

## 2-lane DisplayPort™ Switch/Mux for DP Driven Panels with Triple Control Pins

### Features

- 2 Differential Channel, 2:1 mux/demux that will support 2.7Gbps or 1.62Gbps DP signals
- 1-differential channel is used for AUX signaling
- Insertion Loss for high speed channels @ 2.7 Gbps: -1.5dB
- Hot Insertion Cable
- -3dB Bandwidth for high speed channels of 3.25 Ghz
- Low Bit-to-Bit Skew , 7ps max (between '+' and '-' bits)
- Low Crosstalk for high speed channels: -33dB@2.7 Gbps
- Low Off Isolation for high speed channels: -26dB@2.7 Gbps
- V<sub>DD</sub> Operating Range: 3.3V +/-10%
- ESD Tolerance: 8kV HBM on all data I/O pins per JESD22 Specification
- Low channel-to-channel skew, 35ps max
- Packaging (Pb-free & Green):
  - 32 TQFN (ZLE)

### Description

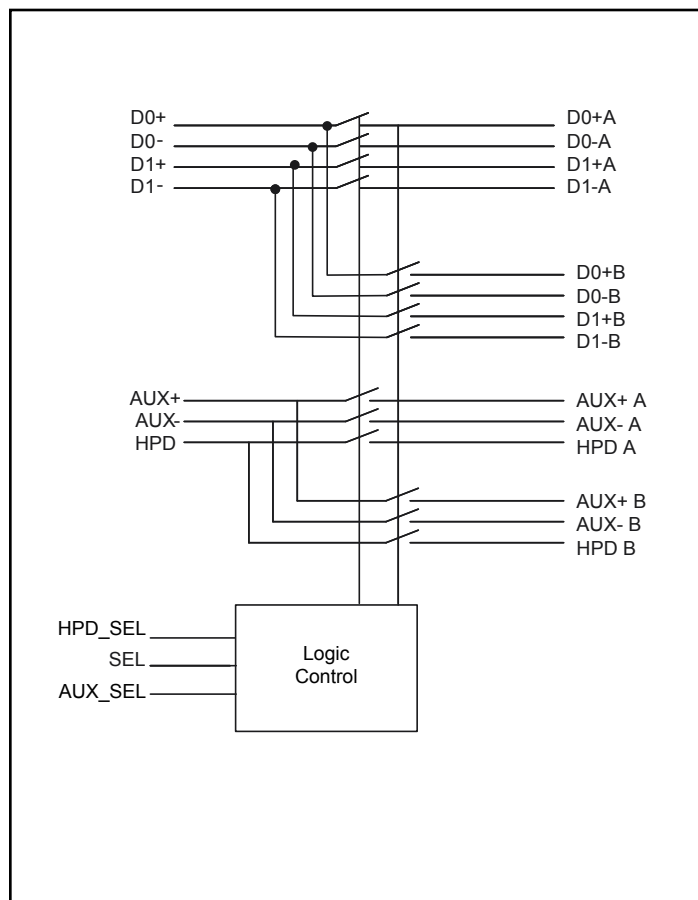
Pericom Semiconductor's PI3VeDP212 switch is targeted for next generation digital video signals. This device can be used to connect two DisplayPort™ sources to a single panel.

The newly released DisplayPort spec requires a data rate of 2.7 Gbps with AC coupled I/Os. Pericom's solution has been specifically designed around this standard and will support such signals.

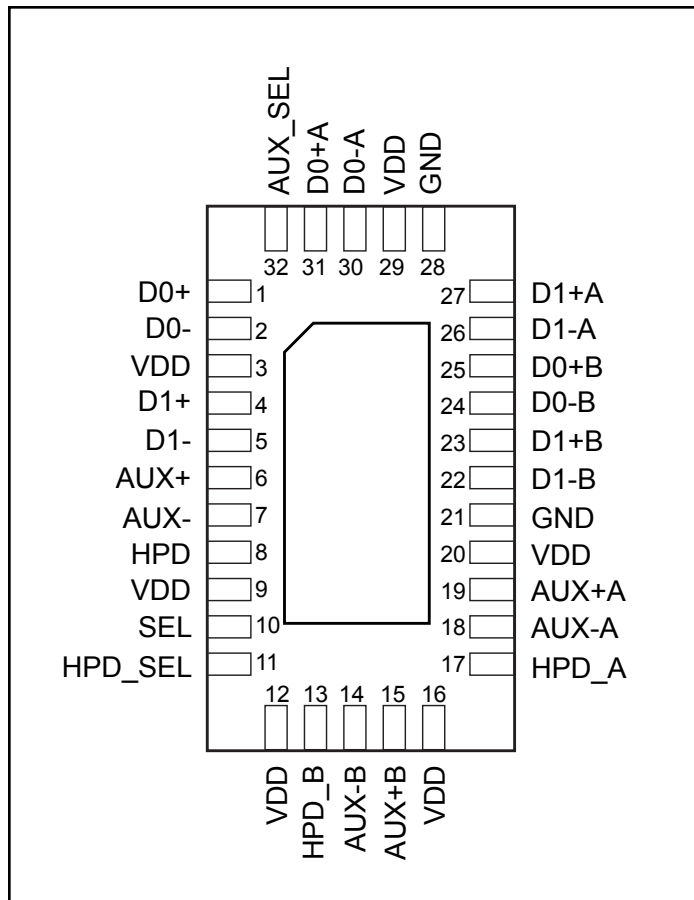
### Application

Routing of DisplayPort™ signals with low signal attenuation between notebook DP connector and docking station DP connector.

### Block Diagram



### Pin Description



**Truth Table (SEL control)**

| Function         | SEL/HPD_SEL/AUX_SEL |
|------------------|---------------------|
| Port A is active | L                   |
| Port B is active | H                   |

Notes: SEL only controls main DP lanes  
HPD\_SEL only controls HPD signaling  
AUX\_SEL only controls AUX signaling

## 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 +3.6V  |
| DC Input Voltage .....                   | -0.5V to 3.6V   |
| 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<sub>A</sub> = -40°C to +85°C, V<sub>DD</sub> = 3.3V +/-10%)

| Parameter        | Description                  | Test Conditions <sup>(1)</sup>                            | Min  | Typ <sup>(2)</sup> | Max  | Units |
|------------------|------------------------------|-----------------------------------------------------------|------|--------------------|------|-------|
| V <sub>IH</sub>  | Input HIGH Voltage           | Guaranteed HIGH level                                     | 1.5  |                    |      | V     |
| V <sub>IL</sub>  | Input LOW Voltage            | Guaranteed LOW level                                      | -0.5 |                    | 0.65 |       |
| V <sub>IK</sub>  | Clamp Diode Voltage          | V <sub>DD</sub> = Max., I <sub>IN</sub> = -18mA           |      | -0.7               | -1.2 |       |
| I <sub>IH</sub>  | Input HIGH Current           | V <sub>DD</sub> = Max., V <sub>IN</sub> = V <sub>DD</sub> |      |                    | ±5   | µA    |
| I <sub>IL</sub>  | Input LOW Current            | V <sub>DD</sub> = Max., V <sub>IN</sub> = GND             |      |                    | ±5   |       |
| I <sub>OFF</sub> | I/O leakage when part is off | V <sub>DD</sub> = 0V, V <sub>input</sub> = 0V to 3.6V     |      |                    | 50   |       |

## Power Supply Characteristics (T<sub>A</sub> = 0°C to +70°C)

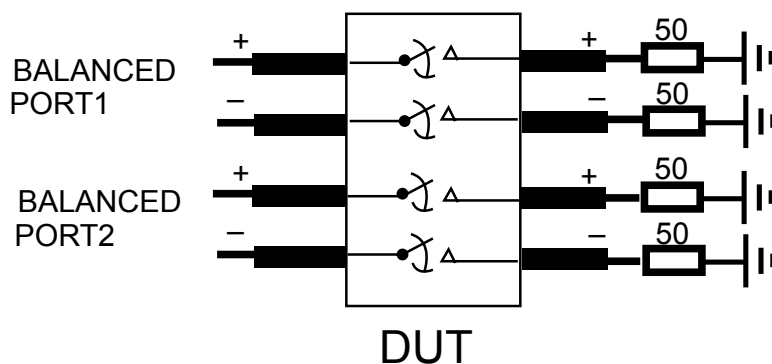
| Parameters      | Description                    | Test Conditions <sup>(1)</sup>                                   | Min. | Typ. <sup>(2)</sup> | Max. | Units |
|-----------------|--------------------------------|------------------------------------------------------------------|------|---------------------|------|-------|
| I <sub>CC</sub> | Quiescent Power Supply Current | V <sub>DD</sub> = Max., V <sub>IN</sub> = GND or V <sub>DD</sub> |      |                     | 70   | µA    |

## Dynamic Electrical Characteristics Over the Operating Range (T<sub>A</sub> = -40° to +85°C, V<sub>DD</sub> = 3.3V +/-10%, GND=0V)

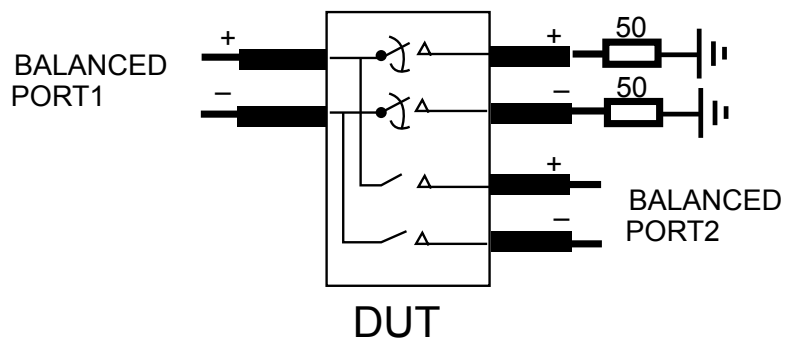
| Parameter         | Description                                        | Test Conditions                            |              | Typ. <sup>(2)</sup> | Units |
|-------------------|----------------------------------------------------|--------------------------------------------|--------------|---------------------|-------|
| X <sub>TALK</sub> | Crosstalk on High Speed Channels                   | See Fig. 1 for Measurement Setup           | f = 1.35 GHz | -33dB               | dB    |
|                   |                                                    |                                            | f = 100 MHz  | -48dB               |       |
| O <sub>IRR</sub>  | OFF Isolation on High Speed Channels               | See Fig. 2 for Measurement Setup,          | f = 1.35 GHz | -33dB               |       |
|                   |                                                    |                                            | f = 100 MHz  | -56dB               |       |
| I <sub>LOSS</sub> | Differential Insertion Loss on High Speed Channels | @2.7Gbps                                   |              | -1.5                | dB    |
| BW                | Bandwidth -3dB                                     | See Fig. 3 for Differential Insertion Loss |              | 3.25                | GHz   |

### Notes:

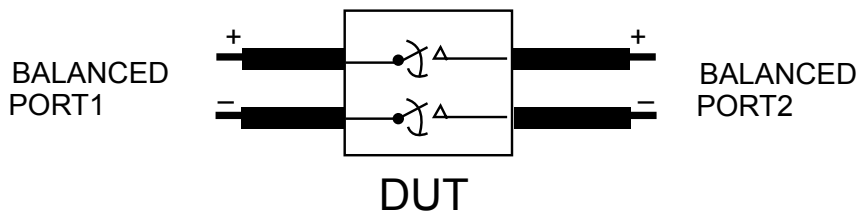
- For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V<sub>DD</sub> = 3.3V, T<sub>A</sub> = 25°C ambient and maximum loading.



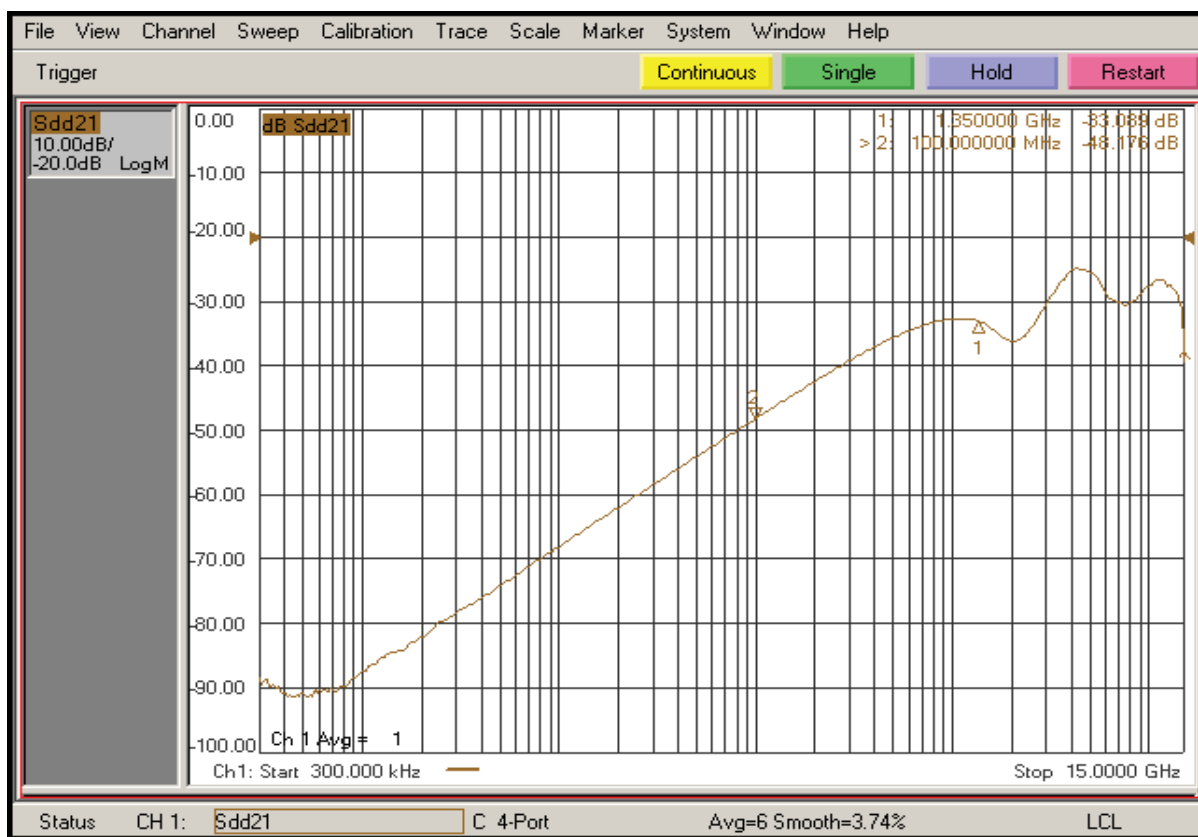
**Fig 1. Crosstalk Setup**



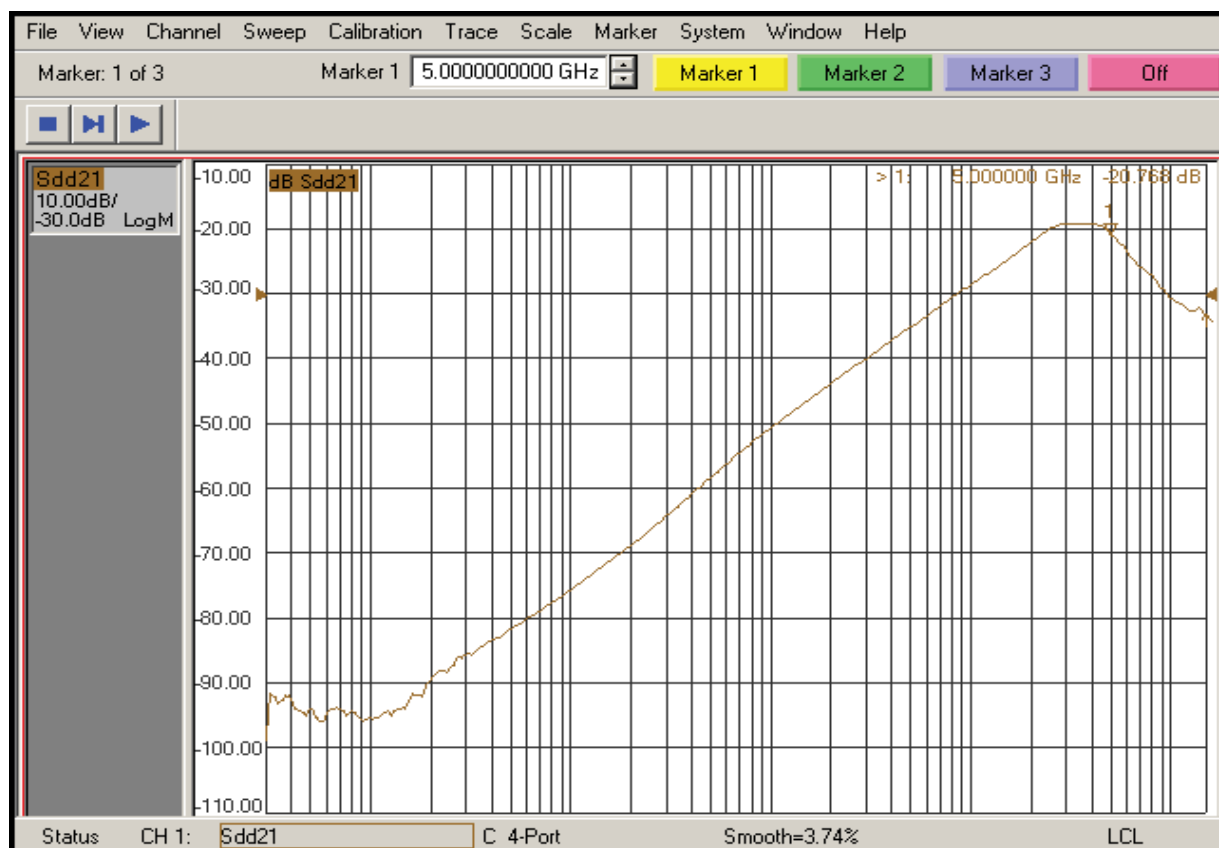
**Fig 2. Off-isolation setup**



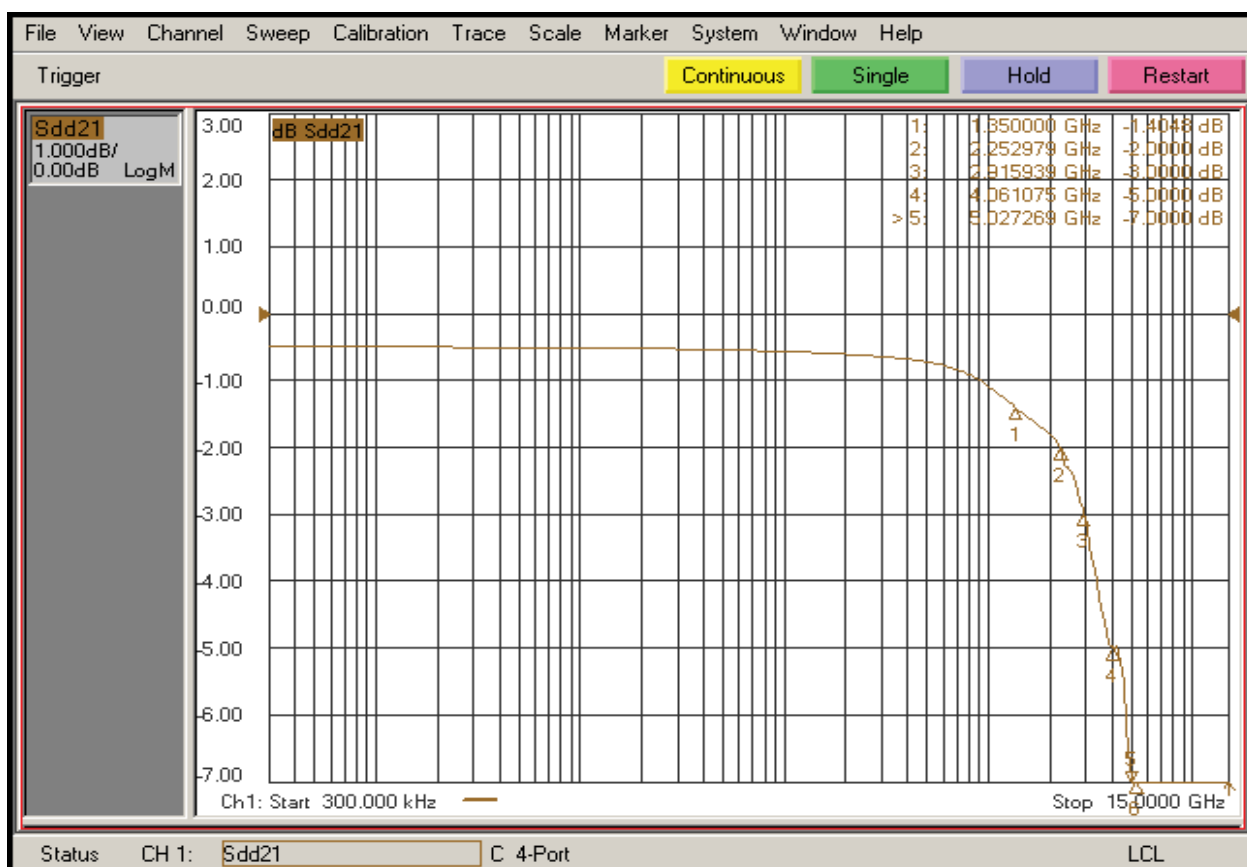
**Fig 3. Differential Insertion Loss**



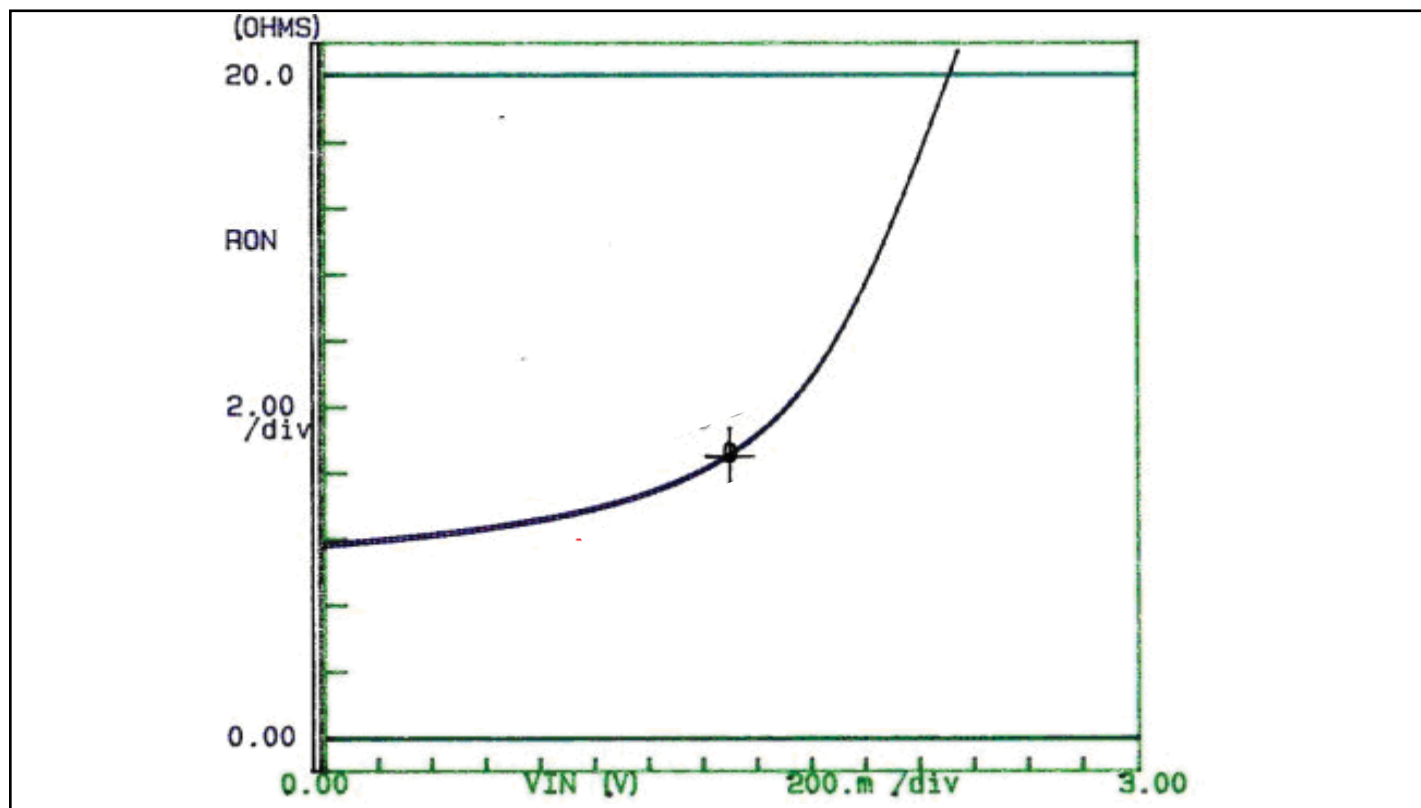
**Fig 4. Crosstalk**



**Fig 5. Off Isolation**



**Fig 6. Insertion Loss**

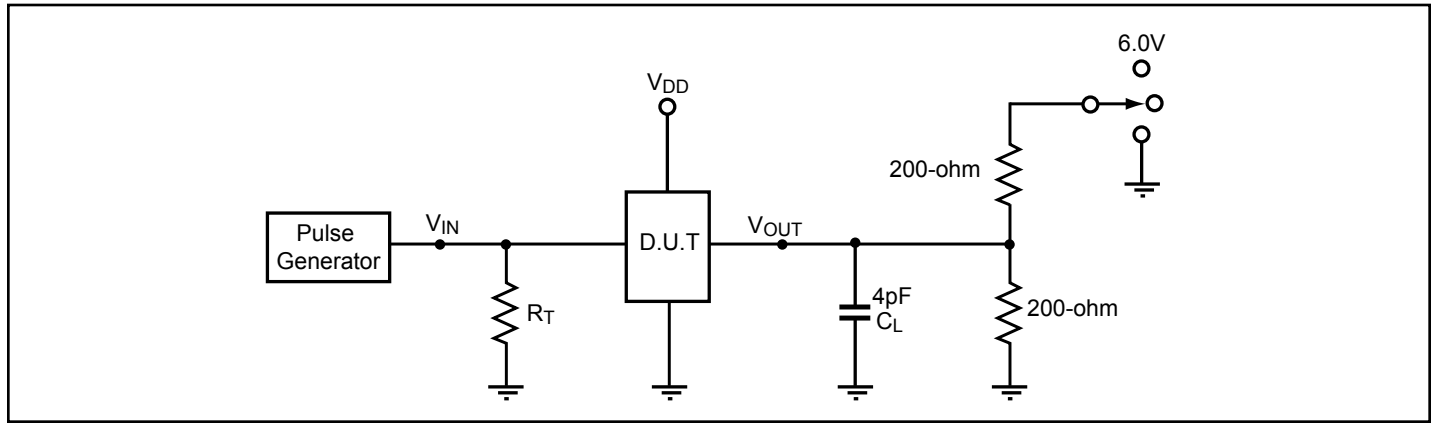


**Fig 7. Ron Curve for High Speed Signal Path Only (Dx+/-)**

**Switching Characteristics** ( $T_A = -40^\circ$  to  $+85^\circ\text{C}$ ,  $V_{DD} = 3.3\text{V} \pm 10\%$ )

| Parameter             | Description                                       | Min. | Max. | Units |
|-----------------------|---------------------------------------------------|------|------|-------|
| $t_{PZH}$ , $t_{PZL}$ | Line Enable Time                                  | 0.5  | 15.0 | ns    |
| $t_{PHZ}$ , $t_{PLZ}$ | Line Disable Time                                 | 0.5  | 15.0 |       |
| $t_{b-b}$             | Bit-to-bit skew within the same differential pair |      | 7    | ps    |
| $t_{ch-ch}$           | Channel-to-channel skew                           |      | 50   | ps    |

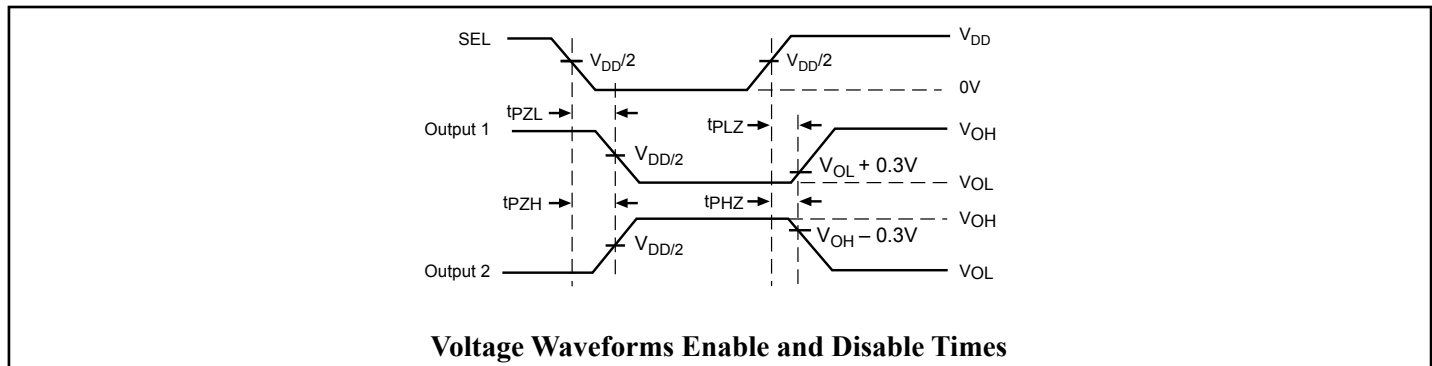
**Test Circuit for Electrical Characteristics<sup>(1-5)</sup>**



**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. 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:  $PRR \leq \text{MHz}$ ,  $Z_O = 50\Omega$ ,  $t_R \leq 2.5\text{ns}$ ,  $t_F \leq 2.5\text{ns}$ .
5. The outputs are measured one at a time with one transition per measurement.

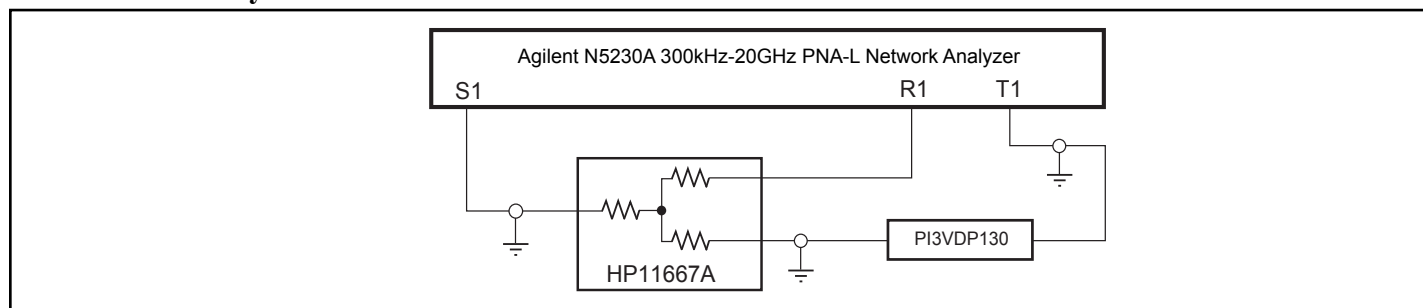
**Switching Waveforms**



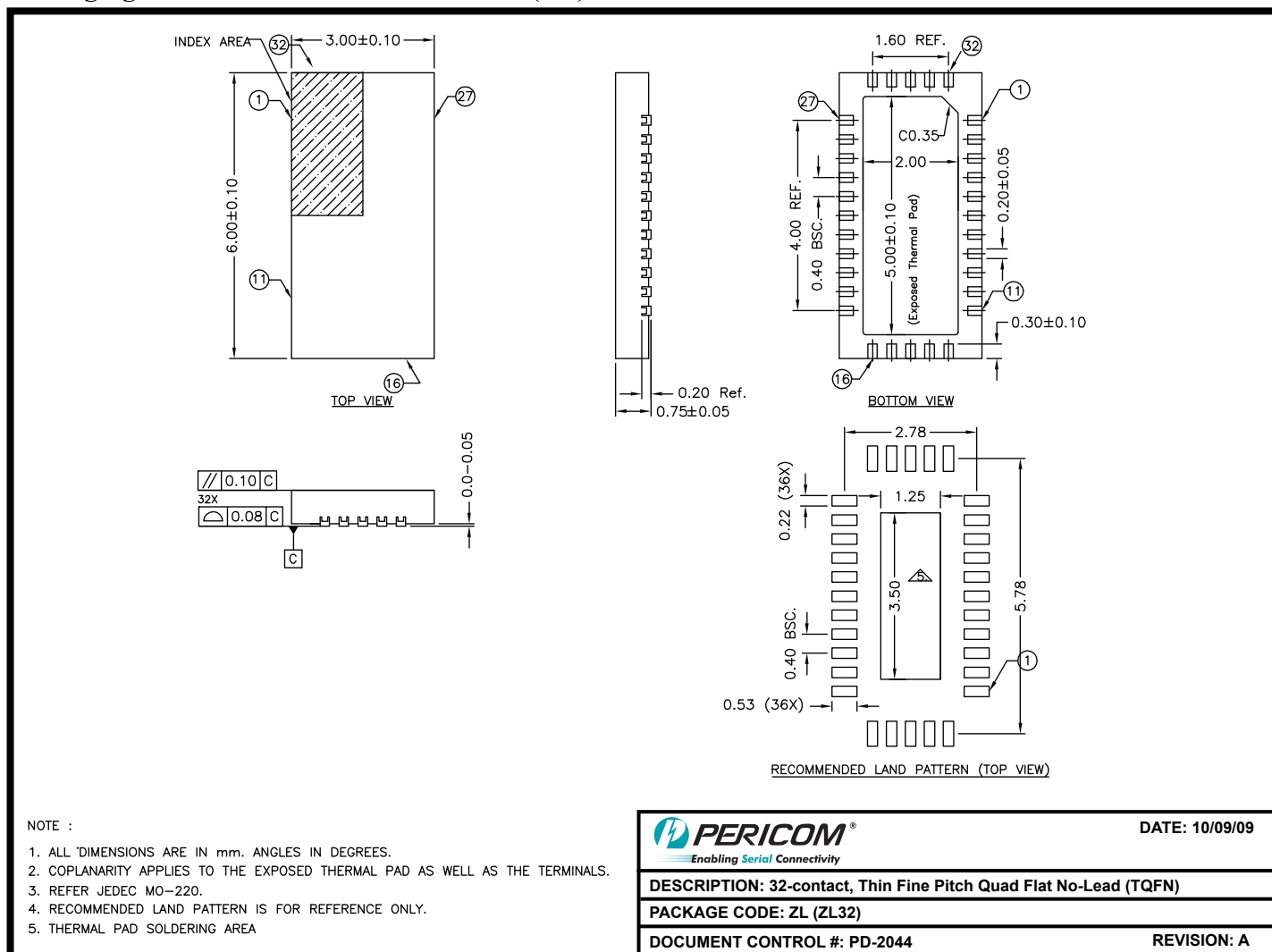
**Switch Positions**

| Test                                     | Switch |
|------------------------------------------|--------|
| $t_{PLZ}$ , $t_{PZL}$ (output on B-side) | 6.0V   |
| $t_{PHZ}$ , $t_{PZH}$ (output on B-side) | GND    |
| Prop Delay                               | Open   |

## Test Circuit for Dynamic Electrical Characteristics



## Packaging Mechanical: 32-Contact TQFN (ZL)



## Ordering Information

| Ordering Code | Package Code | Package Description               |
|---------------|--------------|-----------------------------------|
| PI3VeDP212ZLE | ZL           | Pb-free and Green 32-Contact TQFN |

### Notes:

- Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://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