

Features

- Designed for 2.0 V to 5.5 V V_{CC} Operation
- 3.5 ns t_{PD} at 5 V (typ)
- Inputs/Outputs Over-Voltage Tolerant up to 5.5 V
- I_{OFF} Supports Partial Power Down Protection
- Source/Sink 8 mA at 3.0 V
- TSOT23-5 Package Available

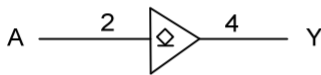
General Description

The 74LVC1G07 is a single Buffer/Driver with open-drain output. This device has power-down protective circuit, preventing device destruction when it is powered down.

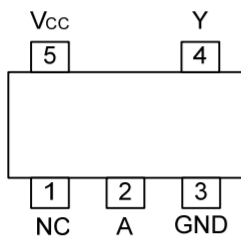
Ordering Information

| ORDER NUMBER | PACKAGE DESCRIPTION | PACKAGE OPTION |
|------------------|---------------------|--------------------|
| MC74VHC1G07DTT1G | TSOT23-5 | Tape and Reel,3000 |

Logic Diagram



Pin Configuration



TSOT23-5

Marking: V7x
x is internal code

Function Table

| INPUT(A) | OUTPUT(Y) |
|----------|-----------|
| H | Z |
| L | L |

**Absolute Maximum Ratings**

| Symbol | Characteristics | Value | Unit |
|-----------------------|--|--|------|
| V_{CC} | DC Supply Voltage | -0.5 to +7.0 | V |
| V_{IN} | DC Input Voltage | -0.5 to +7.0 | V |
| V_{OUT} | DC Output Voltage (NLV) | -0.5 to $V_{CC} + 0.5$ | V |
| | DC Output Voltage Active-Mode (High or Low State) Tri-State Mode (Note 1) Power-Down Mode ($V_{CC} = 0$ V) | -0.5 to $V_{CC} + 0.5$ -0.5 to +6.5 -0.5 to +6.5 | V |
| I_{IK} | DC Input Diode Current $V_{IN} < GND$ | -20 | mA |
| I_{OK} | DC Output Diode Current (NLV) $V_{OUT} > V_{CC}, V_{OUT} < GND$ | ± 20 | mA |
| | DC Output Diode Current $V_{OUT} < GND$ | -20 | mA |
| I_{OUT} | DC Output Source/Sink Current | ± 25 | mA |
| I_{CC} or I_{GND} | DC Supply Current per Supply Pin or Ground Pin | ± 50 | mA |
| T_{STG} | Storage Temperature Range | -65 to +150 | °C |
| T_L | Lead Temperature, 1 mm from Case for 10 secs | 260 | °C |
| T_J | Junction Temperature Under Bias | +150 | °C |
| θ_{JA} | Thermal Resistance (Note 2) | 320 | °C/W |
| | | | |
| P_D | Power Dissipation in Still Air | 390 | mW |
| | | | |
| MSL | Moisture Sensitivity | Level 1 | - |
| F_R | Flammability Rating Oxygen Index: 28 to 34 | UL 94 V-0 @ 0.125 in | - |
| V_{ESD} | ESD Withstand Voltage (Note 3) Human Body Model Charged Device Model | 2000 | V |
| | | 1000 | |
| $I_{Latchup}$ | Latchup Performance (Note 4) | ± 100 | mA |



Recommended Operating Conditions

| Symbol | Characteristics | Min | Max | Unit | |
|---------------------------------|---|----------------------------------|-----------------|-----------------|------|
| V _{CC} | Positive DC Supply Voltage | 2.0 | 5.5 | V | |
| V _{IN} | DC Input Voltage | 0 | 5.5 | V | |
| V _{OUT} | DC Output Voltage (NLV) | 0 | V _{CC} | V | |
| | DC Output Voltage | Active-Mode (High or Low State) | 0 | V _{CC} | V |
| | | Tri-State Mode (Note 1) | 0 | 5.5 | V |
| | Power-Down Mode (V _{CC} = 0 V) | 0 | 5.5 | V | |
| T _A | Operating Temperature Range | -55 | +125 | °C | |
| t _r , t _f | Input Rise and Fall Time | V _{CC} = 3.0 V to 3.6 V | 0 | 100 | ns/V |
| | | V _{CC} = 4.5 V to 5.5 V | 0 | 20 | |
| | Input Rise and Fall Time | V _{CC} = 2.0 V | 0 | 20 | |
| | | V _{CC} = 2.3 V to 2.7 V | 0 | 20 | |
| | | V _{CC} = 3.0 V to 3.6 V | 0 | 10 | |
| | | V _{CC} = 4.5 V to 5.5 V | 0 | 5 | |

Electrical Characteristics

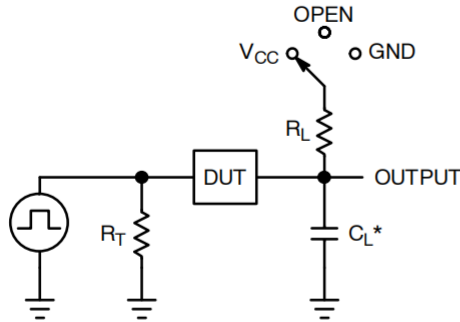
| Symbol | Parameter | Test Conditions | V _{CC} (V) | T _A = 25°C | | | -40°C ≤ T _A ≤ 85°C | | -55°C ≤ T _A ≤ 125°C | | Unit | |
|------------------|---------------------------------|---|------------------------|-----------------------|-----|-------|-------------------------------|------|--------------------------------|------|------|------|
| | | | | Min | Typ | Max | Min | Max | Min | Max | | |
| V _{IH} | High-Level Input Voltage | | 2.0 | 1.5 | - | - | 1.5 | - | 1.5 | - | V | |
| | | | 3.0 | 2.1 | - | - | 2.1 | - | 2.1 | - | | |
| | | | 4.5 | 3.15 | - | - | 3.15 | - | 3.15 | - | | |
| | | | 5.5 | 3.85 | - | - | 3.85 | - | 3.85 | - | | |
| V _{IL} | Low-Level Input Voltage | | 2.0 | - | - | 0.5 | - | 0.5 | - | 0.5 | V | |
| | | | 3.0 | - | - | 0.9 | - | 0.9 | - | 0.9 | | |
| | | | 4.5 | - | - | 1.35 | - | 1.35 | - | 1.35 | | |
| | | | 5.5 | - | - | 1.65 | - | 1.65 | - | 1.65 | | |
| V _{OL} | Low-Level Output Voltage | V _{IN} = V _{IH} or V _{IL} I _{OL} = 50 μA | 2.0 | - | 0.0 | 0.1 | - | 0.1 | - | 0.1 | V | |
| | | | 3.0 | - | 0.0 | 0.1 | - | 0.1 | - | 0.1 | | |
| | | | 4.5 | - | 0.0 | 0.1 | - | 0.1 | - | 0.1 | | |
| | | | I _{OL} = 4 mA | 3.0 | - | - | 0.36 | - | 0.44 | - | | 0.52 |
| | | | I _{OL} = 8 mA | 4.5 | - | - | 0.36 | - | 0.44 | - | | 0.52 |
| I _{IN} | Input Leakage Current | V _{IN} = 5.5 V or GND | 2.0 to 5.5 | - | - | ±0.1 | - | ±1.0 | - | ±1.0 | μA | |
| I _{OZ} | 3-State Output Leakage Current | V _{OUT} = 0 V to 5.5 V | 5.5 | - | - | ±0.25 | - | ±2.5 | - | ±2.5 | μA | |
| I _{OFF} | Power Off Leakage Current (NLV) | V _{IN} = 5.5 V | 0.0 | - | - | 1.0 | - | 10 | - | 10 | μA | |
| | Power Off Leakage Current | V _{IN} = 5.5 V or V _{OUT} = 5.5 V | 0.0 | - | - | 1.0 | - | 10 | - | 10 | μA | |
| I _{CC} | Quiescent Supply Current | V _{IN} = V _{CC} or GND | 5.5 | - | - | 1.0 | - | 20 | - | 40 | μA | |



AC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Conditions | V _{CC} (V) | T _A = 25°C | | | -40°C ≤ T _A ≤ 85°C | | -55°C ≤ T _A ≤ 125°C | | Unit |
|------------------|---|--------------------------------|---------------------|------------------------|-----|-----|-------------------------------|------|--------------------------------|------|------|
| | | | | Min | Typ | Max | Min | Max | Min | Max | |
| t _{PZL} | Propagation Delay, A to Y (Figures 3 and 4) | C _L = 15 pF | 3.0 to 3.6 | - | 5.0 | 7.1 | - | 8.5 | - | 10.0 | ns |
| | | | | C _L = 50 pF | - | 7.5 | 10.6 | - | 12.0 | - | |
| | | C _L = 15 pF | 4.5 to 5.5 | - | 3.8 | 5.5 | - | 6.5 | - | 8.0 | |
| | | | | C _L = 50 pF | - | 5.3 | 7.5 | - | 8.5 | - | |
| t _{PLZ} | Propagation Delay, A to Y (Figures 3 and 4) | C _L = 15 pF | 3.0 to 3.6 | - | 6.5 | 9.7 | - | 11.5 | - | 12.5 | ns |
| | | | | C _L = 50 pF | - | 7.5 | 10.6 | - | 15.0 | - | |
| | | C _L = 15 pF | 4.5 to 5.5 | - | 4.8 | 6.8 | - | 8.0 | - | 9.0 | |
| | | | | C _L = 50 pF | - | 5.3 | 7.5 | - | 10.0 | - | |
| C _{IN} | Input Capacitance | | | - | 4.0 | 10 | - | 10 | - | 10 | pF |
| C _{OUT} | Output Capacitance | Output in High Impedance State | | - | 6.0 | - | - | - | - | - | pF |

| | | | | |
|-----------------|--|---|--|----|
| C _{PD} | Power Dissipation Capacitance (Note 5) | Typical @ 25°C, V _{CC} = 5.0 V | | pF |
| | | 8.0 | | |



C_L includes probe and jig capacitance
 R_T is Z_{OUT} of pulse generator (typically 50 Ω)
 $f = 1 \text{ MHz}$

Figure 3. Test Circuit

| Test | Switch Position | C_L , pF | R_L , Ω |
|---------------------|-----------------|------------------------------|------------------|
| t_{PLH} / t_{PHL} | Open | See AC Characteristics Table | X |
| t_{PLZ} / t_{PZL} | V_{CC} | | 1 k |
| t_{PHZ} / t_{PZH} | GND | | 1 k |

X = Don't Care

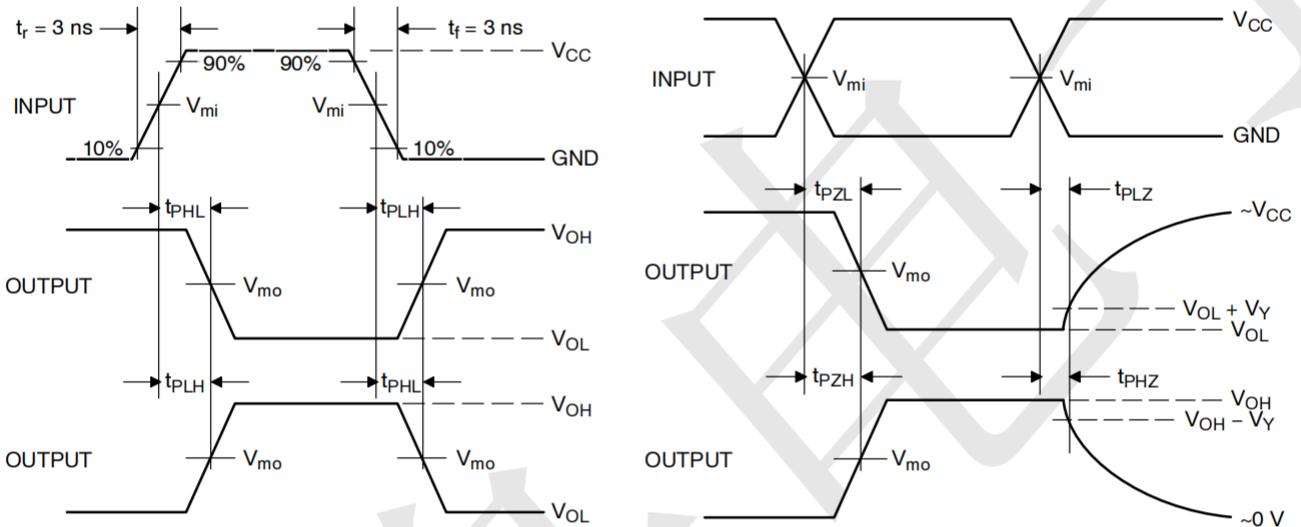


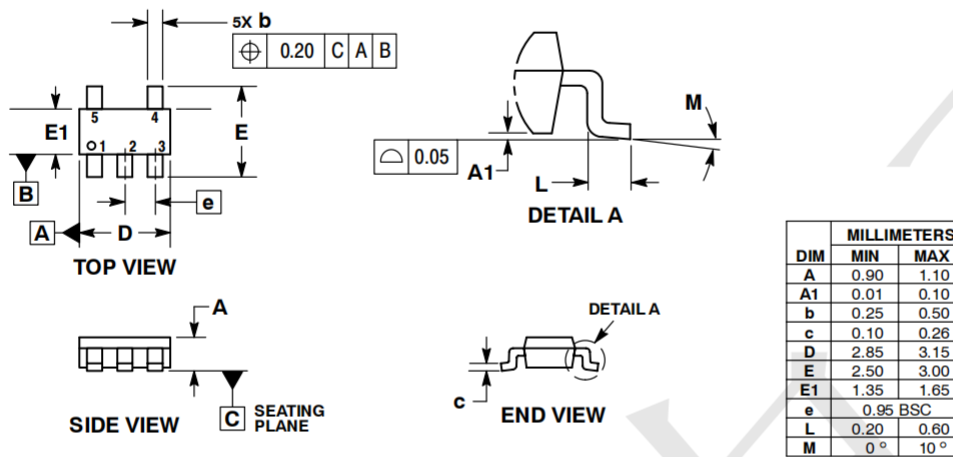
Figure 4. Switching Waveforms

| V_{CC} , V | V_{mi} , V | V_{mo} , V | | V_Y , V |
|--------------|--------------|-----------------------|---|-----------|
| | | t_{PLH} , t_{PHL} | t_{PZL} , t_{PLZ} , t_{PZH} , t_{PHZ} | |
| 3.0 to 3.6 | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | 0.3 |
| 4.5 to 5.5 | $V_{CC}/2$ | $V_{CC}/2$ | $V_{CC}/2$ | 0.3 |

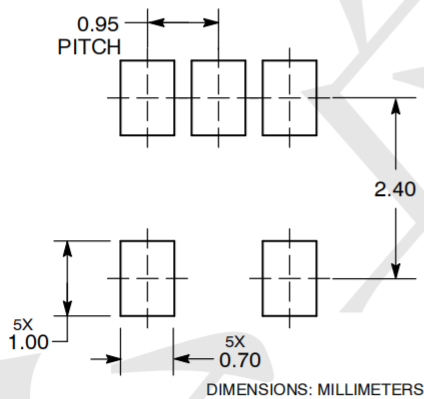


Package Outline Dimensions (Unit: mm)

TSOT23-5



Mounting Pad Layout (Unit: mm)



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