

General Description

The SN74AUP1G126 is a single non-inverting buffer with 3-State output from ultra low power series, which can operate from a 0.8V to 3.6V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

Features

- Designed for 0.8V to 3.6V VCC Operation
- Low static power consumption; ICC = 0.7μA (maximum)
- 4mA Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and are RoHS Compliant

Pin Configuration

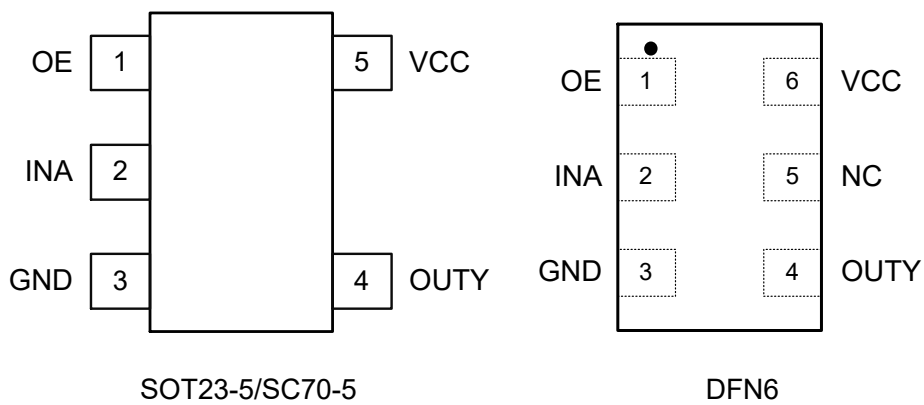


Figure1. Top View

Pin Function

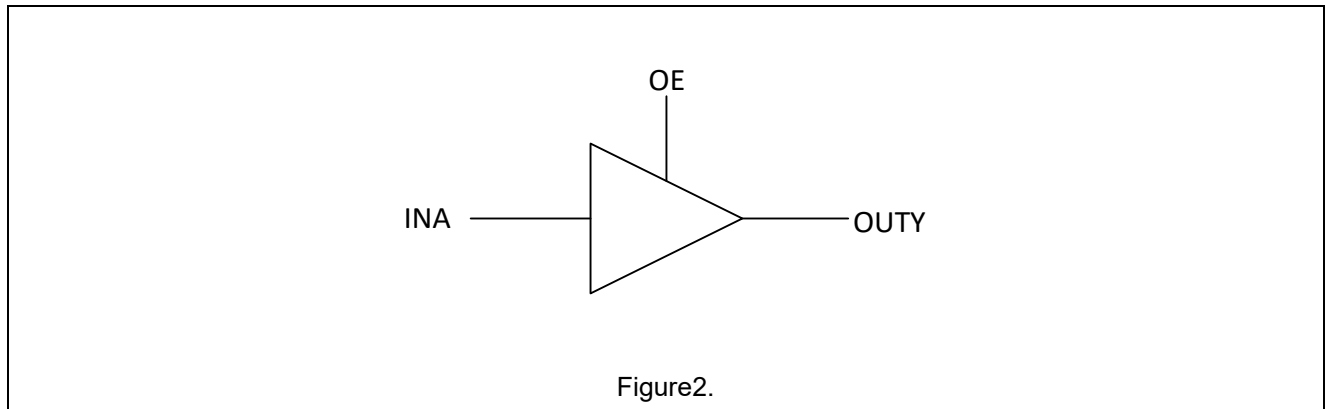
SC70-5/ SOT23-5

| Pin No. | Function |
|---------|----------|
| 1 | OE |
| 2 | INA |
| 3 | GND |
| 4 | OUTY |
| 5 | VCC |

DFN6

| Pin No. | Function |
|---------|----------|
| 1 | OE |
| 2 | IN A |
| 3 | GND |
| 4 | OUTY |
| 5 | NC |
| 6 | VCC |

Block Diagram



Functional Description

Function Table

| Input | | Output |
|-------|-----|--------|
| OE | INA | OUTY |
| H | L | L |
| H | H | H |
| L | X | Z |

Absolute Maximum Ratings

| Symbol | Parameter | | Value | Unit |
|------------------|---|--|------------------------------|------|
| V _{CC} | DC Supply Voltage | | -0.5 to 4.6 | V |
| V _I | DC Input Voltage | | -0.5 ≤ V _I ≤ +4.6 | V |
| V _O | DC Output Voltage Output in Higher or Low State ⁽¹⁾ | | -0.5 to 4.6 | V |
| I _{IK} | DC Input Diode Current | V _I < GND | -50 | mA |
| I _{OK} | DC Output Diode Current | V _O < GND, V _O > V _{CC} | ±50 | mA |
| I _O | DC Output Sink Current | | ±20 | mA |
| I _{CC} | DC Supply Current per Supply Pin | | ±50 | mA |
| I _{GND} | DC Ground Current per Supply Pin | | ±50 | mA |
| T _{STG} | Storage Temperature Range | | -65 to 150 | °C |
| T _L | Lead Temperature, 1 mm from Case for 10 Seconds | | 260 | °C |
| T _J | Junction Temperature Under Bias | | 150 | °C |
| P _D | Power Dissipation in Still Air at 85°C | | 200 | mW |
| ESD | ESD Classification | Human Body Model ⁽²⁾ | 4000 | V |
| | | Machine Model ⁽³⁾ | 200 | |
| | | Charged Device Model ⁽⁴⁾ | 1000 | |
| I _{LU} | Latchup Current Above V _{CC} and GND at 125°C ⁽⁵⁾ | | ±100 | mA |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Notes:

1. IO absolute maximum rating must be observed.
2. Tested to EIA/JESD22-A114-A, rated to EIA/JESD22-A114-B.
3. Tested to EIA/JESD22-A115-A, rated to EIA/JESD22-A115-A.
4. Tested to JESD22-C101-A.
5. Tested to EIA/JESD78.

Recommended Operating Conditions

| Symbol | Parameter | | Min | Max | Unit |
|---------------------------------|---------------------------------------|--------------------------------|-----|-----|------|
| V _{CC} | DC Supply Voltage Operating | | 0.8 | 3.6 | V |
| V _{IN} | DC Input Voltage | | 0 | 3.6 | V |
| V _{OUT} | DC Output Voltage (High or Low State) | | 0 | 3.6 | V |
| T _A | Operating Temperature Range | | -40 | 85 | °C |
| t _r , t _f | Input Rise and Fall Time | V _{CC} = 0.8V to 3.6V | 0 | 20 | ns/V |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied.

Electrical Characteristics
DC Electrical Characteristics

| Symbol | Parameter | Condition | V _{CC} (V) | T _A = 25°C | | | -40°C ≤ T _A ≤ 85°C | | Unit |
|------------------|---------------------------|--|---------------------|-----------------------|------|---------------------|-------------------------------|---------------------|------|
| | | | | Min | Typ | Max | Min | Max | |
| V _{IH} | High-Level Input Voltage | | 0.8V | 0.75V _{CC} | | | 0.75V _{CC} | | V |
| | | | 0.9 to 1.95V | 0.7V _{CC} | | | 0.7V _{CC} | | |
| | | | 2.3 to 2.7V | 1.6 | | | 1.6 | | |
| | | | 3.0 to 3.6V | 2.0 | | | 2.0 | | |
| V _{IL} | Low-Level Input Voltage | | 0.8V | | | 0.25V _{CC} | | 0.25V _{CC} | V |
| | | | 0.9 to 1.95V | | | 0.3V _{CC} | | 0.3V _{CC} | |
| | | | 2.3 to 2.7V | | | 0.7 | | 0.7 | |
| | | | 3.0 to 3.6V | | | 0.9 | | 0.9 | |
| V _{OH} | High-Level Output Voltage | I _{OH} =-20uA | 0.8 to 3.6V | V _{CC} -0.1 | | | V _{CC} -0.1 | | V |
| | | I _{OH} =-1.1mA | 1.1 | 0.82 | 1.02 | | 0.77 | | |
| | | I _{OH} =-1.7mA | 1.4 | 1.11 | 1.32 | | 1.03 | | |
| | | I _{OH} =-1.9mA | 1.65 | 1.32 | 1.58 | | 1.30 | | |
| | | I _{OH} =-2.3mA | 2.3 | 2.05 | 2.24 | | 1.97 | | |
| | | I _{OH} =-3.1mA | | 1.9 | 2.22 | | 1.85 | | |
| | | I _{OH} =-2.7mA | 3.0 | 2.72 | 2.95 | | 2.67 | | |
| | | I _{OH} =-4.0mA | | 2.6 | 2.92 | | 2.55 | | |
| V _{OL} | Low-Level Output Voltage | I _{OL} =20uA | 0.8 to 3.6V | | | 0.1 | | 0.1 | V |
| | | I _{OL} =1.1mA | 1.1 | | 0.11 | 0.33 | | 0.33 | |
| | | I _{OL} =1.7mA | 1.4 | | 0.12 | 0.31 | | 0.37 | |
| | | I _{OL} =1.9mA | 1.65 | | 0.11 | 0.31 | | 0.35 | |
| | | I _{OL} =2.3mA | 2.3 | | 0.14 | 0.31 | | 0.33 | |
| | | I _{OL} =3.1mA | | | 0.19 | 0.44 | | 0.45 | |
| | | I _{OL} =2.7mA | 3.0 | | 0.11 | 0.31 | | 0.33 | |
| | | I _{OL} =4.0mA | | | 0.16 | 0.44 | | 0.45 | |
| I _{IN} | Input Leakage Current | V _{IN} = V _{CC} or GND | 0 to 3.6V | | | ±0.1 | | ±0.2 | uA |
| I _{OFF} | Power Off Leakage Current | V _{IN} = 3.6 V or V _{OUT} = 3.6 V | 0 | | | ±0.2 | | ±0.5 | uA |
| I _{CC} | Quiescent Supply Current | V _{IN} = 3.6V or GND | 3.6 | | | ±0.2 | | ±0.7 | uA |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

AC Electrical Characteristics

$t_r = t_f = 2.5\text{ns}$

| Symbol | Parameter | Condition | V _{CC} (V) | T _A = 25°C | | | -40°C ≤ T _A ≤ 85°C | | Unit |
|--------------------------------------|---|---------------------------------------|---------------------|-----------------------|------|------|-------------------------------|------|------|
| | | | | Min | Typ | Max | Min | Max | |
| t _{PLH} t _{PHL} | Propagation Delay (Figure3 And 4) | C _L = 5 pF ⁽⁶⁾ | 0.8 | 13.2 | 29 | 90.1 | 11.9 | 220 | ns |
| | | | 1.2 | 5.0 | 7.6 | 14.3 | 4.6 | 14.4 | |
| | | | 1.5 | 3.4 | 4.8 | 8.9 | 3 | 9.6 | |
| | | | 1.8 | 2.7 | 3.6 | 6.9 | 2.3 | 7.6 | |
| | | | 2.5 | 1.9 | 2.4 | 5.1 | 1.6 | 5.6 | |
| | | | 3.3 | 1.5 | 1.9 | 4.4 | 1.3 | 4.8 | |
| | | C _L = 10 pF ⁽⁶⁾ | 0.8 | 14.3 | 31.3 | 97.9 | 12.8 | 239 | ns |
| | | | 1.2 | 5.4 | 8.3 | 15.3 | 5.0 | 15.3 | |
| | | | 1.5 | 3.7 | 5.2 | 9.5 | 3.2 | 10.2 | |
| | | | 1.8 | 2.9 | 3.9 | 7.4 | 2.5 | 8.1 | |
| | | | 2.5 | 2.0 | 2.6 | 5.4 | 1.7 | 6.0 | |
| | | | 3.3 | 1.6 | 2.0 | 4.6 | 1.3 | 5.1 | |
| | | C _L = 15 pF ⁽⁶⁾ | 0.8 | 15.3 | 32.5 | 106 | 13.8 | 259 | ns |
| | | | 1.2 | 5.8 | 8.9 | 16.3 | 5.3 | 16.3 | |
| | | | 1.5 | 4.0 | 5.6 | 10.1 | 3.5 | 10.9 | |
| | | | 1.8 | 3.1 | 4.2 | 7.8 | 2.6 | 8.6 | |
| | | | 2.5 | 2.1 | 2.8 | 5.8 | 1.8 | 6.4 | |
| | | | 3.3 | 1.7 | 2.2 | 4.9 | 1.4 | 5.4 | |
| | | C _L = 30 pF ⁽⁶⁾ | 0.8 | 18.3 | 37.5 | 130 | 16.6 | 323 | ns |
| | | | 1.2 | 7.0 | 10.7 | 19.3 | 6.4 | 19.3 | |
| | | | 1.5 | 4.8 | 6.9 | 12.0 | 4.2 | 12.9 | |
| | | | 1.8 | 3.7 | 5.1 | 9.2 | 3.2 | 10.2 | |
| | | | 2.5 | 2.6 | 3.5 | 6.7 | 2.2 | 7.5 | |
| | | | 3.3 | 2.0 | 2.2 | 5.6 | 1.7 | 6.3 | |

Note6. C_L includes probe and jig capacitance.

Capacitance Characteristics

| Symbol | Parameter | Condition | Typical | Unit | |
|-----------------|-----------------------------------|---|-------------------------|------|----|
| C _{IN} | Input Capacitance | V _{CC} = 3.6V, V _I = 0 V or V _{CC} | 2 | pF | |
| C _O | output capacitance | V _{CC} = 0V, V _{OUT} = GND | 3 | pF | |
| C _{PD} | Power Dissipation Capacitance (7) | 1 MHz, V _I = 0 V to V _{CC} | V _{CC} = 0.8V | 7.6 | pF |
| | | | V _{CC} = 1.2V | 8.1 | |
| | | | V _{CC} = 1.5V | 8.5 | |
| | | | V _{CC} = 1.8V | 8.6 | |
| | | | V _{CC} = 2.5V | 9.0 | |
| | | | V _{CC} = 3.3 V | 9.6 | |

Note7. 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(OPR)}=C_{PD}×V_{CC}×fin+I_{CC}×C_{PD} is used to determine the no-load dynamic power consumption; P_D=C_{PD}×V_{CC}² ×fin+I_{CC}×V_{CC}×Fig.

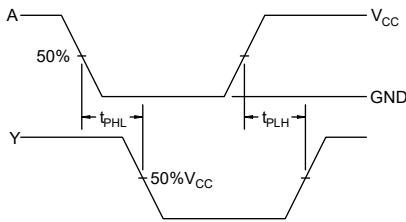


Figure 3. Switching Waveforms

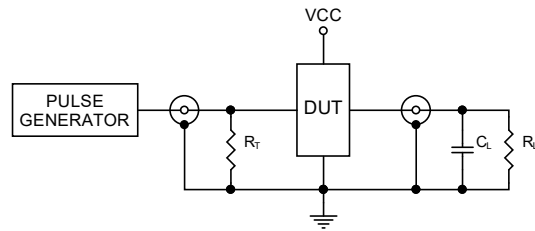
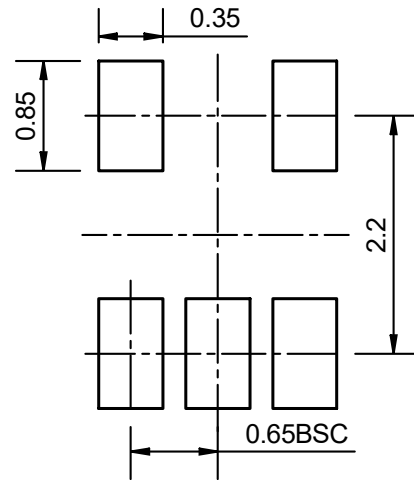
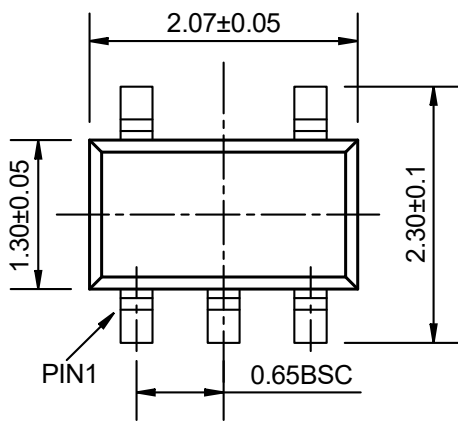
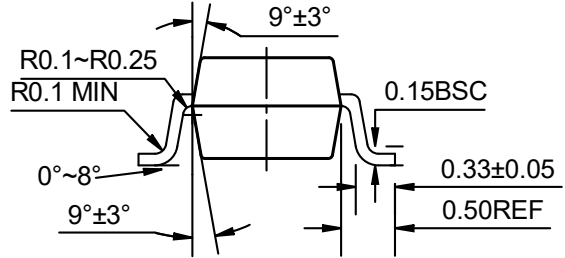
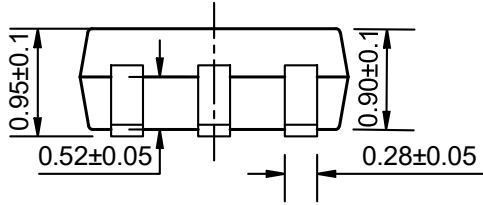


Figure 4. Test Circuit

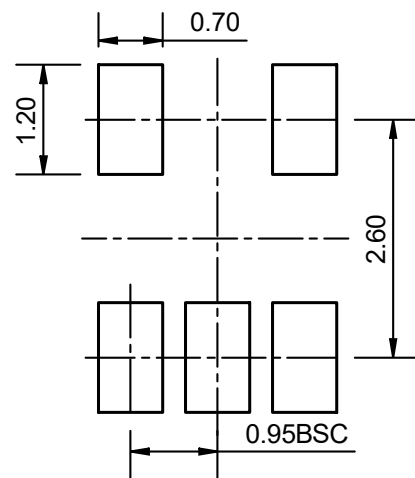
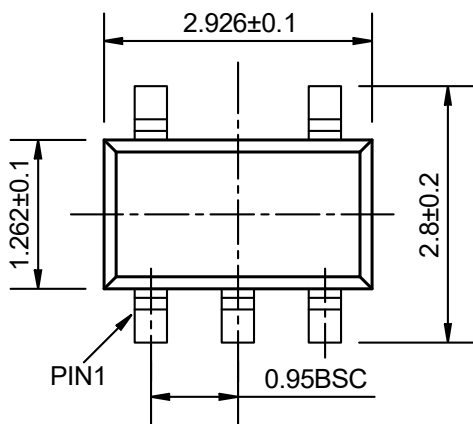
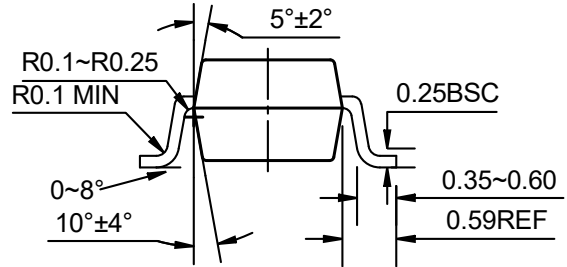
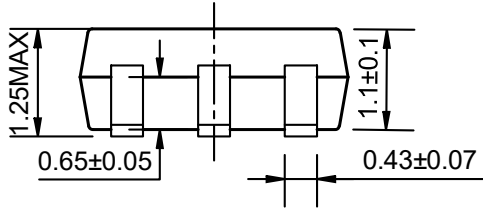
Package Dimension

SC70-5



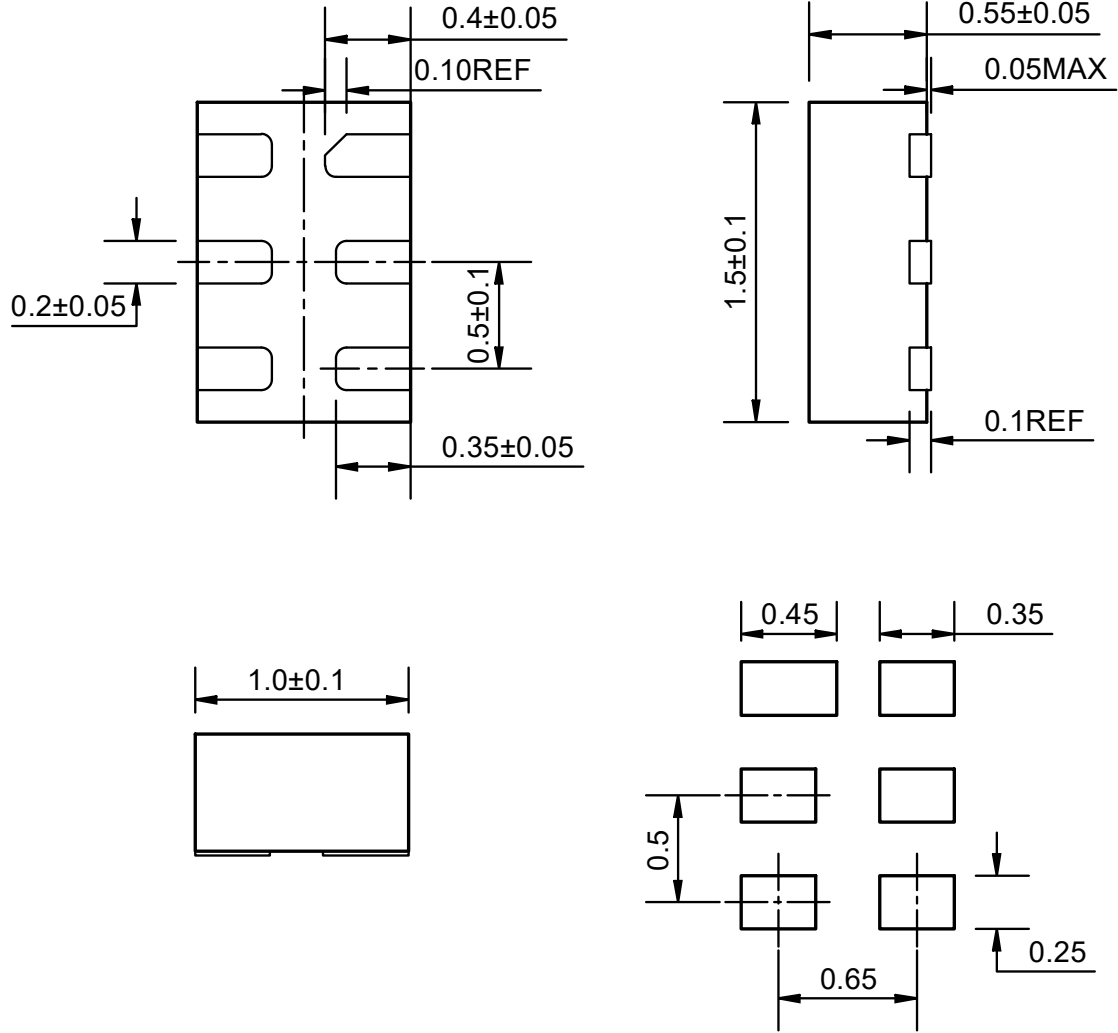
Recommended Land Pattern

SOT23-5



Recommended Land Pattern

DFN6



Recommended Land Pattern

Ordering information

| Order code | Marking code | Package | Baseqty | Deliverymode |
|----------------------|--------------|---------|---------|---------------|
| UMW SN74AUP1G126DCKR | HN5 | SC70-5 | 3000 | Tape and reel |
| UMW SN74AUP1G126DBVR | H26R | SOT23-5 | 3000 | Tape and reel |
| UMW SN74AUP1G126DSFR | HN | DFN6 | 5000 | Tape and reel |