

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

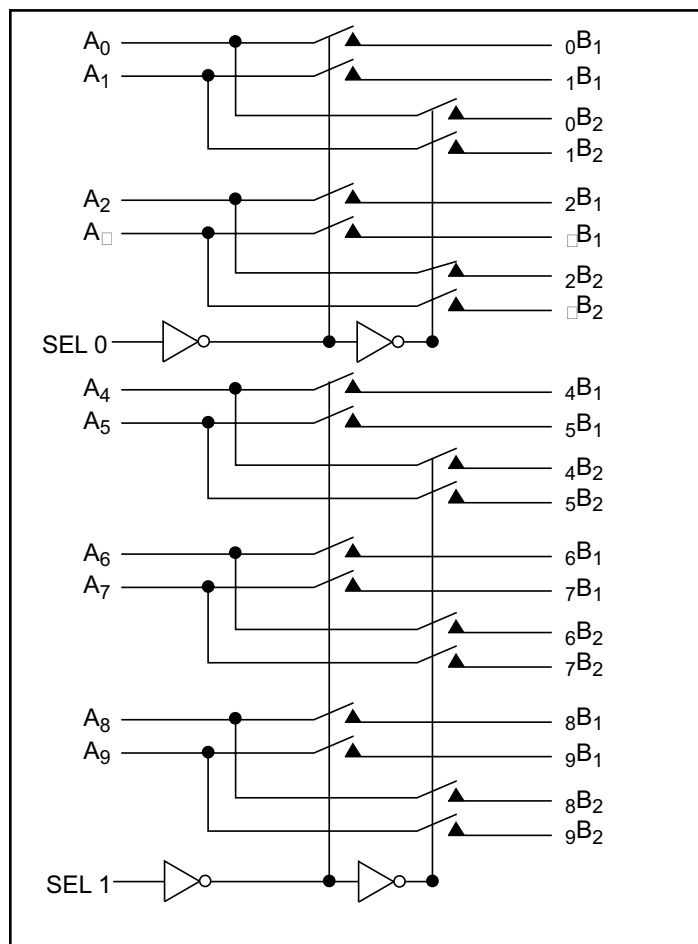
### Features

- 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	64-Pin A	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 <sub>N</sub> B <sub>1</sub> , N = 0, 1, 2, 3	L	X
A <sub>N</sub> to <sub>N</sub> B <sub>2</sub> , N = 0, 1, 2, 3	H	X
A <sub>N</sub> to <sub>N</sub> B <sub>1</sub> , N = 4, 5, 6, 7, 8, 9	X	L
A <sub>N</sub> to <sub>N</sub> B <sub>2</sub> , 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	μA
I <sub>IH</sub>	Input HIGH Current	V <sub>CC</sub> = Max., V <sub>IN</sub> = V <sub>CC</sub>	-	-	±5	
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:**

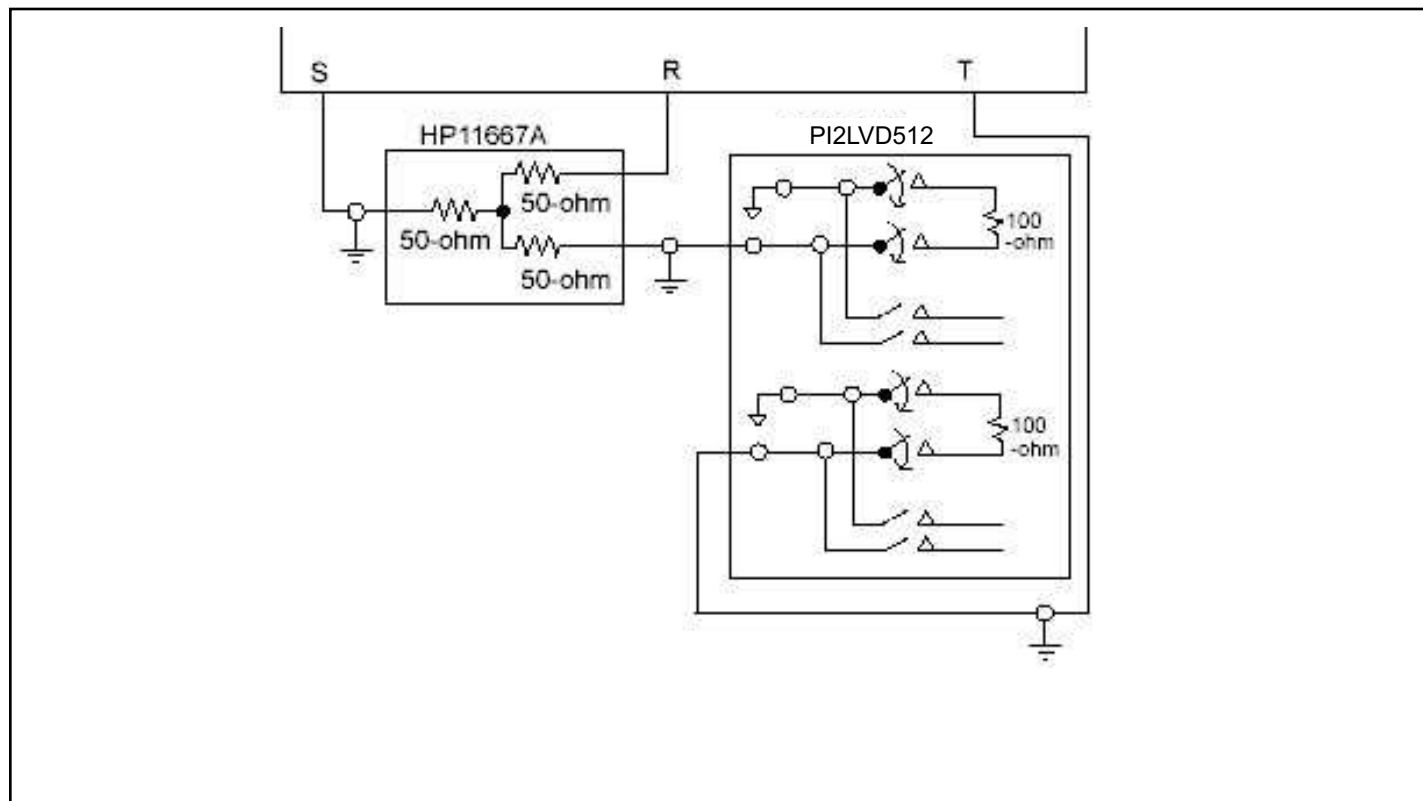
- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V<sub>CC</sub> = 1.8V, T<sub>A</sub> = 25°C ambient and maximum loading.

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

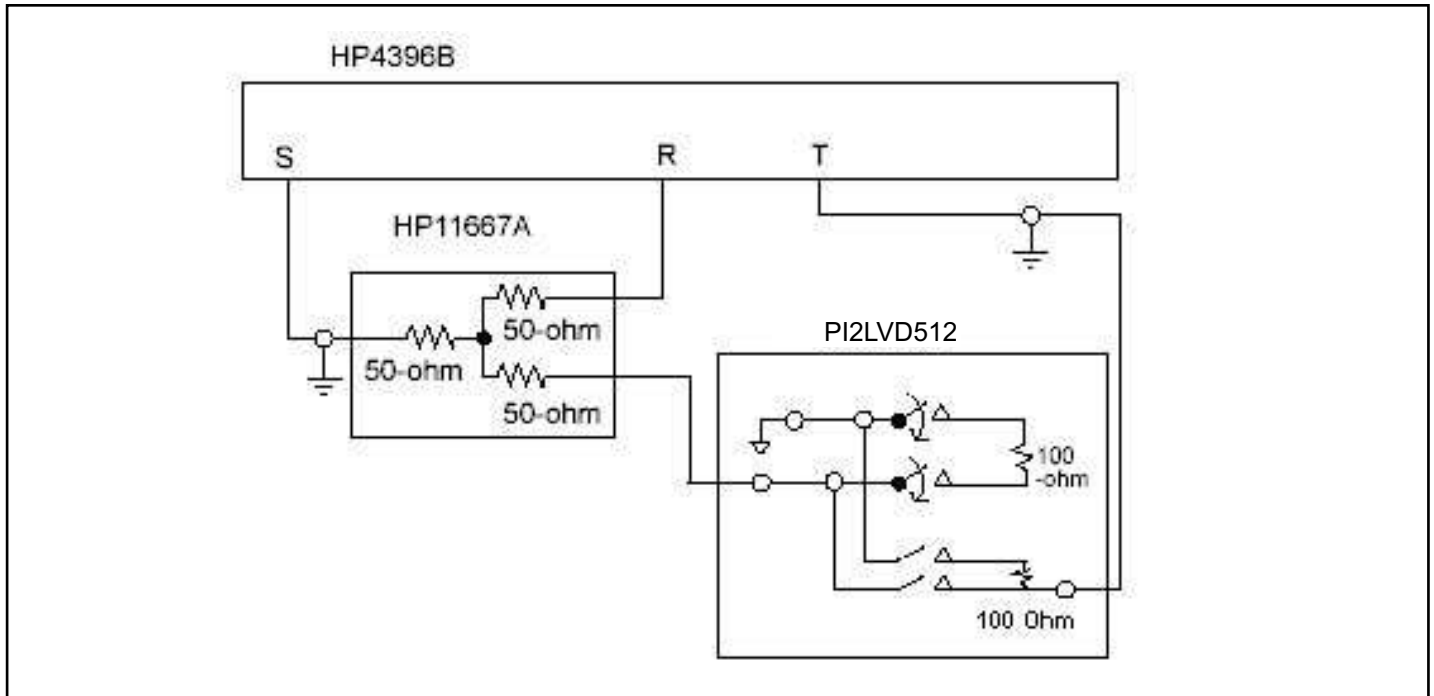
Parameter	Description	Test Conditions	Min.	Typ.	Max.	Units
X <sub>TALK</sub> <sup>(1)</sup>	Crosstalk	See Fig. 1 for Measurement Setup, f = 10 MHz		-70		dB
O <sub>IRR</sub> <sup>(1)</sup>	OFF Isolation	See Fig. 2 for Measurement Setup, f = 10 MHz		-65		
BW	-3dB Bandwidth			1.26		GHz

**Note:**

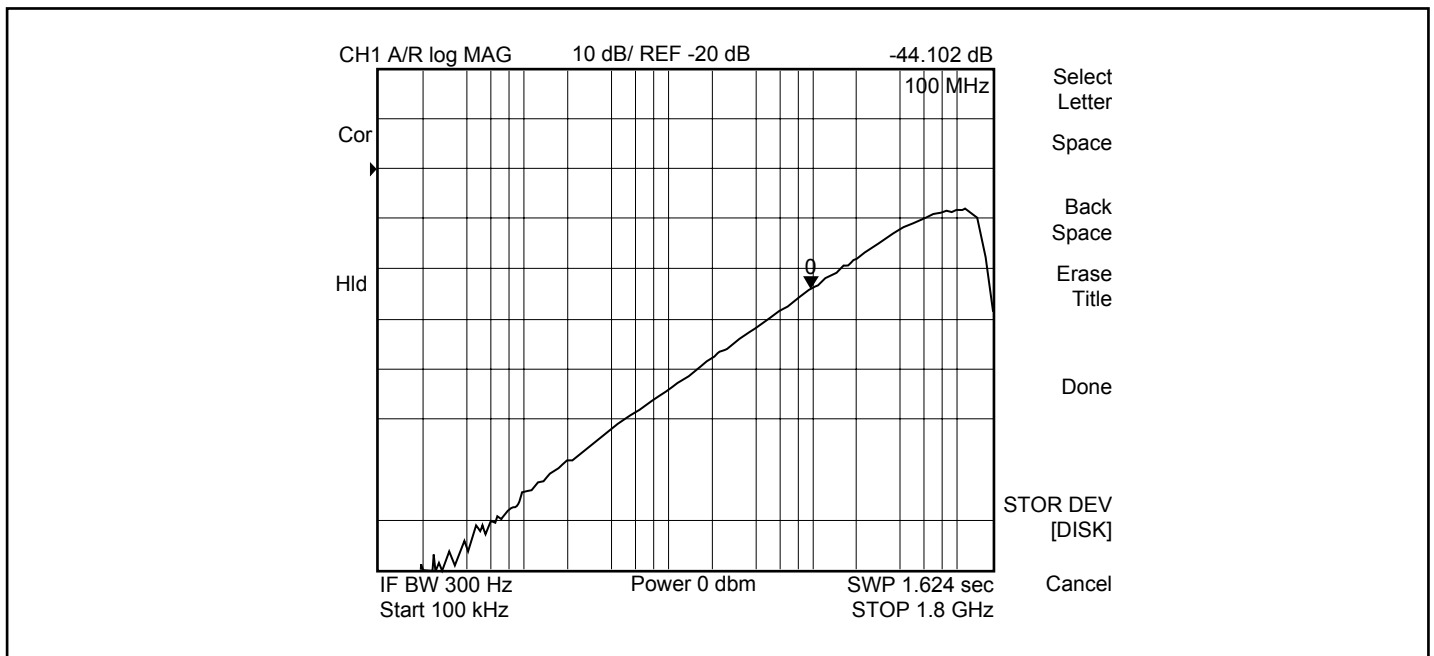
- Guaranteed by design.



**Fig 1. Crosstalk Setup**



**Fig 2. Off-isolation setup**



**Fig 3. Crosstalk**

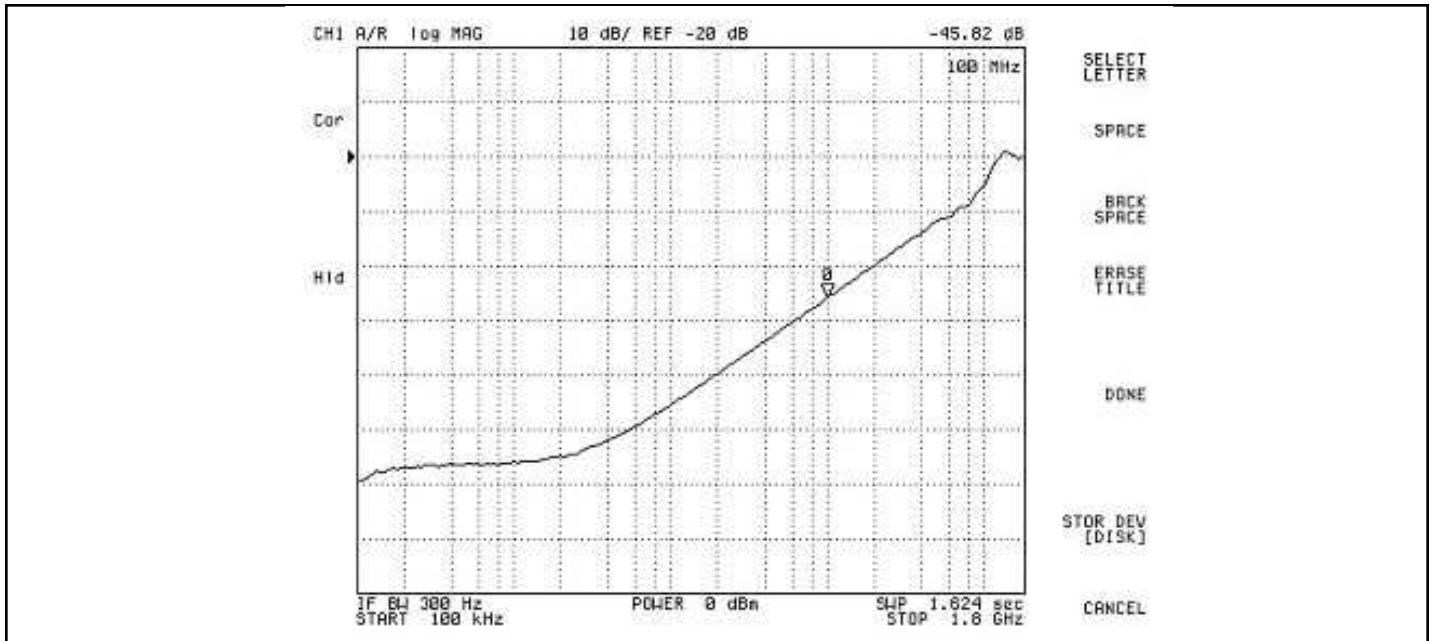


Fig 4. Off Isolation

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 AN, BN	0.5	-	8.0	
tPHZ, tPLZ	Line Disable Time - SEL to AN, BN	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.

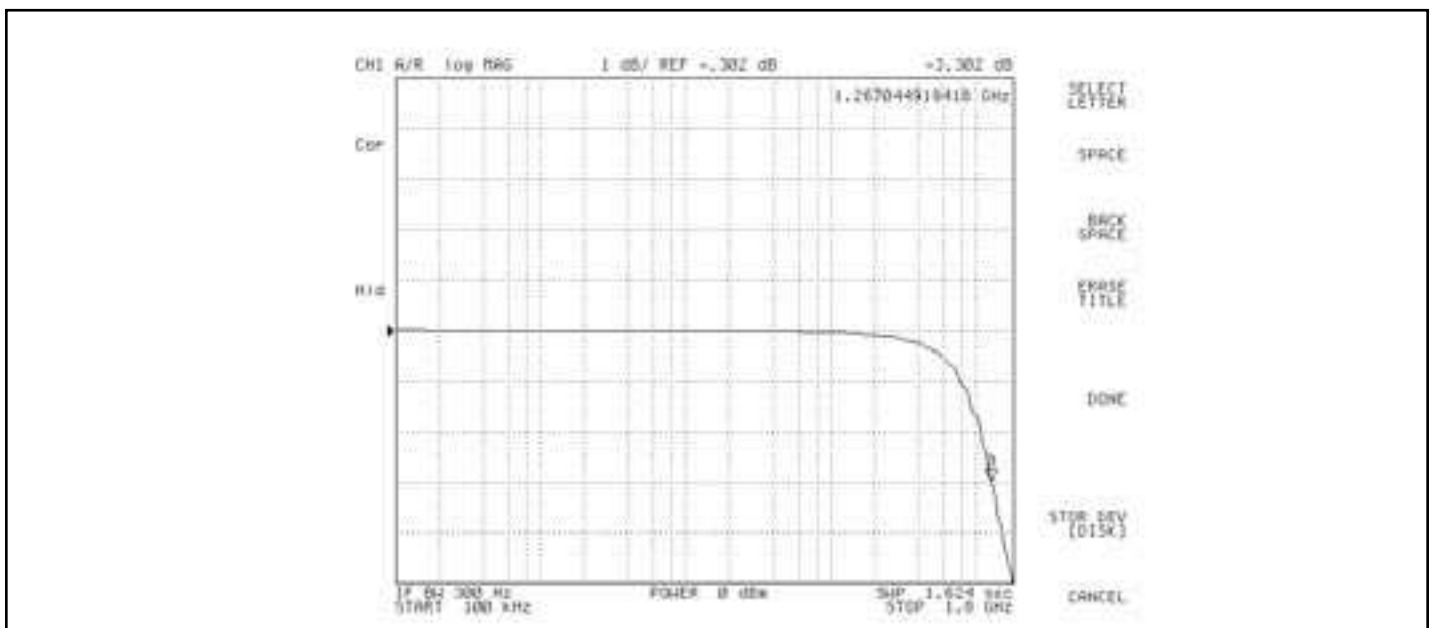
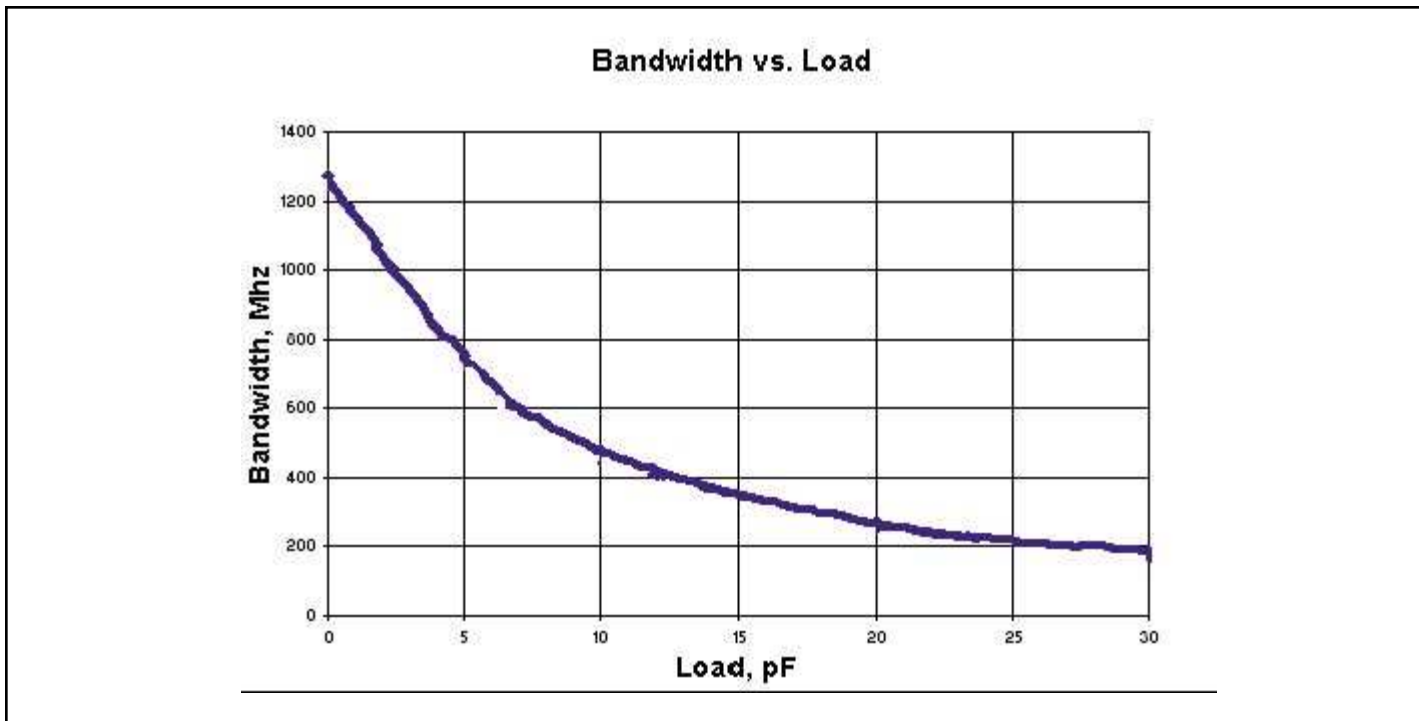
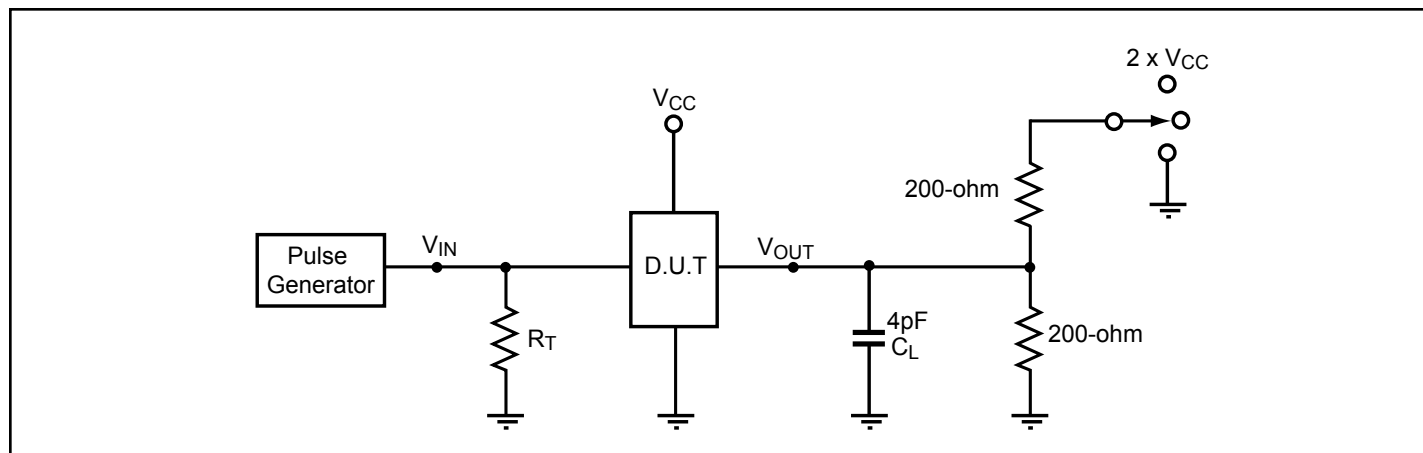


Fig 5. Bandwidth,  $V_{CC} = 1.8\text{V}$ ,  $25^\circ\text{C}$



**Fig 6. Bandwidth vs. Load**

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



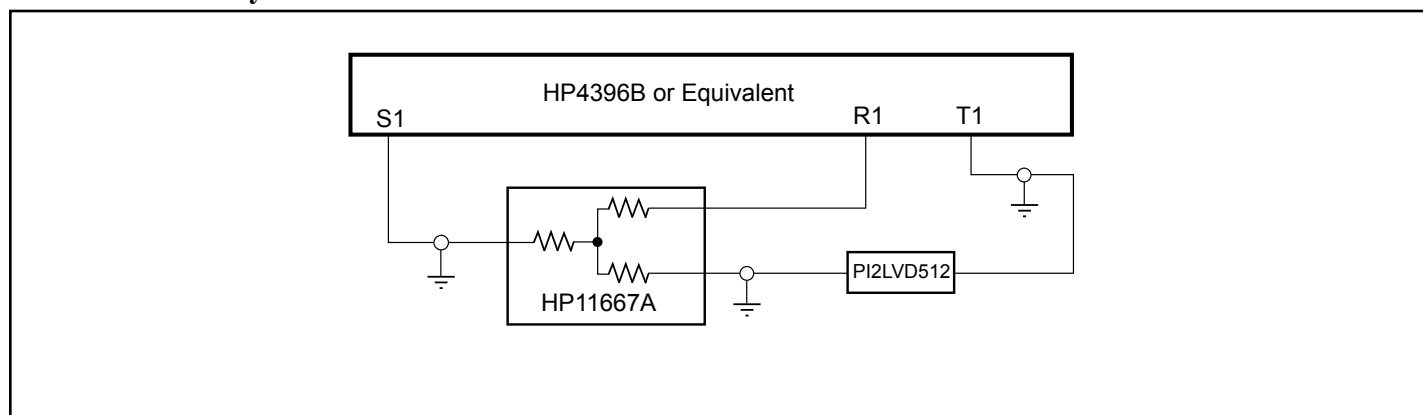
#### Notes:

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.

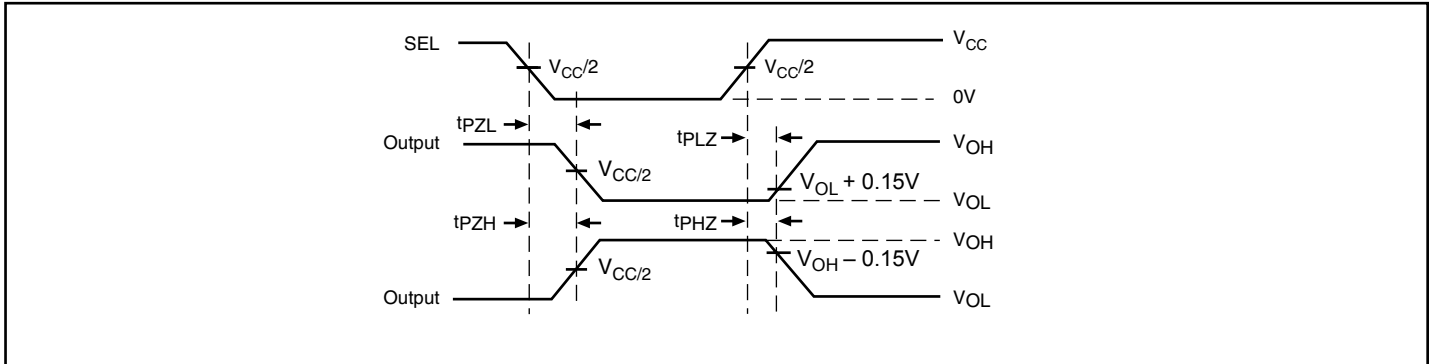
### Switch Positions

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

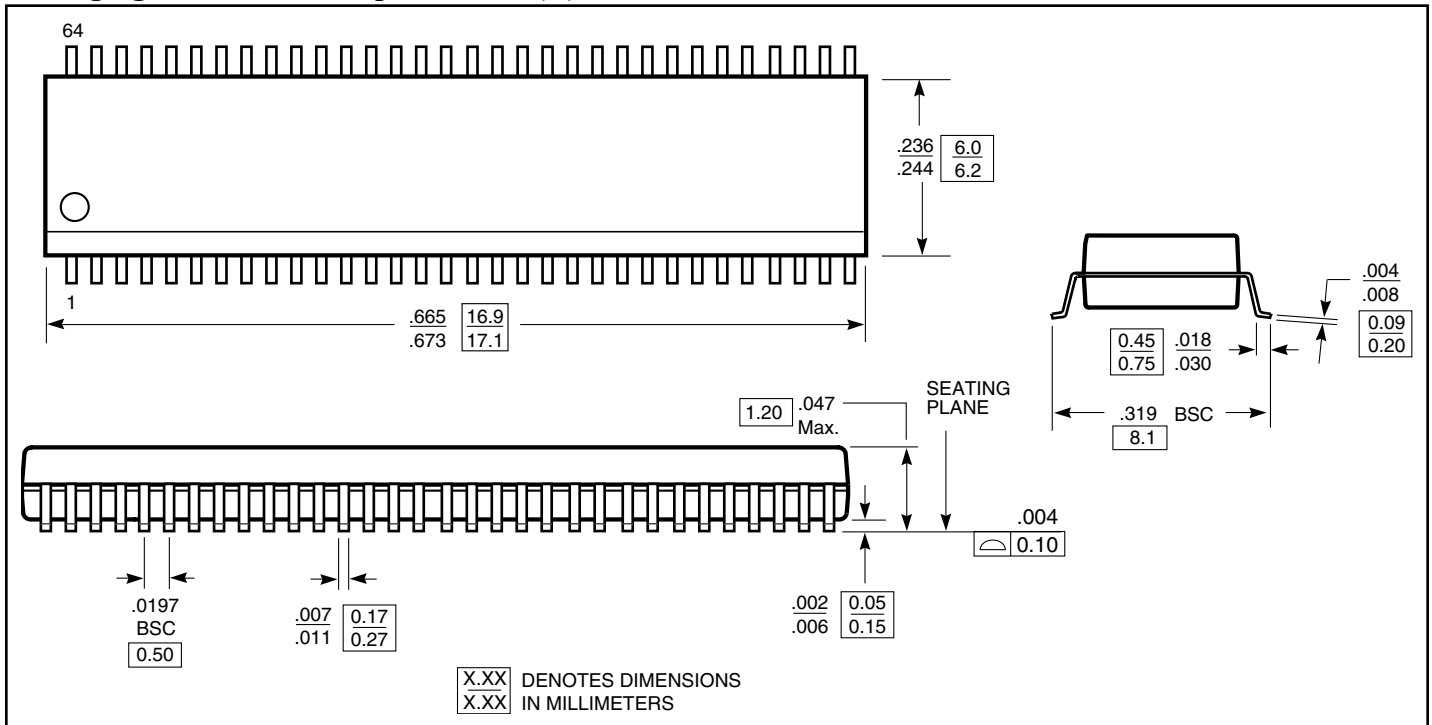


### Switching Waveforms



**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