

HD74BC245A

Octal Bus Transceivers With 3 State Outputs

REJ03D0282-0400Z
 (Previous ADE-205-008B (Z))
 Rev.4.00
 Jul.16.2004

Description

The HD74BC245A provides high drivability and operation equal to or better than high speed bipolar standard logic IC by using Bi-CMOS process. The device features low power dissipation that is about 1/5 of high speed bipolar logic IC, when the frequency is 10 MHz. The device has ten buffers with three state outputs in a 20 pin package. Each device has an active low enable input \overline{G} and a direction control input DiR. When DiR is high, data flows from the A inputs to the B outputs. When DiR is low, data flows from the B inputs to the A outputs. When \overline{G} is high, disables both A and B ports by placing them in a high impedance.

Features

- Input/Output are at high impedance state when power supply is off.
- Built in input pull up circuit can make input pins be open, when not used.
- TTL level input
- Wide operating temperature range
 $T_a = -40$ to $+85^\circ\text{C}$
- Ordering Information

| Part Name | Package Type | Package Code | Package Abbreviation | Taping Abbreviation (Quantity) |
|----------------|--------------------|----------------|----------------------|--------------------------------|
| HD74BC245AP | DILP-20 pin | DP-20N, -20NEV | P | — |
| HD74BC245AFPEL | SOP-20 pin (JEITA) | FP-20DAV | FP | EL (2,000 pcs/reel) |
| HD74BC245ATELL | TSSOP-20 pin | TTP-20DAV | T | ELL (2,000 pcs/reel) |

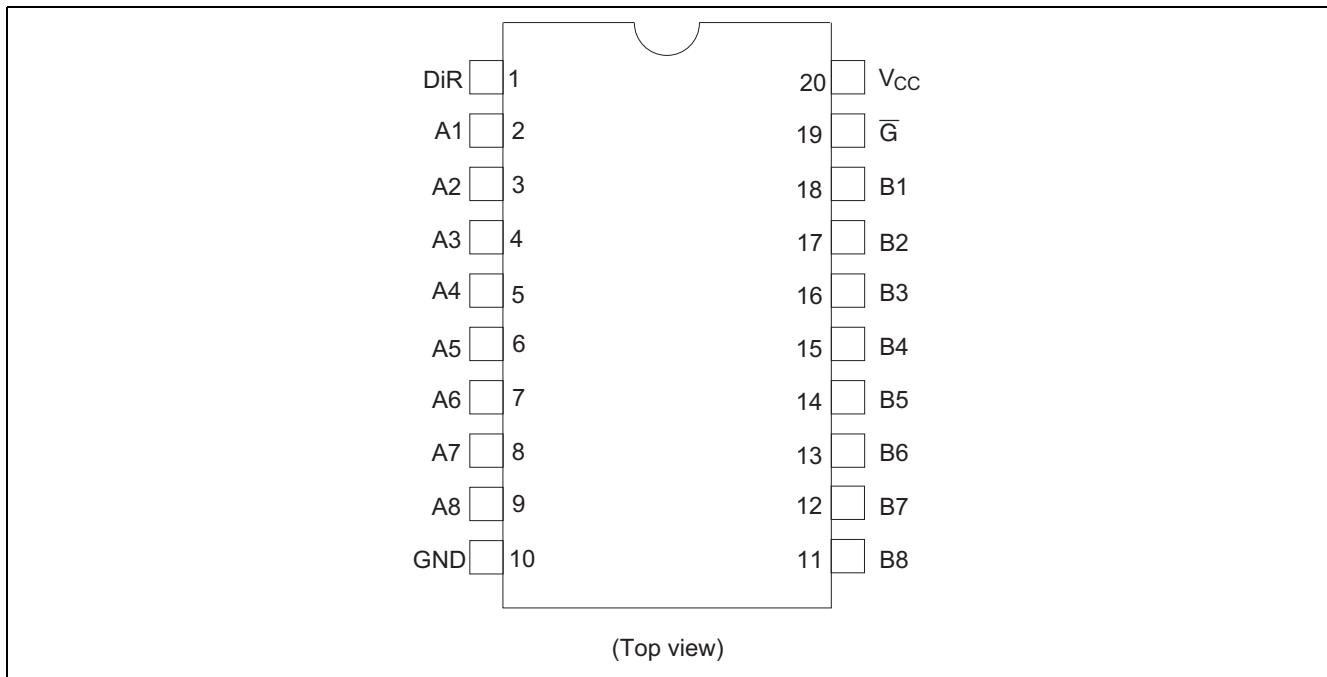
Note: Please consults the sales office for the above package availability.

Function Table

| Control Inputs | | Operation |
|----------------|-----|-----------------|
| \overline{G} | DiR | |
| L | L | B data to A bus |
| L | H | A data to B bus |
| H | X | Z |

H : High level
 L : Low level
 Z : High impedance

Pin Arrangement



Absolute Maximum Ratings

| Item | Symbol | Rating | Unit |
|--------------------------|----------------|--------------|-------------|
| Supply voltage | V_{CC} | -0.5 to +7.0 | V |
| Input diode current | I_{IK} | ± 30 | mA |
| Input voltage | V_{IN} | -0.5 to +7.5 | V |
| Output voltage | V_{OUT} | -0.5 to +7.5 | V |
| Off state output voltage | $V_{OUT(off)}$ | -0.5 to +5.5 | V |
| Storage temperature | T_{stg} | -65 to +150 | $^{\circ}C$ |

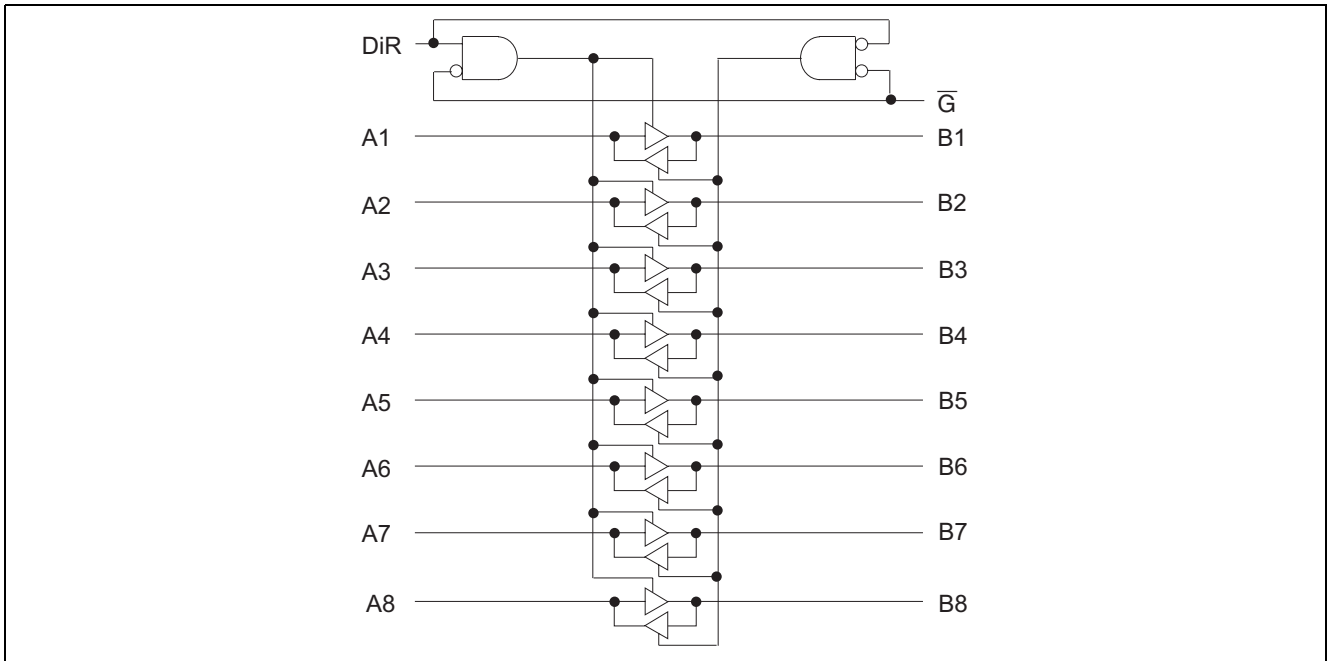
Note: 1. The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

| Item | Symbol | Min | Typ | Max | Unit |
|------------------------|------------|-----|-----|----------|-------------|
| Supply voltage | V_{CC} | 4.5 | 5.0 | 5.5 | V |
| Input voltage | V_{IN} | 0 | — | V_{CC} | V |
| Output voltage | V_{OUT} | 0 | — | V_{CC} | V |
| Operating temperature | T_{opr} | -40 | — | 85 | $^{\circ}C$ |
| Input rise/fall time*1 | t_r, t_f | 0 | — | 8 | ns/V |

Note: 1. This item guarantees maximum limit when one input switches.
Waveform: Refer to test circuit of switching characteristics.

Logic Diagram



Electrical Characteristics (Ta = -40°C to +85°C)

| Item | Symbol | V _{CC} (V) | Min | Max | Unit | Test Conditions |
|--------------------------------|---------------------|---------------------|------|------|------|--|
| Input voltage | V _{IH} | | 2.0 | — | V | |
| | V _{IL} | | — | 0.8 | V | |
| Output voltage | V _{OH} | 4.5 | 2.4 | — | V | I _{OH} = -3 mA |
| | | 4.5 | 2.0 | — | V | I _{OH} = -15 mA |
| | V _{OL} | 4.5 | — | 0.5 | V | I _{OL} = 48 mA |
| | | 4.5 | — | 0.55 | V | I _{OL} = 64 mA |
| Input diode voltage | V _{IK} | 4.5 | — | -1.2 | V | I _{IN} = -18 mA |
| Input current | I _I | 5.5 | — | -250 | μA | V _{IN} = 0 V |
| | | 5.5 | — | 100 | μA | An or Bn, V _{IN} = 5.5 V |
| | | 5.5 | — | 1.0 | μA | DiR or \overline{G} , V _{IN} = 5.5 V |
| | | 5.5 | — | 100 | μA | DiR or \overline{G} , V _{IN} = 7.0 V |
| Short circuit output current*1 | I _{OS} | 5.5 | -100 | -225 | mA | V _O = 0 V, V _{IN} = 5.5 V |
| Off state output current | I _{OZH} | 5.5 | — | -100 | μA | V _O = 2.7 V |
| | I _{OZL} | 5.5 | — | -250 | μA | V _O = 0.5 V |
| Supply current | I _{CCL} | 5.5 | — | 31.5 | mA | V _{IN} = 0 or 5.5 V All outputs is "L" |
| | I _{CCH} | 5.5 | — | 0.5 | mA | V _{IN} = 0 or 5.5 V All outputs is "H" |
| | I _{CCZ} | 5.5 | — | 4.5 | mA | V _{IN} = 0 or 5.5 V All outputs is "Z" |
| | I _{CCT} *2 | 5.5 | — | 1.5 | mA | V _{IN} = 3.4 or 0.5 V |

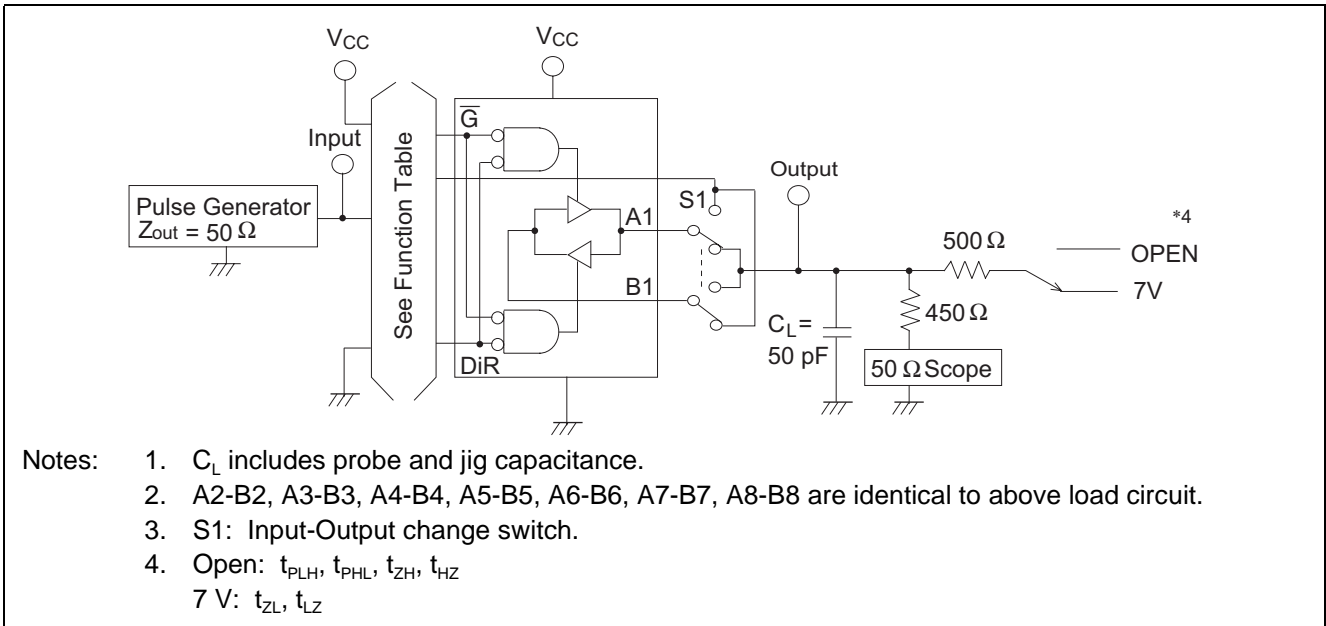
Notes : 1. Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.

2. When input by the TTL level, it shows I_{CC} increase at per one input pin.

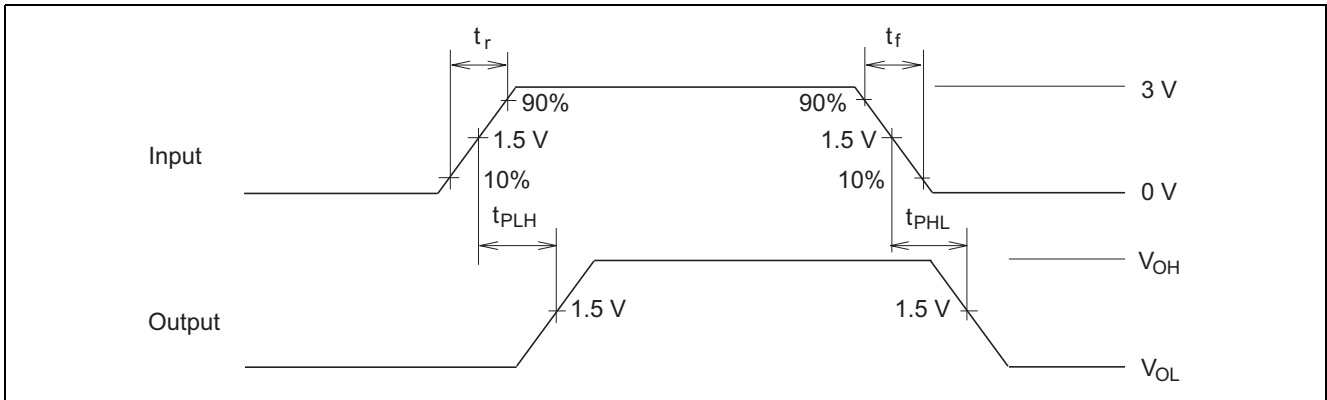
Switching Test Method (C_L = 50 pF)

| Item | Symbol | Ta = 25°C V _{CC} = 5.0 V | | Ta = -40 to 85°C V _{CC} = 5.0 V ±10% | | Unit | Test Conditions |
|--------------------------|------------------|--------------------------------------|-----|--|------|------|---|
| | | Min | Max | Min | Max | | |
| Propagation delay time | t _{PLH} | 3.0 | 6.0 | 3.0 | 7.0 | ns | An to Bn |
| | t _{PHL} | 3.0 | 6.0 | 3.0 | 7.0 | | |
| | t _{PLH} | 3.0 | 6.0 | 3.0 | 7.0 | ns | Bn to An |
| | t _{PHL} | 3.0 | 6.0 | 3.0 | 7.0 | | |
| Output enable time | t _{ZH} | 3.0 | 9.0 | 3.0 | 11.0 | ns | \overline{G} to Bn |
| | t _{ZL} | 3.0 | 9.0 | 3.0 | 11.0 | | |
| | t _{ZH} | 3.0 | 9.0 | 3.0 | 11.0 | ns | \overline{G} to An |
| | t _{ZL} | 3.0 | 9.0 | 3.0 | 11.0 | | |
| Output disable time | t _{HZ} | 3.0 | 8.0 | 3.0 | 10.0 | ns | \overline{G} to Bn |
| | t _{LZ} | 3.0 | 8.0 | 3.0 | 10.0 | | |
| | t _{HZ} | 3.0 | 8.0 | 3.0 | 10.0 | ns | \overline{G} to An |
| | t _{LZ} | 3.0 | 8.0 | 3.0 | 10.0 | | |
| Input capacitance | C _{IN} | 3.0(Typ) | | — | | pF | V _{IN} = V _{CC} or GND |
| Input/output capacitance | C _{I/O} | 15.0(Typ) | | — | | pF | V _{I/O} = V _{CC} or GND |

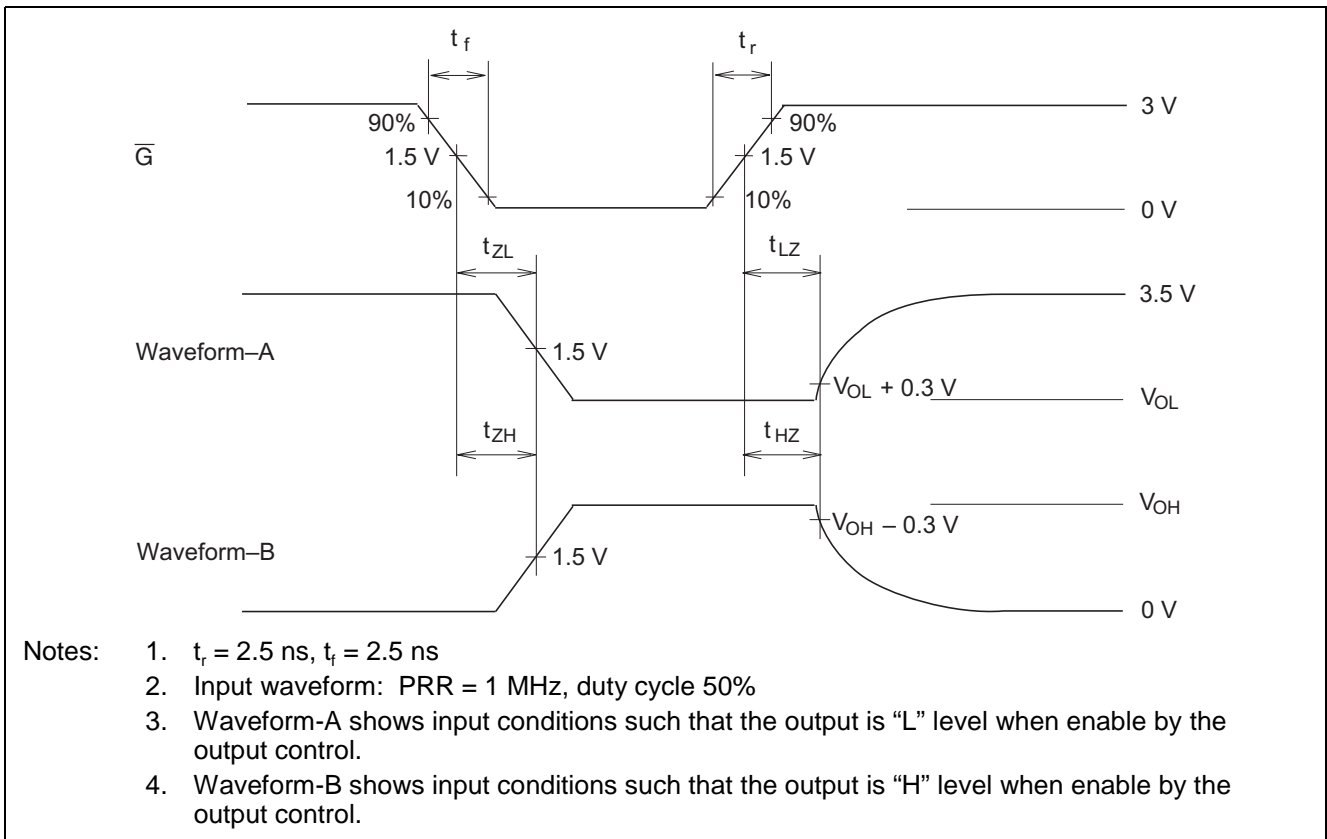
Test Circuit



Waveforms-1

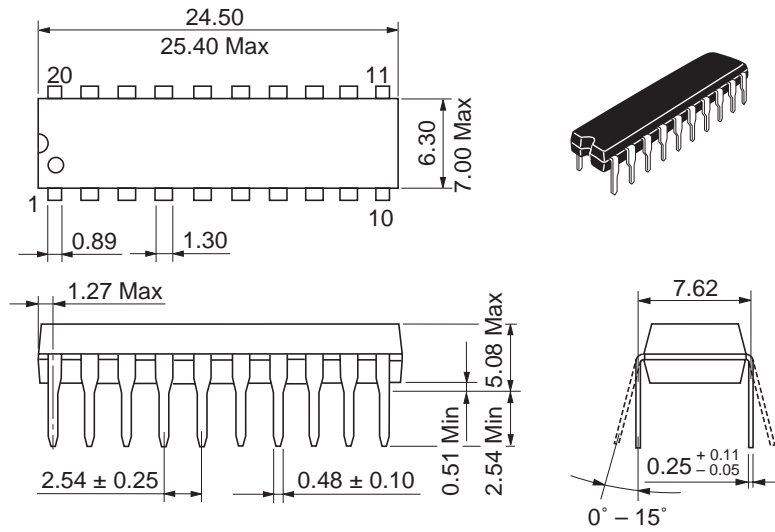


Waveforms-2



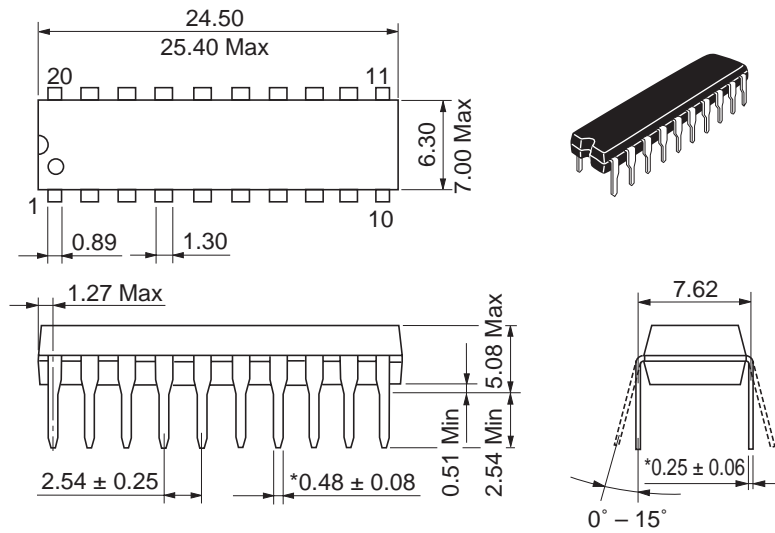
Package Dimensions

As of January, 2003
Unit: mm



| | |
|------------------------|----------|
| Package Code | DP-20N |
| JEDEC | — |
| JEITA | Conforms |
| Mass (reference value) | 1.26 g |

Unit: mm

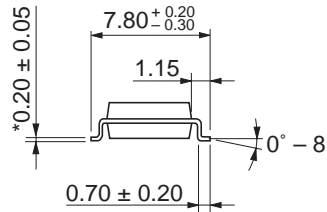
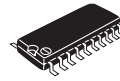
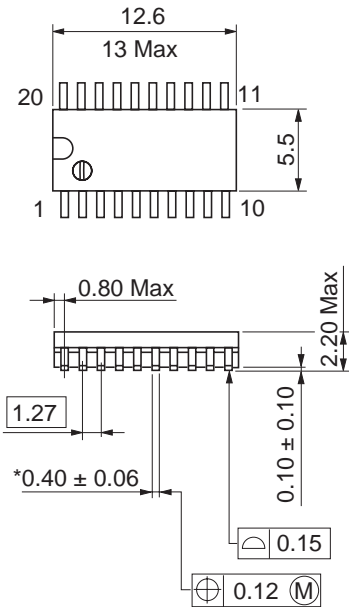


*Ni/Pd/AU Plating

| | |
|------------------------|----------|
| Package Code | DP-20NEV |
| JEDEC | — |
| JEITA | Conforms |
| Mass (reference value) | 1.26 g |

As of January, 2003

Unit: mm

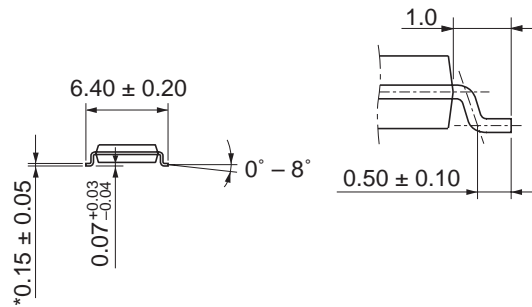
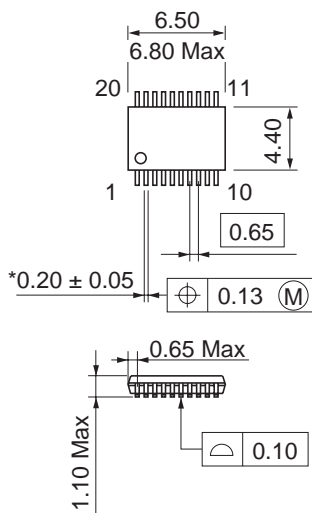


*Ni/Pd/Au plating

| | |
|------------------------|----------|
| Package Code | FP-20DAV |
| JEDEC | — |
| JEITA | Conforms |
| Mass (reference value) | 0.31 g |

As of January, 2003

Unit: mm



*Ni/Pd/Au plating

| | |
|------------------------|-----------|
| Package Code | TTP-20DAV |
| JEDEC | — |
| JEITA | — |
| Mass (reference value) | 0.07 g |

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