

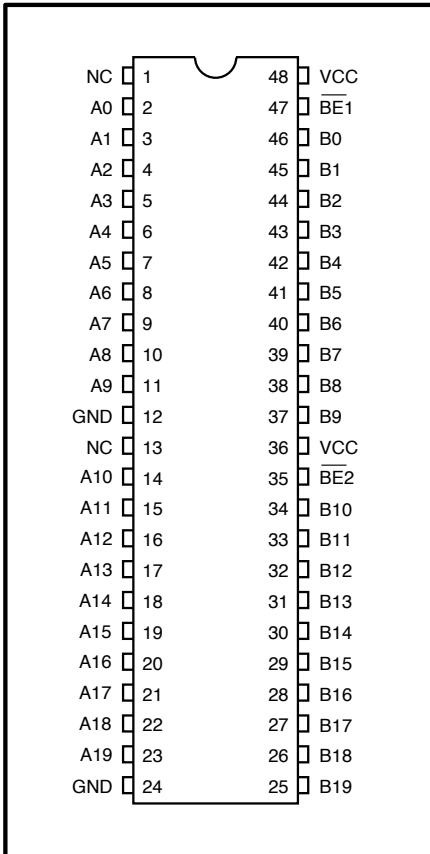


# PO3B16861A

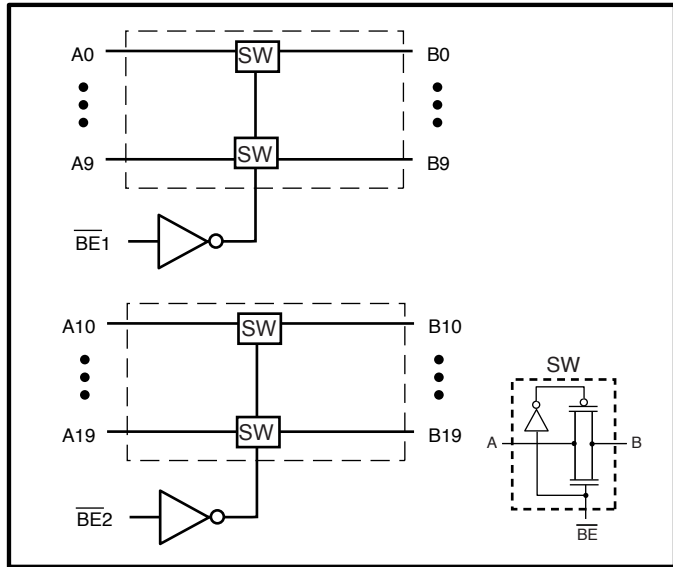
## High Bandwidth Potato Chip

| FEATURES:   | DESCRIPTION:  |
|---|---|
| <ul style="list-style-type: none"> <li>• Patented technology</li> <li>• High signal -3db passing bandwidth at 1.1GHz</li> <li>• Near-Zero propagation delay</li> <li>• VCC = 1.65V to 3.6V</li> <li>• Ultra-Low Quiescent Power: 0.1µA typical</li> <li>• Ideally suited for low power applications</li> <li>• Industrial operating temperature: -40°C to +85°C</li> <li>• Available in 48 pin TSSOP package</li> </ul> | <p>Potato Semiconductor's PO3B16861A is designed for world top performance using submicron CMOS technology to achieve GHz high bandwidth.</p> <p>The PO3B16861A is a 20-Bit, 2-Port Bus Switch. The switch introduces no additional ground bounce noise or propagation delay.</p> |

### Pin Configuration



### Block Diagram



### Truth Table

| Function   | $\overline{BE}_x$ | A19-A0 |
|------------|-------------------|--------|
| Disconnect | H                 | Hi-Z   |
| Connect    | L                 | B19-B0 |

**High Bandwidth Potato Chip****Maximum Ratings**

(Above which the useful life may be impaired. For user guidelines, not tested.)

|  |                           |
|--|---------------------------|
| Storage Temperature .....                    | -65°C to +150°C           |
| Ambient Temperature with Power Applied ..... | -40°C to +85°C            |
| Supply Voltage to Ground Potential .....     | -0.5V to +4.6V            |
| DC Input Voltage .....                       | -0.5V to +V <sub>CC</sub> |
| DC Output Current.....                       | 120mA                     |
| Power Dissipation.....                       | 0.5W                      |

**Note:**

Stresses greater than those 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.

**DC Electrical Characteristics, 3.3V Supply**(Over the Operating Range, T<sub>A</sub> = -40°C to +85°C, V<sub>CC</sub> = 3.3V ±10%)

| Parameters       | Description                   | Test Conditions  | Min. | Typ. | Max. | Units |
|------------------|-------------------------------|--|------|------|------|-------|
| V <sub>IH</sub>  | Input HIGH Voltage            | Guaranteed Logic HIGH Level  | 2.0  |      |      | V     |
| V <sub>IL</sub>  | Input LOW Voltage             | Guaranteed Logic LOW Level   |      |      | 0.8  |       |
| I <sub>IH</sub>  | Input HIGH Current            | V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>                            |      |      | ±1   | μA    |
| I <sub>IL</sub>  | Input LOW Current             | V <sub>CC</sub> = Max., V <sub>IN</sub> = GND  |      |      | ±1   |       |
| I <sub>OZH</sub> | High Impedance Output Current | 0 ≤ Y, I <sub>n</sub> ≤ V <sub>CC</sub>  |      |      | ±1   |       |
| R <sub>ON</sub>  | Switch On-Resistance          | V <sub>CC</sub> = Min., V <sub>IN</sub> = 0.0V,<br>I <sub>ON</sub> = -48 mA or -64mA |      | 12   | 24   | Ω     |
|                  |                               | V <sub>CC</sub> = Min., V <sub>IN</sub> = V <sub>CC</sub> , I <sub>ON</sub> = -15 mA |      | 12   | 24   |       |

**DC Electrical Characteristics, 2.5V Supply**(Over Operating Range, T<sub>A</sub> = -40°C to +85°C, V<sub>CC</sub> = 2.5V ± 10%)

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| Parameters       | Description            | Test Conditions   | Min. | Typ. | Max.                  | Units |
|------------------|------------------------|---|------|------|-----------------------|-------|
| V <sub>IH</sub>  | Input HIGH Voltage     | Guaranteed Logic HIGH Level   | 1.8  |      | V <sub>CC</sub> + 0.3 | V     |
| V <sub>IL</sub>  | Input LOW Voltage      | Guaranteed Logic LOW Level  | -0.3 |      | 0.8                   |       |
| I <sub>IH</sub>  | Input HIGH Current     | V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>                   |      |      | ±1                    | μA    |
| I <sub>IL</sub>  | Input LOW Current      | V <sub>CC</sub> = Max., V <sub>IN</sub> = GND                               |      |      | ±1                    |       |
| I <sub>OZH</sub> | High Impedance Current | 0 ≤ Y, I <sub>n</sub> ≤ V <sub>CC</sub>                                     |      |      | ±1                    |       |
| R <sub>ON</sub>  | Switch On Resistance   | V <sub>CC</sub> = Min., V <sub>IN</sub> = 0.0V,<br>I <sub>ON</sub> = -48mA  |      | 18   | 26                    | Ω     |
|                  |                        | V <sub>CC</sub> = Min., V <sub>IN</sub> = 2.25V,<br>I <sub>ON</sub> = -15mA |      | 18   | 26                    |       |

**High Bandwidth Potato Chip****Power Supply Characteristics**

| Symbol                | Description                    | Test Conditions (1)   | Min | Typ        | Max      | Unit      |
|-----------------------|--------------------------------|---|-----|------------|----------|-----------|
| <b>I<sub>CC</sub></b> | Quiescent Power Supply Current | V <sub>CC</sub> =Max, V <sub>IN</sub> =V <sub>CC</sub> or GND | -   | <b>0.1</b> | <b>3</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 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

**Capacitance** (T<sub>A</sub> = 25°C f = 1 MHz)

| Parameters       | Description                 | Test Conditions     | Typ. | Units |
|------------------|-----------------------------|---------------------|------|-------|
| C <sub>IN</sub>  | Input Capacitance           | V <sub>IN</sub> =0V | 3.0  | pF    |
| C <sub>OFF</sub> | A/B Capacitance, Switch Off | V <sub>IN</sub> =0V | 5.0  | pF    |
| C <sub>ON</sub>  | A/B Capacitance, Switch On  | V <sub>IN</sub> =0V | 10.0 | pF    |

**Dynamic Electrical Characteristics Over the Operating Range**(T<sub>A</sub> = -40° to +85°, V<sub>CC</sub> = 3.3V ± 10%)

| Parameter         | Description    | Test Condition        | Typ. | Units |
|-------------------|----------------|-----------------------|------|-------|
| X <sub>TALK</sub> | Crosstalk      | R <sub>L</sub> = 100Ω | -60  | dB    |
| O <sub>IRR</sub>  | Off-Isolation  | R <sub>L</sub> = 100Ω | -60  |       |
| BW                | -3dB Bandwidth | R <sub>L</sub> = 100Ω | 1.1  | GHz   |

**Switching Characteristics over 3.3V Operating Range**

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| Parameters                           | Description       | Conditions       | Max. | Units |
|--------------------------------------|-------------------|------------------|------|-------|
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propogation Delay | See Test Diagram | 0.3  | ns    |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Bus Enable Time   | See Test Diagram | 2.0  |       |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Bus Disable Time  |                  | 3.0  |       |

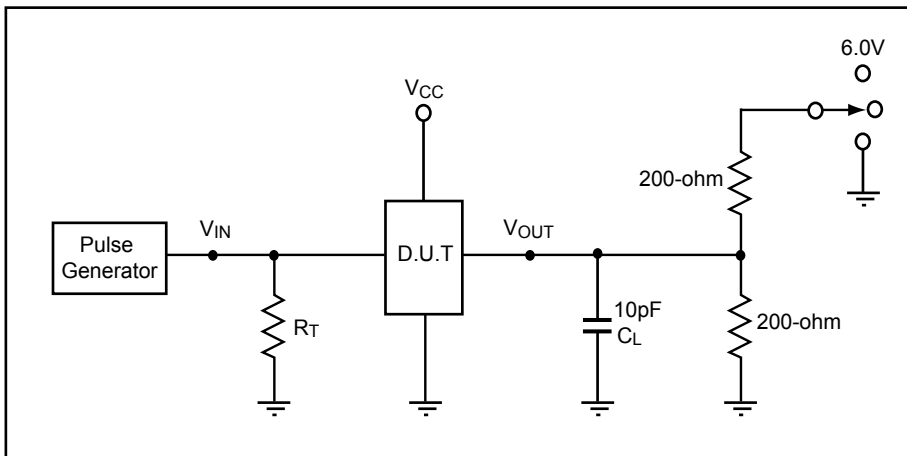


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### Switching Characteristics over 2.5V Operating Range

| Parameters             | Description       | Conditions       | Max. | Units |
|------------------------|-------------------|------------------|------|-------|
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay | See Test Diagram | 0.3  | ns    |
| $t_{PZH}$<br>$t_{PZL}$ | Bus Enable Time   | See Test Diagram | 2.0  |       |
| $t_{PHZ}$<br>$t_{PLZ}$ | Bus Disable Time  |                  | 3.0  |       |

### Test Circuit for Electrical Characteristics

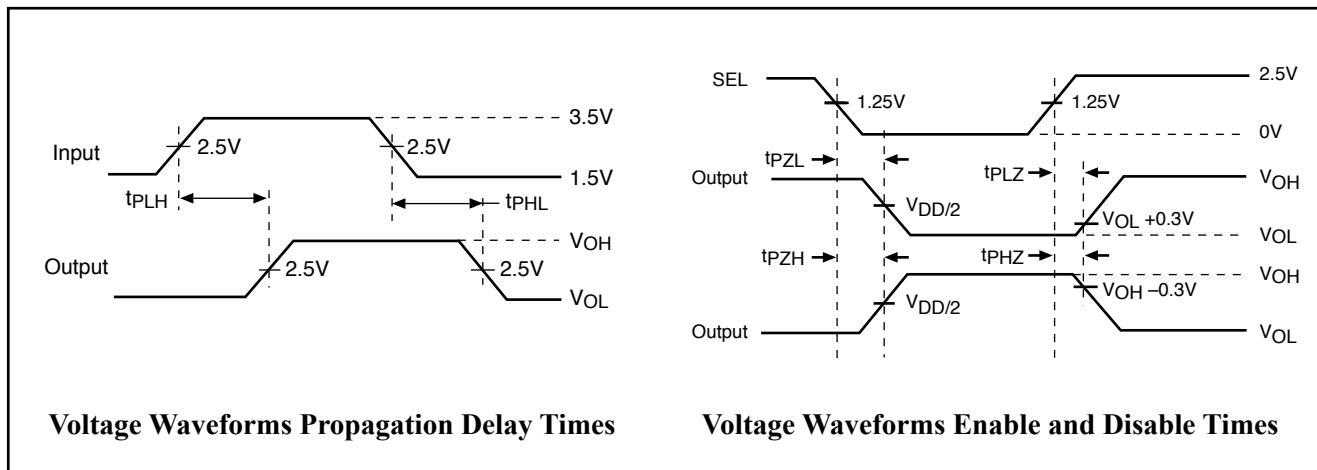


### Switch Positions

| Test                  | Switch |
|-----------------------|--------|
| $t_{PLZ}$ , $t_{PZL}$ | 6.0V   |
| $t_{PHZ}$ , $t_{PZH}$ | GND    |
| Prop Delay            | Open   |

### Switching Waveforms

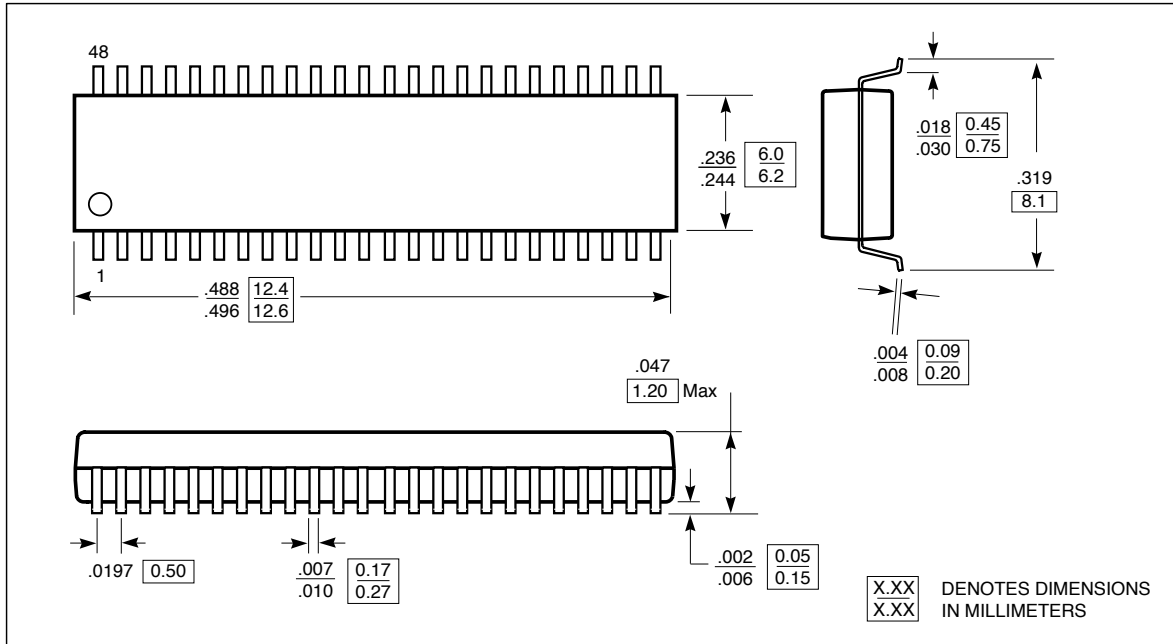
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## High Bandwidth Potato Chip

### Packaging Mechanical Drawing: 48 pin TSSOP



### IC Ordering Information

| Ordering Code                | Package            |                 | Top-Marking | T <sub>A</sub> |
|------------------------------|--------------------|-----------------|-------------|----------------|
| PO3B16861ATU for Tube        | 48pin 240mil TSSOP | Pb-free & Green | PO3B16861AT | -40°C to 85°C  |
| PO3B16861ATR for Tape & Reel | 48pin 240mil TSSOP | Pb-free & Green | PO3B16861AT | -40°C to 85°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 |
|--------------|-----------------|-----------------|-----------------|-----------------|---------------------|--------------|--------------------|--------------|
| T            | 240mil TSSOP 48 | 24              | 12              | Top Left Corner | 26 (12")            | 1500         | 43 (20")           | 39           |