

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

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

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HD74AC125/HD74ACT125

Quad Buffer/Line Driver with 3-State Output

REJ03D0246-0300

Rev.3.00

Nov.12.2004

Description

The HD74AC125/HD74ACT125 is an quad buffer and line driver designed to be employed as a memory address driver, clock driver and bus oriented transmitter/receiver which provides improved PC board density.

Features

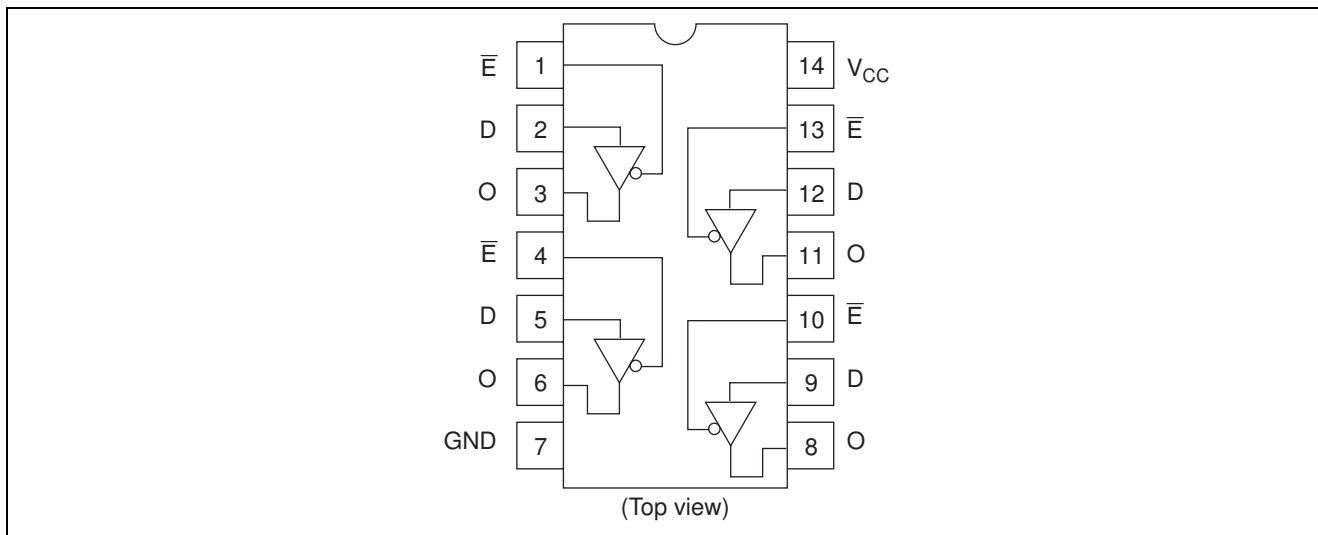
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- HD74ACT125 has TTL-Compatible Inputs
- Ordering Information: Ex. HD74AC125

| Part Name | Package Type | Package Code | Package Abbreviation | Taping Abbreviation (Quantity) |
|---------------|--------------------|--------------|----------------------|--------------------------------|
| HD74AC125P | DIP-14 pin | DP-14, -14AV | P | — |
| HD74AC125FPEL | SOP-14 pin (JEITA) | FP-14DAV | FP | EL (2,000 pcs/reel) |
| HD74AC125RPEL | SOP-14 pin (JEDEC) | FP-14DNV | RP | EL (2,500 pcs/reel) |
| HD74AC125TELL | TSSOP-14 pin | TTP-14DV | T | ELL (2,000 pcs/reel) |

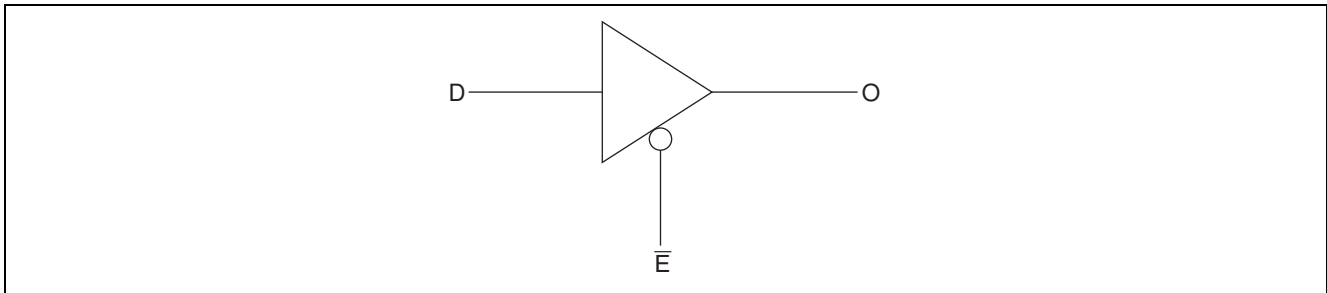
Notes: 1. Please consult the sales office for the above package availability.

2. The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code.

Pin Arrangement



Logic Symbol



Pin Names

- D Data Inputs
- \bar{E} 3-State Output Enable Inputs (Active Low)
- O Outputs

Truth Table

| Inputs | | Output |
|-----------|---|--------|
| \bar{E} | D | |
| L | L | L |
| L | H | H |
| H | X | Z |

- H : High Voltage Level
- L : Low Voltage Level
- X : Immaterial
- Z : High Impedance

Absolute Maximum Ratings

| Item | Symbol | Ratings | Unit | Condition |
|--|-------------------|----------------------|-------------|---------------------|
| Supply voltage | V_{CC} | -0.5 to 7 | V | |
| DC input diode current | I_{IK} | -20 | mA | $V_I = -0.5V$ |
| | | 20 | mA | $V_I = V_{CC}+0.5V$ |
| DC input voltage | V_I | -0.5 to $V_{CC}+0.5$ | V | |
| DC output diode current | I_{OK} | -50 | mA | $V_O = -0.5V$ |
| | | 50 | mA | $V_O = V_{CC}+0.5V$ |
| DC output voltage | V_O | -0.5 to $V_{CC}+0.5$ | V | |
| DC output source or sink current | I_O | ± 50 | mA | |
| DC V_{CC} or ground current per output pin | I_{CC}, I_{GND} | ± 50 | mA | |
| Storage temperature | T_{stg} | -65 to +150 | $^{\circ}C$ | |

Recommended Operating Conditions: HD74AC125

| Item | Symbol | Ratings | Unit | Condition |
|---|------------|---------------|-------------|------------------|
| Supply voltage | V_{CC} | 2 to 6 | V | |
| Input and Output voltage | V_I, V_O | 0 to V_{CC} | V | |
| Operating temperature | T_a | -40 to +85 | $^{\circ}C$ | |
| Input rise and fall time (except Schmitt inputs) V_{IN} 30% to 70% V_{CC} | t_r, t_f | 8 | ns/V | $V_{CC} = 3.0V$ |
| | | | | $V_{CC} = 4.5 V$ |
| | | | | $V_{CC} = 5.5 V$ |

DC Characteristics: HD74AC125

| Item | Symbol | V _{CC} (V) | Ta = 25°C | | | Ta = -40 to +85°C | | Unit | Condition | | |
|--------------------------|-------------------------|---------------------|-----------|-------|------|-------------------|------|------|---|--|--------------------------|
| | | | min. | typ. | max. | min. | max. | | | | |
| Input Voltage | V _{IH} | 3.0 | 2.1 | 1.5 | — | 2.1 | — | V | V _{OUT} = 0.1 V or V _{CC} - 0.1 V | | |
| | | 4.5 | 3.15 | 2.25 | — | 3.15 | — | | | | |
| | | 5.5 | 3.85 | 2.75 | — | 3.85 | — | | | | |
| | V _{IL} | 3.0 | — | 1.50 | 0.9 | — | 0.9 | | V _{OUT} = 0.1 V or V _{CC} - 0.1 V | | |
| | | 4.5 | — | 2.25 | 1.35 | — | 1.35 | | | | |
| | | 5.5 | — | 2.75 | 1.65 | — | 1.65 | | | | |
| Output voltage | V _{OH} | 3.0 | 2.9 | 2.99 | — | 2.9 | — | V | V _{IN} = V _{IL} or V _{IH} I _{OUT} = -50 μA | | |
| | | 4.5 | 4.4 | 4.49 | — | 4.4 | — | | | | |
| | | 5.5 | 5.4 | 5.49 | — | 5.4 | — | | | | |
| | | 3.0 | 2.58 | — | — | 2.48 | — | | | V _{IN} = V _{IL} or V _{IH} | I _{OH} = -12 mA |
| | | 4.5 | 3.94 | — | — | 3.80 | — | | | | I _{OH} = -24 mA |
| | | 5.5 | 4.94 | — | — | 4.80 | — | | | | I _{OH} = -24 mA |
| | V _{OL} | 3.0 | — | 0.002 | 0.1 | — | 0.1 | V | V _{IN} = V _{IL} or V _{IH} I _{OUT} = 50 μA | | |
| | | 4.5 | — | 0.001 | 0.1 | — | 0.1 | | | | |
| | | 5.5 | — | 0.001 | 0.1 | — | 0.1 | | | | |
| | | 3.0 | — | — | 0.32 | — | 0.37 | | | V _{IN} = V _{IL} or V _{IH} | I _{OL} = 12 mA |
| | | 4.5 | — | — | 0.32 | — | 0.37 | | | | I _{OL} = 24 mA |
| | | 5.5 | — | — | 0.32 | — | 0.37 | | | | I _{OL} = 24 mA |
| | Input leakage current | I _{IN} | 5.5 | — | — | ±0.1 | — | ±1.0 | μA | V _{IN} = V _{CC} or GND | |
| | 3 State current | I _{OZ} | 5.5 | — | — | ±0.5 | — | ±5.0 | μA | V _{IN(OE)} = V _{IL} , V _{IH} V _{IN} = V _{CC} or GND V _{OUT} = V _{CC} or GND | |
| | Dynamic output current* | I _{OLD} | 5.5 | — | — | — | 86 | — | mA | V _{OLD} = 1.1 V | |
| I _{OHD} | | 5.5 | — | — | — | -75 | — | mA | V _{OHD} = 3.85 V | | |
| Quiescent supply current | I _{CC} | 5.5 | — | — | 8.0 | — | 80 | μA | V _{IN} = V _{CC} or ground | | |

*Maximum test duration 2.0 ms, one output loaded at a time.

Recommended Operating Conditions: HD74ACT125

| Item | Symbol | Ratings | Unit | Condition |
|--|---------------------------------|----------------------|------|--|
| Supply voltage | V _{CC} | 2 to 6 | V | |
| Input and output voltage | V _I , V _O | 0 to V _{CC} | V | |
| Operating temperature | Ta | -40 to +85 | °C | |
| Input rise and fall time (except Schmitt inputs) V _{IN} 0.8 to 2.0 V | tr, tf | 8 | ns/V | V _{CC} = 4.5V V _{CC} = 5.5V |

DC Characteristics: HD74ACT125

| Item | Symbol | V _{CC} (V) | Ta = 25°C | | | Ta = -40 to +85°C | | Unit | Condition | | | | |
|--------------------------------|-------------------|---------------------|-----------------|-------|------|-------------------|------|------|---|--|--------------------------|----|--|
| | | | min. | typ. | max. | min. | max. | | | | | | |
| Input voltage | V _{IH} | 4.5 | 2.0 | 1.5 | — | 2.0 | — | V | V _{OUT} = 0.1 V or V _{CC} -0.1 V | | | | |
| | | 5.5 | 2.0 | 1.5 | — | 2.0 | — | | | | | | |
| | V _{IL} | 4.5 | — | 1.5 | 0.8 | — | 0.8 | | V _{OUT} = 0.1 V or V _{CC} -0.1 V | | | | |
| | | 5.5 | — | 1.5 | 0.8 | — | 0.8 | | | | | | |
| Output voltage | V _{OH} | 4.5 | 4.4 | 4.49 | — | 4.4 | — | V | V _{IN} = V _{IL} or V _{IH} I _{OUT} = -50 μA | | | | |
| | | 5.5 | 5.4 | 5.49 | — | 5.4 | — | | | | | | |
| | | 4.5 | 3.94 | — | — | 3.80 | — | | | V _{IN} = V _{IL} I _{OH} = -24 mA | | | |
| | | 5.5 | 4.94 | — | — | 4.80 | — | | | | I _{OH} = -24 mA | | |
| | V _{OL} | 4.5 | — | 0.001 | 0.1 | — | 0.1 | | V _{IN} = V _{IL} or V _{IH} I _{OUT} = 50 μA | | | | |
| | | 5.5 | — | 0.001 | 0.1 | — | 0.1 | | | | | | |
| | | 4.5 | — | — | 0.32 | — | 0.37 | | | V _{IN} = V _{IL} I _{OL} = 24 mA | | | |
| | | 5.5 | — | — | 0.32 | — | 0.37 | | | | I _{OL} = 24 mA | | |
| | | Input current | I _{IN} | 5.5 | — | — | ±0.1 | | | — | ±1.0 | μA | V _{IN} = V _{CC} or GND |
| | | 3 State current | I _{OZ} | 5.5 | — | — | ±0.5 | | | — | ±5.0 | μA | V _{IN} = V _{IL} , V _{IH} V _{OUT} = V _{CC} or GND |
| I _{CC} /input current | I _{CC} T | 5.5 | — | 0.6 | — | — | 1.5 | mA | V _{IN} = V _{CC} -2.1 V | | | | |
| Dynamic output current* | I _{OLD} | 5.5 | — | — | — | 86 | — | mA | V _{OLD} = 1.1 V | | | | |
| | I _{OHD} | 5.5 | — | — | — | -75 | — | mA | V _{OHD} = 3.85 V | | | | |
| Quiescent supply current | I _{CC} | 5.5 | — | — | 8.0 | — | 80 | μA | V _{IN} = V _{CC} or ground | | | | |

*Maximum test duration 2.0 ms, one output loaded at a time.

AC Characteristics: HD74AC125

| Item | Symbol | V _{CC} (V)* ¹ | Ta = +25°C C _L = 50 pF | | | Ta = -40°C to +85°C C _L = 50 pF | | Unit |
|-------------------|------------------|-----------------------------------|--------------------------------------|-----|------|---|------|------|
| | | | Min | Typ | Max | Min | Max | |
| Propagation delay | t _{PLH} | 3.3 | 1.0 | 6.5 | 9.0 | 1.0 | 10.0 | ns |
| | | 5.0 | 1.0 | 5.5 | 7.0 | 1.0 | 7.5 | |
| Propagation delay | t _{PHL} | 3.3 | 1.0 | 6.5 | 9.0 | 1.0 | 10.0 | |
| | | 5.0 | 1.0 | 5.0 | 7.0 | 1.0 | 7.5 | |
| Enable time | t _{ZH} | 3.3 | 1.0 | 6.0 | 10.5 | 1.0 | 11.0 | |
| | | 5.0 | 1.0 | 5.0 | 7.0 | 1.0 | 8.0 | |
| Enable time | t _{ZL} | 3.3 | 1.0 | 7.5 | 10.0 | 1.0 | 11.0 | |
| | | 5.0 | 1.0 | 5.5 | 8.0 | 1.0 | 8.5 | |
| Disable time | t _{HZ} | 3.3 | 1.0 | 7.0 | 10.0 | 1.0 | 10.5 | |
| | | 5.0 | 1.0 | 6.5 | 9.0 | 1.0 | 9.5 | |
| Disable time | t _{LZ} | 3.3 | 1.0 | 7.5 | 10.5 | 1.0 | 11.5 | |
| | | 5.0 | 1.0 | 6.5 | 9.0 | 1.0 | 9.5 | |

Note: 1. Voltage Range 3.3 is 3.3 V ± 0.3 V
Voltage Range 5.0 is 5.0 V ± 0.5 V

AC Characteristics: HD74ACT125

| Item | Symbol | V _{CC} (V)* ¹ | Ta = +25°C C _L = 50 pF | | | Ta = -40°C to +85°C C _L = 50 pF | | Unit |
|-------------------|------------------|-----------------------------------|--------------------------------------|-----|------|---|------|------|
| | | | Min | Typ | Max | Min | Max | |
| Propagation delay | t _{PLH} | 5.0 | 1.0 | 6.5 | 9.0 | 1.0 | 10.0 | ns |
| Propagation delay | t _{PHL} | 5.0 | 1.0 | 7.0 | 9.0 | 1.0 | 10.0 | |
| Enable time | t _{ZH} | 5.0 | 1.0 | 6.0 | 8.5 | 1.0 | 9.5 | |
| Enable time | t _{ZL} | 5.0 | 1.0 | 7.0 | 9.5 | 1.0 | 10.5 | |
| Disable time | t _{HZ} | 5.0 | 1.0 | 7.0 | 9.5 | 1.0 | 10.5 | |
| Disable time | t _{LZ} | 5.0 | 1.0 | 7.5 | 10.0 | 1.0 | 10.5 | |

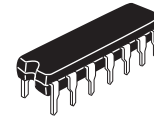
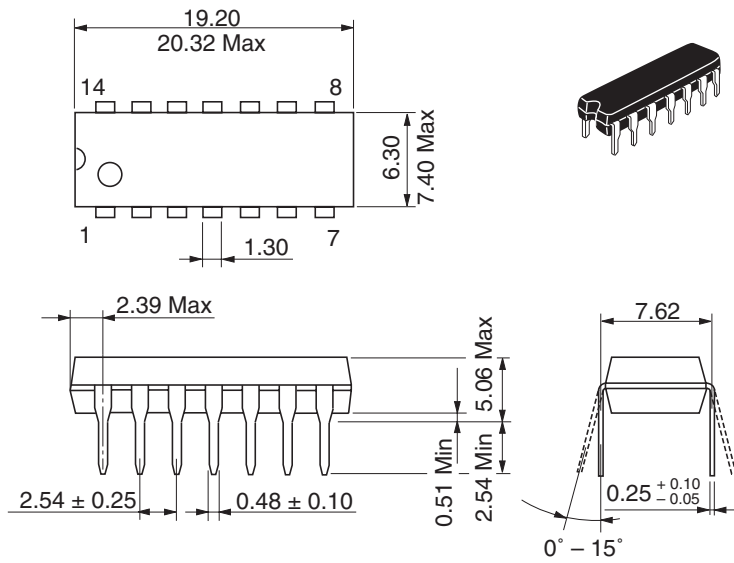
Note: 1. Voltage Range 5.0 is 5.0 V ± 0.5 V

Capacitance

| Item | Symbol | Typ | Unit | Condition |
|-------------------------------|-----------------|------|------|-------------------------|
| Input capacitance | C _{IN} | 4.5 | pF | V _{CC} = 5.5 V |
| Power dissipation capacitance | C _{PD} | 45.0 | pF | V _{CC} = 5.0 V |

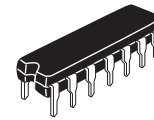
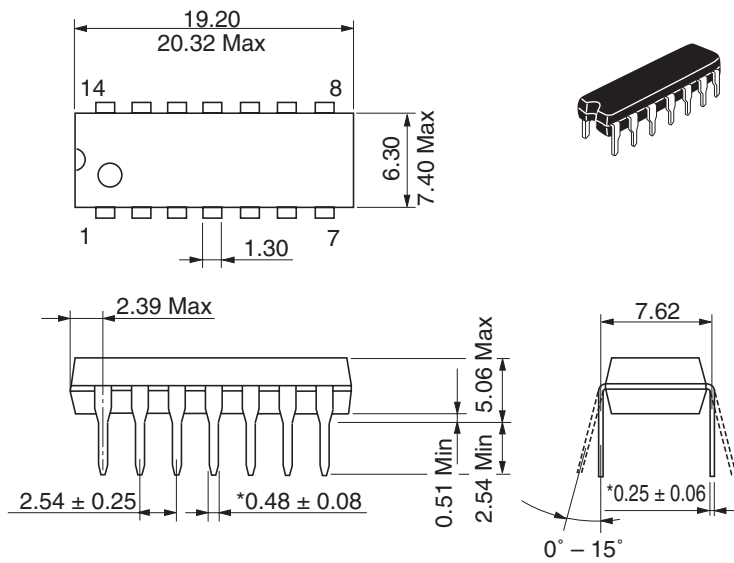
Package Dimensions

As of January, 2003
Unit: mm



| | |
|------------------------|----------|
| Package Code | DP-14 |
| JEDEC | Conforms |
| JEITA | Conforms |
| Mass (reference value) | 0.97 g |

Unit: mm

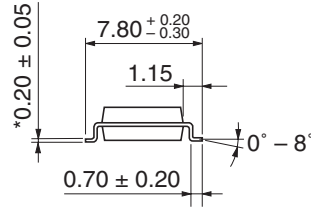
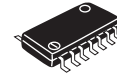
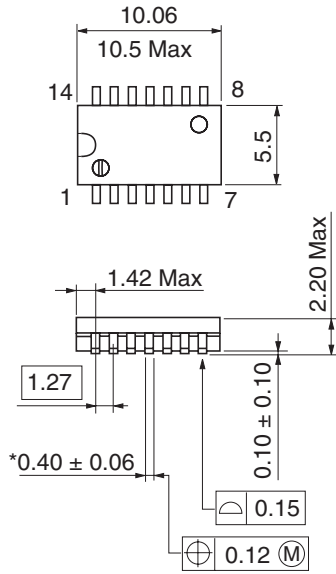


*Ni/Pd/AU Plating

| | |
|------------------------|----------|
| Package Code | DP-14AV |
| JEDEC | Conforms |
| JEITA | Conforms |
| Mass (reference value) | 0.97 g |

As of January, 2003

Unit: mm

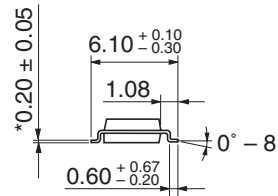
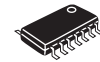
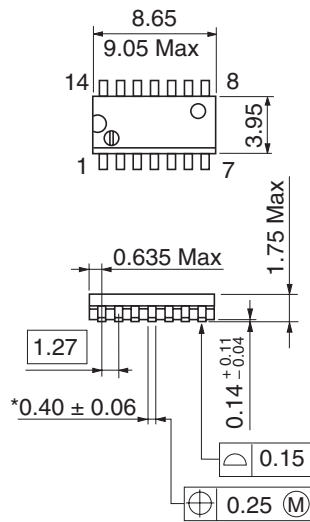


*Ni/Pd/Au plating

| | |
|------------------------|----------|
| Package Code | FP-14DAV |
| JEDEC | — |
| JEITA | Conforms |
| Mass (reference value) | 0.23 g |

As of January, 2003

Unit: mm

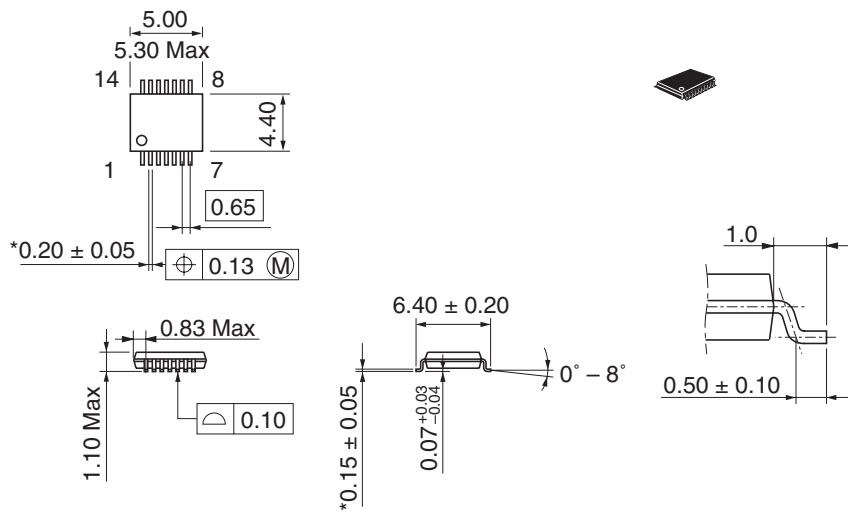


*Ni/Pd/Au plating

| | |
|------------------------|----------|
| Package Code | FP-14DNV |
| JEDEC | Conforms |
| JEITA | Conforms |
| Mass (reference value) | 0.13 g |

As of January, 2003

Unit: mm



*Ni/Pd/Au plating

| | |
|------------------------|----------|
| Package Code | TTP-14DV |
| JEDEC | — |
| JEITA | — |
| Mass (reference value) | 0.05 g |

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