

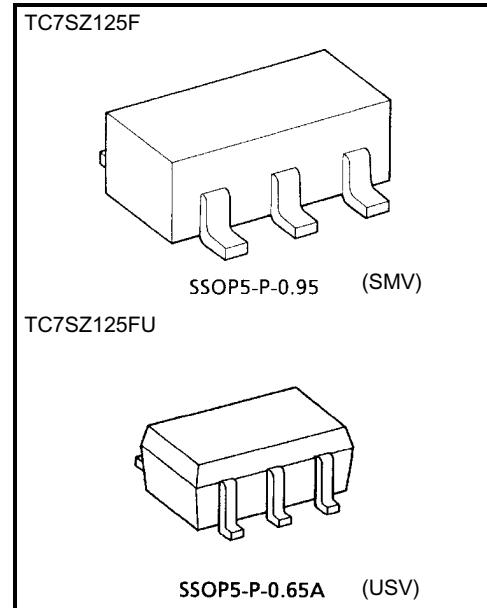
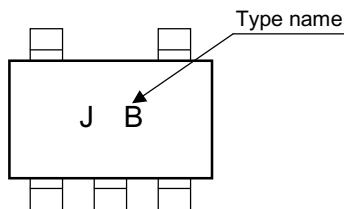
TC7SZ125F, TC7SZ125FU

Bus Buffer 3-State Output

Features

- High output drive: ± 24 mA (min) @ $V_{CC} = 3$ V
- Super high speed operation: $t_{pd} 2.6$ ns (typ.) @ $V_{CC} = 5$ V, 50 pF
- Operation voltage range: $V_{CC} (\text{opr}) = 1.8\sim 5.5$ V
- Power down protection is provided on all inputs and outputs.
- Matches the performance of TC74LCX series when operated at 3.3 V V_{CC} .

Marking

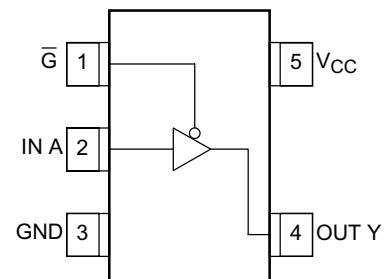


Weight
 SSOP5-P-0.95 : 0.016 g (typ.)
 SSOP5-P-0.65A: 0.006 g (typ.)

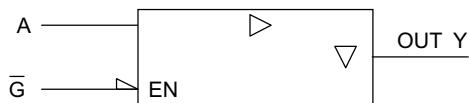
Maximum Ratings ($T_a = 25^\circ\text{C}$)

| Characteristics | Symbol | Rating | Unit |
|-----------------------------|-----------|----------|------|
| Power supply voltage | V_{CC} | -0.5~6 | V |
| DC input voltage | V_{IN} | -0.5~6 | V |
| DC output voltage | V_{OUT} | -0.5~6 | V |
| Input diode current | I_{IK} | ± 20 | mA |
| Output diode current | I_{OK} | ± 20 | mA |
| DC output current | I_{OUT} | ± 50 | mA |
| DC V_{CC} /ground current | I_{CC} | ± 50 | mA |
| Power dissipation | P_D | 200 | mW |
| Storage temperature | T_{stg} | -65~150 | °C |
| Lead temperature (10s) | T_L | 260 | °C |

Pin Assignment (top view)



Logic Diagram



Truth Table

| Input | | Output |
|-------|-----------|--------|
| A | \bar{G} | Y |
| X | H | Z |
| L | L | L |
| H | L | H |

X: Don't Care

Z: High Impedance

Recommended Operating Conditions

| Characteristics | Symbol | Rating | Unit |
|--------------------------|-----------|--|------|
| Supply voltage | V_{CC} | 1.8~5.5 | V |
| | | 1.5~5.5 (Note 1) | |
| Input voltage | V_{IN} | 0~5.5 | V |
| Output voltage | V_{OUT} | 0~5.5 (Note 2) | V |
| | | 0~ V_{CC} (Note 3) | |
| Operating temperature | T_{opr} | -40~85 | °C |
| Input rise and fall time | dt/dv | 0~20 ($V_{CC} = 1.8 \text{ V}, 2.5 \text{ V} \pm 0.2 \text{ V}$) | ns/V |
| | | 0~10 ($V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$) | |
| | | 0~5 ($V_{CC} = 5.5 \text{ V} \pm 0.5 \text{ V}$) | |

Note 1: Data retention only

Note 2: $V_{CC} = 0 \text{ V}$

Note 3: H and Low state

Electrical Characteristics

DC Characteristics

| Characteristics | | Symbol | Test Condition | V _{CC} (V) | Ta = 25°C | | | Ta = -40~85°C | | Unit | | |
|----------------------------------|------------|------------------|--|---------------------------|------------------------|------|------------------------|------------------------|------------------------|------|----|--|
| | | | | | Min | Typ. | Max | Min | Max | | | |
| Input voltage | High level | V _{IH} | — | 1.8 | 0.88 × V _{CC} | — | — | 0.88 × V _{CC} | — | V | | |
| | | | | 2.3~5.5 | 0.75 × V _{CC} | — | — | 0.75 × V _{CC} | — | | | |
| | Low level | V _{IL} | — | 1.8 | — | — | 0.12 × V _{CC} | — | 0.12 × V _{CC} | | | |
| | | | | 2.3~5.5 | — | — | 0.25 × V _{CC} | — | 0.25 × V _{CC} | | | |
| Output voltage | High level | V _{OH} | V _{IN} = V _{IH} | I _{OH} = -100 μA | 1.8 | 1.7 | 1.8 | — | 1.7 | V | | |
| | | | | | 2.3 | 2.2 | 2.3 | — | 2.2 | | | |
| | | | | | 3.0 | 2.9 | 3.0 | — | 2.9 | | | |
| | | | | | 4.5 | 4.4 | 4.5 | — | 4.4 | | | |
| | | | | I _{OH} = -8 mA | 2.3 | 1.9 | 2.15 | — | 1.9 | | | |
| | | | | I _{OH} = -16 mA | 3.0 | 2.4 | 2.8 | — | 2.4 | | | |
| | | | | I _{OH} = -24 mA | 3.0 | 2.3 | 2.68 | — | 2.3 | | | |
| | Low level | V _{OL} | V _{IN} = V _{IL} | I _{OL} = 100 μA | 4.5 | 3.8 | 4.2 | — | 3.8 | V | | |
| | | | | | 1.8 | — | 0 | 0.1 | — | | | |
| | | | | | 2.3 | — | 0 | 0.1 | — | | | |
| | | | | | 3.0 | — | 0 | 0.1 | — | | | |
| | | | | I _{OL} = 8 mA | 2.3 | — | 0.1 | 0.3 | — | | | |
| | | | | I _{OL} = 16 mA | 3.0 | — | 0.15 | 0.4 | — | | | |
| | | | | I _{OL} = 24 mA | 3.0 | — | 0.22 | 0.55 | — | | | |
| Input leakage current | | I _{IN} | V _{IN} = 5.5 V or GND | | 0~5.5 | — | — | ±1 | — | ±10 | μA | |
| 3-state output off-state current | | I _{OZ} | V _{IN} = V _{IH} or V _{IL} V _{OUT} = 0~5.5 V | | 1.8~5.5 | — | — | ±1 | — | ±10 | μA | |
| Power off leakage current | | I _{OFF} | V _{IN} or V _{OUT} = 5.5 V | | 0.0 | — | — | 1 | — | 10 | μA | |
| Quiescent supply current | | I _{CC} | V _{IN} = V _{CC} or GND | | 5.5 | — | — | 2 | — | 20 | μA | |

AC Characteristics (unless otherwise specified, Input: $t_r = t_f = 3$ ns)

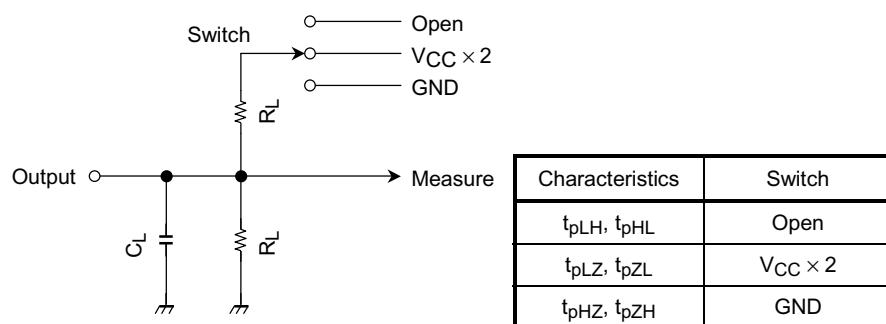
| Characteristics | Symbol | Test Condition | Ta = 25°C | | | Ta = -40~85°C | | Unit | |
|-------------------------------|------------------|---|---|-----------|------|---------------|-----|------|----|
| | | | V _{CC} (V) | Min | Typ. | Max | Min | | |
| Propagation delay time | t _{pLH} | C _L = 15 pF, R _L = 1 MΩ | 1.8 | 2.0 | 5.3 | 11.0 | 2.0 | 11.5 | ns |
| | | | 2.5 ± 0.2 | 0.8 | 3.4 | 7.5 | 0.8 | 8.0 | |
| | | | 3.3 ± 0.3 | 0.5 | 2.5 | 5.2 | 0.5 | 5.5 | |
| | | | 5.0 ± 0.5 | 0.5 | 2.1 | 4.5 | 0.5 | 4.8 | |
| | | | C _L = 50 pF, R _L = 500 Ω | 3.3 ± 0.3 | 1.5 | 3.2 | 5.7 | 1.5 | |
| | | | | 5.0 ± 0.5 | 0.8 | 2.6 | 5.0 | 0.8 | |
| | t _{pZL} | C _L = 50 pF, R _L = 500 Ω | 1.8 | 2.0 | 7.0 | 12.5 | 2.0 | 13.0 | |
| | | | 2.5 ± 0.2 | 1.5 | 4.6 | 8.5 | 1.5 | 9.0 | |
| | | | 3.3 ± 0.3 | 1.5 | 3.5 | 6.2 | 1.5 | 6.5 | |
| | | | 5.0 ± 0.5 | 0.8 | 2.8 | 5.5 | 0.8 | 5.8 | |
| Output disable time | t _{pLZ} | C _L = 50 pF, R _L = 500 Ω | 1.8 | 2.0 | 5.4 | 11.0 | 2.0 | 12.0 | ns |
| | | | 2.5 ± 0.2 | 1.5 | 3.5 | 8.0 | 1.5 | 8.5 | |
| | | | 3.3 ± 0.3 | 1.0 | 2.8 | 5.7 | 1.0 | 6.0 | |
| | | | 5.0 ± 0.5 | 0.5 | 2.1 | 4.7 | 0.5 | 5.0 | |
| Input capacitance | C _{IN} | — | 0~5.5 | — | 4 | — | — | — | pF |
| Power dissipation capacitance | C _{PD} | (Note 4) | 3.3 | — | 17 | — | — | — | pF |
| | | | 5.5 | — | 24 | — | — | — | |

Note 4: 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:

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

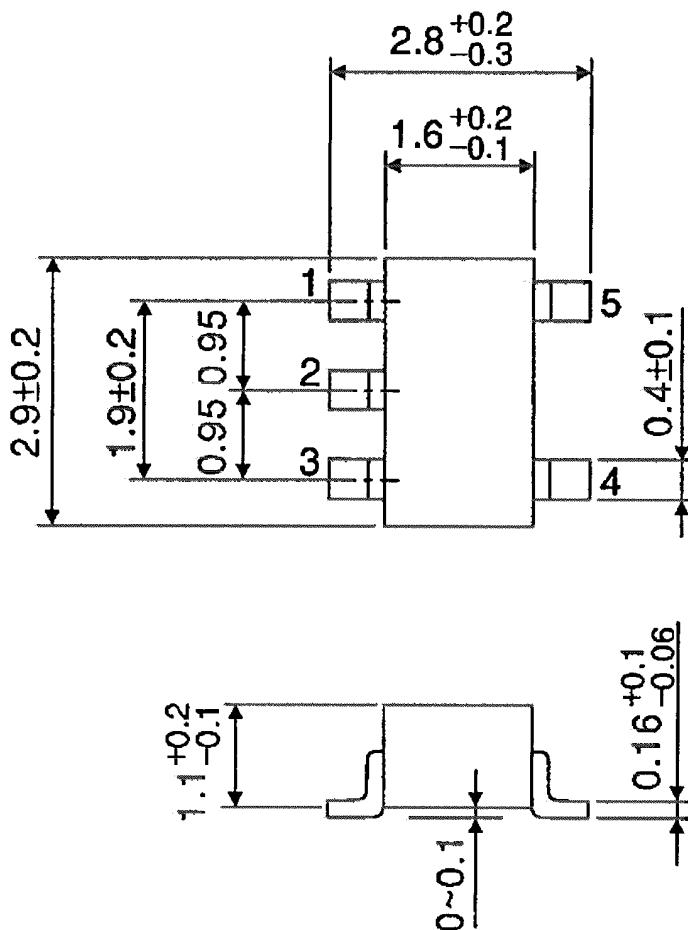
AC Characteristics Measurement Circuit



Package Dimensions

SSOP5-P-0.95

Unit : mm

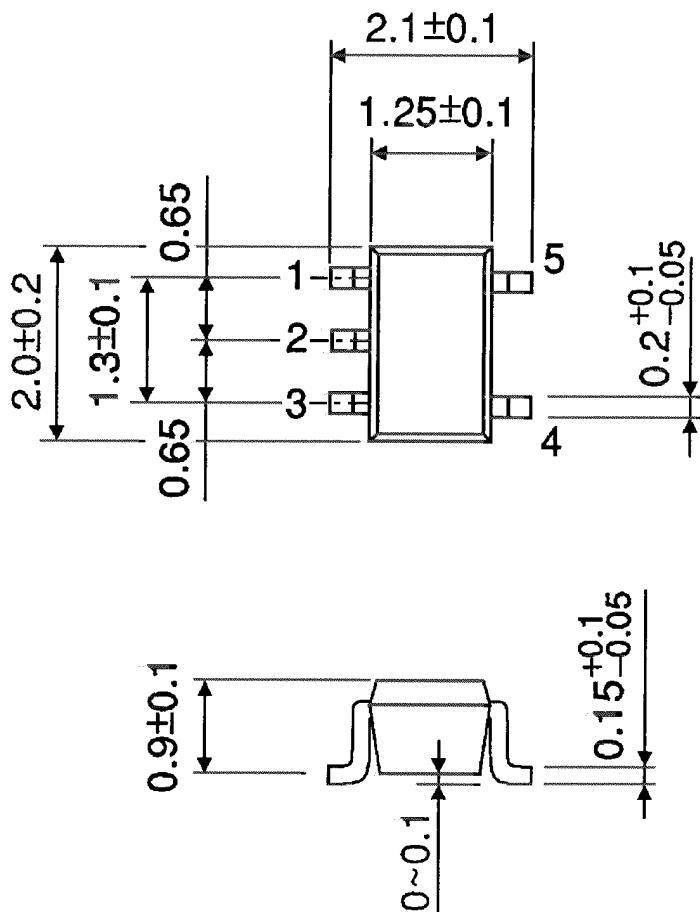


Weight: 0.016 g (typ.)

Package Dimensions

SSOP5-P-0.65A

Unit : mm



Weight: 0.006 g (typ.)

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