

HD74LVC244A

Octal Buffers / Line Drivers with 3-state Outputs

REJ03D0352-0400Z
 (Previous ADE-205-110B (Z))
 Rev.4.00
 Jul. 27, 2004

Description

The HD74LVC244A has eight line drivers with three state outputs in a 20 pin package. This device is a non inverting buffer and has two active low enables ($\overline{1G}$ and $\overline{2G}$). Each enable independently controls four buffers. 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 $V_{IH} (\text{Max.}) = 5.5\text{ V} (@V_{CC} = 0\text{ V to }5.5\text{ V})$
- All outputs $V_{OUT} (\text{Max.}) = 5.5\text{ V} (@V_{CC} = 0\text{ V or output off state})$
- 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) |
|-----------------|--------------------|--------------|----------------------|--------------------------------|
| HD74LVC244AFPEL | SOP-20 pin (JEITA) | FP-20DAV | FP | EL (2,000 pcs/reel) |
| HD74LVC244ATELL | TSSOP-20 pin | TTP-20DAV | T | ELL (2,000 pcs/reel) |

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

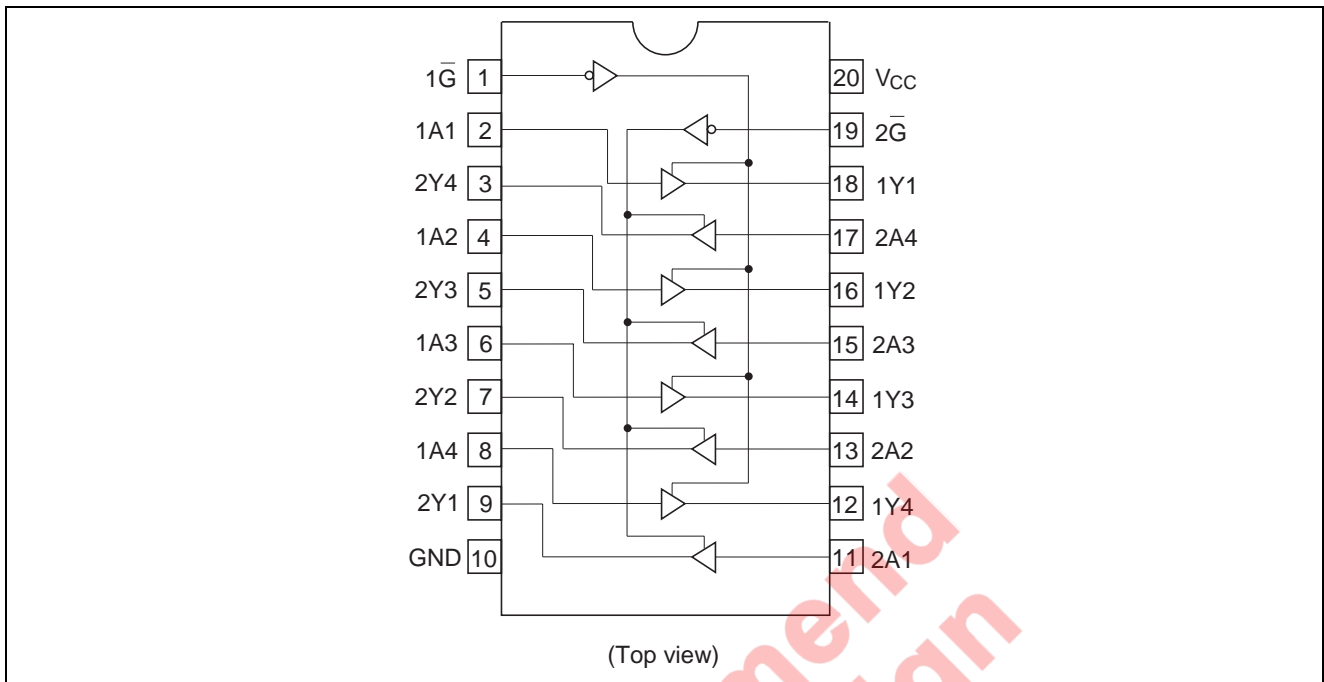
Function Table

Inputs

| \overline{G} | A | Output Y |
|----------------|---|----------|
| H | X | Z |
| L | H | H |
| L | L | L |

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

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 | $V_I = -0.5$ V |
| Input voltage | V_I | -0.5 to 6.0 | V | |
| Output diode current | I_{OK} | -50 50 | mA | $V_O = -0.5$ V $V_O = V_{CC} + 0.5$ V |
| Output voltage | V_O | -0.5 to $V_{CC} + 0.5$ -0.5 to 6.0 | V | Output "H" or "L" Output "Z" $V_{CC}:OFF$ |
| Output current | I_O | ± 50 | mA | |
| V_{CC} , GND current / pin | I_{CC} or I_{GND} | 100 | mA | |
| Storage temperature | T_{stg} | -65 to 150 | $^{\circ}C$ | |

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 | \bar{G} , A |
| | V _O | 0 to V _{CC} 0 to 5.5 | V | Output "H" or "L" Output "Z" or V _{CC} :OFF |
| 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 ≤ 50%

Electrical Characteristics

| Item | Symbol | V _{CC} (V) | T _a = -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 | — | | |
| | | 3.0 | 2.2 | — | | I _{OH} = -24 mA |
| | | 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 | V _{IN} = 5.5 V or GND |
| Off state output current | I _{OZ} | 2.7 to 5.5 | — | ±5.0 | μA | V _{IN} = V _{CC} , GND, V _{OUT} = 5.5 V or GND |
| Output leak current | I _{OFF} | 0 | — | 20 | μA | V _{IN} / V _{OUT} = 5.5 V |
| Quiescent supply current | I _{CC} | 2.7 to 3.6 | — | ±10 | μA | V _{IN} / V _{OUT} = 3.6 to 5.5 V |
| | | 2.7 to 5.5 | — | 10 | | 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 |

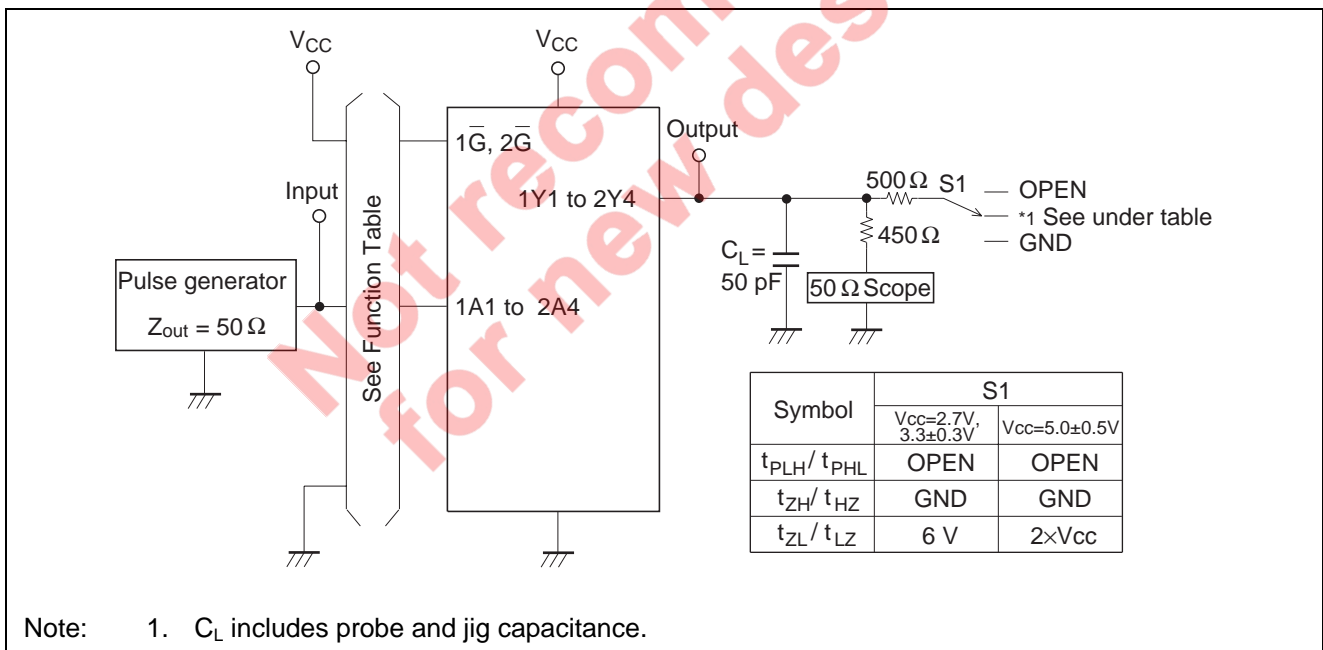
Switching Characteristics

| Item | Symbol | V _{CC} (V) | Ta = -40 to 85°C | | | Unit | From (Input) | To (Output) |
|--|-------------------|---------------------|------------------|------|-----|------|--------------|-------------|
| | | | Min | Typ | Max | | | |
| Propagation delay time | t _{PLH} | 2.7 | — | — | 7.5 | ns | A | Y |
| | t _{PHL} | 3.3±0.3 | 1.5 | — | 6.5 | | | |
| | | 5.0±0.5 | — | — | 5.0 | | | |
| Output enable time | t _{ZH} | 2.7 | — | — | 9.0 | ns | G̅ | Y |
| | t _{ZL} | 3.3±0.3 | 1.5 | — | 8.0 | | | |
| | | 5.0±0.5 | — | — | 6.5 | | | |
| Output disable time | t _{ZH} | 2.7 | — | — | 8.0 | ns | G̅ | Y |
| | t _{LZ} | 3.3±0.3 | 1.5 | — | 7.0 | | | |
| | | 5.0±0.5 | — | — | 6.0 | | | |
| Between output pins skew ^{*1} | t _{OSLH} | 2.7 | — | — | — | ns | | |
| | t _{OSHL} | 3.3±0.3 | — | — | 1.0 | | | |
| | | 5.0±0.5 | — | — | 1.0 | | | |
| Input capacitance | C _{IN} | 2.7 | — | 3.0 | — | pF | | |
| Output capacitance | C _O | 2.7 | — | 15.0 | — | pF | | |

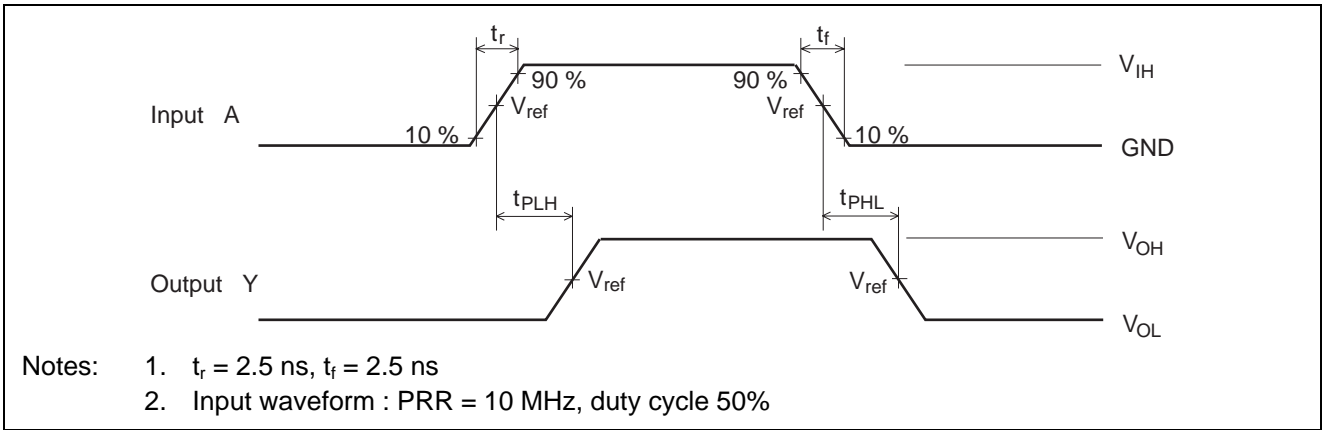
Note: 1. This parameter is characterized but not tested.

$$t_{OSLH} = |t_{PLHm} - t_{PLHn}|, t_{OSHL} = |t_{PHLm} - t_{PHLn}|$$

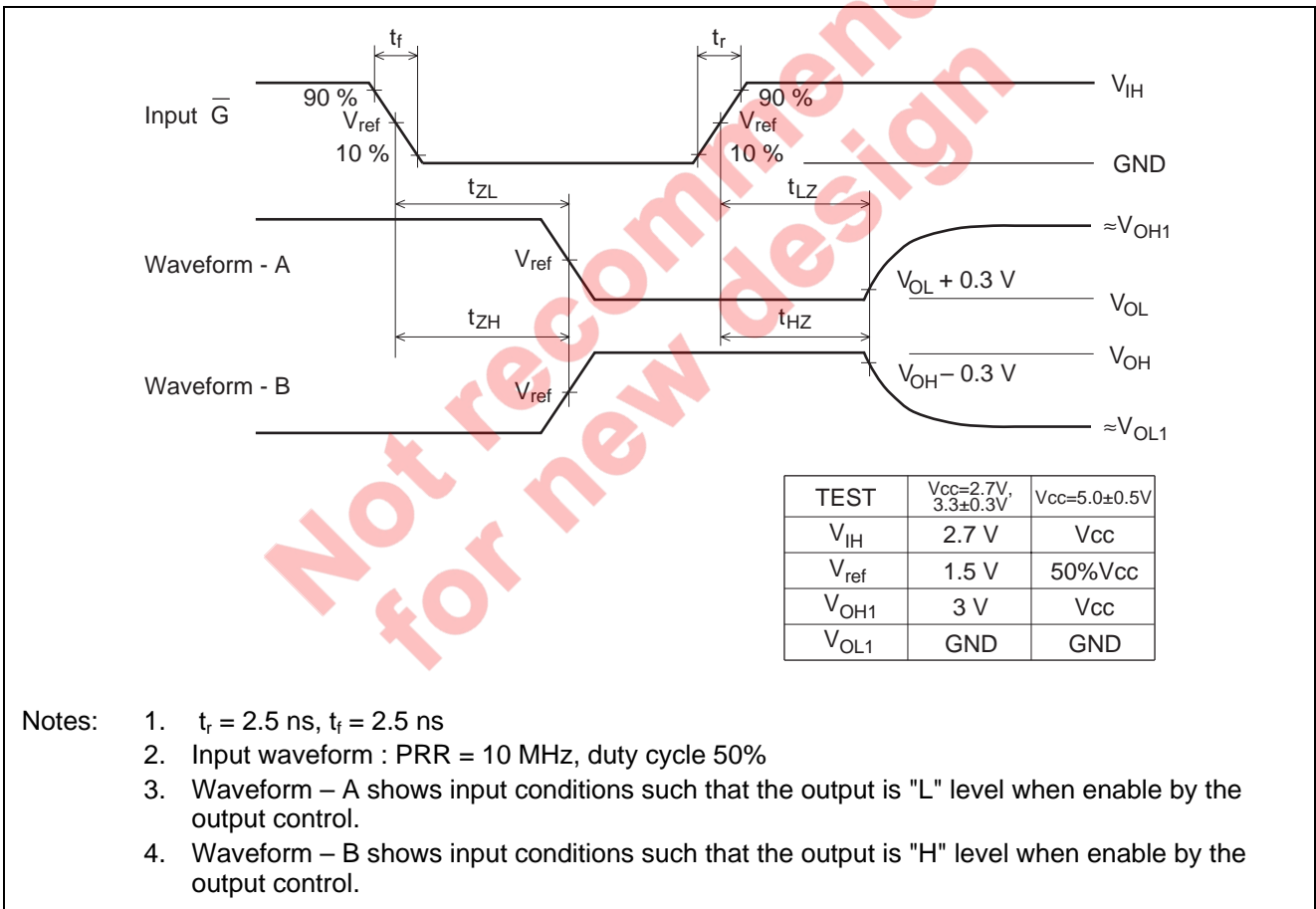
Test Circuit



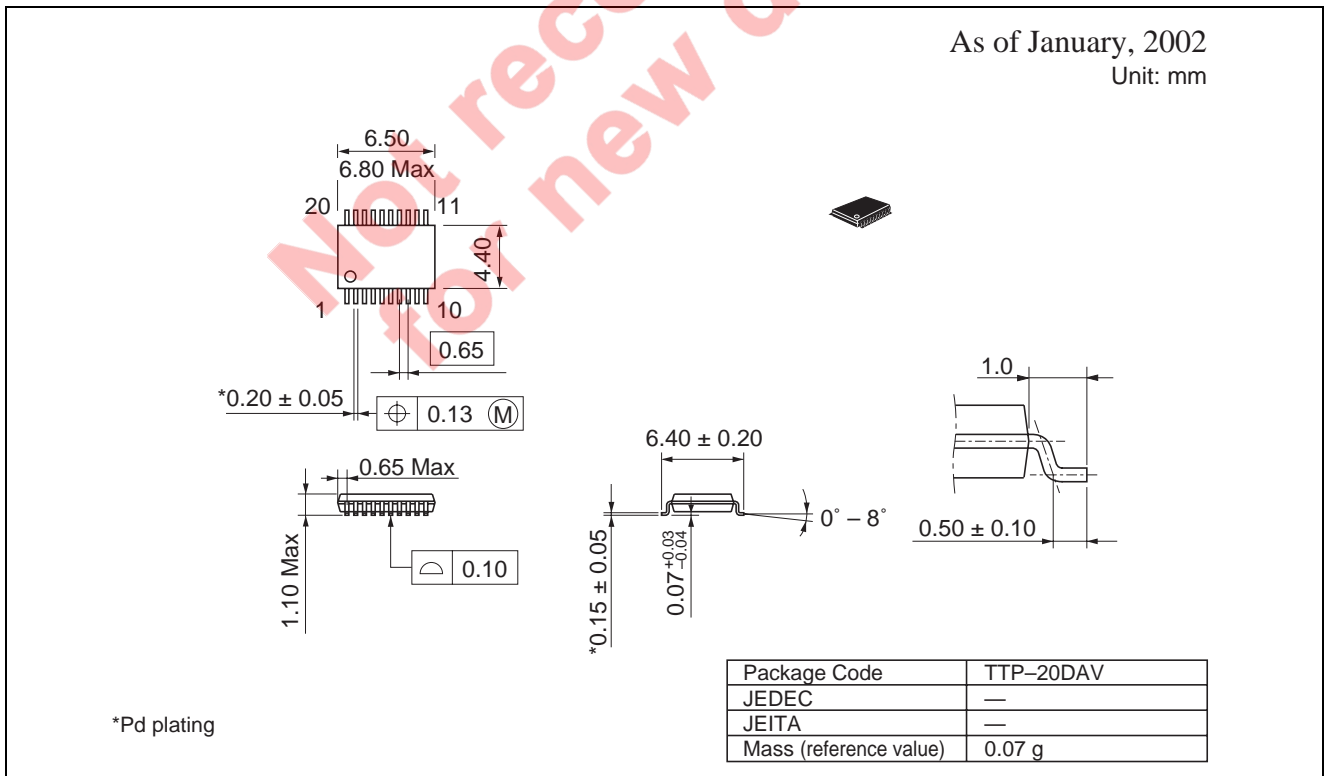
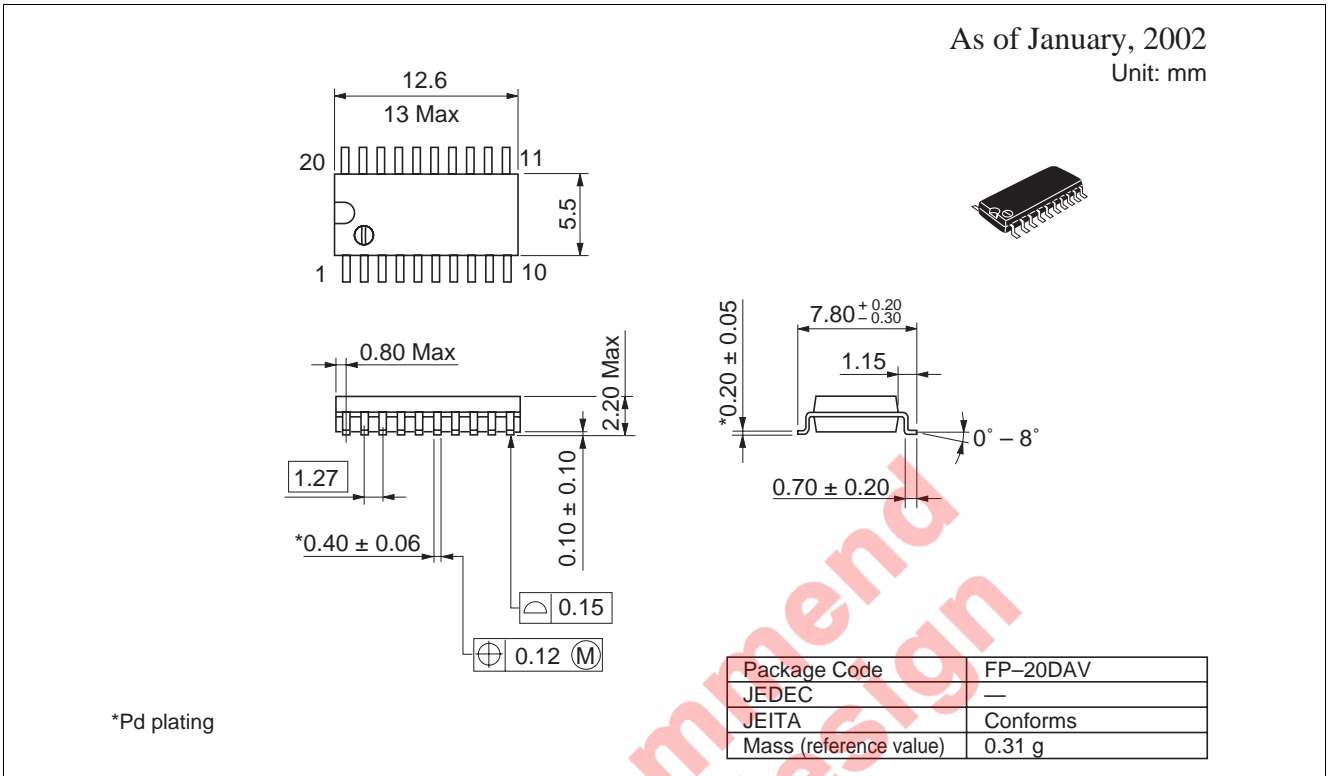
Waveforms – 1



Waveforms – 2



Package Dimensions



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