

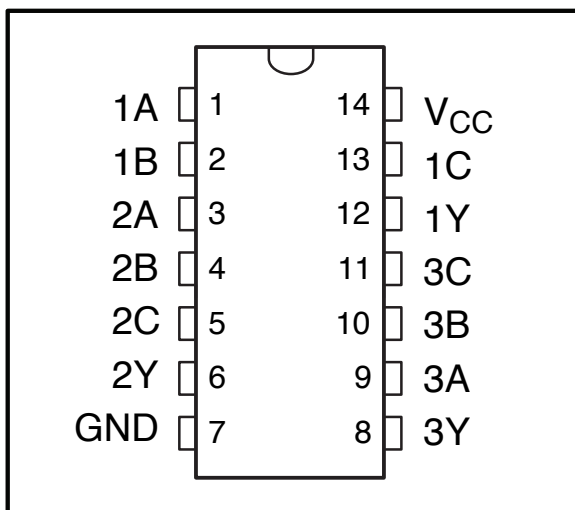


# PO74G10A

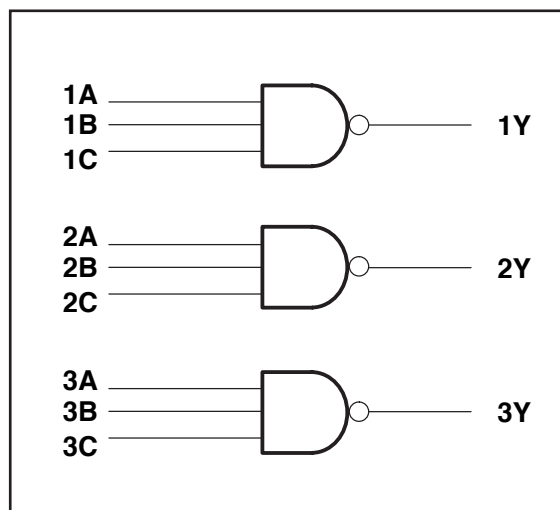
## 54, 74 Series Noise Cancellation GHz Logic

| FEATURES:                                                                                                                                                                                                                                                                                                                                                                                                                                       | DESCRIPTION:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Patented technology</li> <li>Operating frequency up to 1GHz with 2pf load</li> <li>Operating frequency up to 800MHz with 5pf load</li> <li>Operating frequency up to 350MHz with 15pf load</li> <li>VCC Operates from 1.65V to 3.6V</li> <li>Propagation delay &lt; 1.7ns max with 15pf load</li> <li>Low input capacitance: 4pf typical</li> <li>Available in 14pin 150mil wide SOIC package</li> </ul> | <p>Potato Semiconductor's PO74G10A is designed for world top performance using submicron CMOS technology to achieve 1GHz TTL /CMOS output frequency with less than 1.7ns propagation delay.</p> <p>This quadruple 2-input positive-NOR gate is designed for 1.65-V to 3.6-V VCC operation.</p> <p>The PO74G10A performs the Boolean function <math>Y = \overline{A \cdot B \cdot C}</math> or <math>Y = \overline{A + B + C}</math> in positive logic.</p> <p>Inputs can be driven from either 3.3V or 5V devices. This feature allows the use of these devices as translators in a mixed 3.3V/5V system environment.</p> |

### Pin Configuration



### Logic Block Diagram



### Pin Description

| INPUTS |   |   | OUTPUT<br>Y |
|--------|---|---|-------------|
| A      | B | C |             |
| H      | H | H | L           |
| L      | X | X | H           |
| X      | L | X | H           |
| X      | L | X | H           |

**54, 74 Series Noise Cancellation GHz Logic****Maximum Ratings**

| Description           | Max                          | Unit |
|-----------------------|------------------------------|------|
| Storage Temperature   | -65 to 150                   | °C   |
| Operation Temperature | -40 to 85                    | °C   |
| Operation Voltage     | -0.5 to +4.6                 | V    |
| Input Voltage         | -0.5 to +5.5                 | V    |
| Output Voltage        | -0.5 to V <sub>cc</sub> +0.5 | V    |

**Note:**

stresses greater than listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability specification is not implied.

**DC Electrical Characteristics**

| Symbol                | Description         | Test Conditions                                                                      | Min         | Typ         | Max         | Unit      |
|-----------------------|---------------------|--------------------------------------------------------------------------------------|-------------|-------------|-------------|-----------|
| <b>V<sub>OH</sub></b> | Output High voltage | V <sub>cc</sub> =3V Vin=V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> = -12mA | <b>2.4</b>  | <b>3</b>    | <b>-</b>    | <b>V</b>  |
| <b>V<sub>OL</sub></b> | Output Low voltage  | V <sub>cc</sub> =3V Vin=V <sub>IH</sub> or V <sub>IL</sub> , I <sub>OH</sub> =12mA   | <b>-</b>    | <b>0.3</b>  | <b>0.5</b>  | <b>V</b>  |
| <b>V<sub>IH</sub></b> | Input High voltage  | Guaranteed Logic HIGH Level (Input Pin)                                              | <b>2</b>    | <b>-</b>    | <b>5.5</b>  | <b>V</b>  |
| <b>V<sub>IL</sub></b> | Input Low voltage   | Guaranteed Logic LOW Level (Input Pin)                                               | <b>-0.5</b> | <b>-</b>    | <b>0.8</b>  | <b>V</b>  |
| <b>I<sub>IH</sub></b> | Input High current  | V <sub>cc</sub> = 3.6V and Vin = 5.5V                                                | <b>-</b>    | <b>-</b>    | <b>1</b>    | <b>uA</b> |
| <b>I<sub>IL</sub></b> | Input Low current   | V <sub>cc</sub> = 3.6V and Vin = 0V                                                  | <b>-</b>    | <b>-</b>    | <b>-1</b>   | <b>uA</b> |
| <b>V<sub>IK</sub></b> | Clamp diode voltage | V <sub>cc</sub> = Min. And I <sub>IN</sub> = -18mA                                   | <b>-</b>    | <b>-0.7</b> | <b>-1.2</b> | <b>V</b>  |

**Notes:**

1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at V<sub>cc</sub> = 3.3V, 25 °C ambient.
3. This parameter is guaranteed but not tested.
4. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
5. V<sub>OH</sub> = V<sub>cc</sub> – 0.6V at rated current



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### Power Supply Characteristics

| Symbol      | Description                         | Test Conditions (1)     | Min | Typ        | Max        | Unit      |
|-------------|-------------------------------------|-------------------------|-----|------------|------------|-----------|
| <b>IccQ</b> | Quiescent Power Supply Current      | Vcc=Max, Vin=Vcc or GND | -   | <b>0.1</b> | <b>30</b>  | <b>uA</b> |
| <b>ΔIcc</b> | Power Supply Current per Input High | Vcc=Max, Vin= Vcc-0.6V  | -   | <b>50</b>  | <b>300</b> | <b>uA</b> |

**Notes:**

1. For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at Vcc = 3.3V, 25°C ambient.
3. This parameter is guaranteed but not tested.
4. Not more than one output should be shorted at one time. Duration of the test should not exceed one second.
5. VoH = Vcc – 0.6V at rated current

### Capacitance

| Parameters (1) | Description        | Test Conditions | Typ      | Unit      |
|----------------|--------------------|-----------------|----------|-----------|
| <b>Cin</b>     | Input Capacitance  | Vin = 0V        | <b>4</b> | <b>pF</b> |
| <b>Cout</b>    | Output Capacitance | Vout = 0V       | <b>6</b> | <b>pF</b> |

**Notes:**

- 1 This parameter is determined by device characterization but not production tested.

### Switching Characteristics

| Symbol       | Description                 | Test Conditions (1) | Max         | Unit       |
|--------------|-----------------------------|---------------------|-------------|------------|
| <b>tPLH</b>  | Propagation Delay A, B to Y | CL = 15pF           | <b>1.7</b>  | <b>ns</b>  |
| <b>tPHL</b>  | Propagation Delay A, B to Y | CL = 15pF           | <b>1.7</b>  | <b>ns</b>  |
| <b>tr/tf</b> | Rise/Fall Time              | 0.8V – 2.0V         | <b>0.8</b>  | <b>ns</b>  |
| <b>fmax</b>  | Input Frequency             | CL =15pF            | <b>350</b>  | <b>MHz</b> |
| <b>fmax</b>  | Input Frequency             | CL = 5pF            | <b>800</b>  | <b>MHz</b> |
| <b>fmax</b>  | Input Frequency             | CL = 2pF            | <b>1000</b> | <b>MHz</b> |

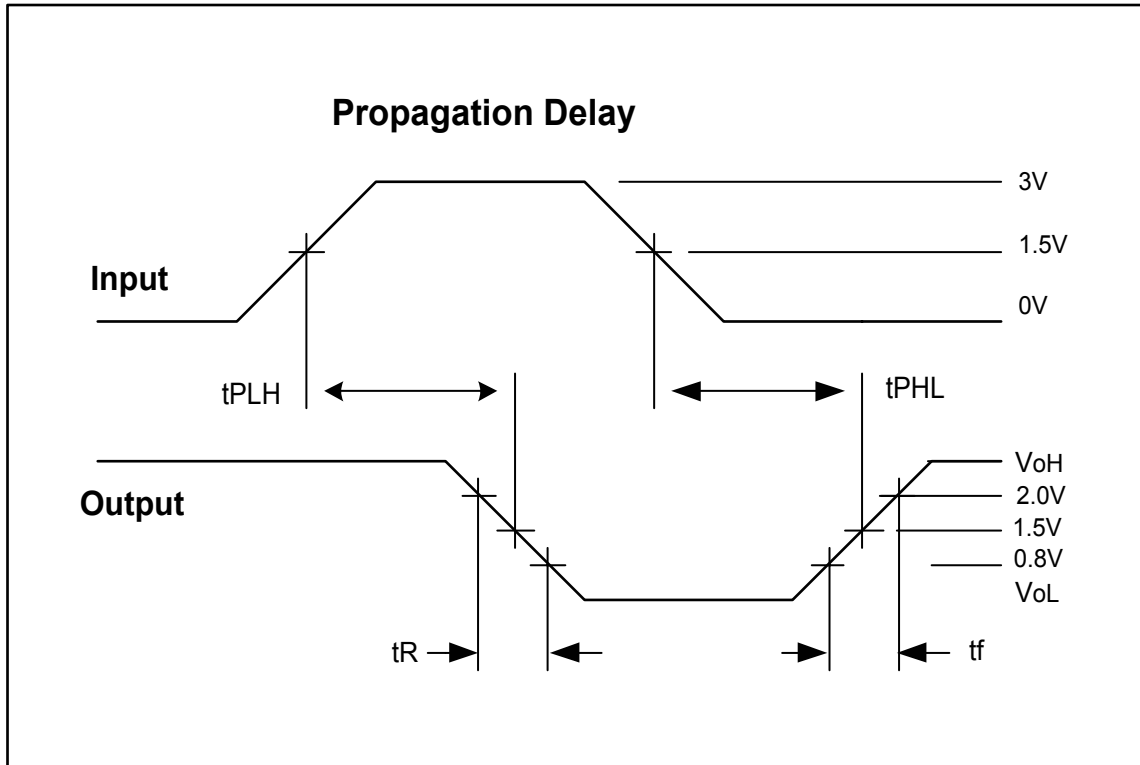
**Notes:**

1. See test circuits and waveforms.
2. tPLH, tPHL, tsk(p), and tsk(o) are production tested. All other parameters guaranteed but not production tested.
3. Airflow of 1m/s is recommended for frequencies above 133MHz

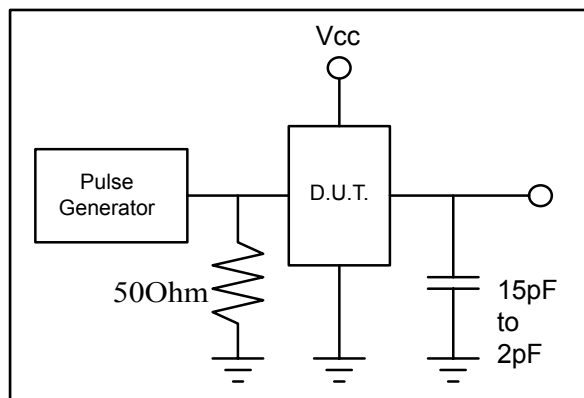


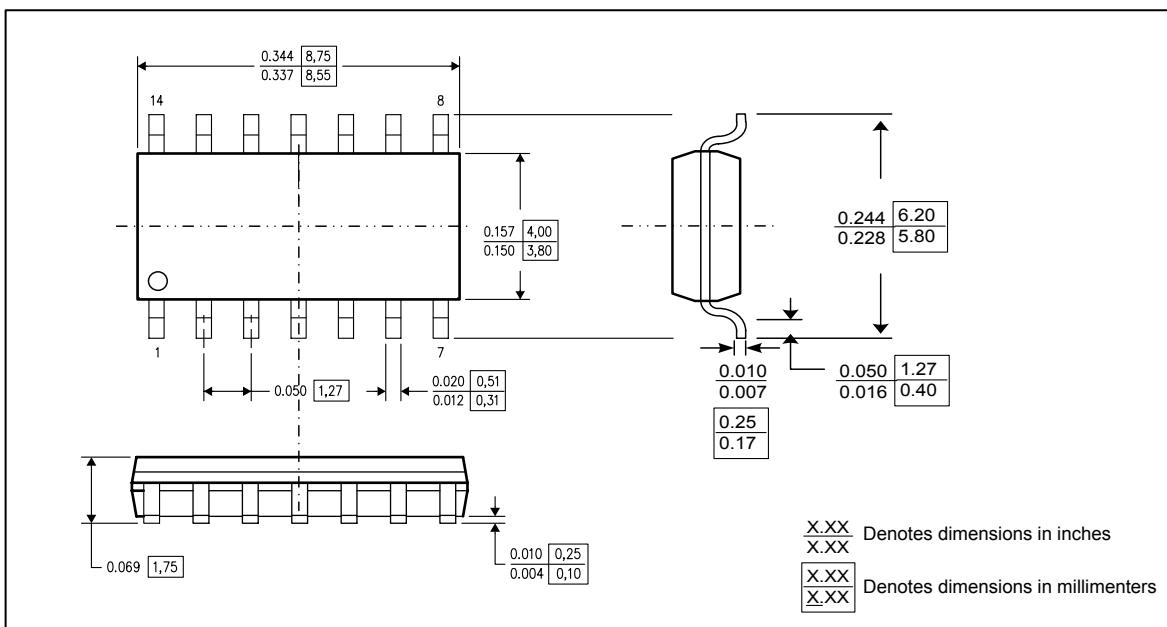
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### Test Waveforms



### Test Circuit



**54, 74 Series Noise Cancellation GHz Logic****Packaging Mechanical Drawing: 14 pin 150mil SOIC****IC Ordering Information**

| Ordering Code              | Package           |                 | Top-Marking   | T <sub>A</sub> |
|----------------------------|-------------------|-----------------|---------------|----------------|
| PO74G10ASU for Tube        | 14pin 150mil SOIC | Pb-free & Green | POTATO74G10AS | -40°C to 125°C |
| PO74G10ASR for Tape & Reel | 14pin 150mil SOIC | Pb-free & Green | POTATO74G10AS | -40°C to 125°C |

**IC Package Information**

| PACKAGE CODE | PACKAGE TYPE | TAPE WIDTH (mm) | TAPE PITCH (mm) | PIN 1 LOCATION  | TAPE TRAILER LENGTH | QTY PER REEL | TAPE LEADER LENGTH | QTY PER TUBE |
|--------------|--------------|-----------------|-----------------|-----------------|---------------------|--------------|--------------------|--------------|
| S            | SOIC 14      | 16              | 8               | Top Left Corner | 39 (12")            | 3000         | 64 (20")           | 55           |