

HD74LS645

Octal Bus Transceivers (non-inverted 3-state outputs)

REJ03D0491-0200

Rev.2.00

Feb.18.2005

This octal bus transceivers is designed for asynchronous two-way communication between data buses. The devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the direction control (DIR) input. The enable input (\overline{G}) can be used to disable the device so that the buses are effectively isolated.

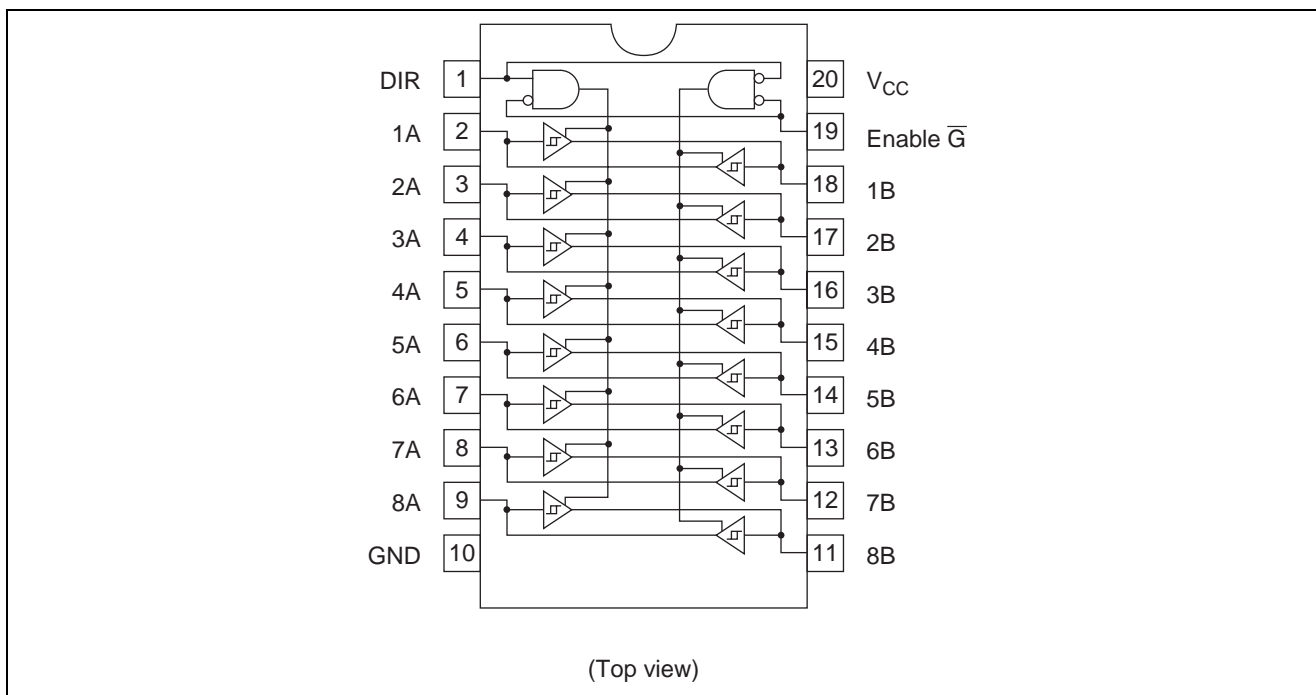
Features

- Ordering Information

| Part Name | Package Type | Package Code (Previous Code) | Package Abbreviation | Taping Abbreviation (Quantity) |
|---------------|--------------------|------------------------------|----------------------|--------------------------------|
| HD74LS645P | DILP-20 pin | PRDP0020AC-B (DP-20NEV) | P | — |
| HD74LS645FPEL | SOP-20 pin (JEITA) | PRSP0020DD-B (FP-20DAV) | FP | EL (2,000 pcs/reel) |

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

Pin Arrangement

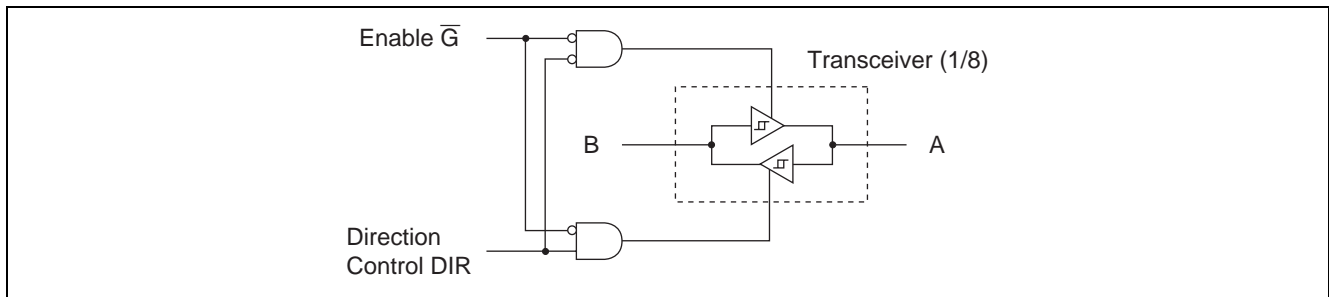


Function Table

| Enable | Direction Control | Operation |
|----------------|-------------------|-----------------|
| \overline{G} | DIR | |
| L | L | B data to A bus |
| L | H | A data to B bus |
| H | X | Isolation |

Note: 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} | — | — | -15 | mA |
| | I_{OL} | — | — | 24 | 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 | | | | |
| Hysteresis | V _{T+} - V _{T-} | 0.2 | — | — | V | V _{CC} = 4.75 V | | |
| Output voltage | V _{OH} | 2.4 | — | — | V | I _{OH} = -3 mA | V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V | |
| | | 2 | — | — | | I _{OH} = -15 mA | | |
| | V _{OL} | — | — | 0.4 | V | I _{OL} = 12 mA | V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V | |
| | | — | — | 0.5 | | I _{OL} = 24 mA | | |
| Output current | I _{OZH} | — | — | 20 | μA | V _O = 2.7 V | V _{CC} = 5.25 V, G̅ input = 2 V | |
| | I _{OZL} | — | — | -400 | | V _O = 0.4 V | | |
| Input current | I _{IH} | — | — | 20 | μA | V _{CC} = 5.25 V, V _I = 2.7 V | | |
| | | — | — | -400 | μA | V _{CC} = 5.25 V, V _I = 0.4 V | | |
| | A or B DIR or G̅ | I _I | — | — | 0.1 | mA | V _I = 5.5 V | V _{CC} = 5.25 V |
| | | | — | — | 0.1 | | V _I = 7 V | |
| Short-circuit output current | I _{OS} *** | -40 | — | -225 | mA | V _{CC} = 5.25 V | | |
| Supply current** | I _{CCH} | — | 48 | 70 | mA | V _{CC} = 5.25 V, Output open | | |
| | I _{CCL} | — | 62 | 90 | | | | |
| | I _{CCZ} | — | 64 | 95 | | | | |
| Input clamp voltage | V _{IK} | — | — | -1.5 | V | V _{CC} = 4.75 V, I _{IN} = -18 mA | | |

Notes: * V_{CC} = 5 V, Ta = 25°C

** I_{CC} is measured with all outputs open.

*** Not more than one output shall be shorted at a time. the duration of the short circuit shall not exceed one second.

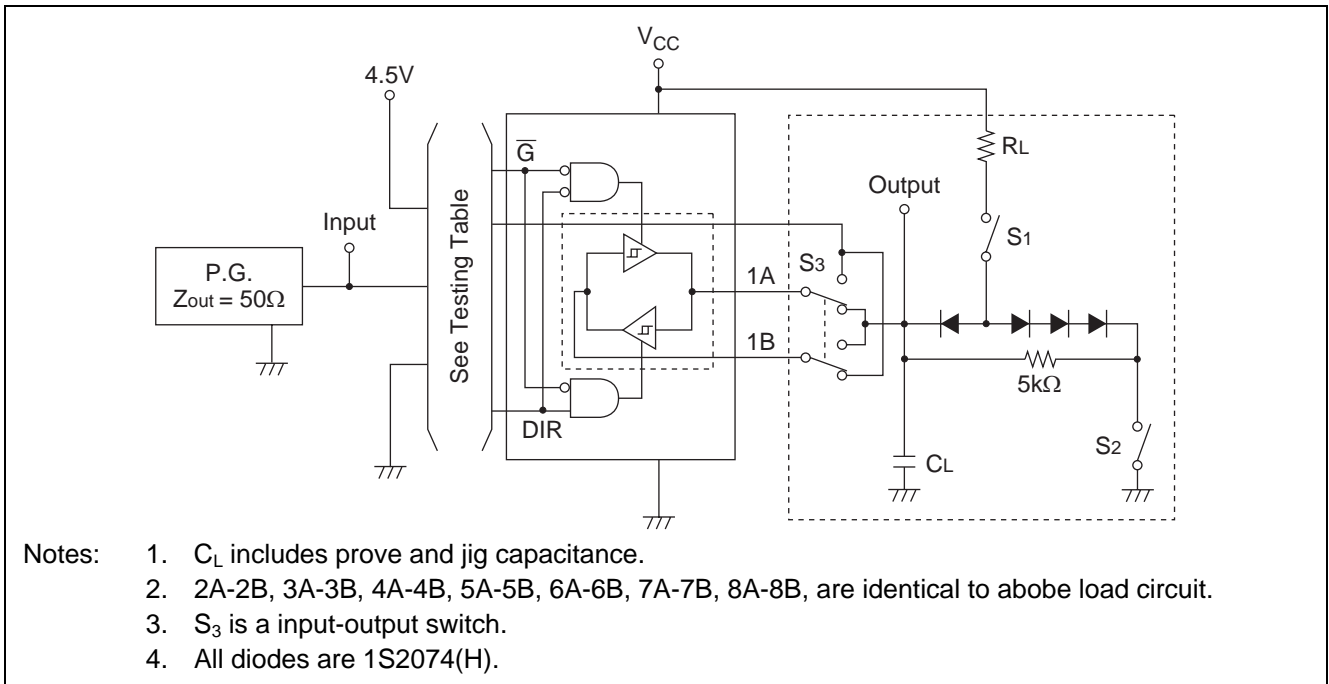
Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

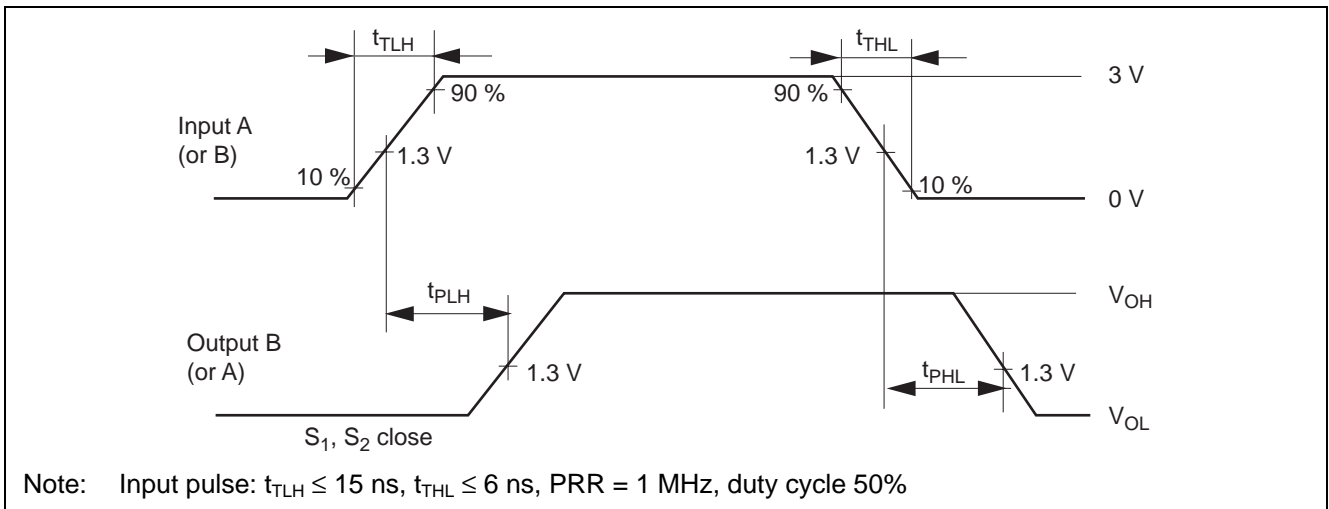
| Item | Symbol | Inputs | Outputs | min. | typ. | max. | Unit | Condition |
|------------------------|------------------|--------|---------|------|------|------|------|---|
| Propagation delay time | t _{PLH} | A | B | — | 8 | 15 | ns | C _L = 45 pF, R _L = 667 Ω |
| | | B | A | — | 8 | 15 | ns | |
| | t _{PHL} | A | B | — | 11 | 15 | ns | |
| | | B | A | — | 11 | 15 | ns | |
| Output enable time | t _{ZL} | G̅ | A | — | 31 | 40 | ns | |
| | | G̅ | B | — | 31 | 40 | ns | |
| | t _{ZH} | G̅ | A | — | 26 | 40 | ns | |
| | | G̅ | B | — | 26 | 40 | ns | |
| Output disable time | t _{LZ} | G̅ | A | — | 15 | 25 | ns | C _L = 5 pF, R _L = 667 Ω |
| | | G̅ | B | — | 15 | 25 | ns | |
| | t _{HZ} | G̅ | A | — | 15 | 25 | ns | |
| | | G̅ | B | — | 15 | 25 | ns | |

Testing Method

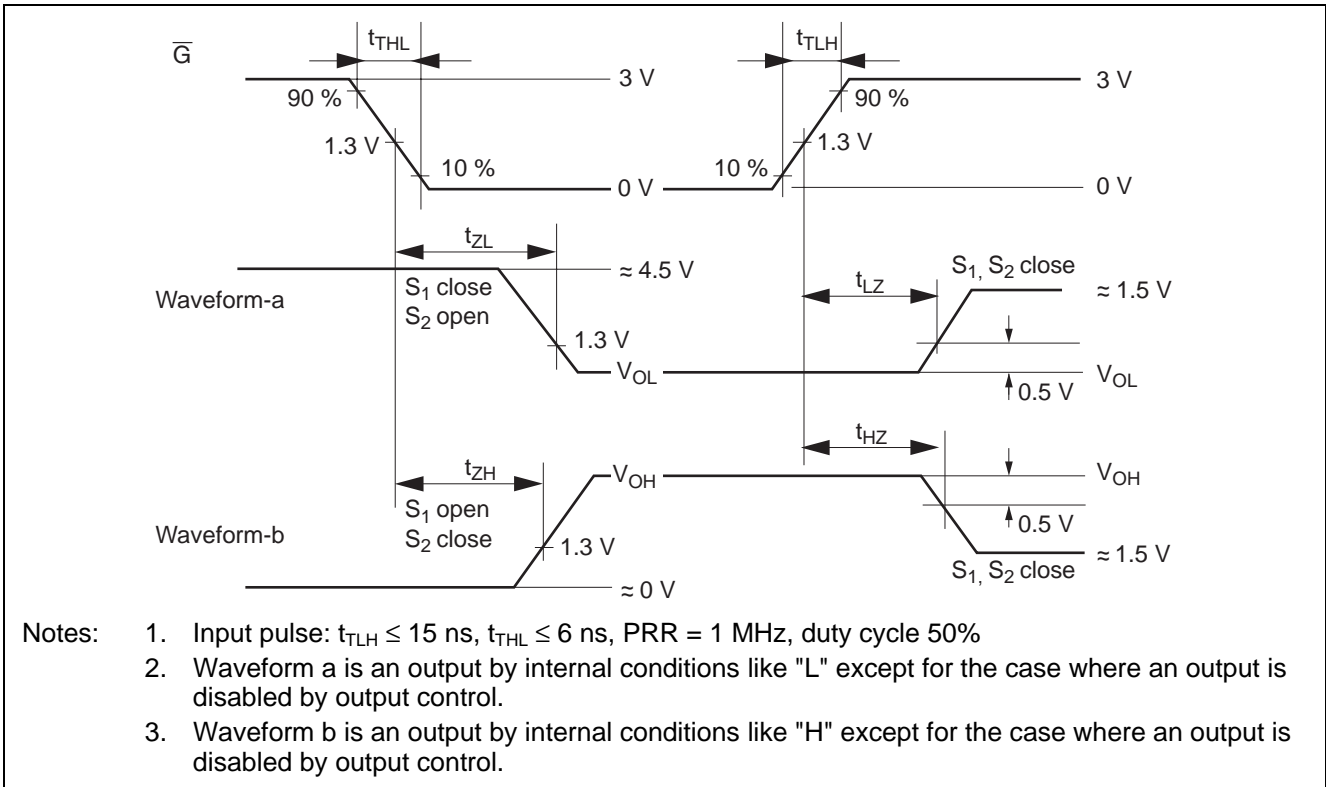
Test Circuit



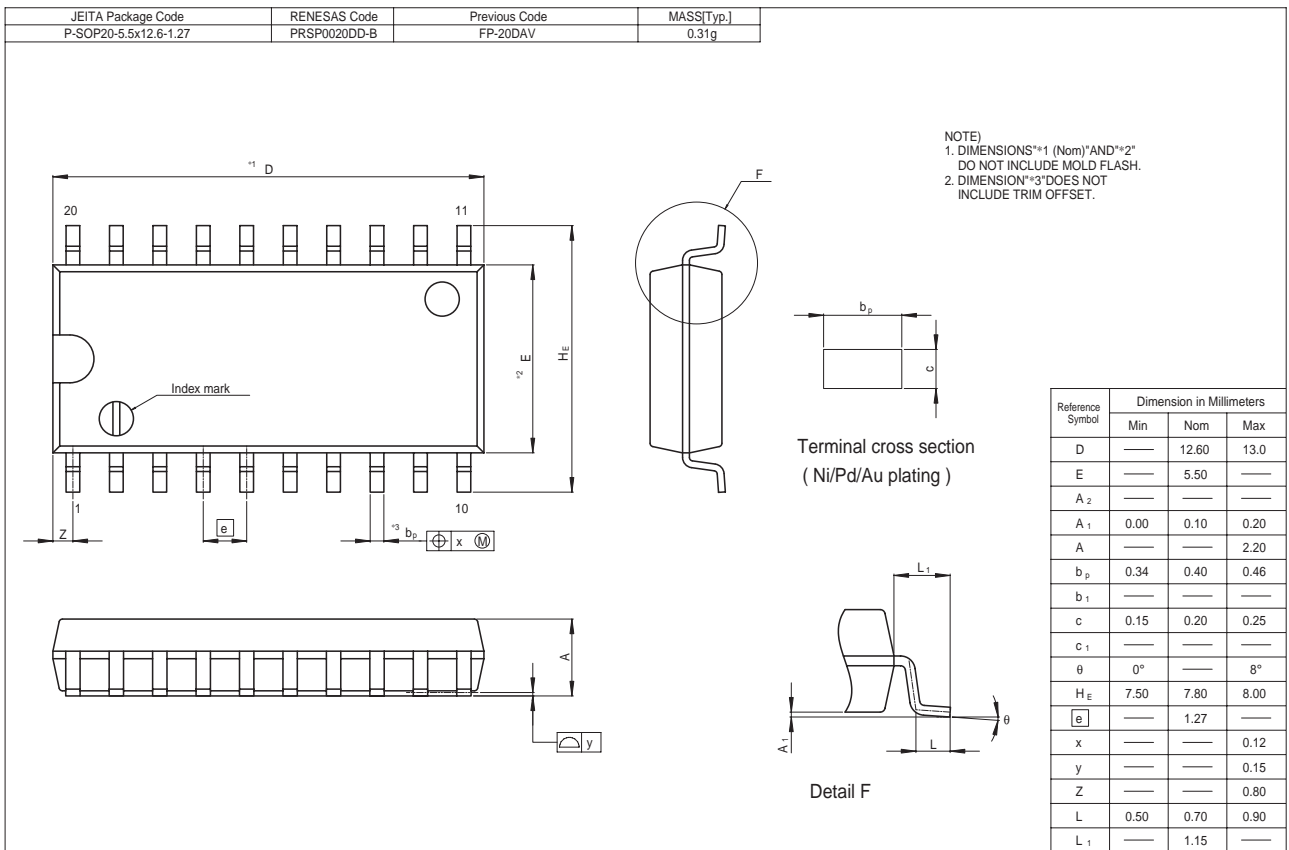
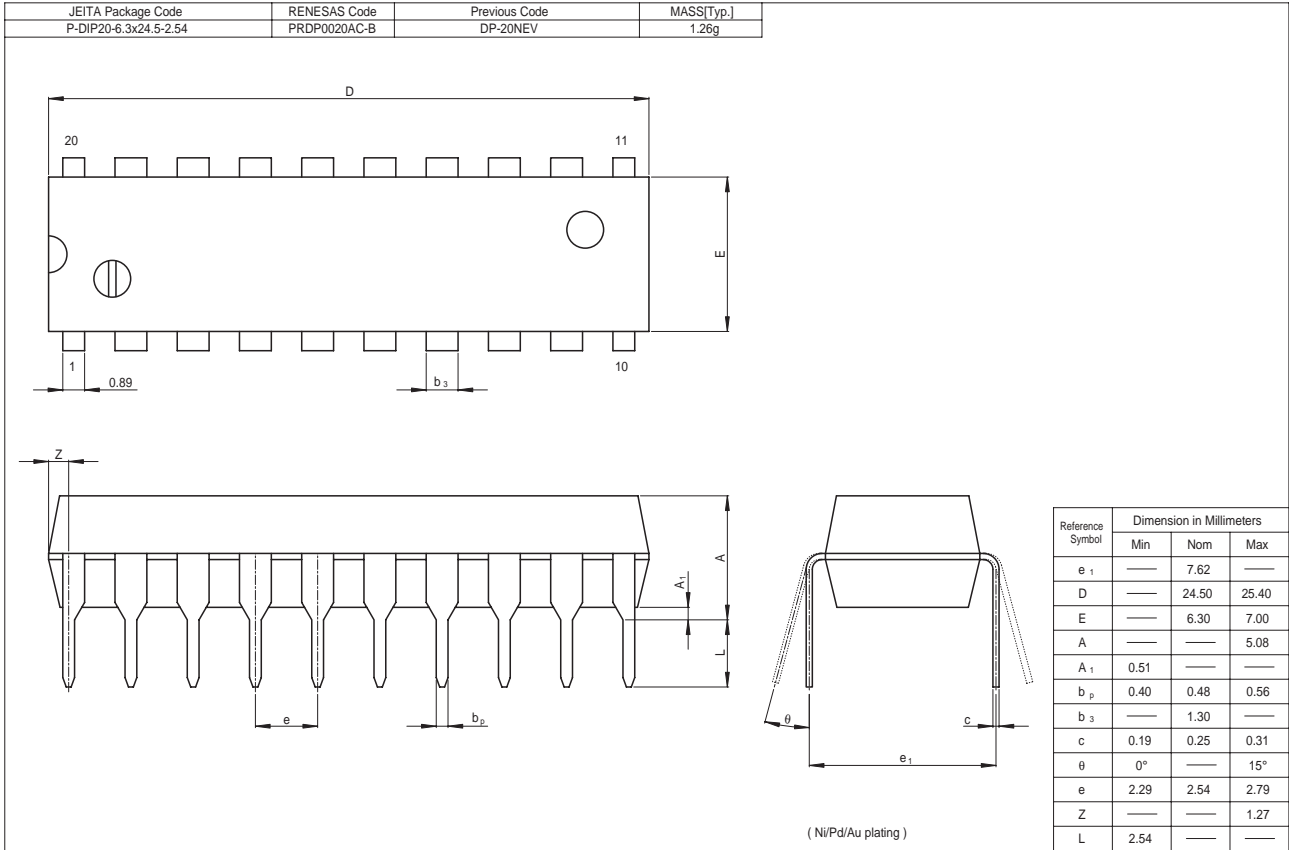
Waveforms 1



Waveforms 2



Package Dimensions



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