

Truth Table

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| H | L |

Absolute Maximum Ratings (Note 1)

| Characteristics | Symbol | Rating | Unit |
|-----------------------------|-----------|------------------------------|------|
| Supply voltage range | V_{CC} | -0.5 to 7 | V |
| DC input voltage | V_{IN} | -0.5 to $V_{CC} + 0.5$ | V |
| DC output voltage | V_{OUT} | -0.5 to $V_{CC} + 0.5$ | V |
| Input diode current | I_{IK} | ± 20 | mA |
| Output diode current | I_{OK} | ± 20 | mA |
| DC output current | I_{OUT} | ± 25 | mA |
| DC V_{CC} /ground current | I_{CC} | ± 50 | mA |
| Power dissipation | P_D | 500 (DIP) (Note 2)/180 (SOP) | mW |
| Storage temperature | T_{stg} | -65 to 150 | °C |

Note 1: 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).

Note 2: 500 mW in the range of $T_a = -40$ to 65°C . From $T_a = 65$ to 85°C a derating factor of -10 mW/°C shall be applied until 300 mW.

Operating Ranges (Note)

| Characteristics | Symbol | Rating | Unit |
|--------------------------|------------|---|------|
| Supply voltage | V_{CC} | 2 to 6 | V |
| Input voltage | V_{IN} | 0 to V_{CC} | V |
| Output voltage | V_{OUT} | 0 to V_{CC} | V |
| Operating temperature | T_{opr} | -40 to 85 | °C |
| Input rise and fall time | t_r, t_f | 0 to 1000 ($V_{CC} = 2.0$ V) 0 to 500 ($V_{CC} = 4.5$ V) 0 to 400 ($V_{CC} = 6.0$ V) | ns |

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

| Characteristics | Symbol | Test Condition | | Ta = 25°C | | | Ta = −40 to 85°C | | Unit | |
|---------------------------|-----------------|---|--------------------------|---------------------|----------------------|-------------|----------------------|----------------------|------|-----|
| | | | | V _{CC} (V) | Min | Typ. | Max | Min | | Max |
| High-level input voltage | V _{IH} | — | | 2.0 4.5 6.0 | 1.50 3.15 4.20 | — — — | — — — | 1.50 3.15 4.20 | V | |
| Low-level input voltage | V _{IL} | — | | 2.0 4.5 6.0 | — — — | — — — | 0.50 1.35 1.80 | — — — | V | |
| High-level output voltage | V _{OH} | V _{IN} = V _{IH} or V _{IL} | I _{OH} = −20 μA | 2.0 | 1.9 | 2.0 | — | 1.9 | — | V |
| | | | | 4.5 | 4.4 | 4.5 | — | 4.4 | — | |
| | | | | 6.0 | 5.9 | 6.0 | — | 5.9 | — | |
| | | | I _{OH} = −4 mA | 4.5 | 4.18 | 4.31 | — | 4.13 | — | |
| I _{OH} = −5.2 mA | 6.0 | 5.68 | | 5.80 | — | 5.63 | — | | | |
| Low-level output voltage | V _{OL} | V _{IN} = V _{IH} or V _{IL} | I _{OL} = 20 μA | 2.0 | — | 0.0 | 0.1 | — | 0.1 | V |
| | | | | 4.5 | — | 0.0 | 0.1 | — | 0.1 | |
| | | | | 6.0 | — | 0.0 | 0.1 | — | 0.1 | |
| | | | I _{OL} = 4 mA | 4.5 | — | 0.17 | 0.26 | — | 0.33 | |
| I _{OL} = 5.2 mA | 6.0 | — | | 0.18 | 0.26 | — | 0.33 | | | |
| Input leakage current | I _{IN} | V _{IN} = V _{CC} or GND | | 6.0 | — | — | ±0.1 | — | ±1.0 | μA |
| Quiescent supply current | I _{CC} | V _{IN} = V _{CC} or GND | | 6.0 | — | — | 1.0 | — | 10.0 | μA |

AC Characteristics (C_L = 15 pF, V_{CC} = 5 V, Ta = 25°C, input: t_r = t_f = 6 ns)

| Characteristics | Symbol | Test Condition | Min | Typ. | Max | Unit |
|------------------------|------------------|----------------|-----|------|-----|------|
| Output transition time | t _{TLH} | — | — | 4 | 8 | ns |
| | t _{THL} | | | | | |
| Propagation delay time | t _{pLH} | — | — | 6 | 12 | ns |
| | t _{pHL} | | | | | |

AC Characteristics ($C_L = 50 \text{ pF}$, input: $t_r = t_f = 6 \text{ ns}$)

| Characteristics | Symbol | Test Condition | $T_a = 25^\circ\text{C}$ | | | $T_a = -40 \text{ to } 85^\circ\text{C}$ | | Unit |
|-------------------------------|--------------------|----------------|--------------------------|-----|------|--|-----|------|
| | | | $V_{CC} \text{ (V)}$ | Min | Typ. | Max | Min | Max |
| Output transition time | t_{TLH} | — | 2.0 | — | 30 | 75 | — | 95 |
| | t_{THL} | | 4.5 | — | 8 | 15 | — | 19 |
| | | | 6.0 | — | 7 | 13 | — | 16 |
| Propagation delay time | t_{pLH} | — | 2.0 | — | 27 | 75 | — | 95 |
| | t_{pHL} | | 4.5 | — | 9 | 15 | — | 19 |
| | | | 6.0 | — | 8 | 13 | — | 16 |
| Input capacitance | C_{IN} | — | — | — | 5 | 10 | — | 10 |
| Power dissipation capacitance | C_{PD} (Note) | — | — | — | 20 | — | — | — |

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

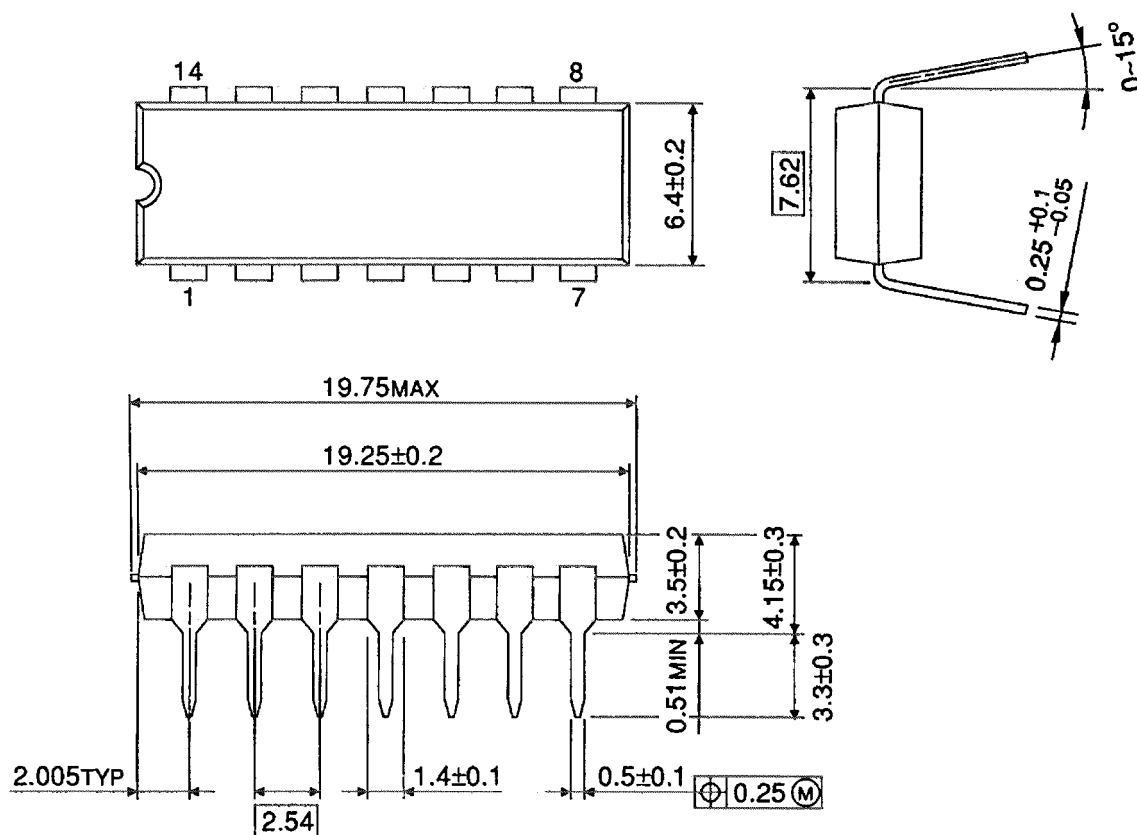
Average operating current can be obtained by the equation:

$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/6 \text{ (per gate)}$$

Package Dimensions

DIP14-P-300-2.54

Unit : mm

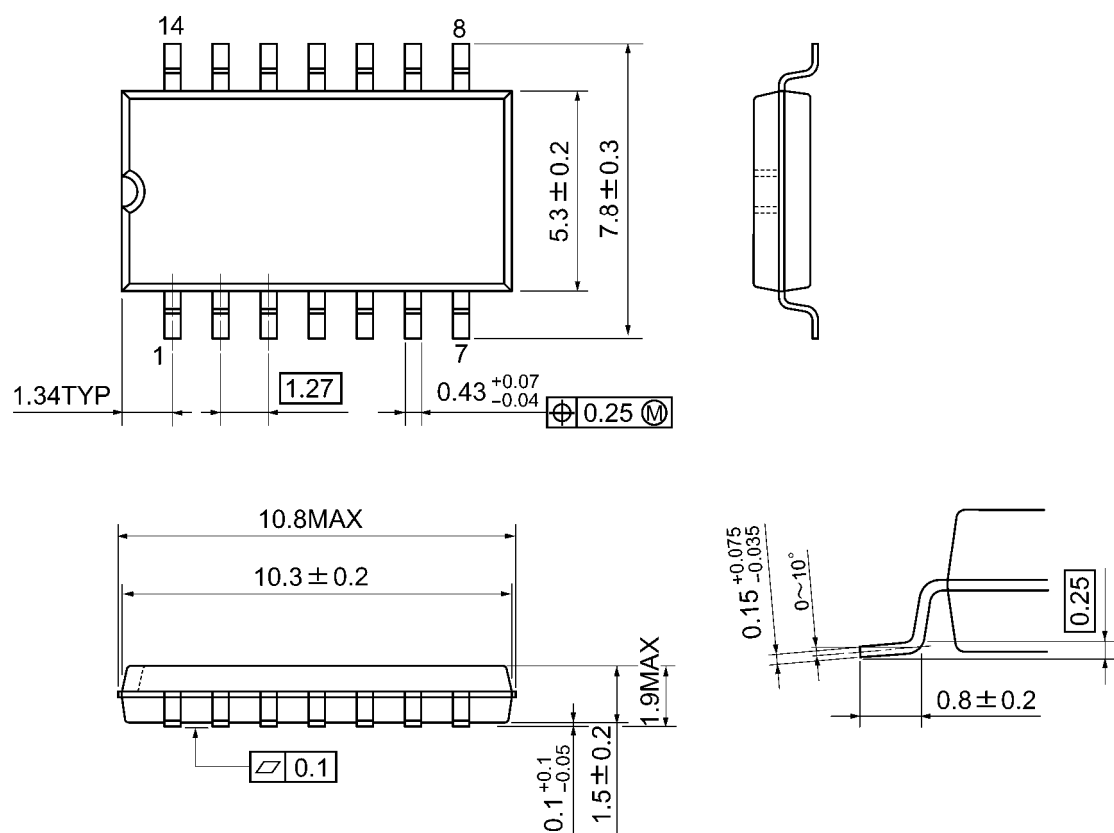


Weight: 0.96 g (typ.)

Package Dimensions

SOP14-P-300-1.27A

Unit: mm



Weight: 0.18 g (typ.)

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