## Pin Description

| Pin # | Pin Name | I/O | Description |
|---|---|---|---|
| 2<br>3 | A0+<br>A0– | I/O | Signal I/O, Channel 0, Port A |
| 6<br>7 | A1+<br>A1– | I/O | Signal I/O, Channel 1, Port A |
| 11<br>12 | A2+<br>A2– | I/O | Signal I/O, Channel 2, Port A |
| 15<br>16 | A3+<br>A3– | I/O | Signal I/O, Channel 3, Port A |
| 38<br>37 | B0+<br>B0− | I/O | Signal I/O, Channel 0, Port B |
| 36<br>35 | B1+<br>B1− | I/O | Signal I/O, Channel 1, Port B |
| 29<br>28 | B2+<br>B2− | I/O | Signal I/O, Channel 2, Port B |
| 27<br>26 | B3+<br>B3− | I/O | Signal I/O, Channel 3, Port B |
| 34<br>33 | C0+<br>C0– | I/O | Signal I/O, Channel 0, Port C |
| 32<br>31 | C1+<br>C1– | I/O | Signal I/O, Channel 1, Port C |
| 25<br>24 | C2+<br>C2– | I/O | Signal I/O, Channel 2, Port C |
| 23<br>22 | C3+<br>C3– | I/O | Signal I/O, Channel 3, Port C |
| 9 | SEL | I | Operation mode Select<br>(when SEL=0: A⟶B, when SEL=1: A⟶C |
| 5, 8, 13,18, 20, 30, 40, 42 | $V_{DD}$ | Pwr | 1.5V to 1.8V (±0.1V) Positive Supply Voltage |
| 1, 4, 10, 14, 17, 19, 21, 39, 41, Center Pad | GND | Pwr | Power ground |

## 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 $V_{DD}$ |
| 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 for Switching over Operating Range

($T_A$ = –40°C to +85°C, $V_{DD}$ = 1.5V to 1.8V ±10%)

| Parameters | Description | Test Conditions[1] | Min | Typ[2] | Max | Units |
|---|---|---|---|---|---|---|
| $V_{IH}$ | Input HIGH Voltage | Guaranteed HIGH level | 0.65 x $V_{DD}$ | | | V |
| $V_{IL}$ | Input LOW Voltage | Guaranteed LOW level | –0.5 | | 0.35 x $V_{DD}$ | |
| $V_{IK}$ | Clamp Diode Voltage | $V_{DD}$ = Max., $I_{IN}$ = –18mA | | –0.7 | –1.2 | |
| IIH | Input HIGH Current | $V_{DD}$ = Max., $V_{IN}$ = $V_{DD}$ | | | ±5 | µA |
| $I_{IL}$ | Input LOW Current | $V_{DD}$ = Max., $V_{IN}$ = GND | | | ±5 | |

## Power Supply Characteristics

| Parameters | Description | Test Conditions[1] | Min. | Typ.[2] | Max. | Units |
|---|---|---|---|---|---|---|
| $I_{DD}$ | Quiescent Power Supply Current | $V_{DD}$ = Max., $V_{IN}$ = GND or $V_{DD}$ | | | 350 | µA |

## Switching Characteristics

($T_A$= -40° to +85°C, $V_{DD}$ = 1.8V±10%)

| Parameters | Description | Min. | Max. | Units |
|---|---|---|---|---|
| $t_{PZH}$, $t_{PZL}$ | Line Enable Time - SEL to $A_N$, $B_N$, $C_N$ | 0.5 | 8.0 | ns |
| $t_{PHZ}$, $t_{PLZ}$ | Line Disable Time - SEL to $A_N$, $B_N$, $C_N$ | 0.5 | 8.0 | |
| $t_{b-b}$ | Bit-to-bit skew within the same differential pair | | 7 | ps |
| $t_{ch-ch}$ | Channel-to-channel skew | | 35 | ps |

## Dynamic Electrical Characteristics Over the Operating Range

(TA= -40° to +85°C, VDD = 1.8V±10%, GND=0V)

| Parameters | Description | Test Conditions | Min. | Typ.[2] | Max. | Units |
|---|---|---|---|---|---|---|
| $X_{TALK}$ | Crosstalk | See Fig. 1 for Measurement Setup, f= 3 GHz<br>f = 100 MHz | | -23dB<br>-58dB | | dB |
| $O_{IRR}$ | OFF Isolation | See Fig. 2 for Measurement Setup, f= 3 GHz<br>f = 100 MHz | | -23dB<br>-58dB | | |
| $I_{LOSS}$ | Differential Insertion Loss | f= 3 GHz | | -2 | | dB |
| BW | Bandwidth -3dB | | | 4.1 | | GHz |

**Notes:**

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at $V_{DD}$ = 1.8V, $T_A$ = 25°C ambient and maximum loading.

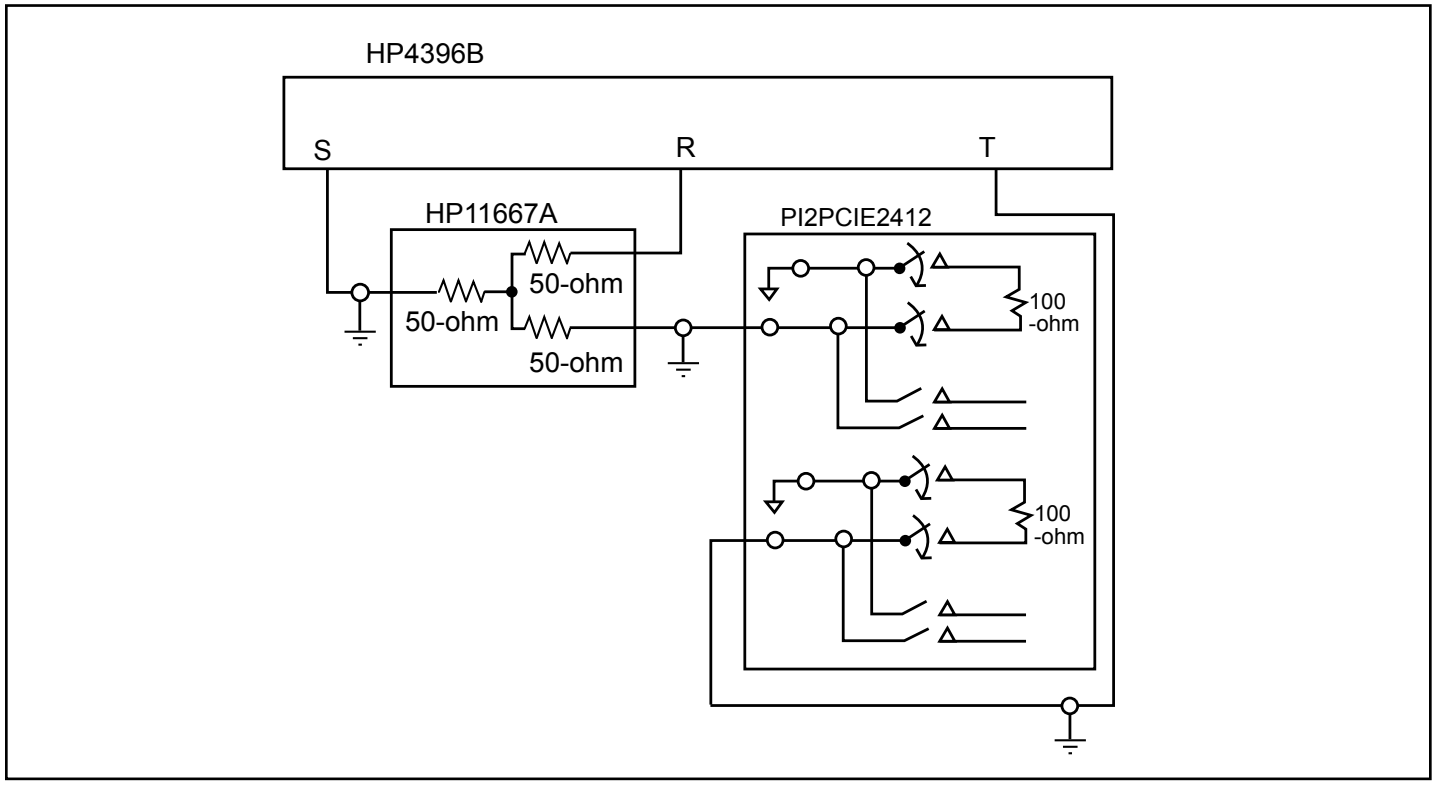



**Fig 1. Crosstalk Setup**

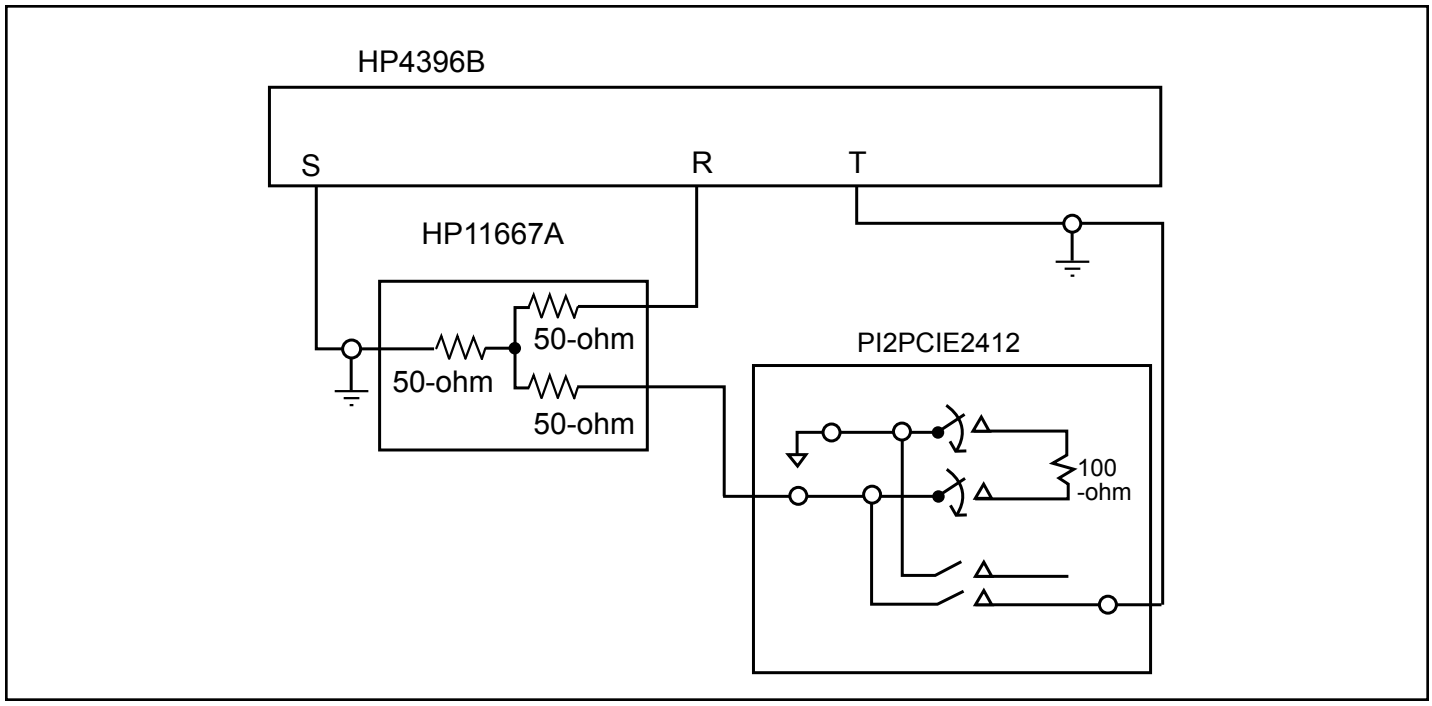



**Fig 2. Off-isolation setup**

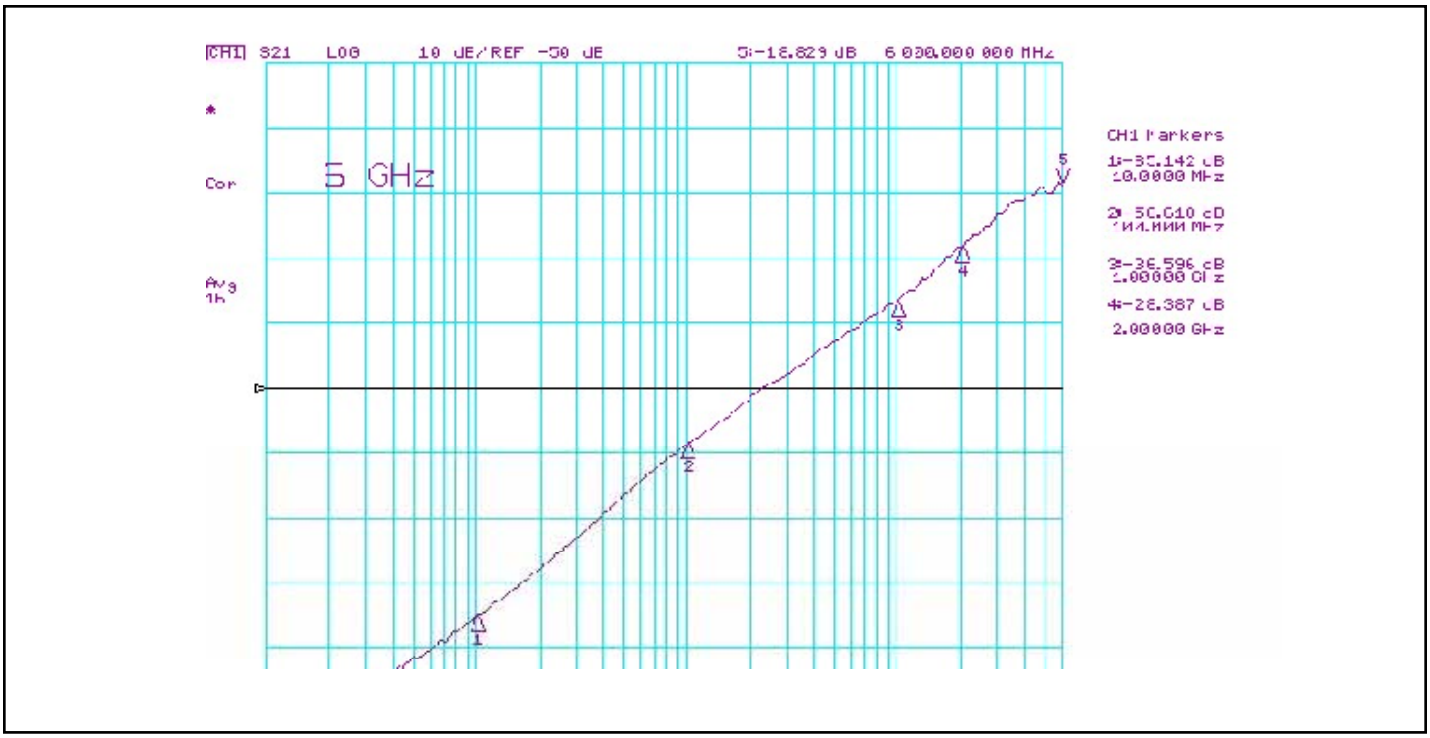



**Fig 3. Crosstalk**

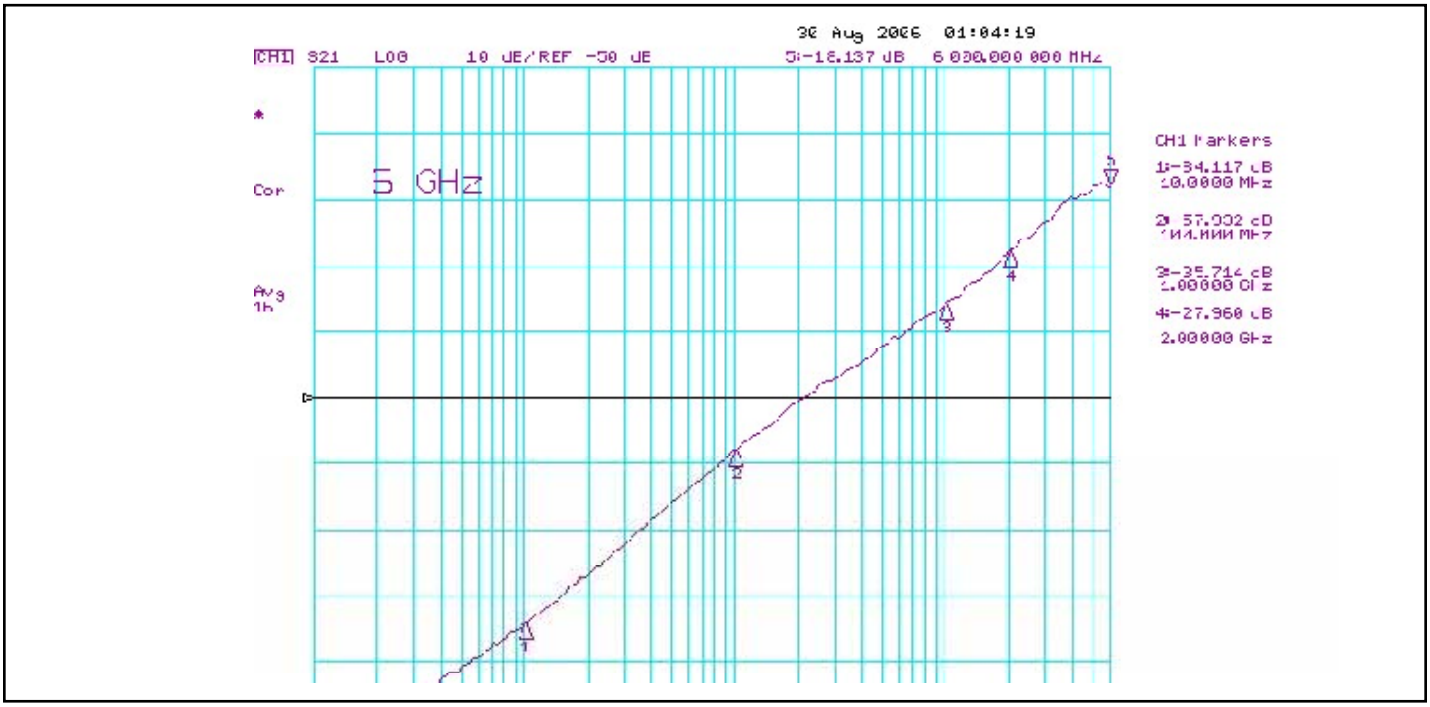



**Fig 4. Off Isolation**

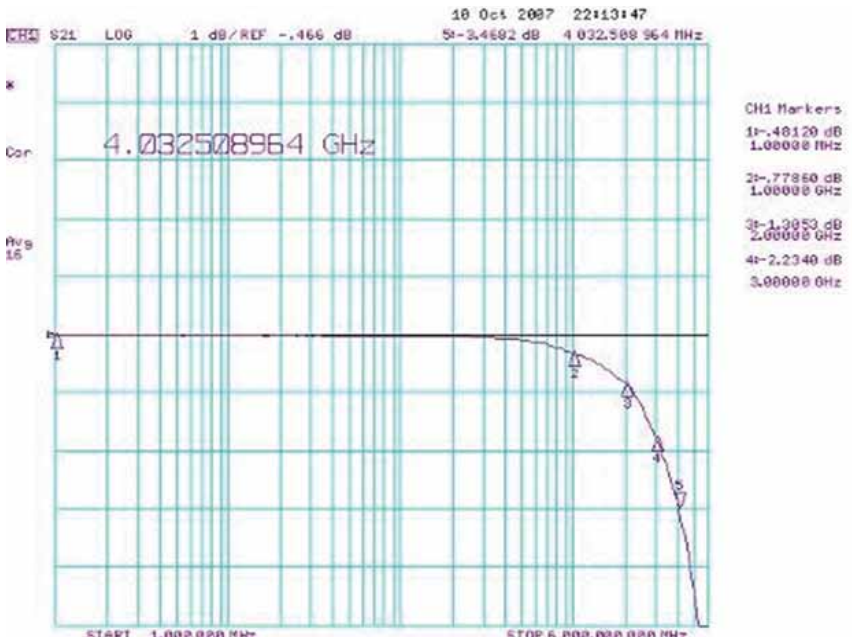
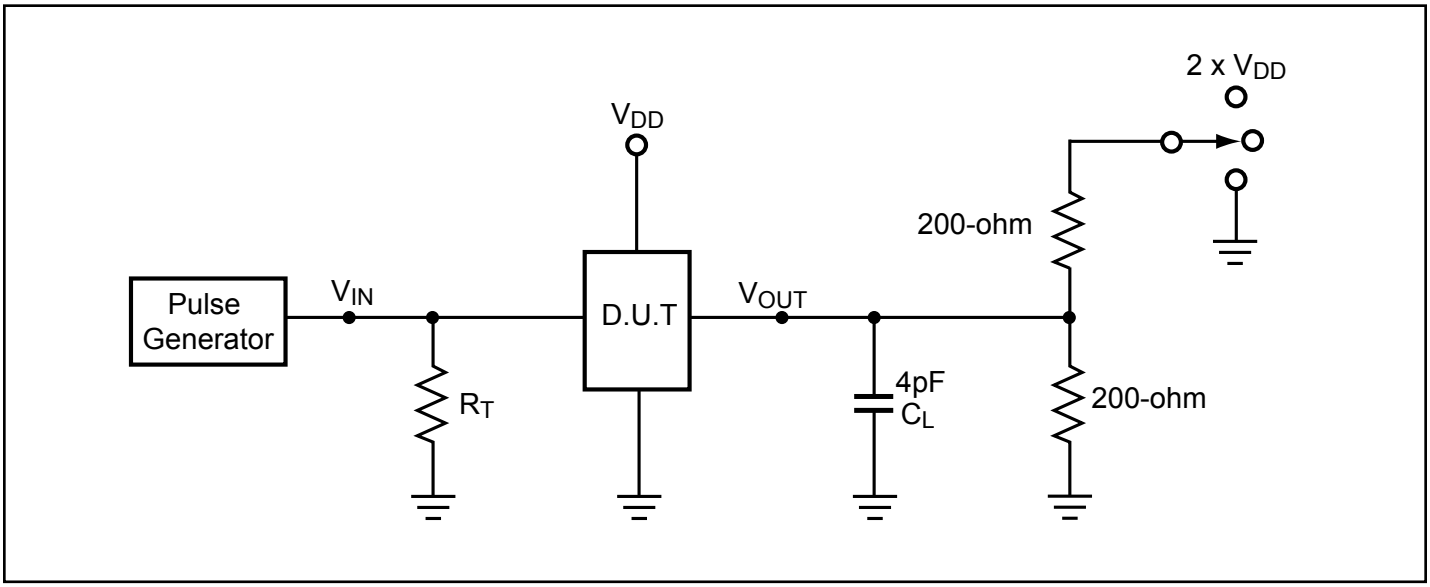


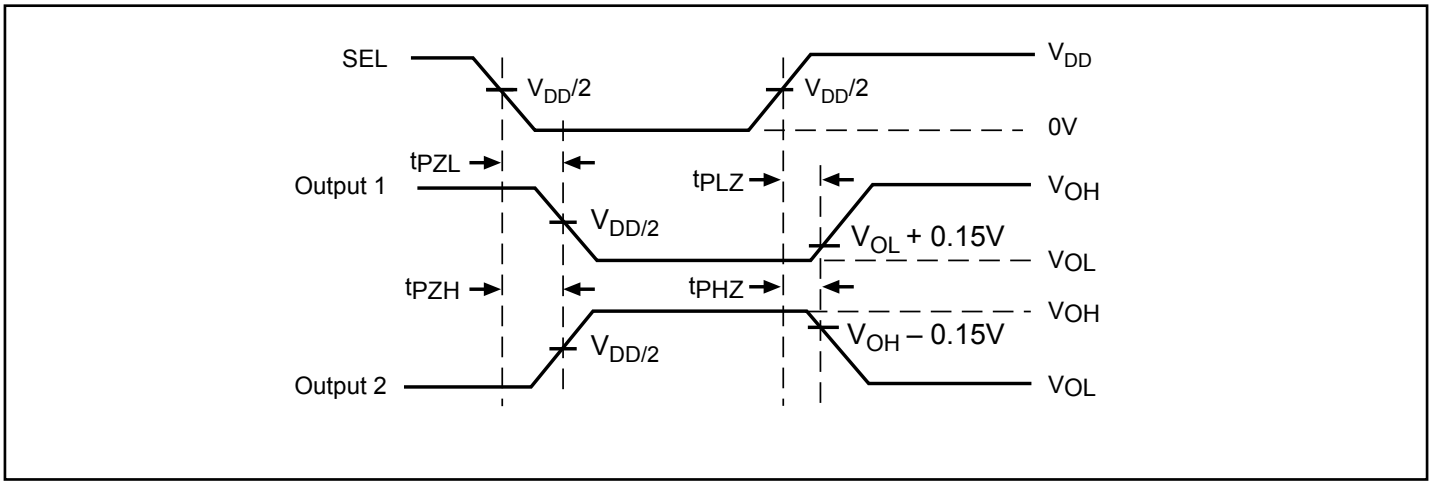

**Fig 5. Insertion Loss**

## Test Circuit for Electrical Characteristics(1-5)




**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. Output 1 is for an output with internal conditions such that the output is low except when disabled by the output control. output 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 ≤ MHz, $Z_O$ = 50Ω, $t_R \leq 2.5$ns, $t_F \leq 2.5$ns.
5. The outputs are measured one at a time with one transition per measurement.

## Switching Waveforms

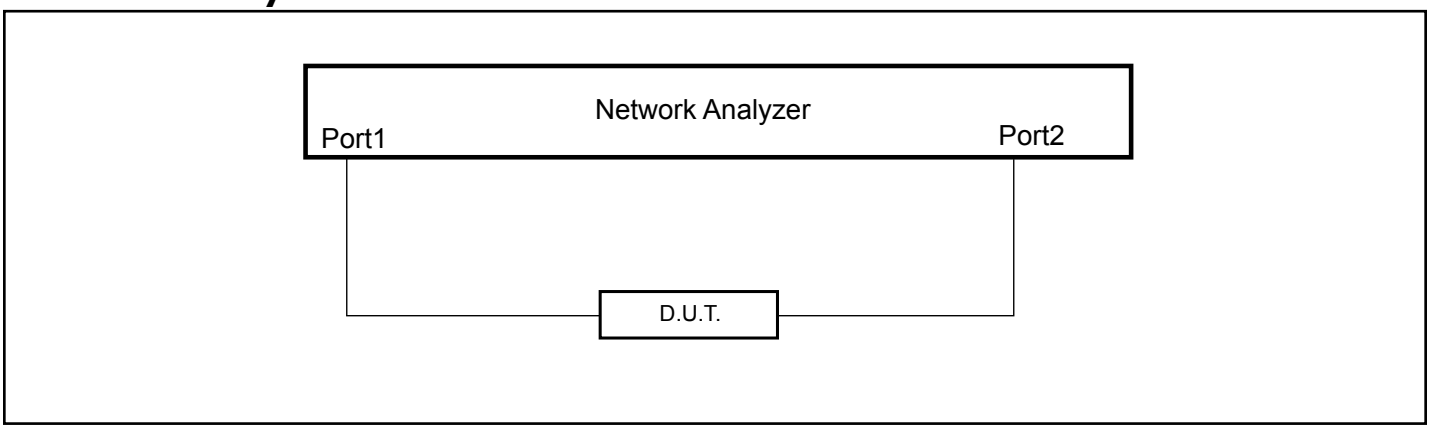



**Voltage Waveforms Enable and Disable Times**

## Switch Positions

| Test | Switch |
|---|---|
| $t_{PLZ}$, $t_{PZL}$ (output on B-side) | 2 x $V_{DD}$ |
| $t_{PHZ}$, $t_{PZH}$ (output on B-side) | GND |
| Prop Delay | Open |

## Test Circuit for Dynamic Electrical Characteristics




## Applications Information

*Rail-to-Rail is a registered trademark of Nippon Motorola, Ltd*

## PCI Express Application Specific Measurements and Test Set-up


**Figure 5: Test Setup**

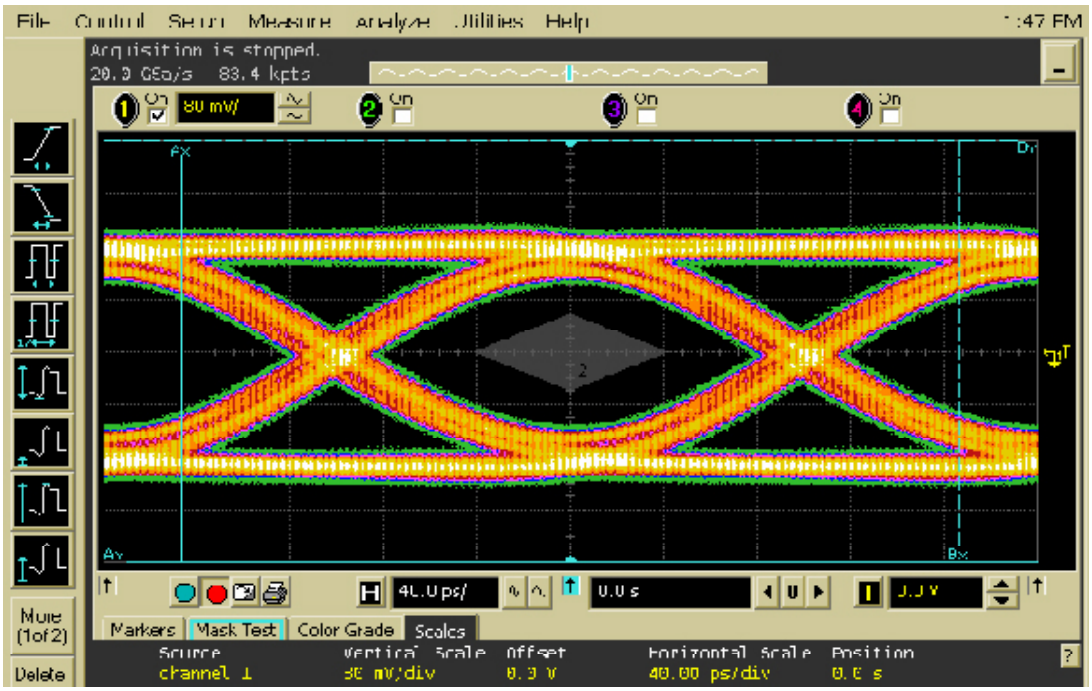



**Figure 6: 5 Gbps RX signal eye of the PCI-SIG compliance software test using PI2PCIE2412 + 16" test card**

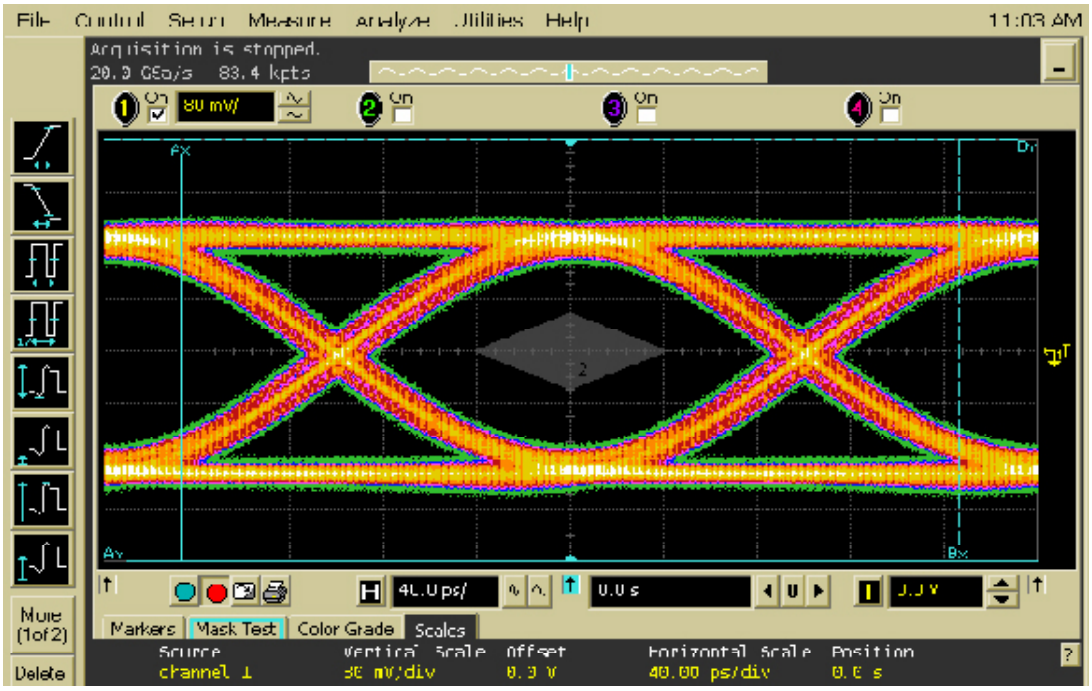
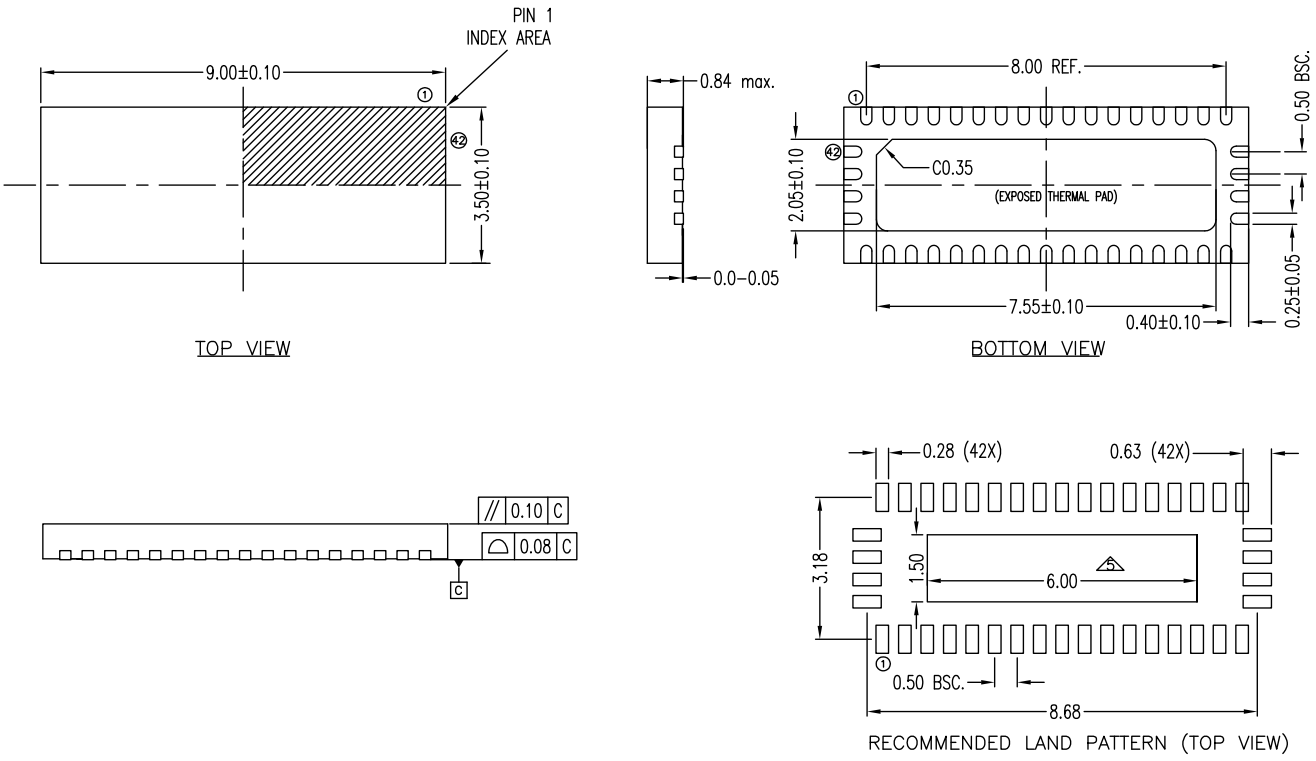



**Figure 7. 5 Gbps RX signal eye of the PCI-SIG compliance software test with no switch + w/ 16" test card**

## Packaging Mechanical: 42-Contact TQFN (ZH)




**Notes:**
1. All dimensions are in millimeters. Angles in degrees.
2. Coplanarity applies to the exposed pad as well as the terminals.
3. Refer JEDEC MO-220.
4. Recommended land pattern is for reference only.
5. Thermal pad soldering area

PERICOM Enabling Serial Connectivity

**DATE: 11/14/12**

**DESCRIPTION: 42-contact Thin Fine Pitch Quad Flat No-Lead (TQFN)**

**PACKAGE CODE: ZH42**

**DOCUMENT CONTROL #: PD-2035** **REVISION:D**

12-0529

## Ordering Information

| Ordering Code | Package Code | Package Description |
|---|---|---|
| PI2PCIE2412ZHEX | ZH | 42-contact, Thin Fine Pitch Quad Flat No-Lead (TQFN) |

**Notes:**
- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- "E" denotes Pb-free and Green
- Adding an "X" at the end of the ordering code denotes tape and reel packaging