

# HD74LS245

## Octal Bus Transceivers (with three-state outputs)

REJ03D0464-0300  
 Rev.3.00  
 Jul.15.2005

This octal bus transceiver is designed for synchronous two-way communication between data buses. The control function implementation minimizes external timing requirements. The device allows data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction control (DIR) input. The enable input ( $\bar{G}$ ) can be used to disable the device so that the buses are effectively isolated.

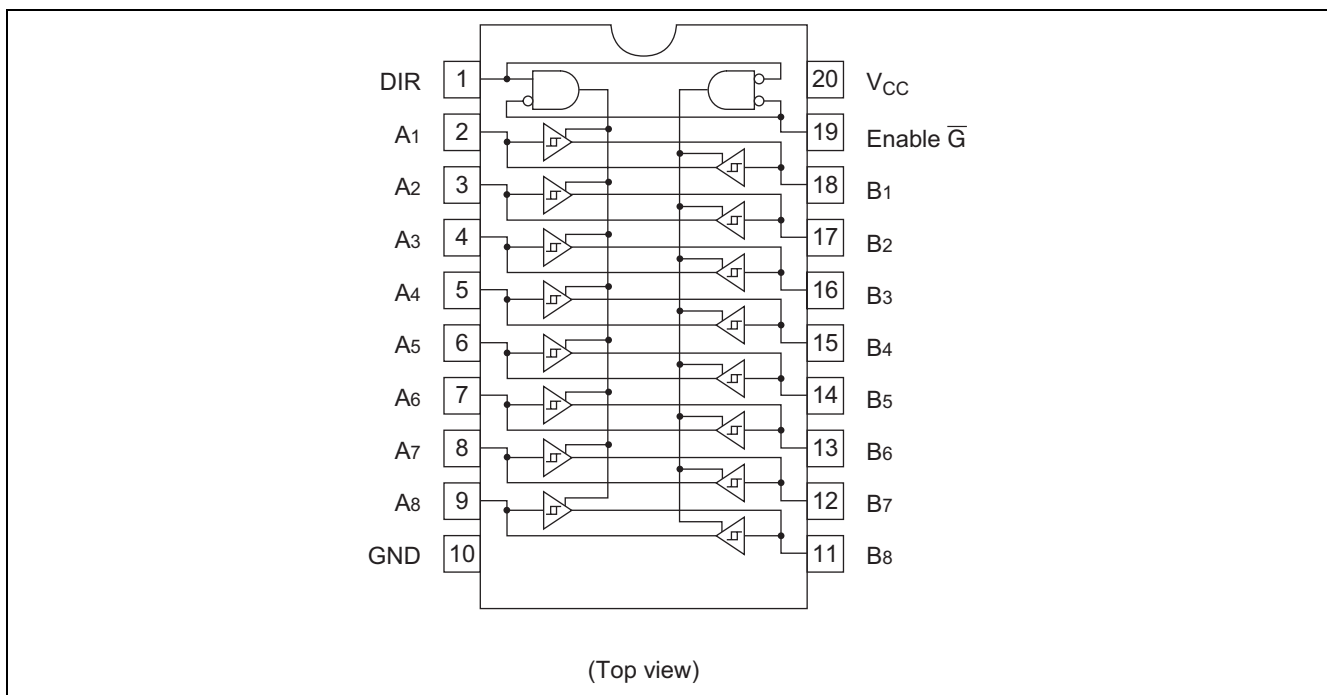
### Features

- Ordering Information

| Part Name     | Package Type       | Package Code (Previous Code) | Package Abbreviation | Taping Abbreviation (Quantity) |
|---------------|--------------------|------------------------------|----------------------|--------------------------------|
| HD74LS245P    | DILP-20 pin        | PRDP0020AC-B (DP-20NEV)      | P                    | —                              |
| HD74LS245FPEL | SOP-20 pin (JEITA) | PRSP0020DD-B (FP-20DAV)      | FP                   | EL (2,000 pcs/reel)            |
| HD74LS245RPEL | SOP-20 pin (JEDEC) | PRSP0020DC-A (FP-20DBV)      | RP                   | EL (1,000 pcs/reel)            |

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

### Pin Arrangement

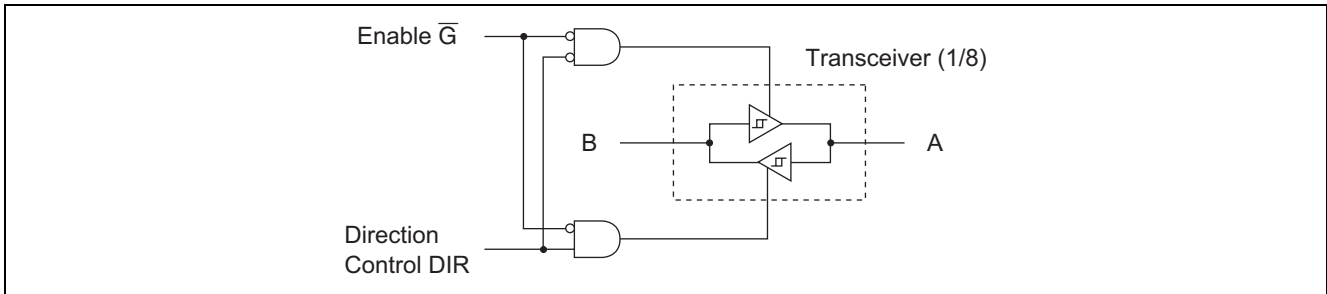


### Function Table

| Enable $\bar{G}$ | Direction Control DIR | Operation       |
|------------------|-----------------------|-----------------|
| 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         | DIR, $\bar{G}$ | 7           | V    |
|                       | A, B           | 5.5         | V    |
| Power dissipation     | $P_T$          | 400         | mW   |
| Storage temperature   | $T_{stg}$      | -65 to +150 | °C   |
| Operating temperature | $T_{opr}$      | -20 to +75  | °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 <sub>IH</sub>                   | 2.0  | —     | —    | V    |   |
|                              | V <sub>IL</sub>                   | —    | —     | 0.8  |      |   |
| Hysteresis                   | V <sub>T+</sub> - V <sub>T-</sub> | 0.2  | 0.4   | —    | V    | V <sub>CC</sub> = 4.75 V  |
| Output voltage               | V <sub>OH</sub>                   | 2.4  | —     | —    | V    | V <sub>CC</sub> = 4.75 V, V <sub>IH</sub> = 2 V,<br>V <sub>IL</sub> = 0.8 V |
|                              |                                   | 2    | —     | —    |      |   |
|                              | V <sub>OL</sub>                   | —    | —     | 0.4  | V    | V <sub>CC</sub> = 4.75 V, V <sub>IH</sub> = 2 V,<br>V <sub>IL</sub> = 0.8 V |
|                              |                                   | —    | —     | 0.5  |      |   |
| Off-state output current     | I <sub>ozH</sub>                  | —    | —     | 20   | μA   | V <sub>O</sub> = 2.7 V<br>V <sub>O</sub> = 0.4 V                            |
|                              | I <sub>ozL</sub>                  | —    | —     | -200 |      |   |
| Input current                | I <sub>IH</sub>                   | —    | —     | 20   | μA   | V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 2.7 V                            |
|                              |                                   | —    | —     | -0.2 |      |   |
|                              | I <sub>IL</sub>                   | —    | —     | -0.2 | mA   | V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 0.4 V                            |
|                              |                                   | —    | —     | -0.2 |      |   |
| A or B                       | I <sub>I</sub>                    | —    | —     | 0.1  | mA   | V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 5.5 V                            |
|                              |                                   | —    | —     | 0.1  |      |   |
| DIR or $\overline{G}$        | I <sub>I</sub>                    | —    | —     | 0.1  |      | V <sub>CC</sub> = 5.25 V, V <sub>I</sub> = 7 V                              |
| Short-circuit output current | I <sub>OS</sub>                   | -40  | —     | -225 | mA   | V <sub>CC</sub> = 5.25 V  |
| Supply current**             | I <sub>CCH</sub>                  | —    | 48    | 70   | mA   | V <sub>CC</sub> = 5.25 V  |
|                              | I <sub>CCL</sub>                  | —    | 62    | 90   |      |   |
|                              | I <sub>CCZ</sub>                  | —    | 64    | 95   |      |   |
| Input clamp voltage          | V <sub>IK</sub>                   | —    | —     | -1.5 | V    | V <sub>CC</sub> = 4.75 V, I <sub>IN</sub> = -18 mA                          |

Notes: \* V<sub>CC</sub> = 5 V, Ta = 25°C

\*\* With all outputs open, I<sub>CC</sub> is measured with transceivers enabled in one direction only, or with all transceivers disabled.

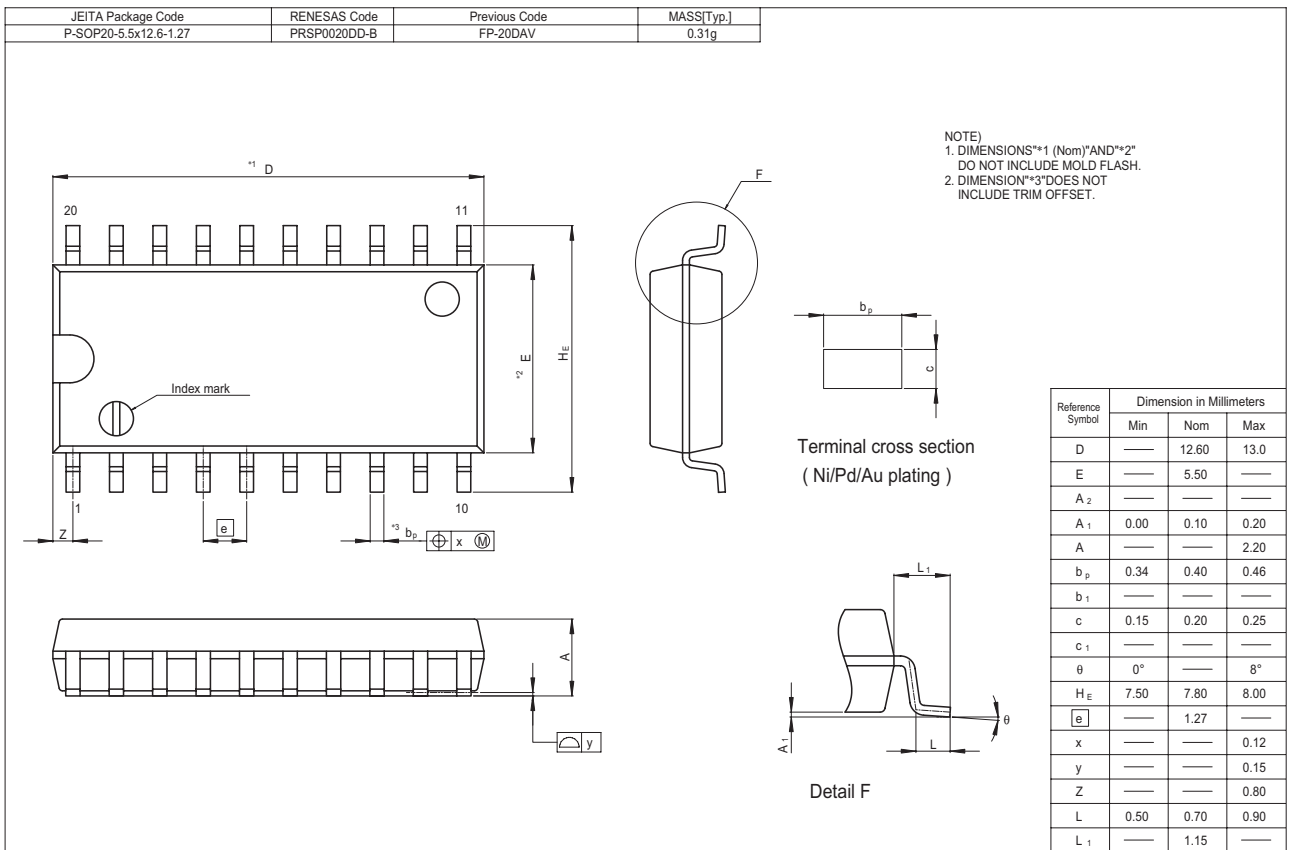
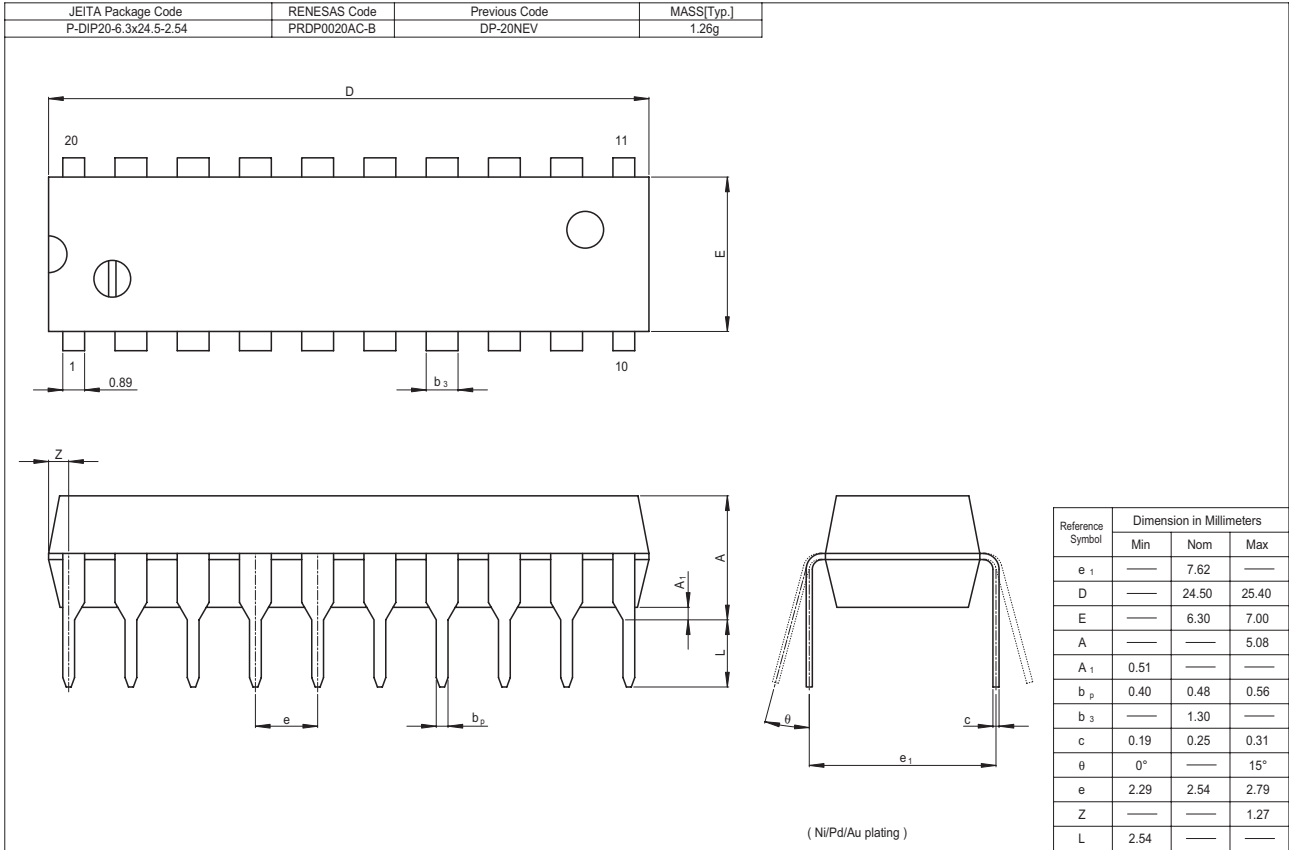
**Switching Characteristics**

(V<sub>CC</sub> = 5 V, Ta = 25°C)

| Item                   | Symbol           | min. | typ. | max. | Unit | Condition                                      |   |
|------------------------|------------------|------|------|------|------|--|---|
| Propagation delay time | t <sub>PLH</sub> | —    | 8    | 15   | ns   | C <sub>L</sub> = 45 pF, R <sub>L</sub> = 667 Ω |   |
|                        | t <sub>PHL</sub> | —    | 11   | 15   |      |  |   |
| Output enable time     | t <sub>ZL</sub>  | —    | 27   | 40   |      |  |   |
|                        | t <sub>ZH</sub>  | —    | 25   | 40   |      |  |   |
| Output disable time    | t <sub>LZ</sub>  | —    | 15   | 25   |      |  | C <sub>L</sub> = 5 pF, R <sub>L</sub> = 667 Ω |
|                        | t <sub>HZ</sub>  | —    | 15   | 25   |      |  |   |

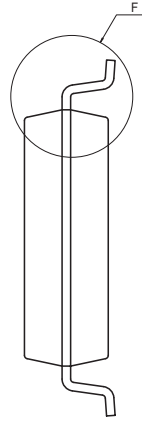
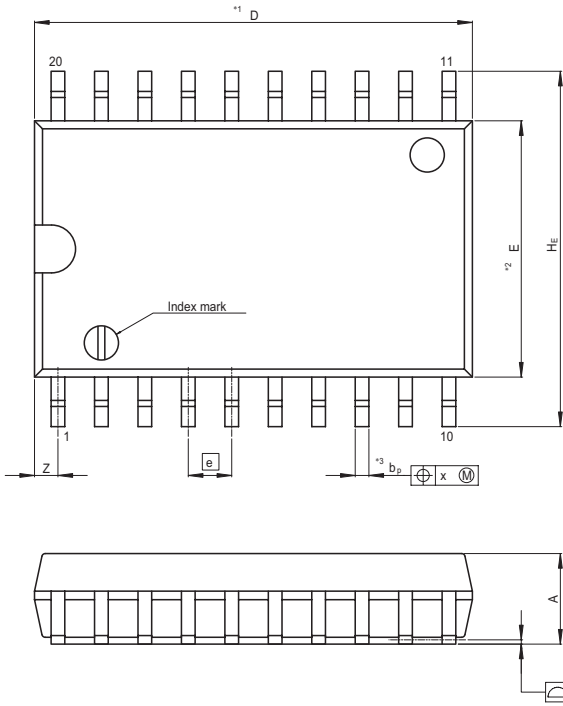
Note: Refer to Test Circuit and Waveform of the Common Item "TTL Common Matter (Document No.: REJ27D0005-0100)".

Package Dimensions

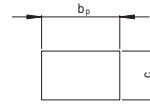


# HD74LS245

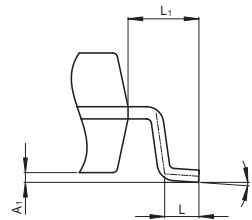
|   |                              |                           |                     |
|---|------------------------------|---------------------------|---------------------|
| JEITA Package Code<br>P-SOP20-7.5x12.8-1.27 | RENESAS Code<br>PRSP0020DC-A | Previous Code<br>FP-20DBV | MASS[Typ.]<br>0.52g |
|---|------------------------------|---------------------------|---------------------|



NOTE)  
 1. DIMENSIONS\*\*1 (Nom)\*\*AND\*\*2\*  
 @ DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION\*\*3\*DOES NOT  
 @ INCLUDE TRIM OFFSET.



Terminal cross section  
( Ni/Pd/Au plating )



Detail F

| Reference Symbol | Dimension in Millimeters |       |       |
|------------------|--------------------------|-------|-------|
|                  | Min                      | Nom   | Max   |
| D                | —                        | 12.80 | 13.2  |
| E                | —                        | 7.50  | —     |
| A <sub>2</sub>   | —                        | —     | —     |
| A <sub>1</sub>   | 0.10                     | 0.20  | 0.30  |
| A                | —                        | —     | 2.65  |
| b <sub>p</sub>   | 0.34                     | 0.40  | 0.46  |
| b <sub>1</sub>   | —                        | —     | —     |
| c                | 0.20                     | 0.25  | 0.30  |
| c <sub>1</sub>   | —                        | —     | —     |
| θ                | 0°                       | —     | 8°    |
| H <sub>E</sub>   | 10.00                    | 10.40 | 10.65 |
| e                | —                        | 1.27  | —     |
| x                | —                        | —     | 0.12  |
| y                | —                        | —     | 0.15  |
| Z                | —                        | —     | 0.935 |
| L                | 0.40                     | 0.70  | 1.27  |
| L <sub>1</sub>   | —                        | 1.45  | —     |

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