

# HD74HC240

## Octal Buffers/Line Drivers/Line Receivers (with inverted 3-state outputs)

REJ03D0594-0200  
(Previous ADE-205-471)  
Rev.2.00  
Jan 31, 2006

### Description

The HD74HC240 is an inverting buffer and has two active low enables ( $\overline{1G}$  and  $\overline{2G}$ ). Each enable independently controls 4 buffers. This device does not have schmitt trigger inputs.

### Features

- High Speed Operation:  $t_{pd} = 10$  ns typ ( $C_L = 50$  pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 2$  to 6 V
- Low Input Current: 1  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu$ A max ( $T_a = 25^\circ\text{C}$ )
- Ordering Information

| Part Name     | Package Type       | Package Code<br>(Previous Code) | Package<br>Abbreviation | Taping Abbreviation<br>(Quantity) |
|---------------|--------------------|---------------------------------|-------------------------|-----------------------------------|
| HD74HC240P    | DILP-20 pin        | PRDP0020AC-B<br>(DP-20NEV)      | P                       | —                                 |
| HD74HC240FPEL | SOP-20 pin (JEITA) | PRSP0020DD-B<br>(FP-20DAV)      | FP                      | EL (2,000 pcs/reel)               |
| HD74HC240RPEL | SOP-20 pin (JEDEC) | PRSP0020DC-A<br>(FP-20DBV)      | RP                      | EL (1,000 pcs/reel)               |
| HD74HC240TELL | TSSOP-20 pin       | PTSP0020JB-A<br>(TTP-20DAV)     | T                       | ELL (2,000 pcs/reel)              |

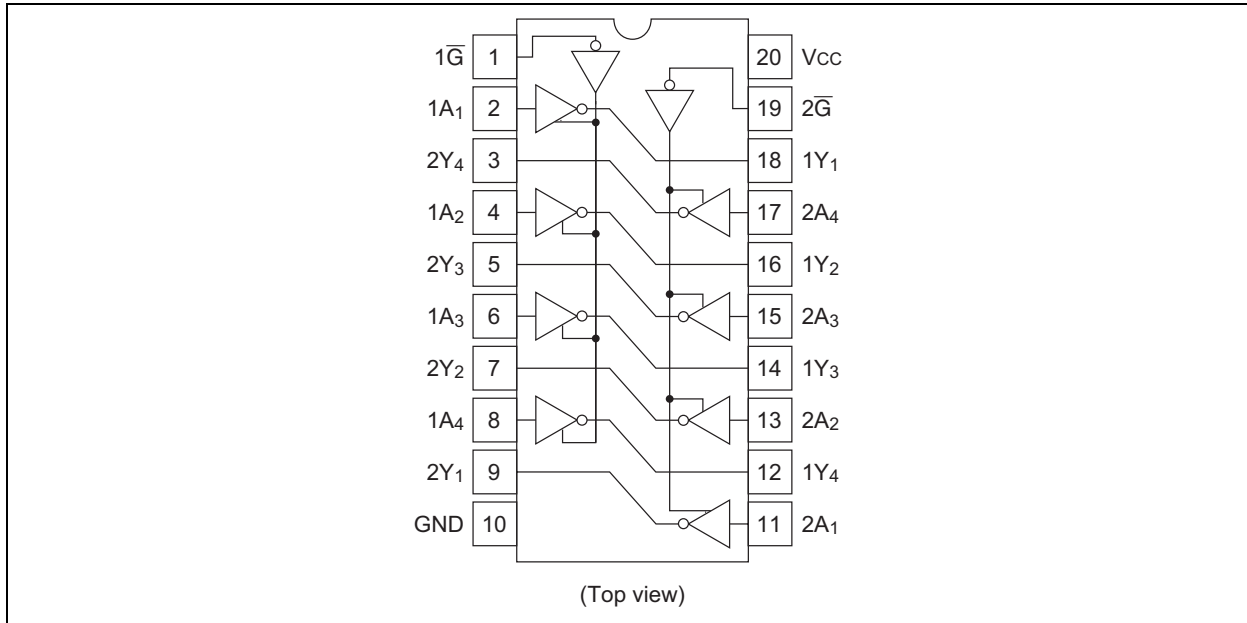
Note: Please consult the sales office for the above package availability.

### Function Table

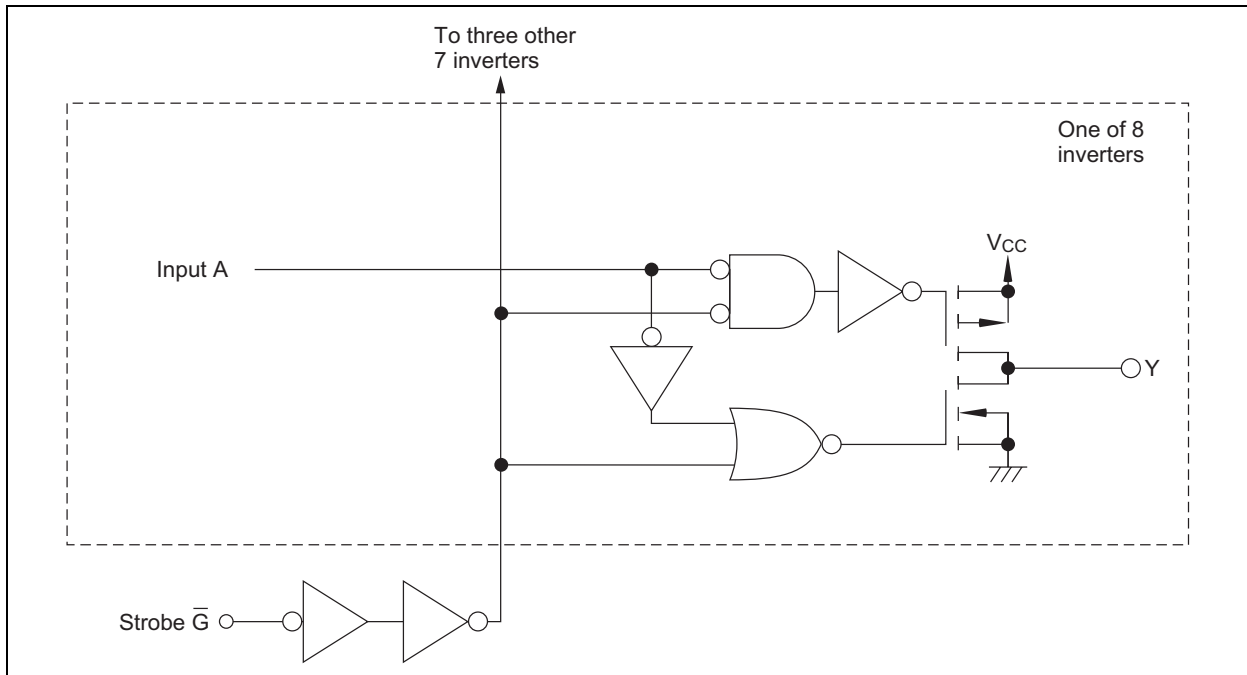
| Inputs         |   | Output |
|----------------|---|--------|
| $\overline{G}$ | A | Y      |
| H              | X | Z      |
| L              | H | L      |
| L              | L | H      |

- H : high level  
L : low level  
X : irrelevant  
Z : off (high-impedance) state of a 3-state output

### Pin Arrangement



### Logic Diagram



### Absolute Maximum Ratings

| Item                         | Symbol                | Ratings                | Unit |
|------------------------------|-----------------------|------------------------|------|
| Supply voltage range         | $V_{CC}$              | -0.5 to 7.0            | V    |
| Input / Output voltage       | $V_{IN}, V_{OUT}$     | -0.5 to $V_{CC} + 0.5$ | V    |
| Input / Output diode current | $I_{IK}, I_{OK}$      | $\pm 20$               | mA   |
| Output current               | $I_O$                 | $\pm 35$               | mA   |
| $V_{CC}$ , GND current       | $I_{CC}$ or $I_{GND}$ | $\pm 75$               | mA   |
| Power dissipation            | $P_T$                 | 500                    | mW   |
| Storage temperature          | $T_{stg}$             | -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                      | $V_{CC}$          | 2 to 6        | V    |                  |
| Input / Output voltage              | $V_{IN}, V_{OUT}$ | 0 to $V_{CC}$ | V    |                  |
| Operating temperature               | $T_a$             | -40 to 85     | °C   |                  |
| Input rise / fall time <sup>1</sup> | $t_r, t_f$        | 0 to 1000     | ns   | $V_{CC} = 2.0$ V |
|                                     |                   | 0 to 500      |      | $V_{CC} = 4.5$ V |
|                                     |                   | 0 to 400      |      | $V_{CC} = 6.0$ V |

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

### Electrical Characteristics

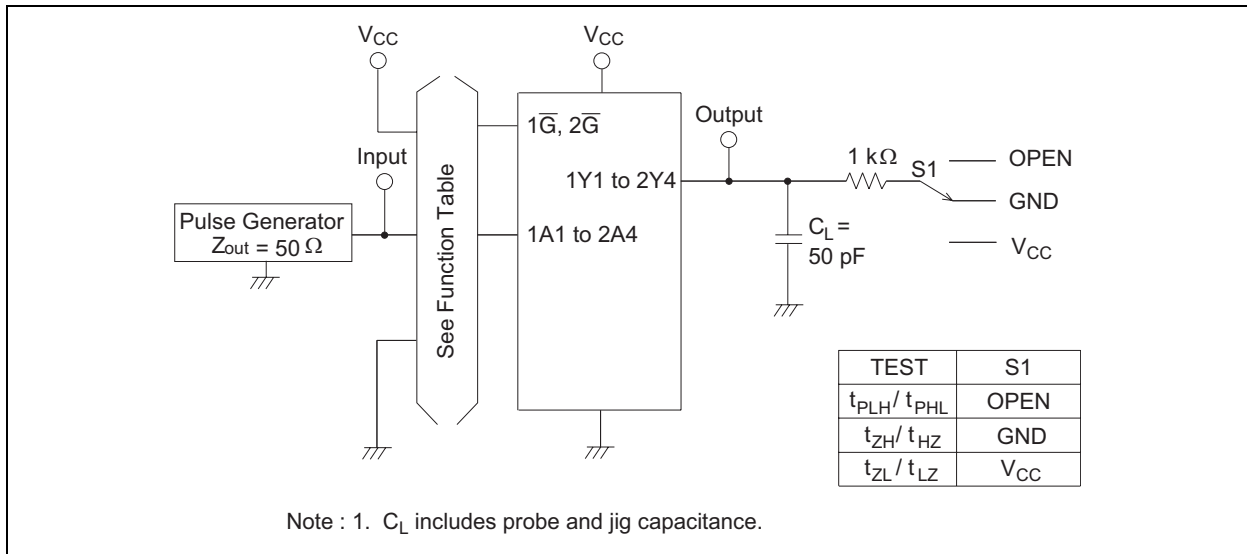
| Item                     | Symbol   | $V_{CC}$ (V) | $T_a = 25^\circ\text{C}$ |     |           | $T_a = -40 \text{ to } +85^\circ\text{C}$ |           | Unit          | Test Conditions  |                            |
|--------------------------|----------|--------------|--------------------------|-----|-----------|---|-----------|---------------|--|----------------------------|
|                          |          |              | Min                      | Typ | Max       | Min                                       | Max       |               |  |                            |
| Input voltage            | $V_{IH}$ | 2.0          | 1.5                      | —   | —         | 1.5                                       | —         | V             |  |                            |
|                          |          | 4.5          | 3.15                     | —   | —         | 3.15                                      | —         |               |  |                            |
|                          |          | 6.0          | 4.2                      | —   | —         | 4.2                                       | —         |               |  |                            |
|                          | $V_{IL}$ | 2.0          | —                        | —   | 0.5       | —   | 0.5       | V             |  |                            |
|                          |          | 4.5          | —                        | —   | 1.35      | —   | 1.35      |               |  |                            |
|                          |          | 6.0          | —                        | —   | 1.8       | —   | 1.8       |               |  |                            |
| Output voltage           | $V_{OH}$ | 2.0          | 1.9                      | 2.0 | —         | 1.9                                       | —         | V             | $V_{in} = V_{IH}$ or $V_{IL}$                                | $I_{OH} = -20 \mu\text{A}$ |
|                          |          | 4.5          | 4.4                      | 4.5 | —         | 4.4                                       | —         |               |  | $I_{OH} = -6 \text{ mA}$   |
|                          |          | 6.0          | 5.9                      | 6.0 | —         | 5.9                                       | —         |               |  | $I_{OH} = -7.8 \text{ mA}$ |
|                          |          | 4.5          | 4.18                     | —   | —         | 4.13                                      | —         |               |  |                            |
|                          |          | 6.0          | 5.68                     | —   | —         | 5.63                                      | —         |               |  |                            |
|                          | $V_{OL}$ | 2.0          | —                        | 0.0 | 0.1       | —   | 0.1       | V             | $V_{in} = V_{IH}$ or $V_{IL}$                                | $I_{OL} = 20 \mu\text{A}$  |
|                          |          | 4.5          | —                        | 0.0 | 0.1       | —   | 0.1       |               |  |                            |
|                          |          | 6.0          | —                        | 0.0 | 0.1       | —   | 0.1       |               |  |                            |
|                          |          | 4.5          | —                        | —   | 0.26      | —   | 0.33      |               |  | $I_{OL} = 6 \text{ mA}$    |
|                          |          | 6.0          | —                        | —   | 0.26      | —   | 0.33      |               |  | $I_{OL} = 7.8 \text{ mA}$  |
| Off-state output current | $I_{OZ}$ | 6.0          | —                        | —   | $\pm 0.5$ | —   | $\pm 5.0$ | $\mu\text{A}$ | $V_{in} = V_{IH}$ or $V_{IL}$ ,<br>$V_{out} = V_{CC}$ or GND |                            |
| Input current            | $I_{in}$ | 6.0          | —                        | —   | $\pm 0.1$ | —   | $\pm 1.0$ | $\mu\text{A}$ | $V_{in} = V_{CC}$ or GND                                     |                            |
| Quiescent supply current | $I_{CC}$ | 6.0          | —                        | —   | 4.0       | —   | 40        | $\mu\text{A}$ | $V_{in} = V_{CC}$ or GND, $I_{out} = 0 \mu\text{A}$          |                            |

## Switching Characteristics

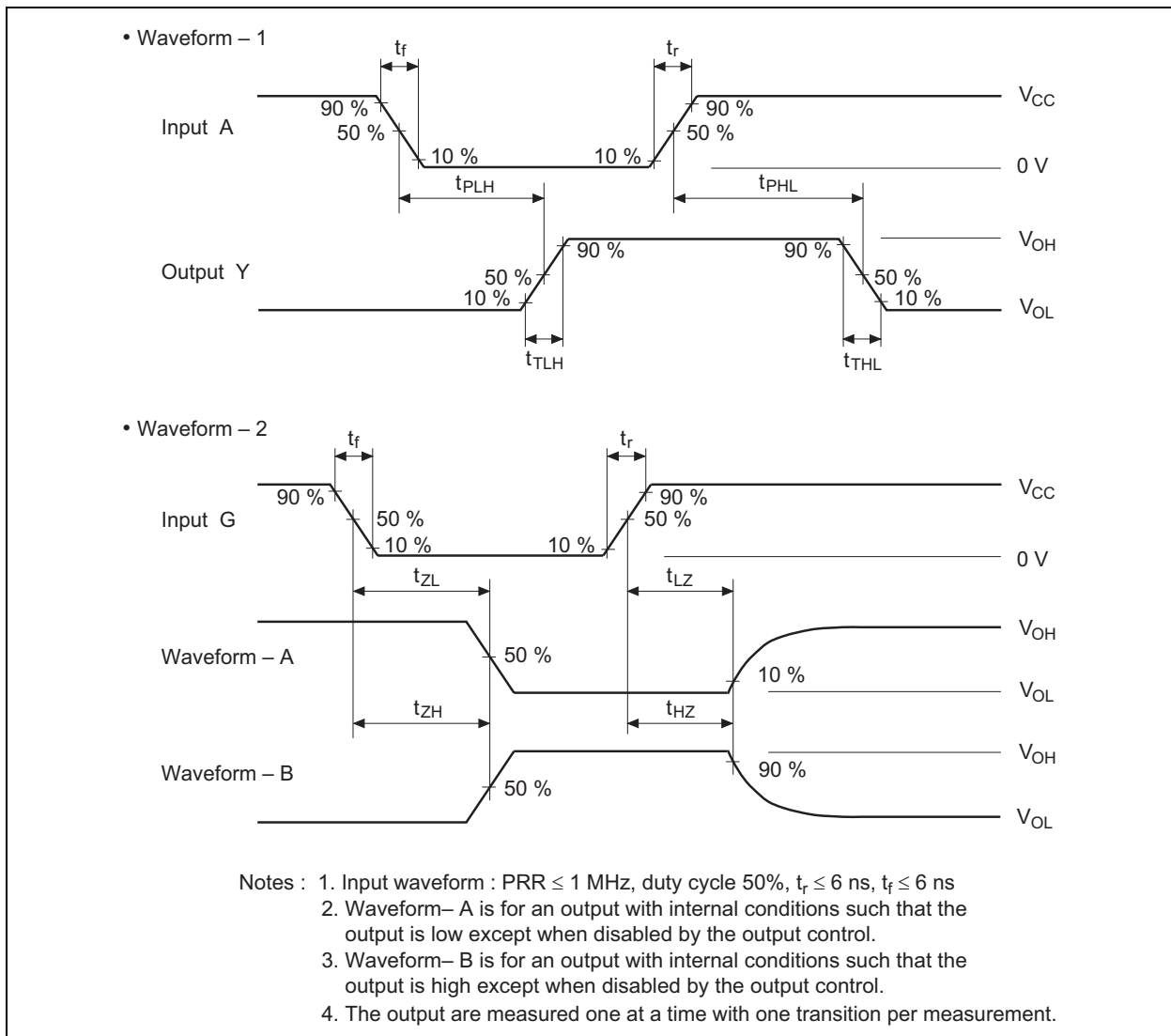
(C<sub>L</sub> = 50 pF, Input t<sub>r</sub> = t<sub>f</sub> = 6 ns)

| Item                   | Symbol           | V <sub>CC</sub> (V) | Ta = 25°C |     |     | Ta = -40 to +85°C |     | Unit | Test Conditions |
|------------------------|------------------|---------------------|-----------|-----|-----|-------------------|-----|------|-----------------|
|                        |                  |                     | Min       | Typ | Max | Min               | Max |      |                 |
| Propagation delay time | t <sub>PHL</sub> | 2.0                 | —         | —   | 90  | —                 | 115 | ns   |                 |
|                        |                  | 4.5                 | —         | 10  | 18  | —                 | 23  |      |                 |
|                        |                  | 6.0                 | —         | —   | 15  | —                 | 20  |      |                 |
|                        | t <sub>PLH</sub> | 2.0                 | —         | —   | 90  | —                 | 115 | ns   |                 |
|                        |                  | 4.5                 | —         | 10  | 18  | —                 | 23  |      |                 |
|                        |                  | 6.0                 | —         | —   | 15  | —                 | 20  |      |                 |
| Output enable time     | t <sub>ZL</sub>  | 2.0                 | —         | —   | 150 | —                 | 190 | ns   |                 |
|                        |                  | 4.5                 | —         | 11  | 30  | —                 | 38  |      |                 |
|                        |                  | 6.0                 | —         | —   | 26  | —                 | 33  |      |                 |
|                        | t <sub>ZH</sub>  | 2.0                 | —         | —   | 150 | —                 | 190 | ns   |                 |
|                        |                  | 4.5                 | —         | 12  | 30  | —                 | 38  |      |                 |
|                        |                  | 6.0                 | —         | —   | 26  | —                 | 33  |      |                 |
| Output disable time    | t <sub>LZ</sub>  | 2.0                 | —         | —   | 150 | —                 | 190 | ns   |                 |
|                        |                  | 4.5                 | —         | 16  | 30  | —                 | 38  |      |                 |
|                        |                  | 6.0                 | —         | —   | 26  | —                 | 33  |      |                 |
|                        | t <sub>HZ</sub>  | 2.0                 | —         | —   | 150 | —                 | 190 | ns   |                 |
|                        |                  | 4.5                 | —         | 19  | 30  | —                 | 38  |      |                 |
|                        |                  | 6.0                 | —         | —   | 26  | —                 | 33  |      |                 |
| Output rise/fall time  | t <sub>TLH</sub> | 2.0                 | —         | —   | 60  | —                 | 75  | ns   |                 |
|                        | t <sub>THL</sub> | 4.5                 | —         | 4   | 12  | —                 | 15  |      |                 |
|                        |                  | 6.0                 | —         | —   | 10  | —                 | 13  |      |                 |
| Input capacitance      | C <sub>in</sub>  | —                   | —         | 5   | 10  | —                 | 10  | pF   |                 |

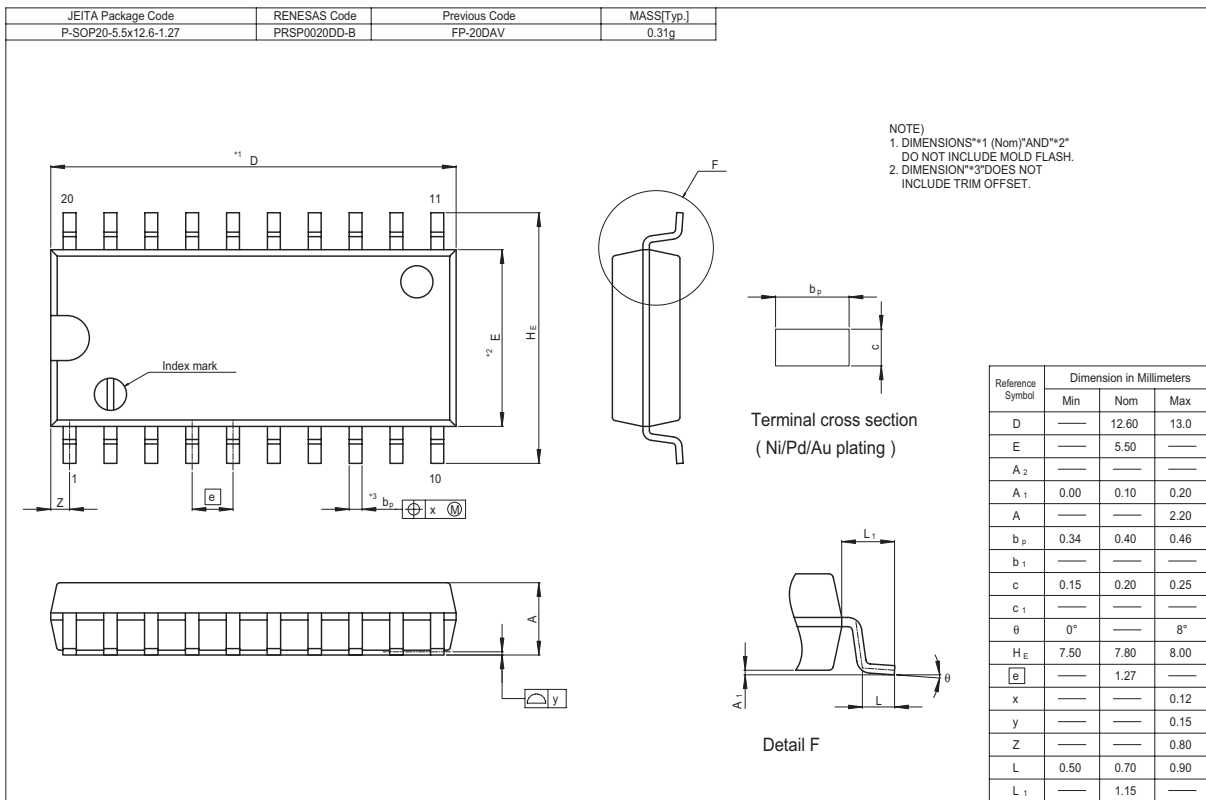
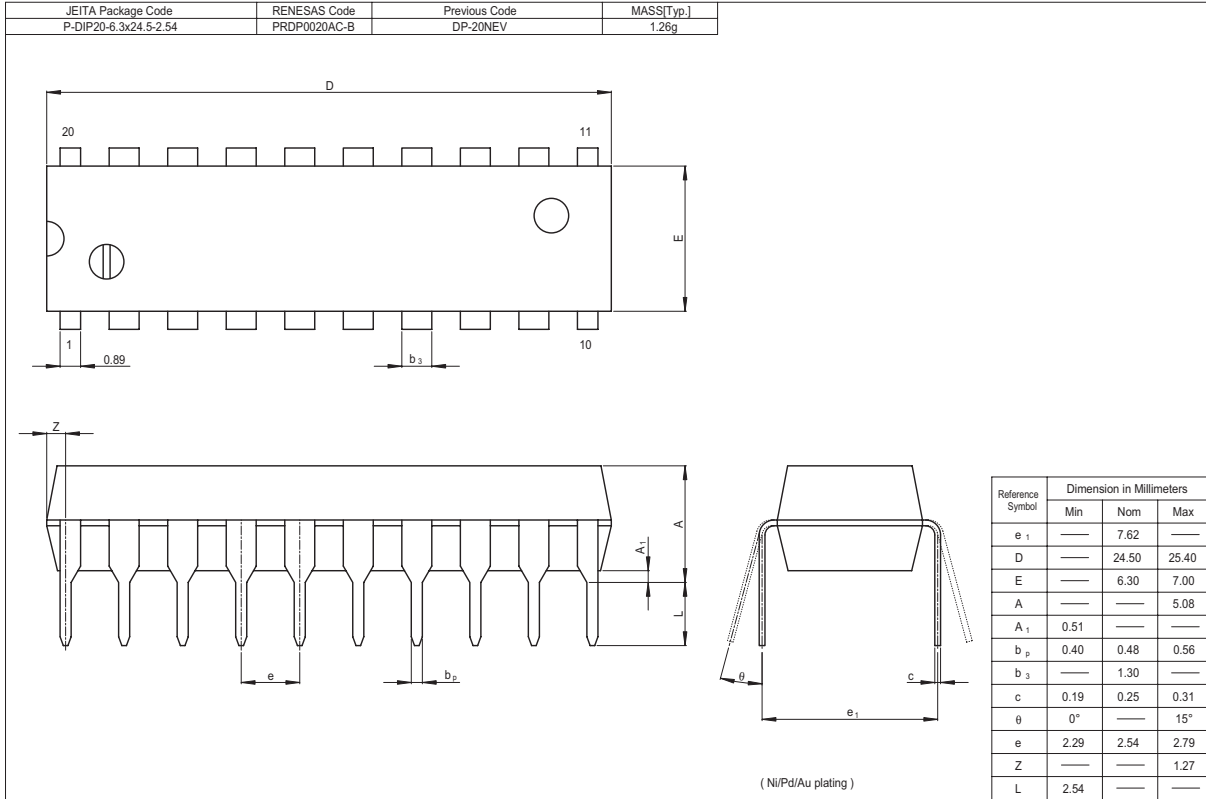
Test Circuit



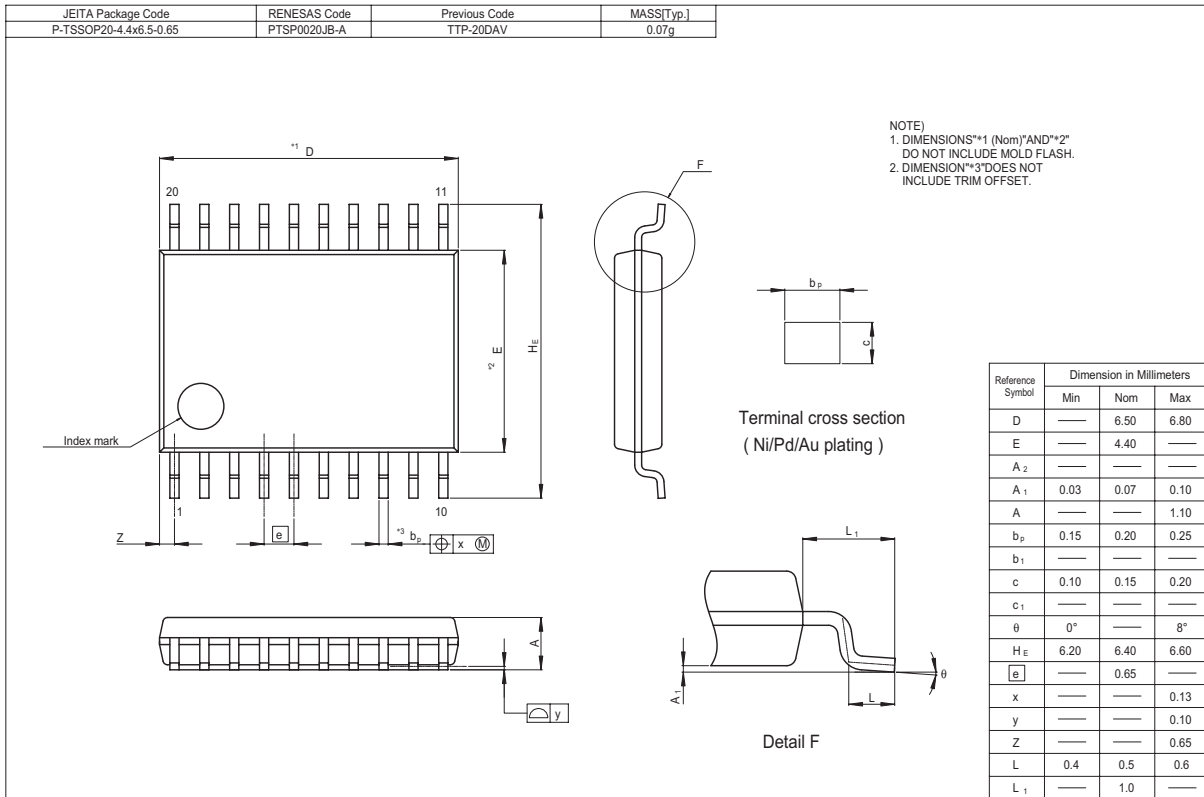
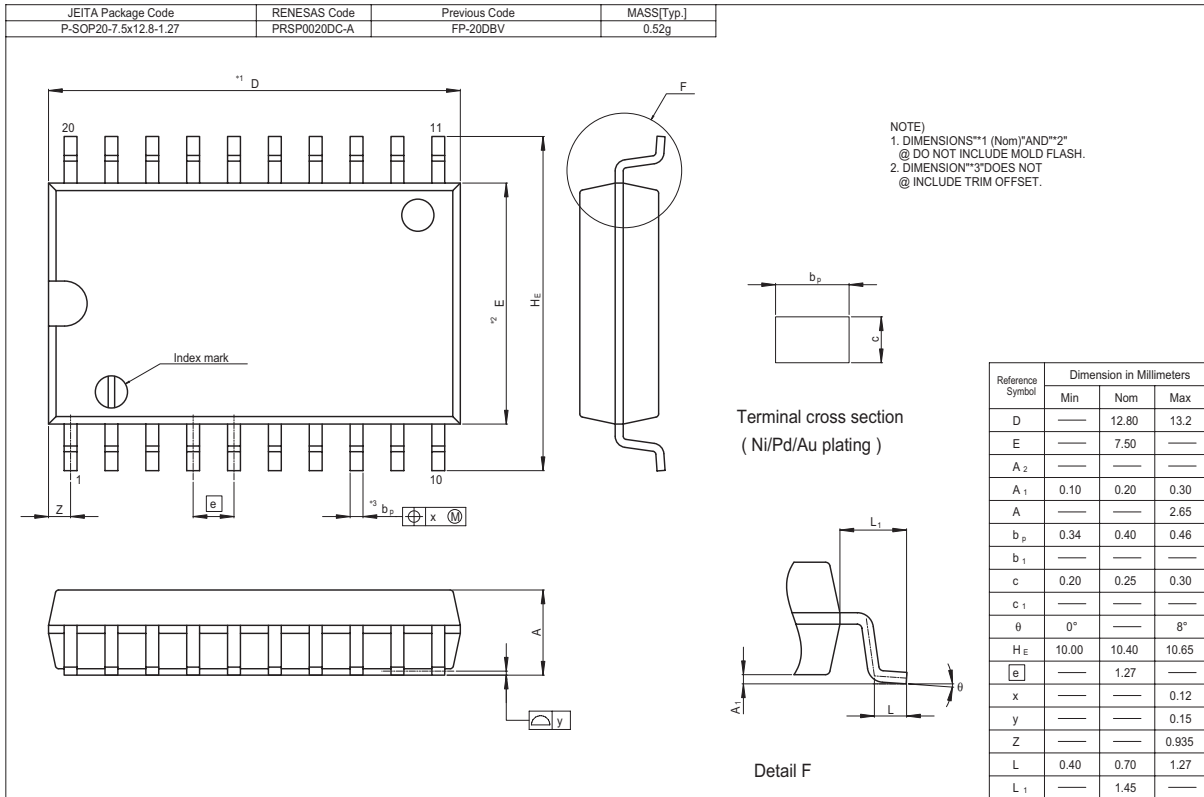
Waveforms



Package Dimensions



# HD74HC240



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