

## 1.8V, Wide-Bandwidth, 5 Differential Channels, 2:1 Mux/DeMux Switch with Dual Enable

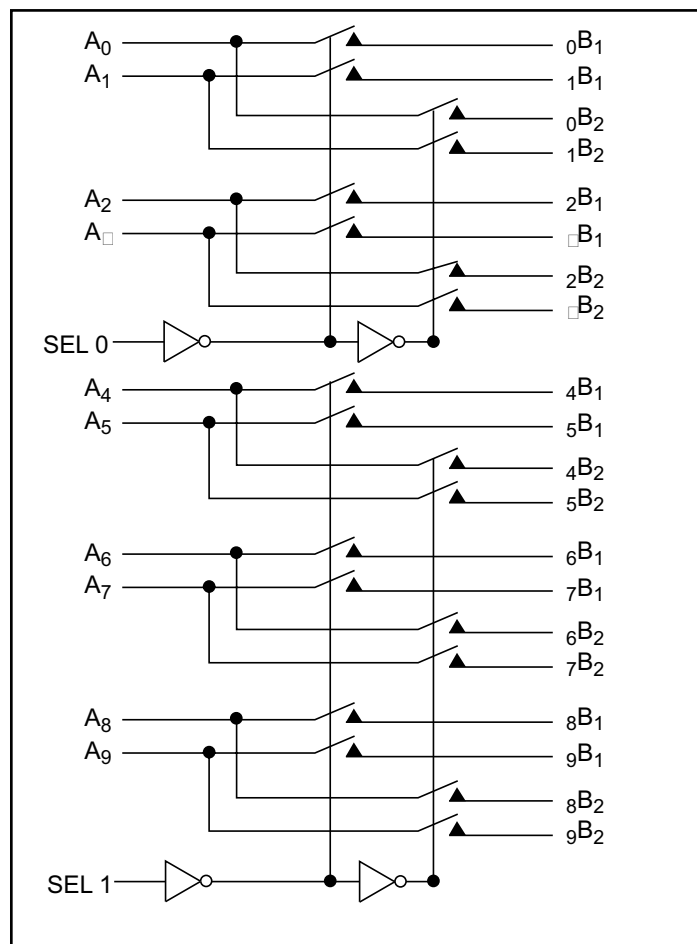
### Features

- 5 different channels, 2:1 Mux/DeMux
- LVDS signal switching beyond 2.5Gbps
- Low bit-to-bit skew, 8ps
- Low crosstalk: -70dB @ 10MHz
- Switching speed: 4ns
- V<sub>CC</sub> Operating Range: +1.5V to +2.0V
- ESD: Data bits @ 8kV HBM, select bits @ 2kV HBM
- Packaging (Pb-free & Green):  
- 64-pin TSSOP (A)

### Applications

- Routes physical layer signals for high-speed, high bandwidth differential protocols

### Block Diagram



### Description

Pericom Semiconductor's PI2LVD512 is a 10- to 5-channel multiplexer/demultiplexer Switch. The device multiplexes differential signals to one of two corresponding outputs. The switch is bidirectional. It is designed for low bit-to-bit skew, high channel-to-channel noise isolation and is compatible with various differential standards such as LVDS

### Pin Description 64-TSSOP

|                  |    |    |                 |
|------------------|----|----|-----------------|
| GND              | 1  | 64 | V <sub>DD</sub> |
| V <sub>DD</sub>  | 2  | 63 | GND             |
| GND              | 3  | 62 | GND             |
| GND              | 4  | 61 | 0B1             |
| GND              | 5  | 60 | 1B1             |
| A <sub>0</sub>   | 6  | 59 | 0B2             |
| A <sub>1</sub>   | 7  | 58 | 1B2             |
| V <sub>DD</sub>  | 8  | 57 | GND             |
| GND              | 9  | 56 | V <sub>DD</sub> |
| SEL <sub>0</sub> | 10 | 55 | 2B1             |
| V <sub>DD</sub>  | 11 | 54 | 3B1             |
| A <sub>2</sub>   | 12 | 53 | 2B2             |
| A <sub>3</sub>   | 13 | 52 | 3B2             |
| GND              | 14 | 51 | GND             |
| V <sub>DD</sub>  | 15 | 50 | GND             |
| V <sub>DD</sub>  | 16 | 49 | 4B1             |
| GND              | 17 | 48 | 5B1             |
| A <sub>4</sub>   | 18 | 47 | 4B2             |
| A <sub>5</sub>   | 19 | 46 | 5B2             |
| V <sub>DD</sub>  | 20 | 45 | 6B1             |
| A <sub>6</sub>   | 21 | 44 | 7B1             |
| A <sub>7</sub>   | 22 | 43 | 6B2             |
| GND              | 23 | 42 | 7B2             |
| V <sub>DD</sub>  | 24 | 41 | GND             |
| SEL <sub>1</sub> | 25 | 40 | V <sub>DD</sub> |
| V <sub>DD</sub>  | 26 | 39 | 8B1             |
| A <sub>8</sub>   | 27 | 38 | 9B1             |
| A <sub>9</sub>   | 28 | 37 | 8B2             |
| GND              | 29 | 36 | 9B2             |
| GND              | 30 | 35 | GND             |
| V <sub>DD</sub>  | 31 | 34 | GND             |
| GND              | 32 | 33 | V <sub>DD</sub> |

## Maximum Ratings

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

|                                         |                   |
|-----------------------------------------|-------------------|
| Storage Temperature.....                | –65°C to +150°C   |
| Supply Voltage to Ground Potential..... | –0.5V to +2.5V    |
| DC Input Voltage .....                  | –0.5V to $V_{CC}$ |
| 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.

## Truth Table

| Function                                                 | SEL <sub>0</sub> | SEL <sub>1</sub> |
|----------------------------------------------------------|------------------|------------------|
| A <sub>N</sub> to N <sub>B</sub> 1, N = 0, 1, 2, 3       | L                | X                |
| A <sub>N</sub> to N <sub>B</sub> 2, N = 0, 1, 2, 3       | H                | X                |
| A <sub>N</sub> to N <sub>B</sub> 1, N = 4, 5, 6, 7, 8, 9 | X                | L                |
| A <sub>N</sub> to N <sub>B</sub> 2, N = 4, 5, 6, 7, 8, 9 | X                | H                |

## DC Electrical Characteristics for Switching over Operating Range (T<sub>A</sub> = –40°C to +85°C, V<sub>CC</sub> = 1.5V to 2.0V)

| Parameter       | Description         | Test Conditions <sup>(1)</sup>                            | Min.                   | Typ. <sup>(2)</sup> | Max.                   | Units |
|-----------------|---------------------|-----------------------------------------------------------|------------------------|---------------------|------------------------|-------|
| V <sub>IH</sub> | Input HIGH Voltage  | Guaranteed HIGH level                                     | 0.65 x V <sub>CC</sub> | -                   | -                      | V     |
| V <sub>IL</sub> | Input LOW Voltage   | Guaranteed LOW level                                      | –0.5                   | -                   | 0.35 x V <sub>CC</sub> |       |
| V <sub>IK</sub> | Clamp Diode Voltage | V <sub>CC</sub> = Max., I <sub>IN</sub> = –18mA           | -                      | –0.7                | –1.2                   |       |
| I <sub>IH</sub> | Input HIGH Current  | V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub> | -                      | -                   | ±5                     | μA    |
| I <sub>IL</sub> | Input LOW Current   | V <sub>CC</sub> = Max., V <sub>IN</sub> = GND             | -                      | -                   | ±5                     |       |

### Notes:

- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V<sub>CC</sub> = 1.8V, T<sub>A</sub> = 25°C ambient and maximum loading.

### Power Supply Characteristics

| Parameters      | Description                    | Test Conditions <sup>(1)</sup>                                   | Min. | Typ. <sup>(2)</sup> | Max. | Units |
|-----------------|--------------------------------|------------------------------------------------------------------|------|---------------------|------|-------|
| I <sub>CC</sub> | Quiescent Power Supply Current | V <sub>CC</sub> = Max., V <sub>IN</sub> = GND or V <sub>CC</sub> |      | 400                 |      | μA    |

#### Notes:

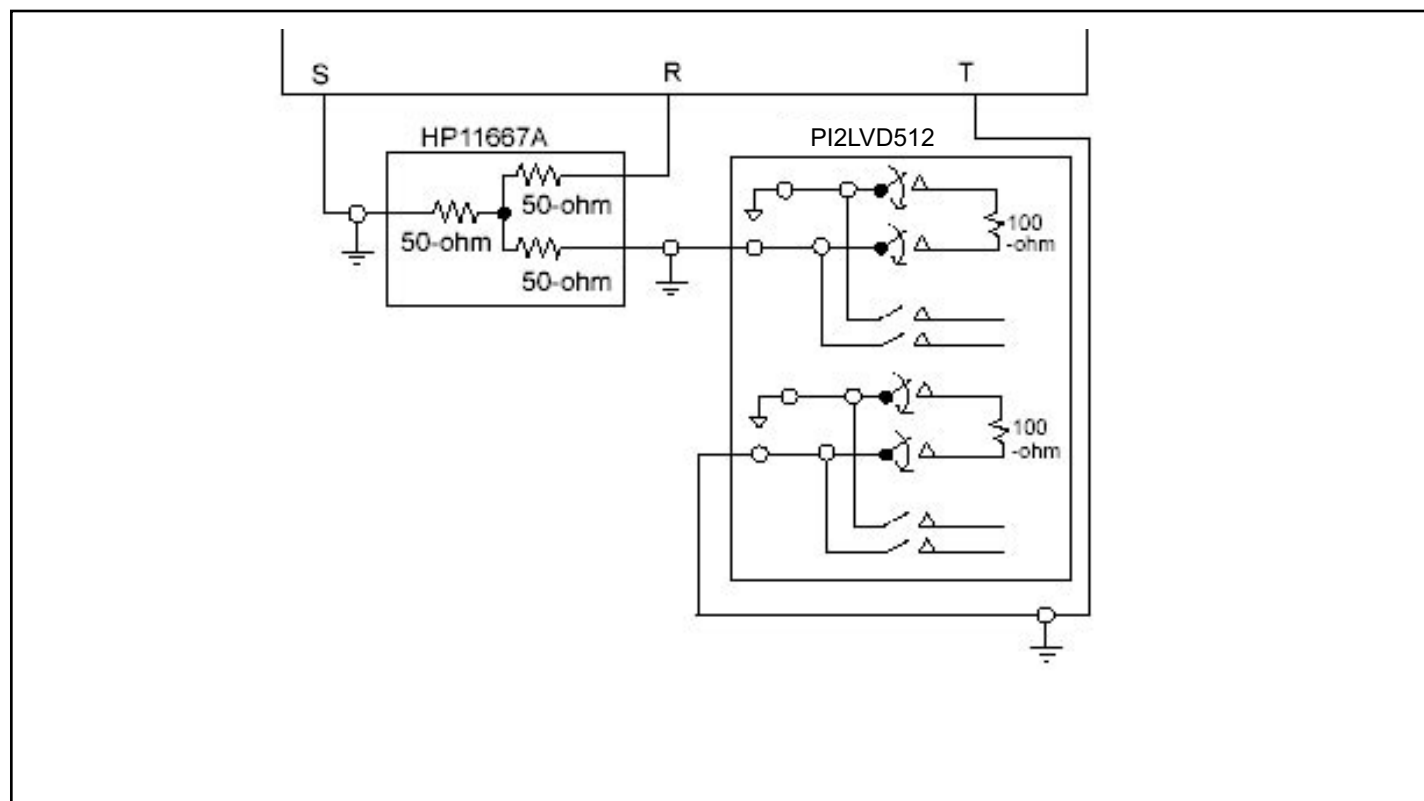
- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V<sub>CC</sub> = 1.8V, T<sub>A</sub> = 25°C ambient and maximum loading.

### Dynamic Electrical Characteristics Over the Operating Range (T<sub>A</sub> = -40° to +85°C, V<sub>CC</sub> = 1.8V±10%, GND=0V)

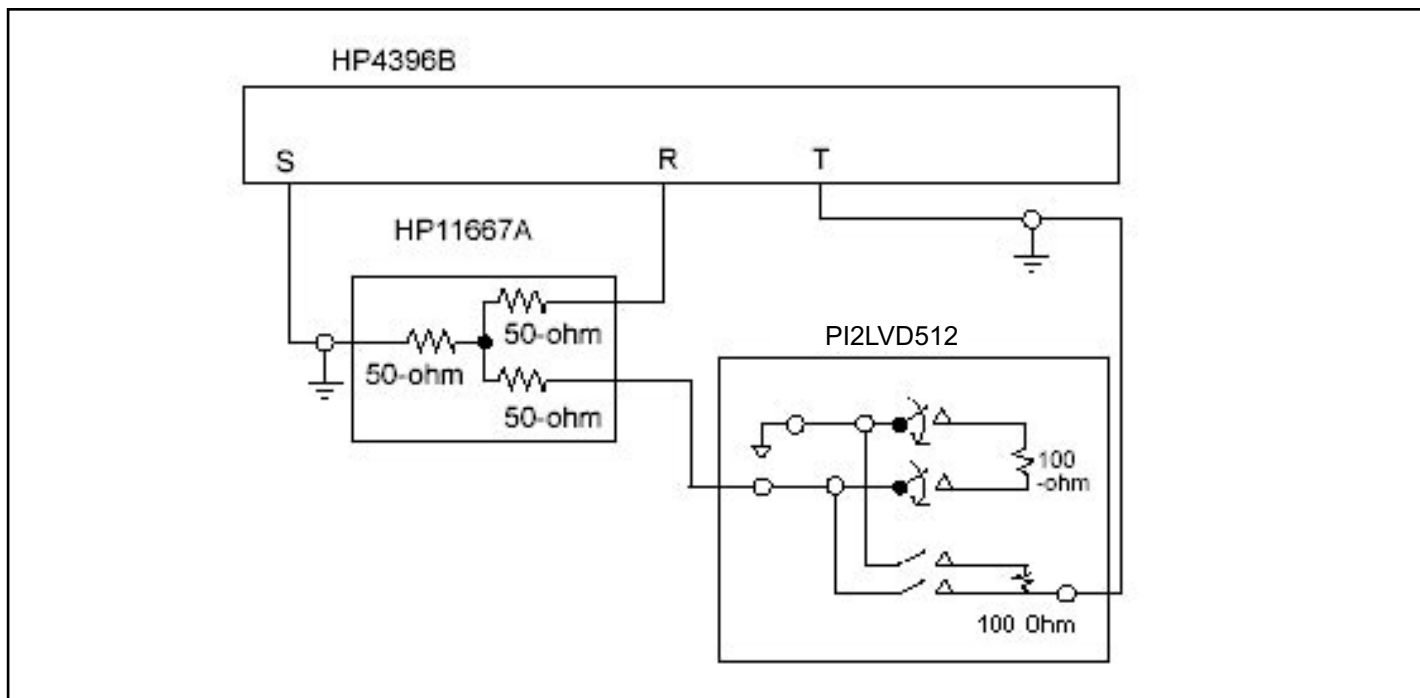
| Parameter                        | Description    | Test Conditions                                 | Min. | Typ. | Max. | Units |
|----------------------------------|----------------|-------------------------------------------------|------|------|------|-------|
| X <sub>TALK</sub> <sup>(1)</sup> | Crosstalk      | See Fig. 1 for Measurement Setup,<br>f = 10 MHz |      | -70  |      | dB    |
| O <sub>IRR</sub> <sup>(1)</sup>  | OFF Isolation  | See Fig. 2 for Measurement Setup,<br>f = 10 MHz |      | -65  |      |       |
| BW                               | -3dB Bandwidth |                                                 |      | 1.26 |      | GHz   |

#### Note:

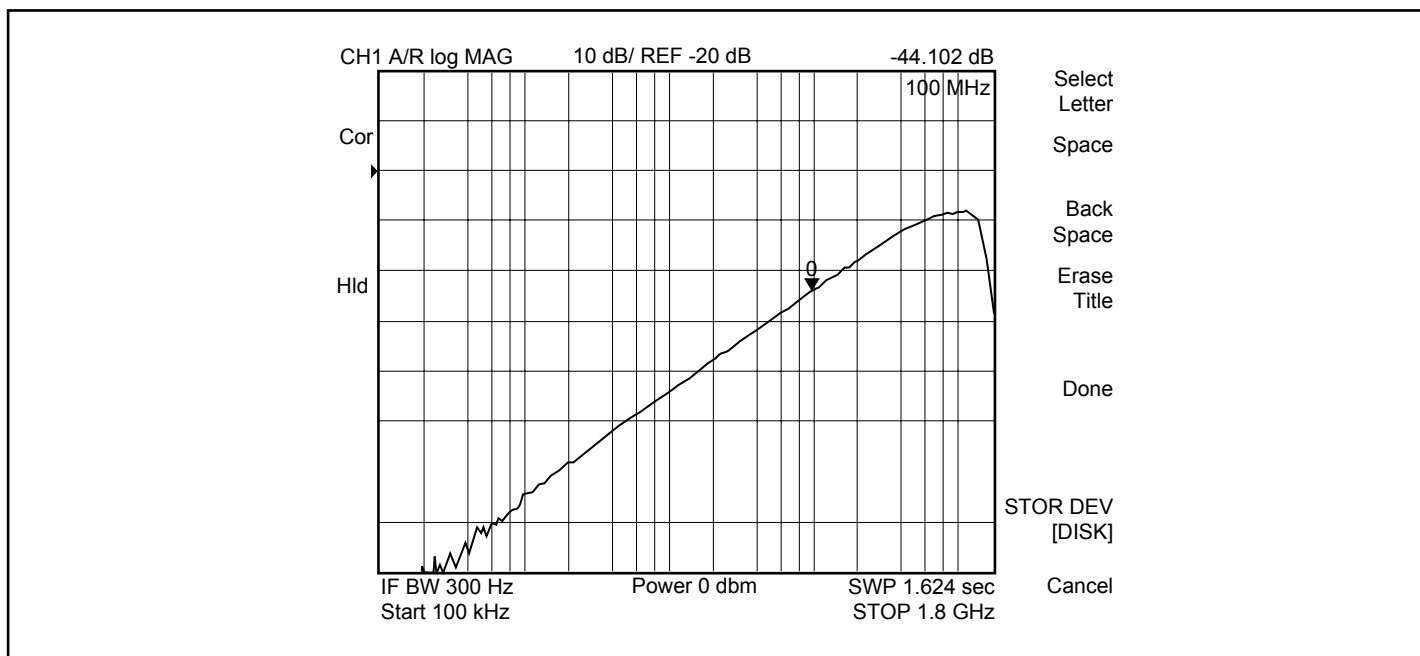
- Guaranteed by design.



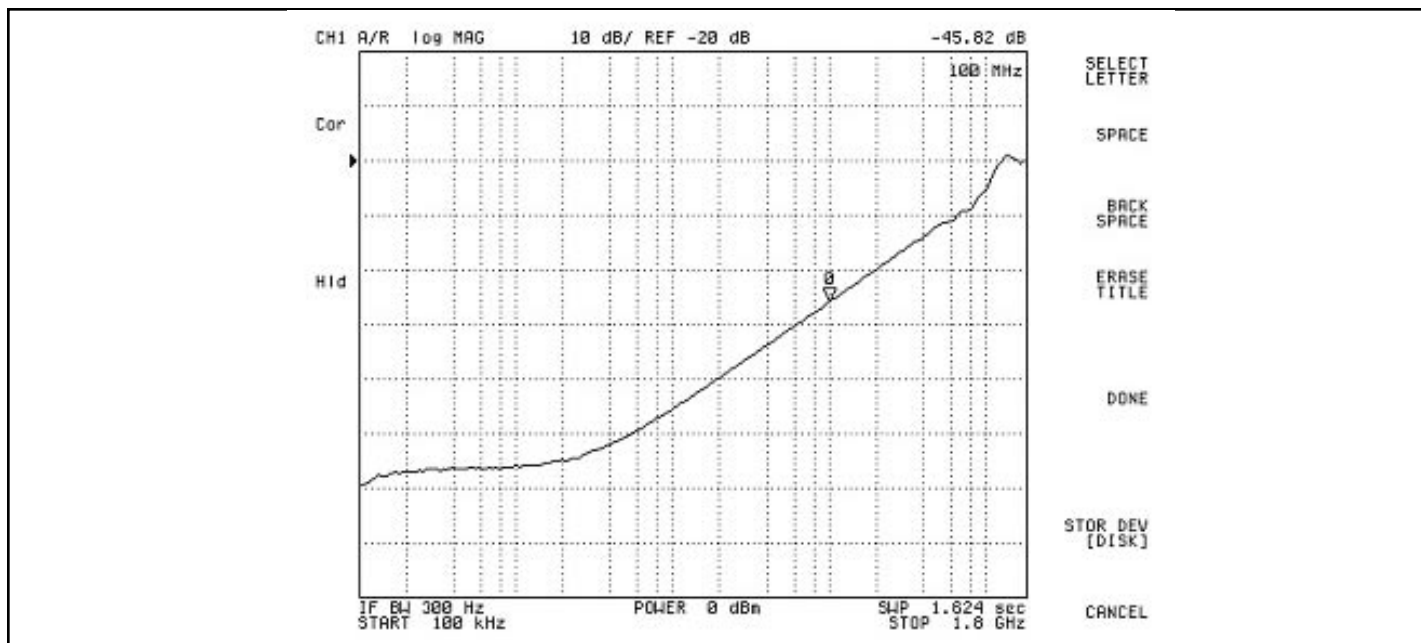
**Fig 1. Crosstalk Setup**



**Fig 2. Off-isolation setup**



**Fig 3. Crosstalk**



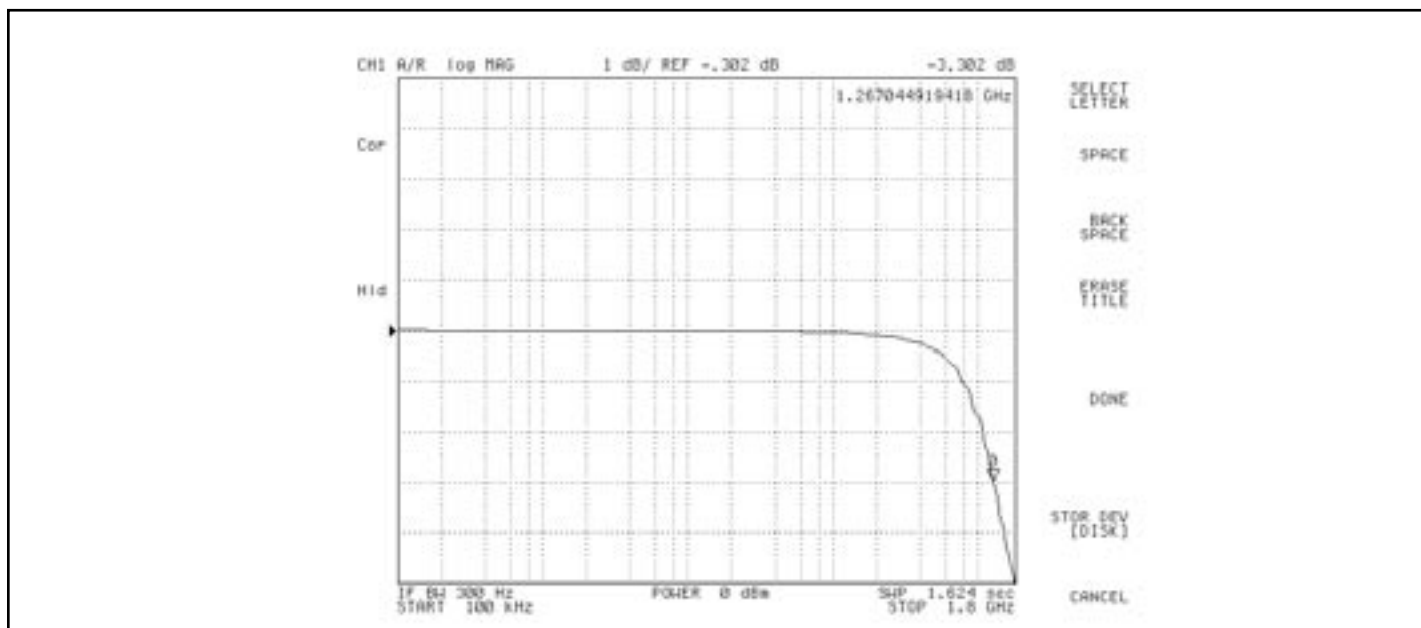
**Fig 4. Off Isolation**

**Switching Characteristics** ( $T_A = -40^\circ$  to  $+85^\circ\text{C}$ ,  $V_{CC} = 1.8\text{V} \pm 10\%$ )

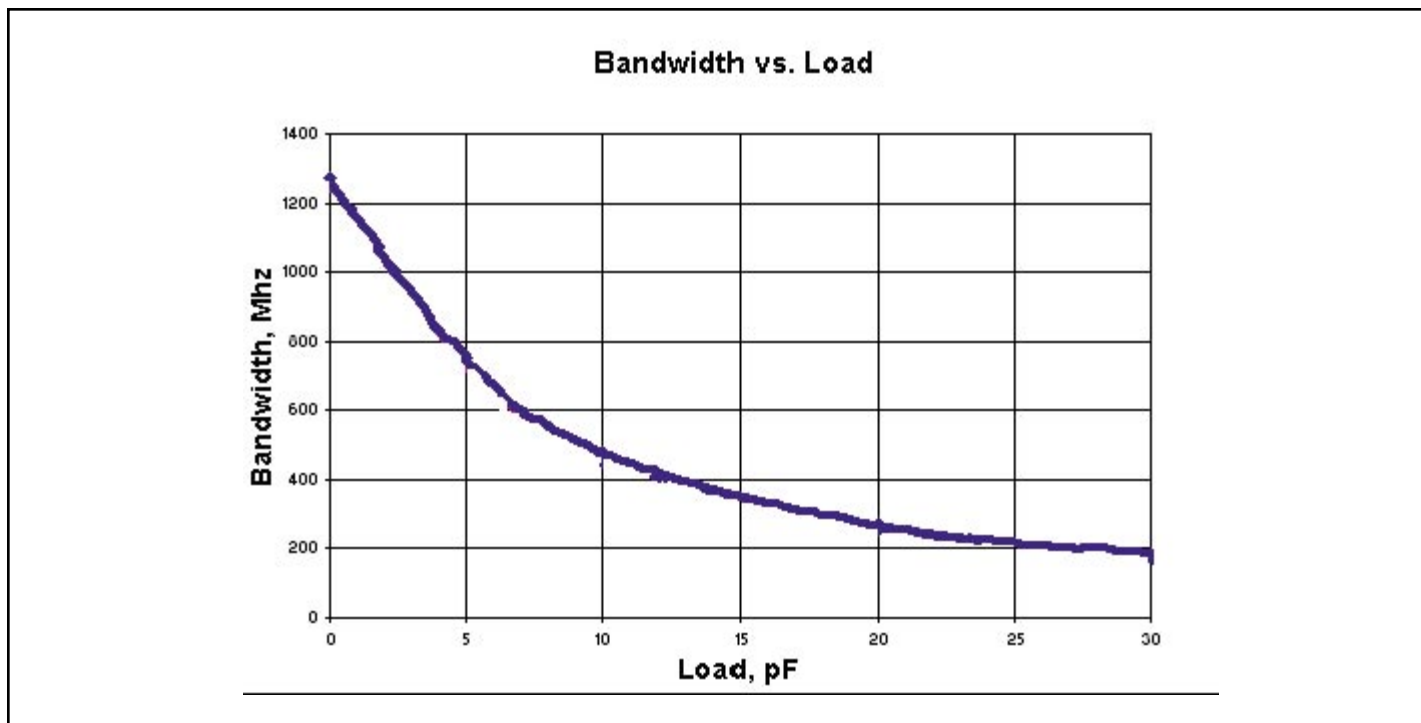
| Parameter  | Description                                                | Min. | Typ. <sup>(2)</sup> | Max. | Units |
|------------|------------------------------------------------------------|------|---------------------|------|-------|
| tpZH, tpZL | Line Enable Time - SEL to A <sub>N</sub> , B <sub>N</sub>  | 0.5  | -                   | 8.0  |       |
| tPHZ, tPLZ | Line Disable Time - SEL to A <sub>N</sub> , B <sub>N</sub> | 0.5  | -                   | 4.0  |       |
| tb-b       | Bit-to-bit skew                                            |      | 8                   |      | ps    |
| tch-ch     | Channel-to-channel skew                                    |      | 45                  |      | ps    |

**Note:**

- For max. or min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.

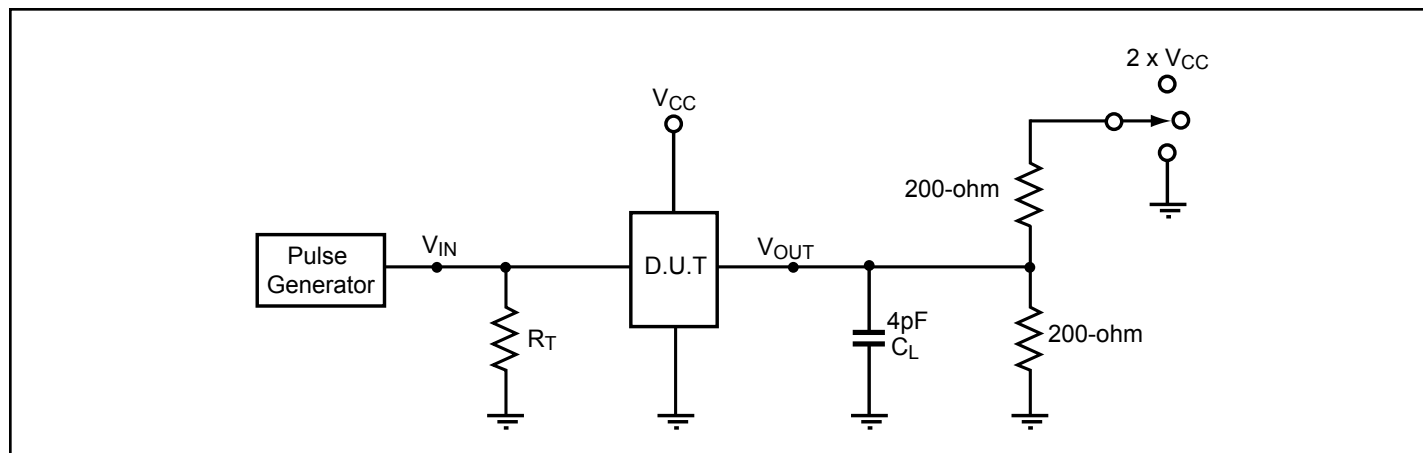


**Fig 5. Bandwidth,  $V_{CC} = 1.8\text{V}$ ,  $25^\circ\text{C}$**



**Fig 6. Bandwidth vs. Load**

### Test Circuit for Electrical Characteristics<sup>(1)</sup>



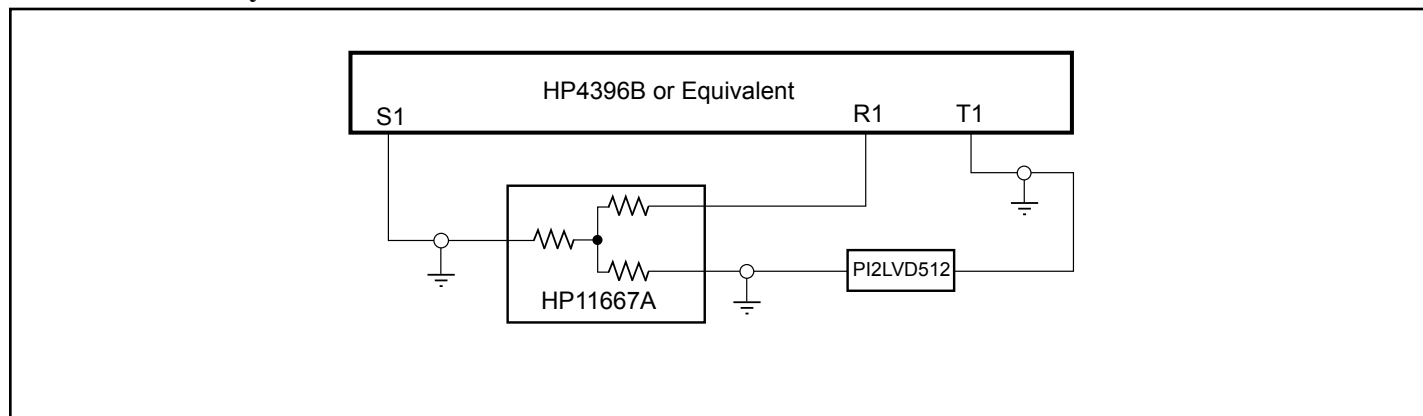
#### Notes:

1.  $C_L$  = Load capacitance: includes jig and probe capacitance.
2.  $R_T$  = Termination resistance: should be equal to  $Z_{OUT}$  of the Pulse Generator
3. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.  
Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
4. All input impulses are supplied by generators having the following characteristics:  $PRR \leq \text{MHz}$ ,  $Z_O = 50\Omega$ ,  $t_R \leq 2.5\text{ns}$ ,  $t_F \leq 2.5\text{ns}$ .
5. The outputs are measured one at a time with one transition per measurement.

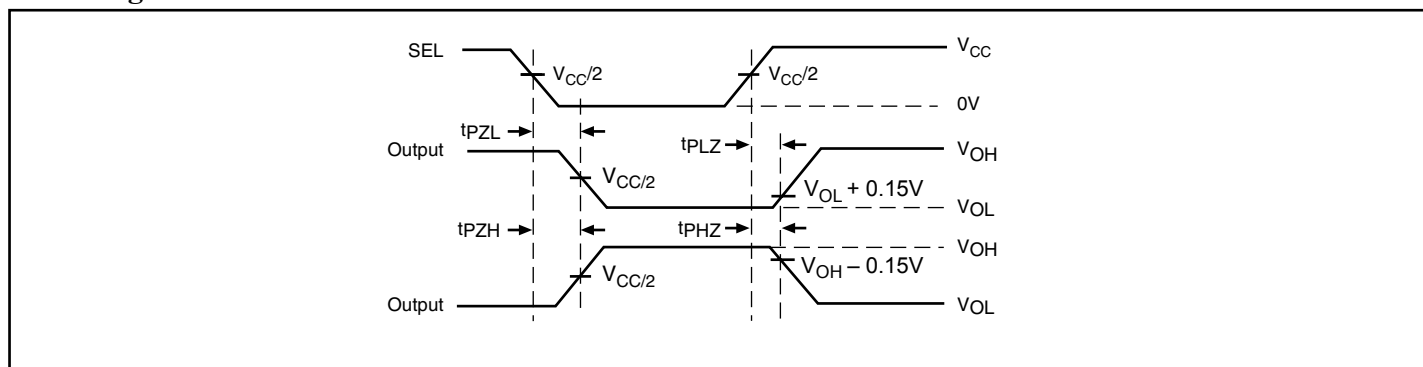
### Switch Positions

| Test                                     | Switch            |
|------------------------------------------|-------------------|
| $t_{PLZ}$ , $t_{PZL}$ (output on B-side) | $2 \times V_{CC}$ |
| $t_{PHZ}$ , $t_{PZH}$ (output on B-side) | GND               |

### Test Circuit for Dynamic Electrical Characteristics

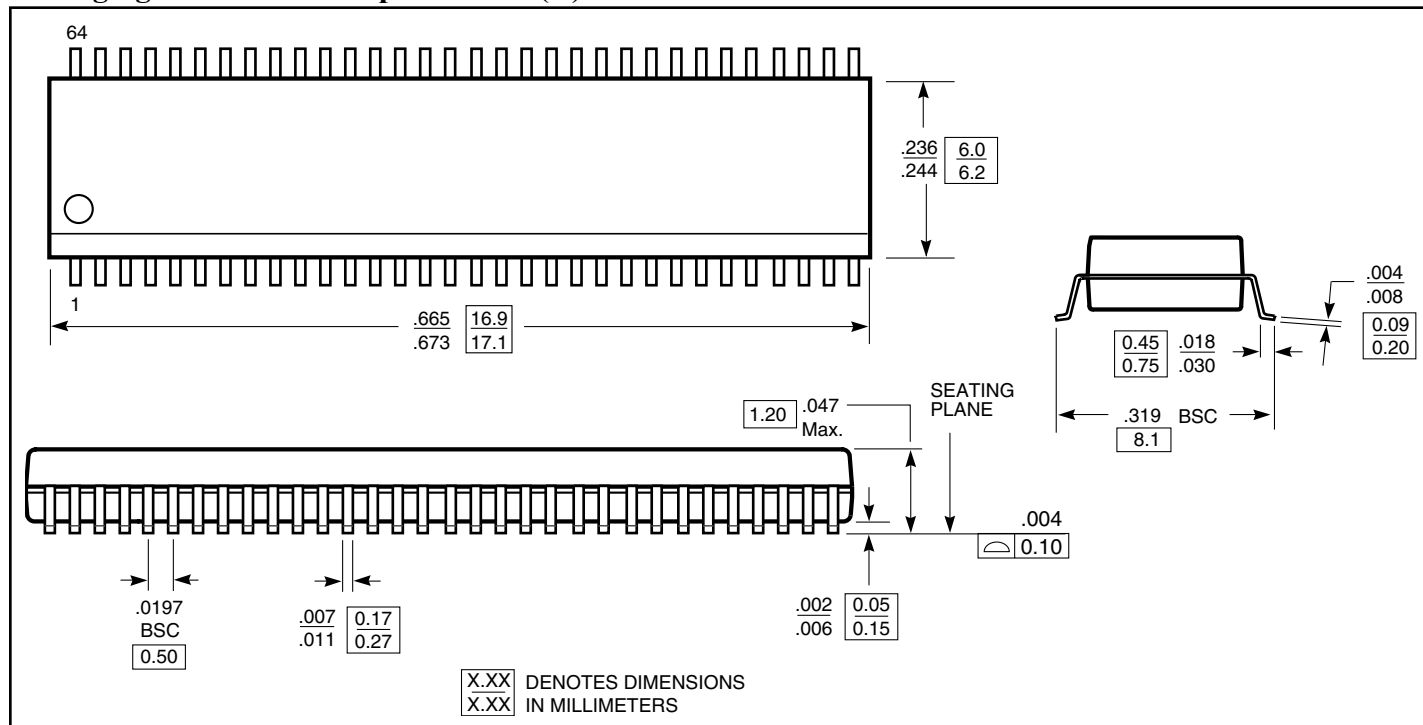


## Switching Waveforms



Voltage Waveforms Enable and Disable Times

## Packaging Mechanical: 64-pin TSSOP (A)



## Ordering Information

| Ordering Code | Package Code | Package Description             |
|---------------|--------------|---------------------------------|
| PI2LVD512AE   | AE           | Pb-free and Green, 64-Pin TSSOP |

### Notes:

- Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://www.pericom.com/packaging/)
- E = Pb-free and Green
- X suffix = Tape/Reel