# 700MHz TTL/CMOS Potato Chip

## FEATURES:

- Patented technology
- Operating frequency up to 700MHz with 2pf load
- Operating frequency up to 650MHz with 5pf load
- Operating frequency up to 450MHz with 15pf load
- Operating frequency up to 100MHz with 50pf load
- Very low output pin to pin skew < 100ps
- Very low pulse skew < 150ps
- VCC = 1.65V to 3.6V
- Propagation delay < 2.1ns max with 15pf load
- Low input capacitance: 3pf typical
- 1:4 fanout
- Packaging (Pb-free & Green available)
- Available in 8-pin TSSOP package

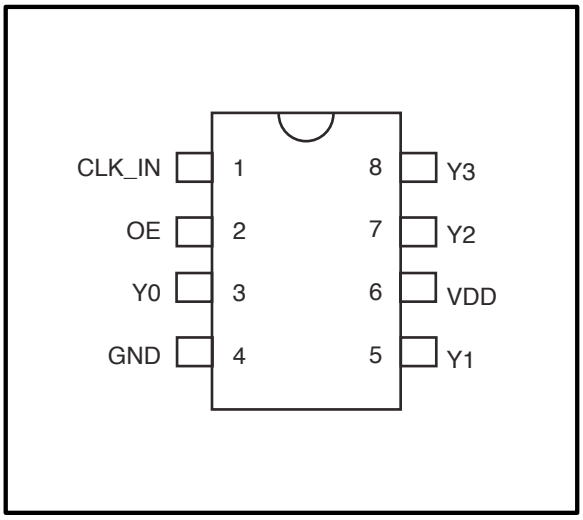
## DESCRIPTION:

Potato Semiconductor's PO74G304A is designed for world top performance using submicron CMOS technology to achieve 700MHz TTL output frequency with less than 100ps output pin to pin skew.

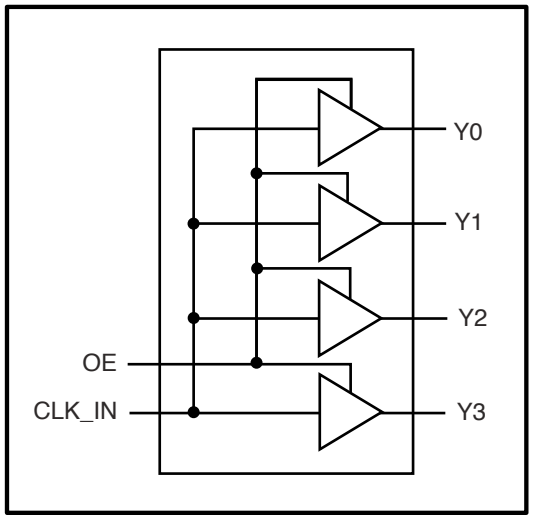
PO74G304A is a 3.3V CMOS 1 input to 4 outputs Buffered driver to achieve 700MHz output frequency. Typical applications are clock and signal distribution. They are used for networking and communications applications.

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.

## Pin Configuration




## Logic Block Diagram




## Pin Description

| Pin# | Description |
|---|---|
| 1 | 5V Tolerant clock input |
| 2 | Active High Output Enable. |
| 3,5,7,8 | LVCMOS level outputs |
| 4 | Groun |
| 6 | 3.3V powe |

## FUNCTION TABLE

| INPUTS | | OUTPUT |
|---|---|---|
| CLKIN | OE | 1Y (0:3) |
| L | L | L |
| H | L | L |
| L | H | L |
| H | H | H |

## 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 Vcc+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 |
|---|---|---|---|---|---|---|
| $V_{OH}$ | Output High voltage | Vcc=3V Vin=VIH or VIL, IOH= -12mA | 2.4 | 3 | - | V |
| $V_{OL}$ | Output Low voltage | Vcc=3V Vin=VIH or VIL, IOH=12mA | - | 0.4 | 0.5 | V |
| $V_{IH}$ | Input High voltage | Guaranteed Logic HIGH Level (Input Pin) | 2 | - | 5.5 | V |
| $V_{IL}$ | Input Low voltage | Guaranteed Logic LOW Level (Input Pin) | -0.5 | - | 0.8 | V |
| $I_{IH}$ | Input High current | Vcc = 3.6V and Vin = 5.5V | - | - | 50 | uA |
| $I_{IL}$ | Input Low current | Vcc = 3.6V and Vin = 0V | - | - | -50 | uA |
| $V_{IK}$ | Clamp diode voltage | Vcc = Min. And $I_{IN}$ = -18mA | - | -0.7 | -1.2 | V |

**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

# Power Supply Characteristics

| Symbol | Description | Test Conditions (1) | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $I_{CCQ}$ | Quiescent Power Supply Current | Vcc=Max, Vin=Vcc or GND | - | 0.1 | 30 | uA |
| $\Delta I_{CC}$ | Power Supply Current per Input High | Vcc=Max, Vin= Vcc-0.6V | - | 50 | 300 | uA |

**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 | Max | Unit |
|---|---|---|---|---|---|
| Cin | Input Capacitance | Vin = 0V | 3 | 4 | pF |
| Cout | Output Capacitance | Vout = 0V | - | 6 | pF |

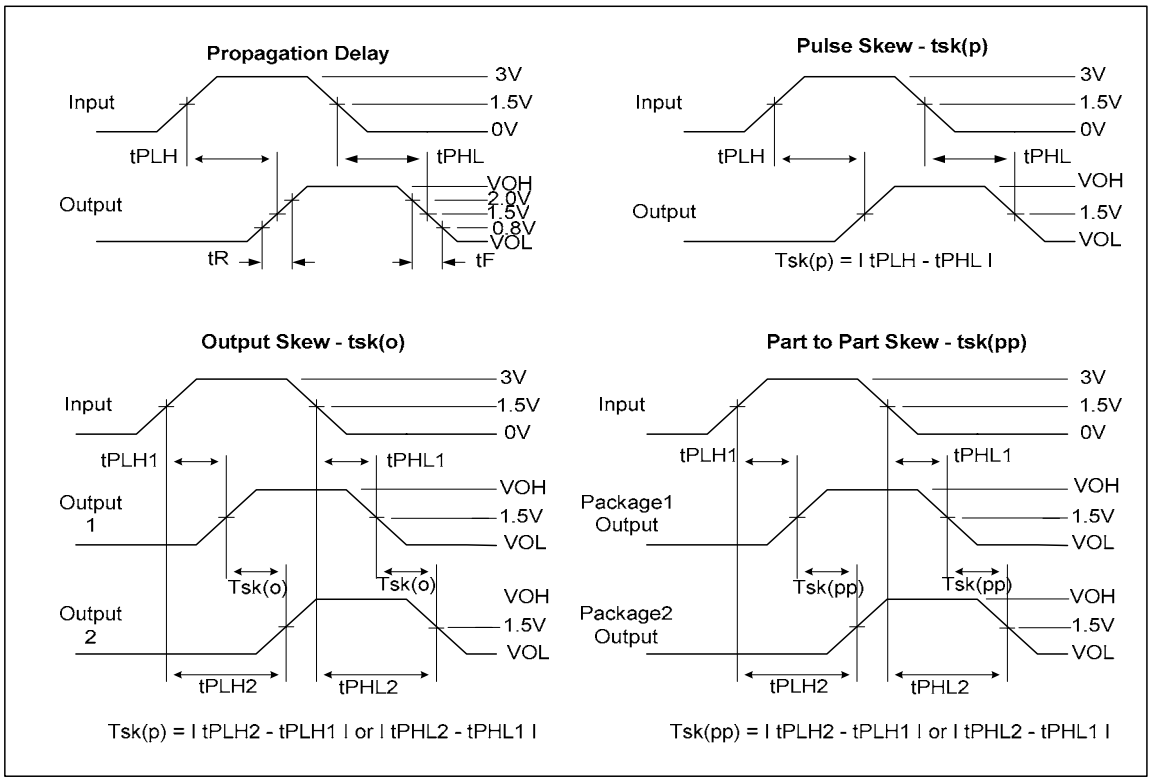
**Notes:**
1 This parameter is determined by device characterization but not production tested.

# Switching Characteristics

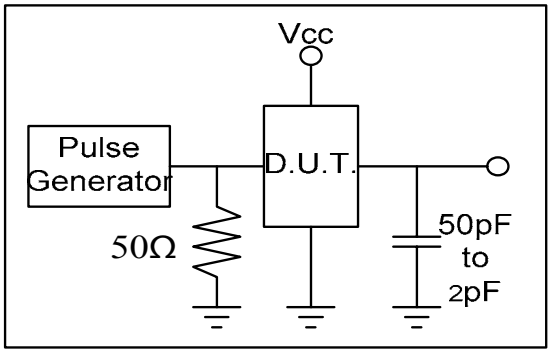
| Symbol | Description | Test Conditions (1) | Max | Unit |
|---|---|---|---|---|
| $t_{PLH}$ | Propagation Delay A to Bn | CL = 15pF | 2.1 | ns |
| $t_{PHL}$ | Propagation Delay A to Bn | CL = 15pF | 2.1 | ns |
| tr/tf | Rise/Fall Time | 0.8V – 2.0V | 0.8 | ns |
| tsk(p) | Pulse Skew (Same Package) | CL = 15pF, 125MHz | 150 | ps |
| tsk(o) | Output Pin to Pin Skew (Same Package) | CL = 15pF, 125MHz | 100 | ps |
| tsk(pp) | Output Skew (Different Package) | CL = 15pF, 125MHz | 400 | ps |
| fmax | Input Frequency | CL = 50pF | 100 | MHz |
| fmax | Input Frequency | CL =15pF | 450 | MHz |
| fmax | Input Frequency | CL = 5pF | 650 | MHz |
| fmax | Input Frequency | CL = 2pF | 700 | MHz |

**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

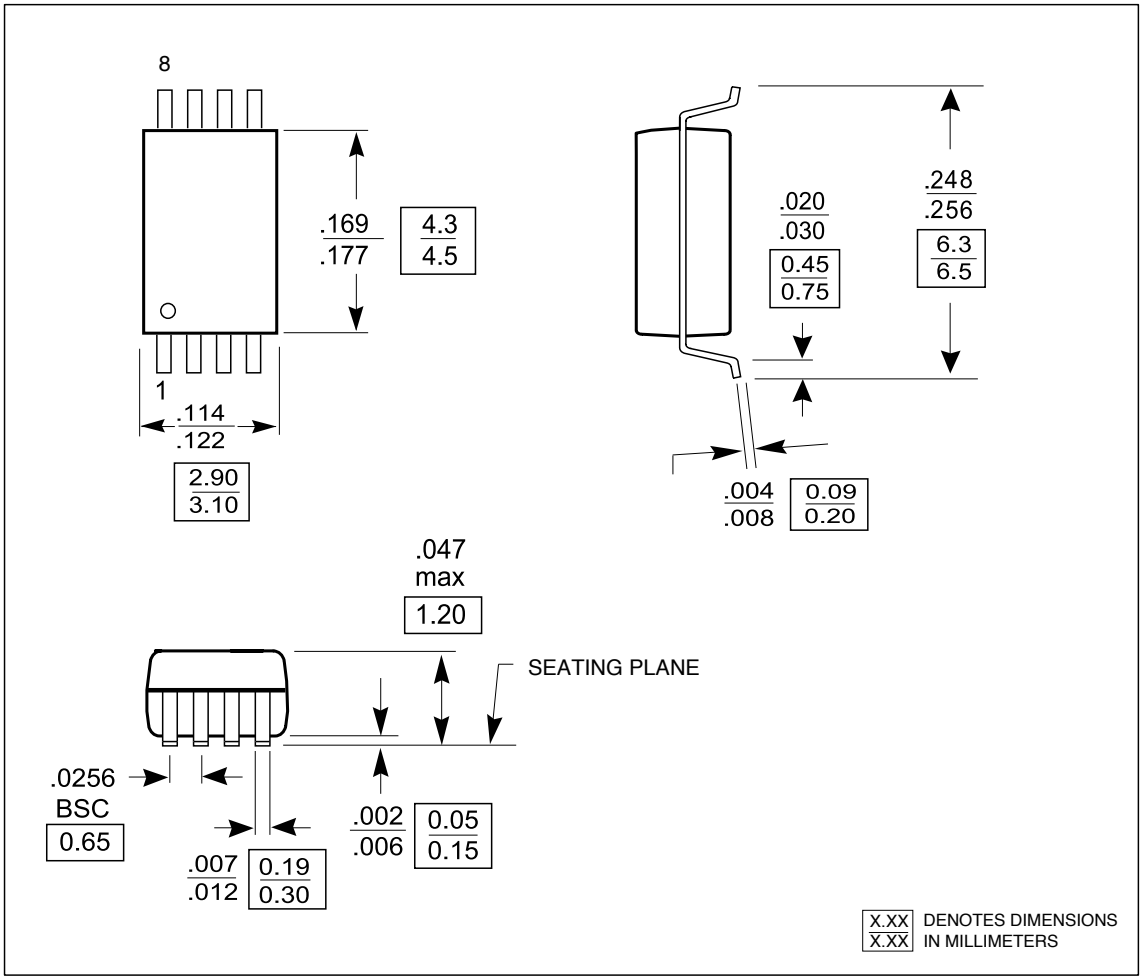
## Test Waveforms




## Test Circuit



# Packaging Mechanical Drawing: 8 pin TSSOP



# Ordering Information

| Ordering Code | Package | | | Top-Marking | $T_A$ |
|---|---|---|---|---|---|
| PO74G304ATU | 8pin TSSOP | Tube | Pb-free & Green | PO74G304AT | -40°C to 85°C |
| PO74G304ATR | 8pin TSSOP | Tape and reel | Pb-free & Green | PO74G304AT | -40°C to 85°C |