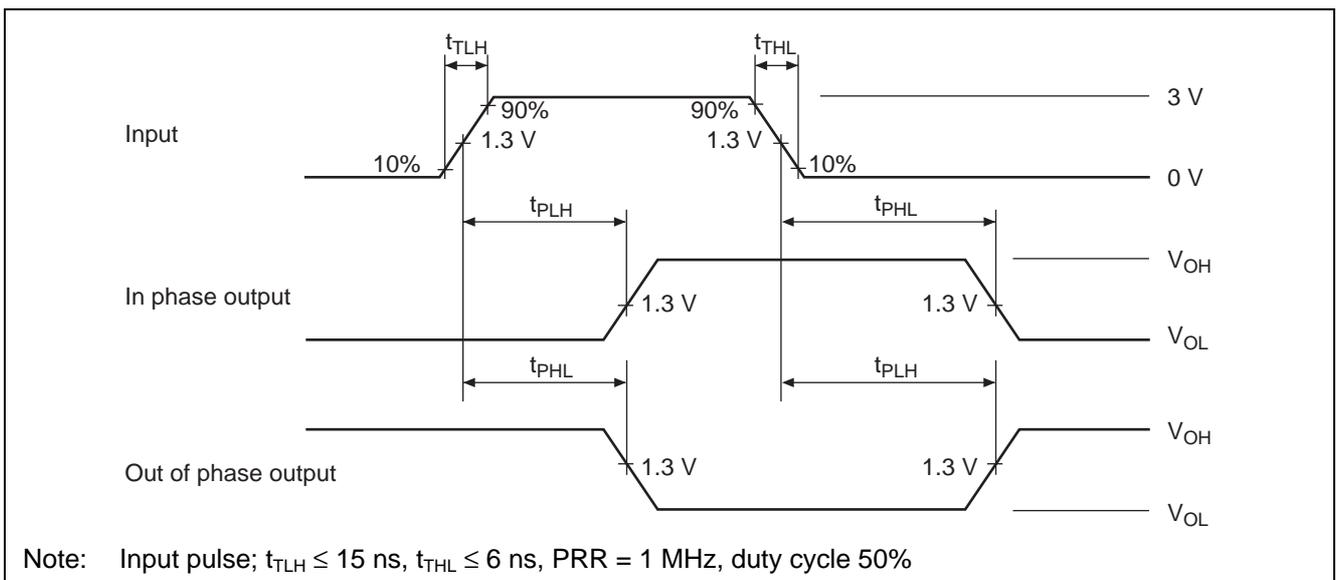
| Item | Symbol | Inputs | Output | Levels of delay | min. | typ. | max. | Unit | Condition |
|------------------------|------------------|------------------|------------------------------------|-----------------|--------|------------------------------------|------|------|---|
| Propagation delay time | t _{PLH} | Binary select | 1Y ₀ to 1Y ₃ | 2 | — | 13 | 20 | ns | C _L = 15 pF, R _L = 2 kΩ |
| | t _{PHL} | | | | — | 22 | 33 | ns | |
| | t _{PLH} | 1A, 1B 2A, 2B | 2Y ₀ to 2Y ₃ | 3 | — | 18 | 29 | ns | |
| | t _{PLH} | | | | — | 25 | 38 | ns | |
| | t _{PLH} | Enable | 1Y ₀ to 1Y ₃ | 2 | — | 16 | 24 | ns | |
| | t _{PHL} | | | | 1G, 2G | 2Y ₀ to 2Y ₃ | — | 21 | |

Testing Method

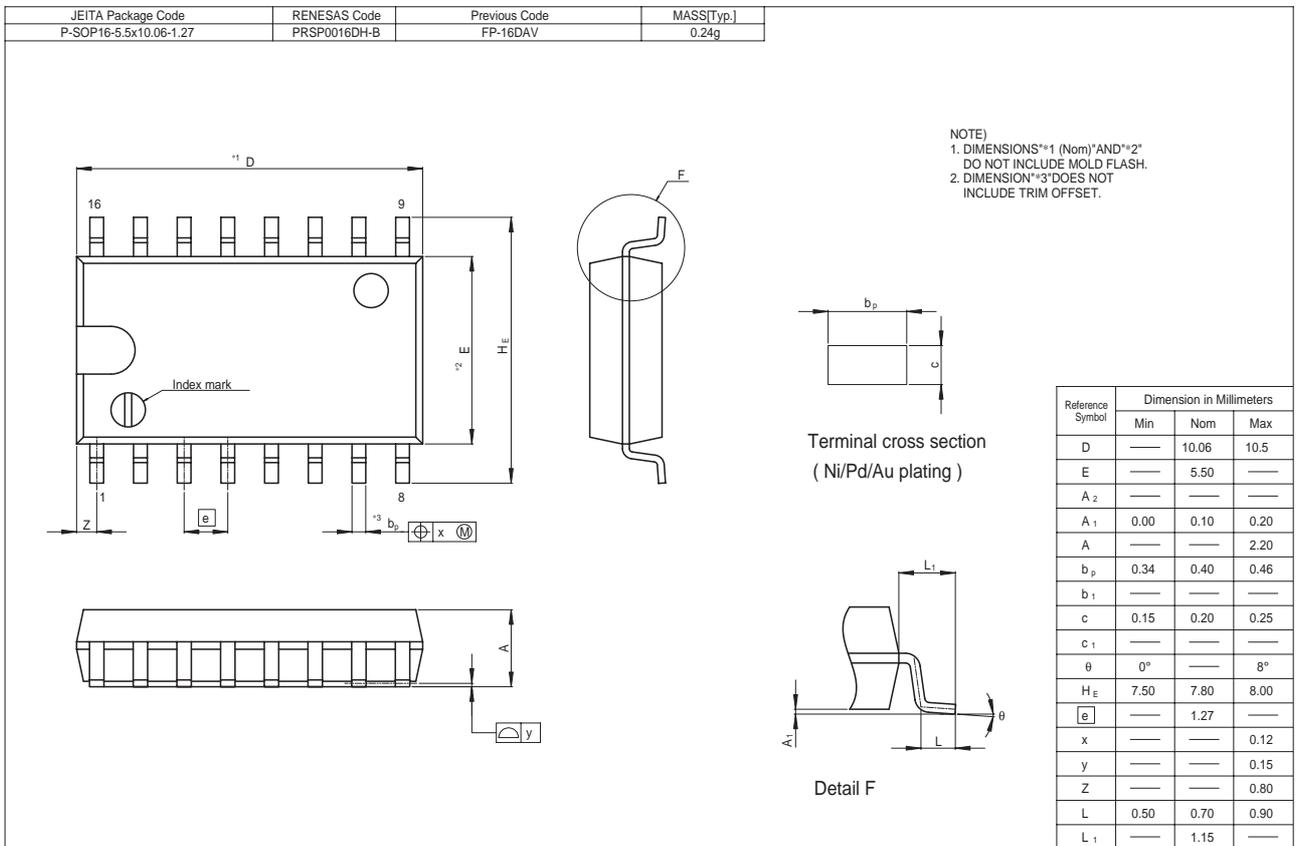
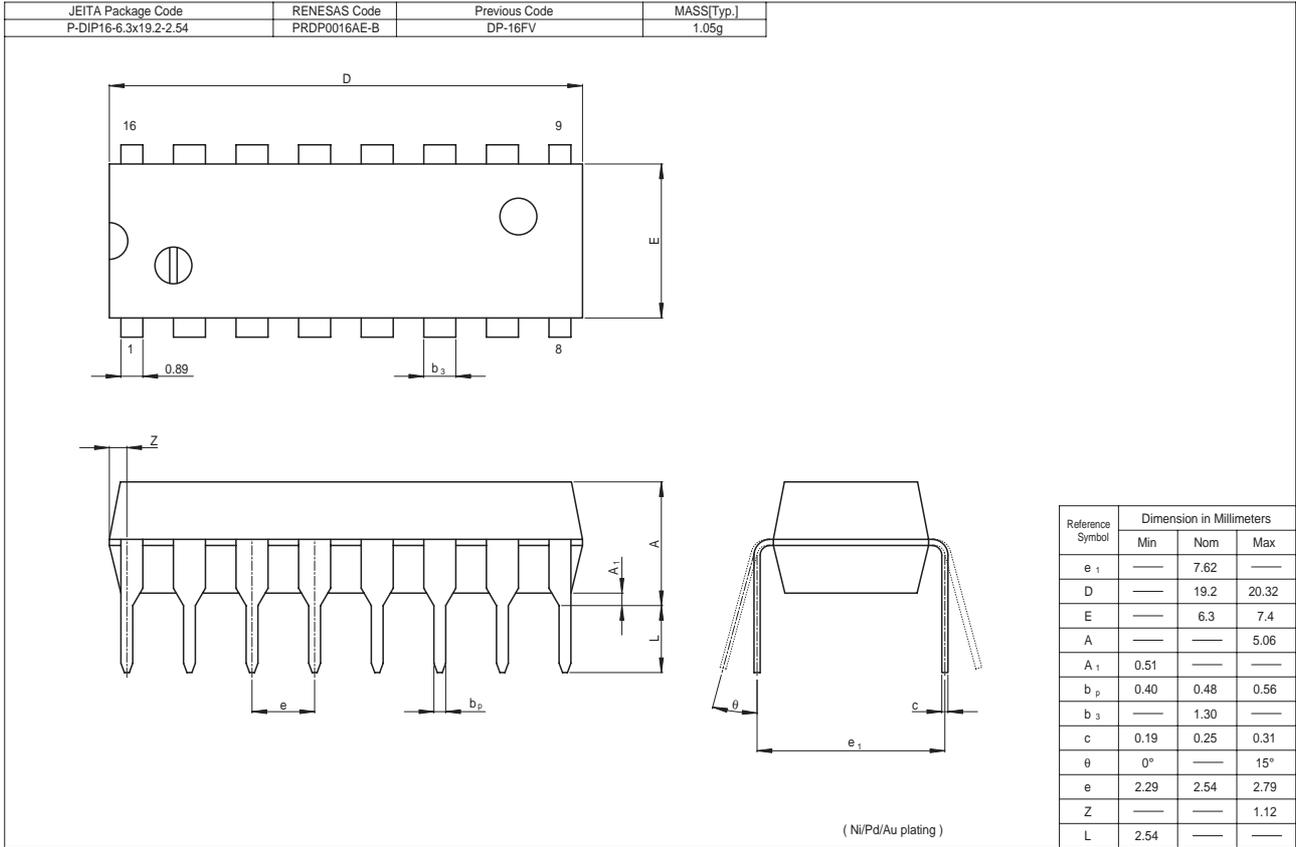
Test Circuit



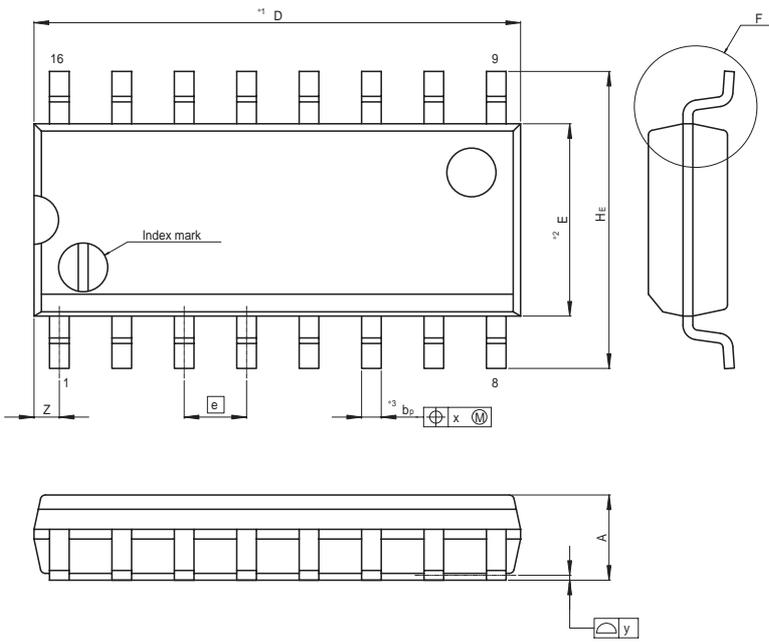
Waveform



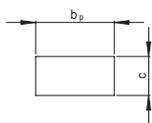
Package Dimensions



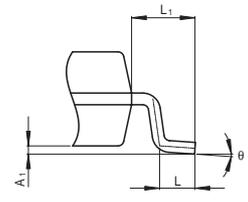
| | | | |
|---|------------------------------|---------------------------|---------------------|
| JEITA Package Code P-SOP16-3.95x9.9-1.27 | RENESAS Code PRSP0016DG-A | Previous Code FP-16DNV | MASS[Typ.] 0.15g |
|---|------------------------------|---------------------------|---------------------|



NOTE)
 1. DIMENSIONS*1 (Nom)*AND*2*
 DO NOT INCLUDE MOLD FLASH.
 2. DIMENSION*3*DOES NOT
 INCLUDE TRIM OFFSET.



Terminal cross section
(Ni/Pd/Au plating)



Detail F

| Reference Symbol | Dimension in Millimeters | | |
|------------------|--------------------------|------|-------|
| | Min | Nom | Max |
| D | — | 9.90 | 10.30 |
| E | — | 3.95 | — |
| A ₂ | — | — | — |
| A ₁ | 0.10 | 0.14 | 0.25 |
| A | — | — | 1.75 |
| b _p | 0.34 | 0.40 | 0.46 |
| b ₁ | — | — | — |
| c | 0.15 | 0.20 | 0.25 |
| c ₁ | — | — | — |
| θ | 0° | — | 8° |
| H _E | 5.80 | 6.10 | 6.20 |
| e | — | 1.27 | — |
| x | — | — | 0.25 |
| y | — | — | 0.15 |
| Z | — | — | 0.635 |
| L | 0.40 | 0.60 | 1.27 |
| L ₁ | — | 1.08 | — |

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