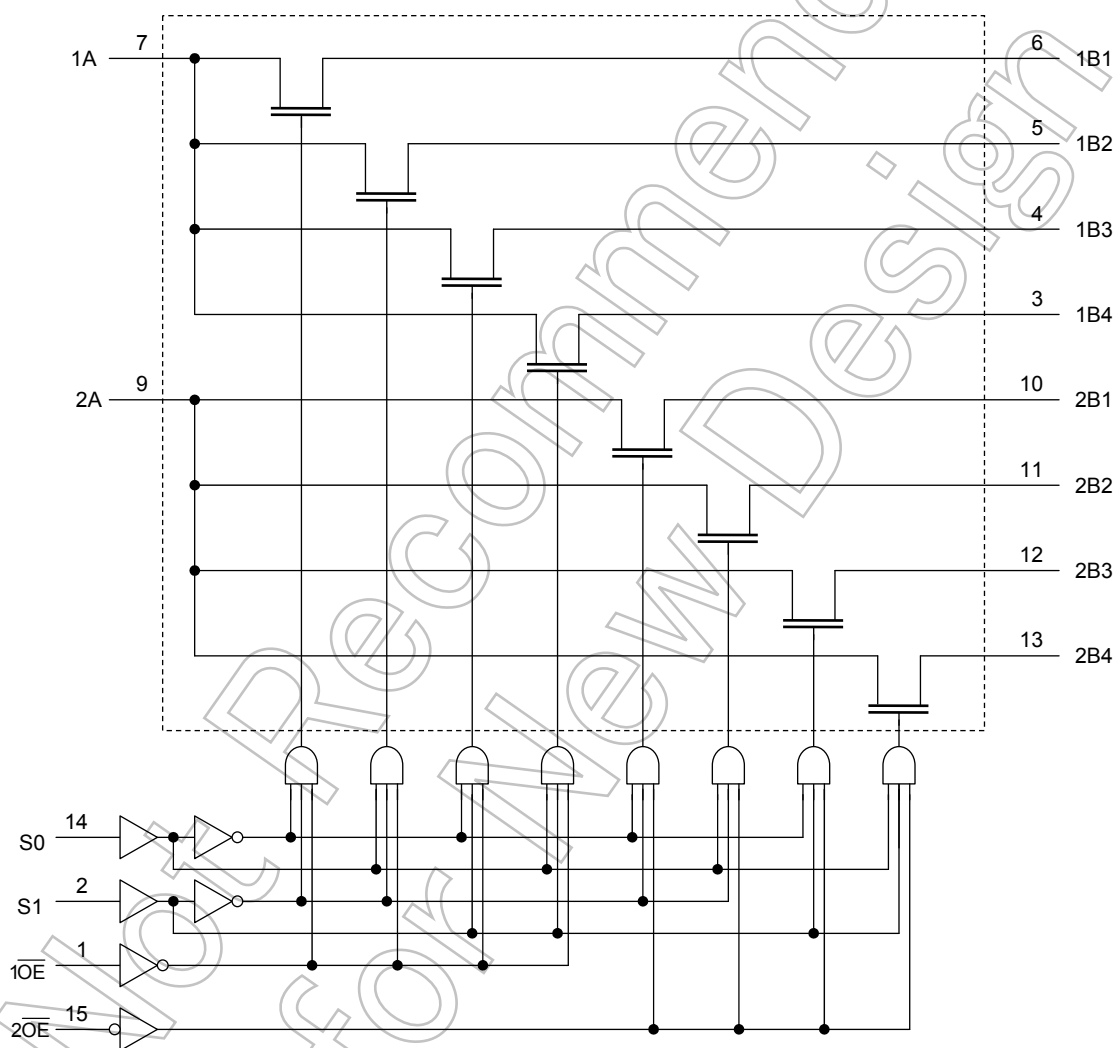


## Truth Table

| Inputs          |    |    | Function         |
|-----------------|----|----|------------------|
| $\overline{OE}$ | S1 | S0 |                  |
| L               | L  | L  | A port = B1 port |
| L               | L  | H  | A port = B2 port |
| L               | H  | L  | A port = B3 port |
| L               | H  | H  | A port = B4 port |
| H               | X  | X  | Disconnect       |

## System Diagram



## Absolute Maximum Ratings (Note)

| Characteristics            | Symbol           | Rating      | Unit |
|----------------------------|------------------|-------------|------|
| Power supply range         | $V_{CC}$         | -0.5 to 7.0 | V    |
| DC input voltage           | $V_{IN}$         | -0.5 to 7.0 | V    |
| DC switch voltage          | $V_S$            | -0.5 to 7.0 | V    |
| Input diode current        | $I_{IK}$         | -50         | mA   |
| Continuous channel current | $I_S$            | 128         | mA   |
| Power dissipation          | $P_D$            | 180         | mW   |
| DC $V_{CC}$ /GND current   | $I_{CC}/I_{GND}$ | $\pm 100$   | mA   |
| Storage temperature        | $T_{stg}$        | -65 to 150  | °C   |

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

## Operating Ranges (Note)

| Characteristics          | Symbol    | Rating     | Unit |
|--------------------------|-----------|------------|------|
| Supply voltage           | $V_{CC}$  | 4.5 to 5.5 | V    |
| Input voltage            | $V_{IN}$  | 0 to 5.5   | V    |
| Switch voltage           | $V_S$     | 0 to 5.5   | V    |
| Operating temperature    | $T_{opr}$ | -40 to 85  | °C   |
| Input rise and fall time | $dt/dv$   | 0 to 10    | ns/V |

Note: The operating ranges must be maintained to ensure the normal operation of the device.  
Unused inputs must be tied to either  $V_{CC}$  or GND.

## Electrical Characteristics

## DC Characteristics (Ta = -40 to 85°C)

| Characteristics                           |                 | Symbol                                           | Test Condition                                                 |                     | Min | Typ.<br>(Note 1) | Max  | Unit |
|-------------------------------------------|-----------------|--------------------------------------------------|----------------------------------------------------------------|---------------------|-----|------------------|------|------|
|                                           |                 |                                                  |                                                                | V <sub>CC</sub> (V) |     |                  |      |      |
| Input voltage                             | “H” level       | V <sub>IH</sub>                                  | —                                                              | 4.5 to 5.5          | 2.0 | —                | —    | V    |
|                                           | “L” level       | V <sub>IL</sub>                                  | —                                                              | 4.5 to 5.5          | —   | —                | 0.8  |      |
| Input leakage current                     |                 | I <sub>IN</sub>                                  | V <sub>IN</sub> = 0 to 5.5 V                                   | 4.5 to 5.5          | —   | —                | ±1.0 | μA   |
| Power off leakage current                 |                 | I <sub>OFF</sub>                                 | A, B, $\overline{\text{OE}}$ = 0 to 5.5 V                      | 0                   | —   | —                | ±1.0 | μA   |
| Off-state leakage current<br>(switch off) |                 | I <sub>SZ</sub>                                  | A, B = 0 to 5.5 V, $\overline{\text{OE}}$ = V <sub>CC</sub>    | 4.5 to 5.5          | —   | —                | ±1.0 | μA   |
| On resistance<br>(Note 2)                 | R <sub>ON</sub> | V <sub>IS</sub> = 0 V                            | I <sub>IS</sub> = 64 mA                                        | 4.5                 | —   | 5                | 7    | Ω    |
|                                           |                 |                                                  | I <sub>IS</sub> = 30 mA                                        | 4.5                 | —   | 5                | 7    |      |
|                                           |                 | V <sub>IS</sub> = 2.4 V, I <sub>IS</sub> = 15 mA |                                                                | 4.5                 | —   | 10               | 15   |      |
| Quiescent supply current                  |                 | I <sub>CC</sub>                                  | V <sub>IN</sub> = V <sub>CC</sub> or GND, I <sub>OUT</sub> = 0 | 5.5                 | —   | —                | 10   | μA   |
| Increase in I <sub>CC</sub> per input     |                 | ΔI <sub>CC</sub>                                 | V <sub>IN</sub> = 3.4 V (one input)                            | 5.5                 | —   | —                | 2.5  | mA   |

Note 1: Typical values are at V<sub>CC</sub> = 5 V, Ta = 25°C.

Note 2: Measured by the voltage drop between A and B pins at the indicated current through the switch. On resistance is determined by the lower of the voltages on the two (A or B) pins.

## AC Characteristics (Ta = -40 to 85°C)

| Characteristics                                      |                                      | Symbol                    | Test Condition |                     | Min | Max  | Unit |
|------------------------------------------------------|--------------------------------------|---------------------------|----------------|---------------------|-----|------|------|
|                                                      |                                      |                           |                | V <sub>CC</sub> (V) |     |      |      |
| Propagation delay time (bus to bus)                  | t <sub>pLH</sub><br>t <sub>pHL</sub> | Figure 1, Figure 2 (Note) |                | 4.5                 | —   | 0.25 | ns   |
|                                                      |                                      |                           |                | 4.5                 | —   | 5.3  | ns   |
| Propagation delay time (S to bus)                    | t <sub>pLH</sub><br>t <sub>pHL</sub> | Figure 1, Figure 2        |                | 4.5                 | —   | 5.3  | ns   |
|                                                      |                                      |                           |                | 4.5                 | —   | 5.3  | ns   |
| Output enable time ( $\overline{\text{OE}}$ to bus)  | t <sub>pZL</sub><br>t <sub>pZH</sub> | Figure 1, Figure 3        |                | 4.5                 | —   | 5.3  | ns   |
|                                                      |                                      |                           |                | 4.5                 | —   | 5.3  | ns   |
| Output enable time (S to bus)                        | t <sub>pZL</sub><br>t <sub>pZH</sub> | Figure 1, Figure 3        |                | 4.5                 | —   | 5.3  | ns   |
|                                                      |                                      |                           |                | 4.5                 | —   | 5.3  | ns   |
| Output disable time ( $\overline{\text{OE}}$ to bus) | t <sub>pLZ</sub><br>t <sub>pHZ</sub> | Figure 1, Figure 3        |                | 4.5                 | —   | 5.3  | ns   |
|                                                      |                                      |                           |                | 4.5                 | —   | 5.3  | ns   |
| Output disable time (S to bus)                       | t <sub>pLZ</sub><br>t <sub>pHZ</sub> | Figure 1, Figure 3        |                | 4.5                 | —   | 5.3  | ns   |
|                                                      |                                      |                           |                | 4.5                 | —   | 5.3  | ns   |

Note: This parameter is guaranteed by design but is not tested. The bus switch contributes no propagation delay other than the RC delay of the typical on resistance of the switch and the 50 pF load capacitance, when driven by an ideal voltage the source (zero output impedance).

## Capacitive Characteristics (Ta = 25°C)

| Characteristics                                             |  | Symbol           | Test Condition                           |                     | Typ. | Unit  |
|-------------------------------------------------------------|--|------------------|------------------------------------------|---------------------|------|-------|
|                                                             |  |                  |                                          | V <sub>CC</sub> (V) |      |       |
| Control pin input capacitance ( $\overline{\text{OE}}$ , S) |  | C <sub>IN</sub>  | (Note)                                   | 5.0                 | 3    | pF    |
| Switch terminal capacitance (B)                             |  | C <sub>I/O</sub> | $\overline{\text{OE}}$ = V <sub>CC</sub> | (Note)              | 5.0  | 10 pF |
| Switch terminal capacitance (A)                             |  | C <sub>I/O</sub> | $\overline{\text{OE}}$ = V <sub>CC</sub> | (Note)              | 5.0  | 31 pF |

Note: This parameter is guaranteed by design.

AC Test Circuit

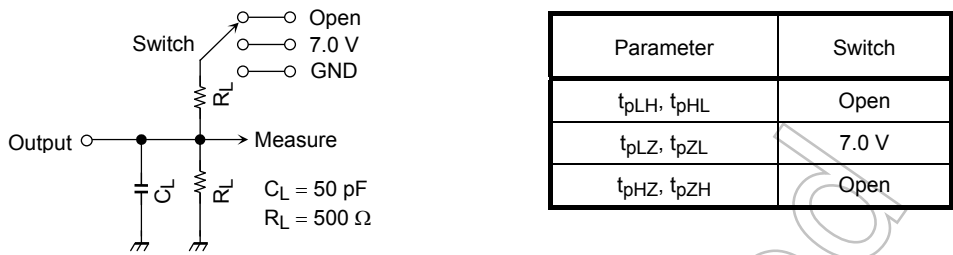


Figure 1

AC Waveform

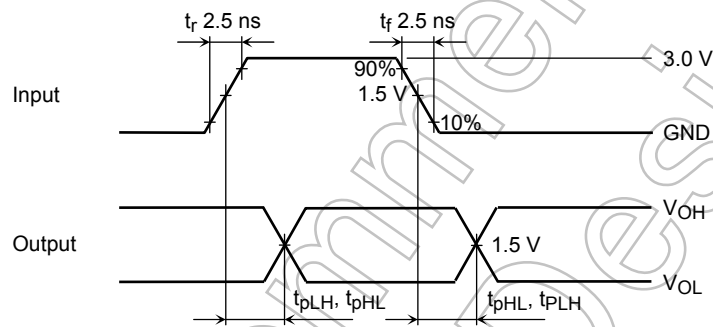


Figure 2  $t_{\text{PLH}}, t_{\text{PHL}}$

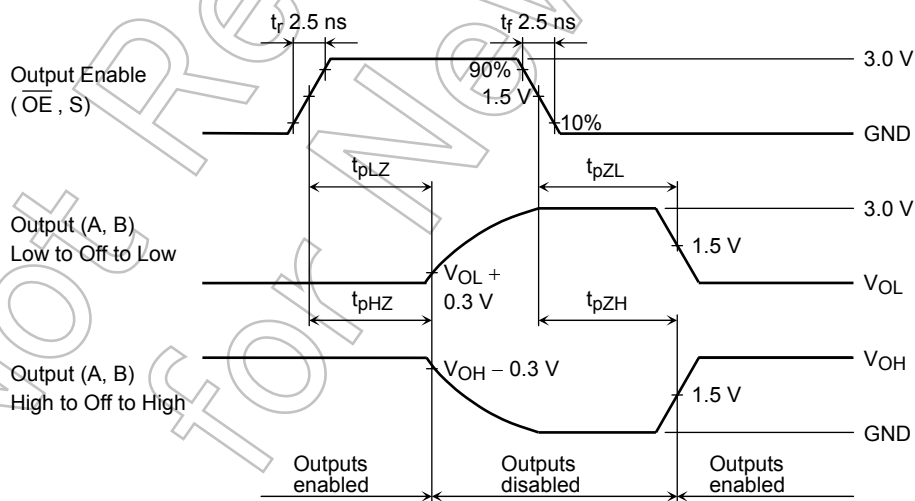
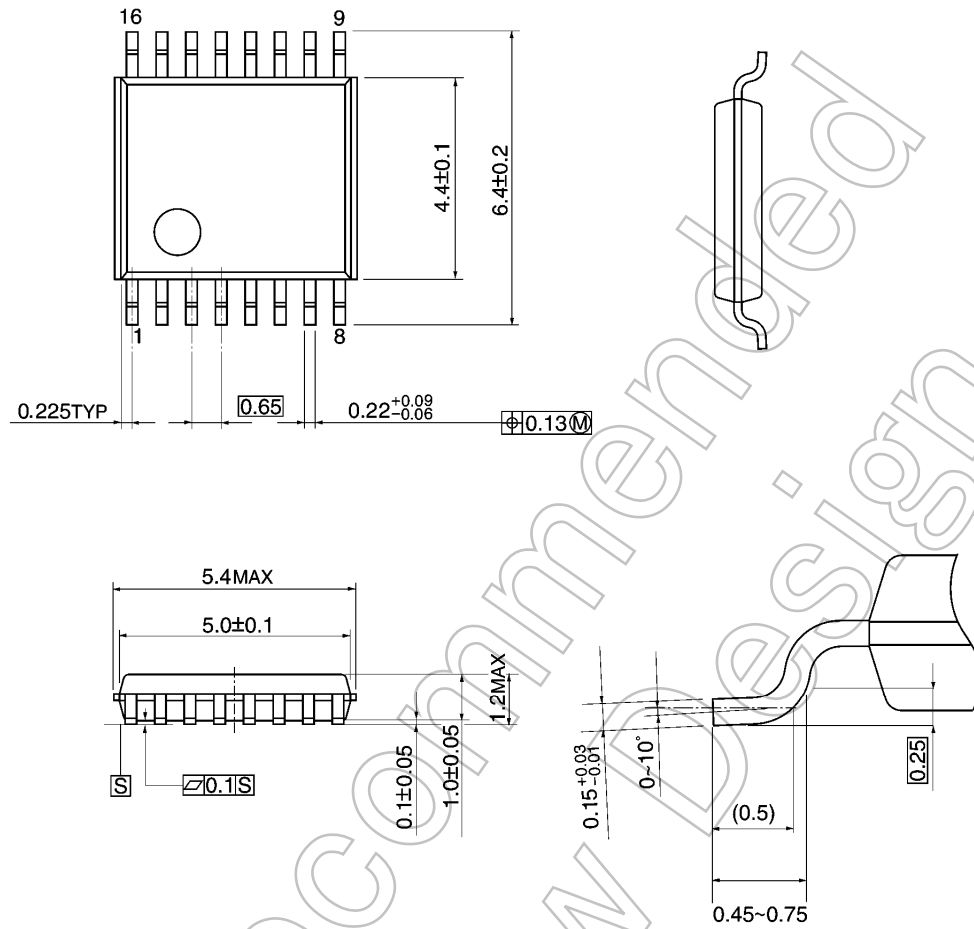


Figure 3  $t_{\text{PLZ}}, t_{\text{PHZ}}, t_{\text{PZL}}, t_{\text{PZH}}$

## Package Dimensions

TSSOP16-P-0044-0.65A

Unit: mm

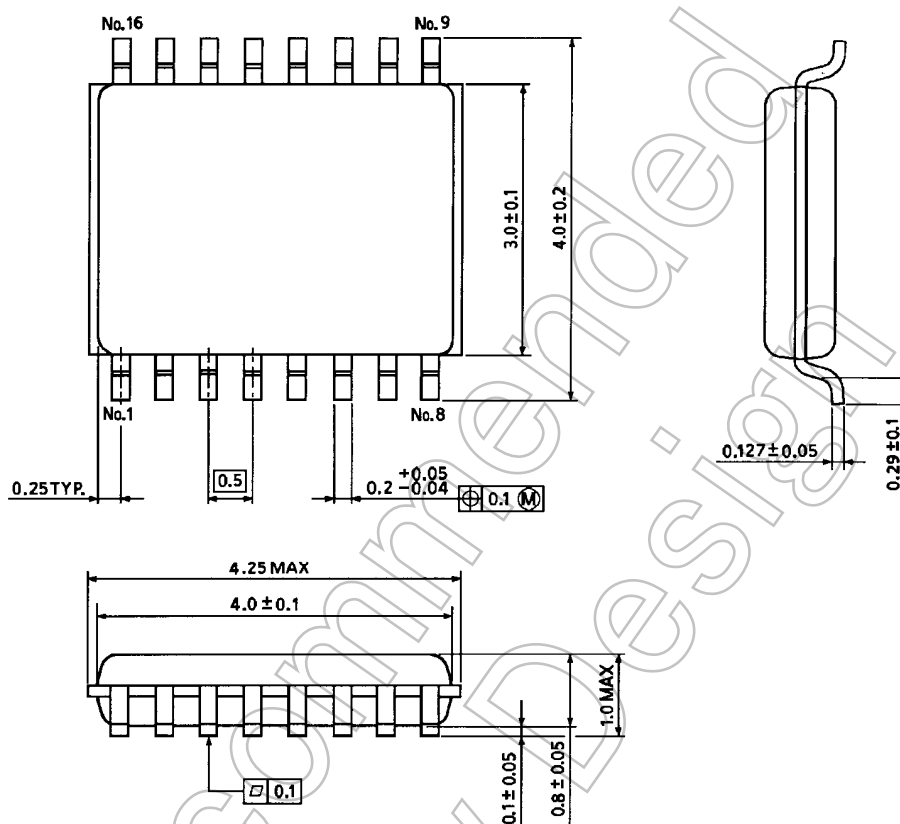


Weight: 0.06 g (typ.)

## Package Dimensions

VSSOP16-P-0030-0.50

Unit : mm



Weight: 0.02 g (typ.)

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