

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_{DD} 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

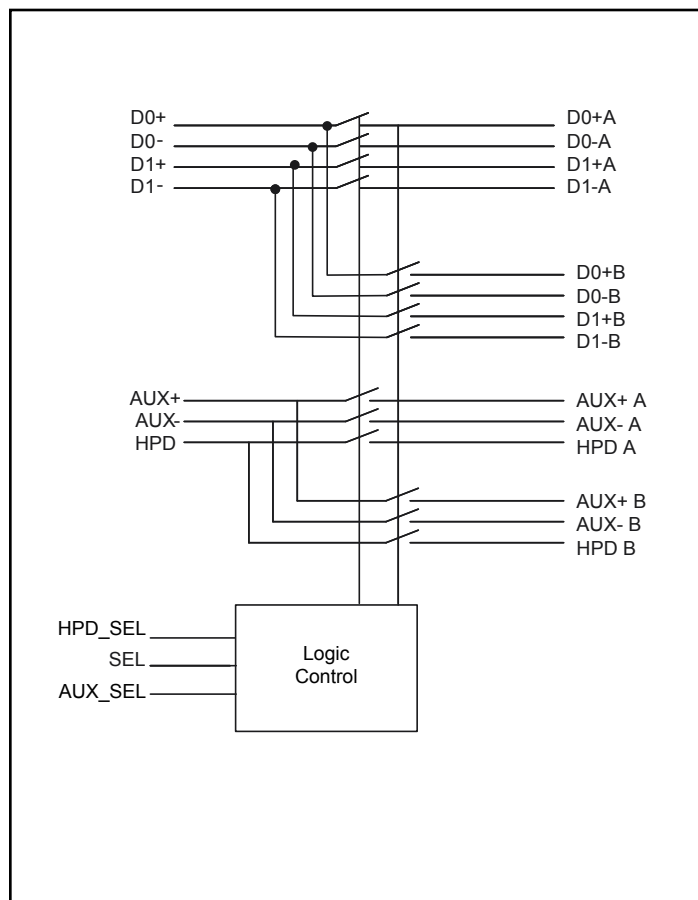
Pericom Semiconductor's PI3VeDP212 switch is targeted for next generation digital video signals. This device can be used to connect two DisplayPort™ sources to a single panel.

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.

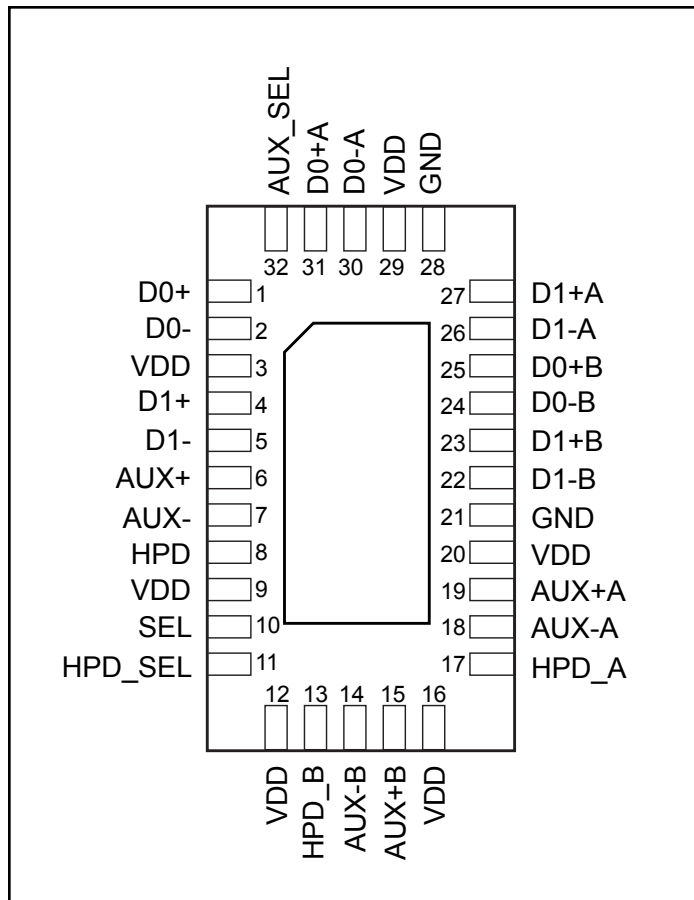
Application

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_A = -40°C to +85°C, V_{DD} = 3.3V +/-10%)

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

Power Supply Characteristics (T_A = 0°C to +70°C)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ. ⁽²⁾	Max.	Units
I _{CC}	Quiescent Power Supply Current	V _{DD} = Max., V _{IN} = GND or V _{DD}			70	µA

Dynamic Electrical Characteristics Over the Operating Range (T_A = -40° to +85°C, V_{DD} = 3.3V +/-10%, GND=0V)

Parameter	Description	Test Conditions		Typ. ⁽²⁾	Units	
X _{TALK}	Crosstalk on High Speed Channels	See Fig. 1 for Measurement Setup	f= 1.35 GHz	-33dB	dB	
			f = 100 MHz	-48dB		
O _{IRR}	OFF Isolation on High Speed Channels	See Fig. 2 for Measurement Setup,	f= 1.35 GHz	-33dB		
			f = 100 MHz	-56dB		
I _{LOSS}	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_{DD} = 3.3V, T_A = 25°C ambient and maximum loading.

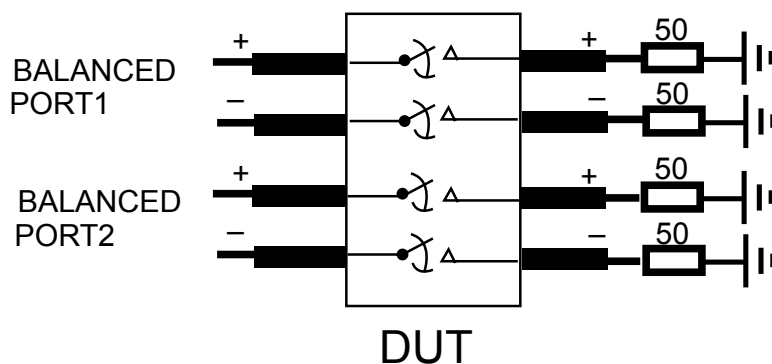


Fig 1. Crosstalk Setup

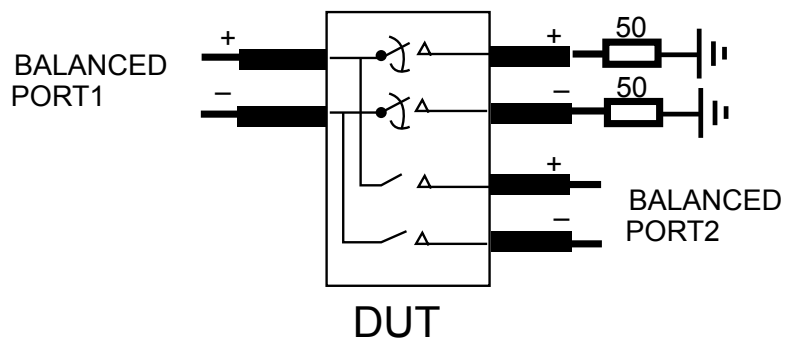


Fig 2. Off-isolation setup

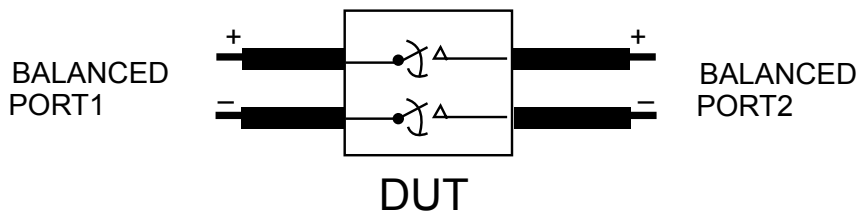


Fig 3. Differential Insertion Loss

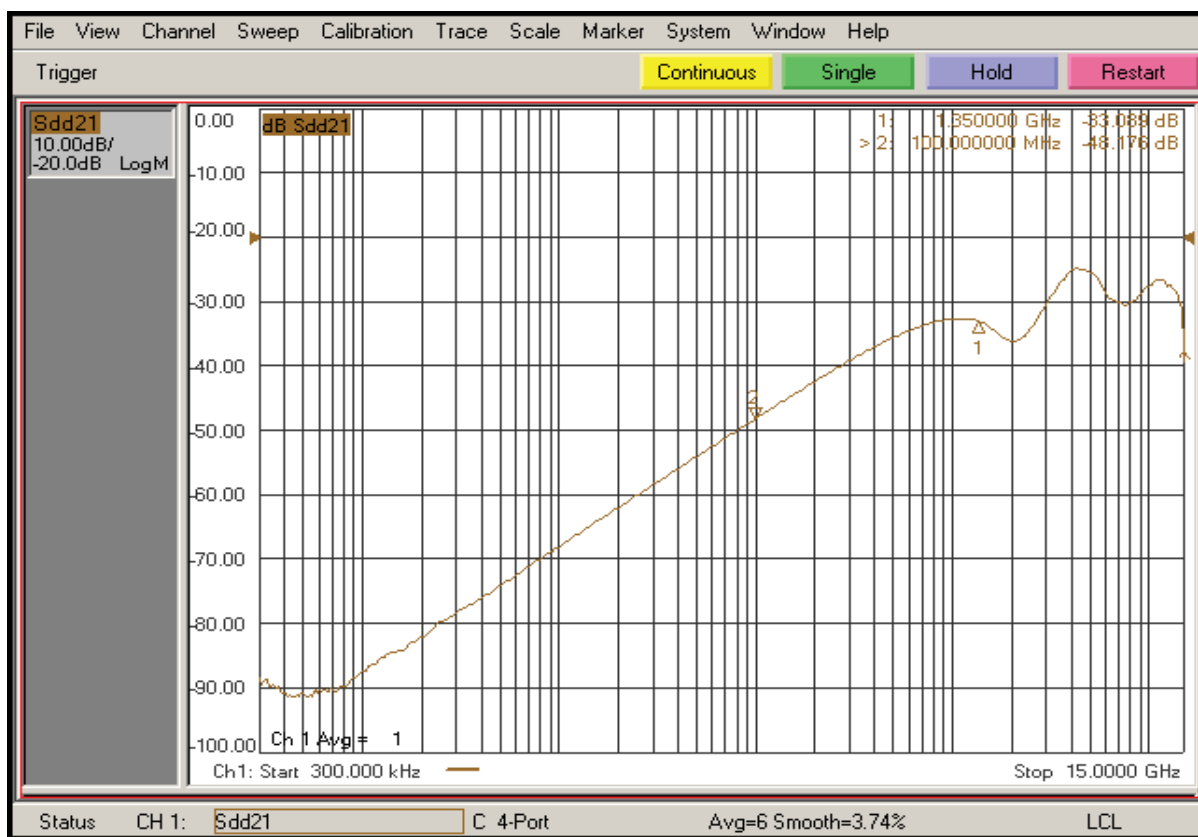


Fig 4. Crosstalk

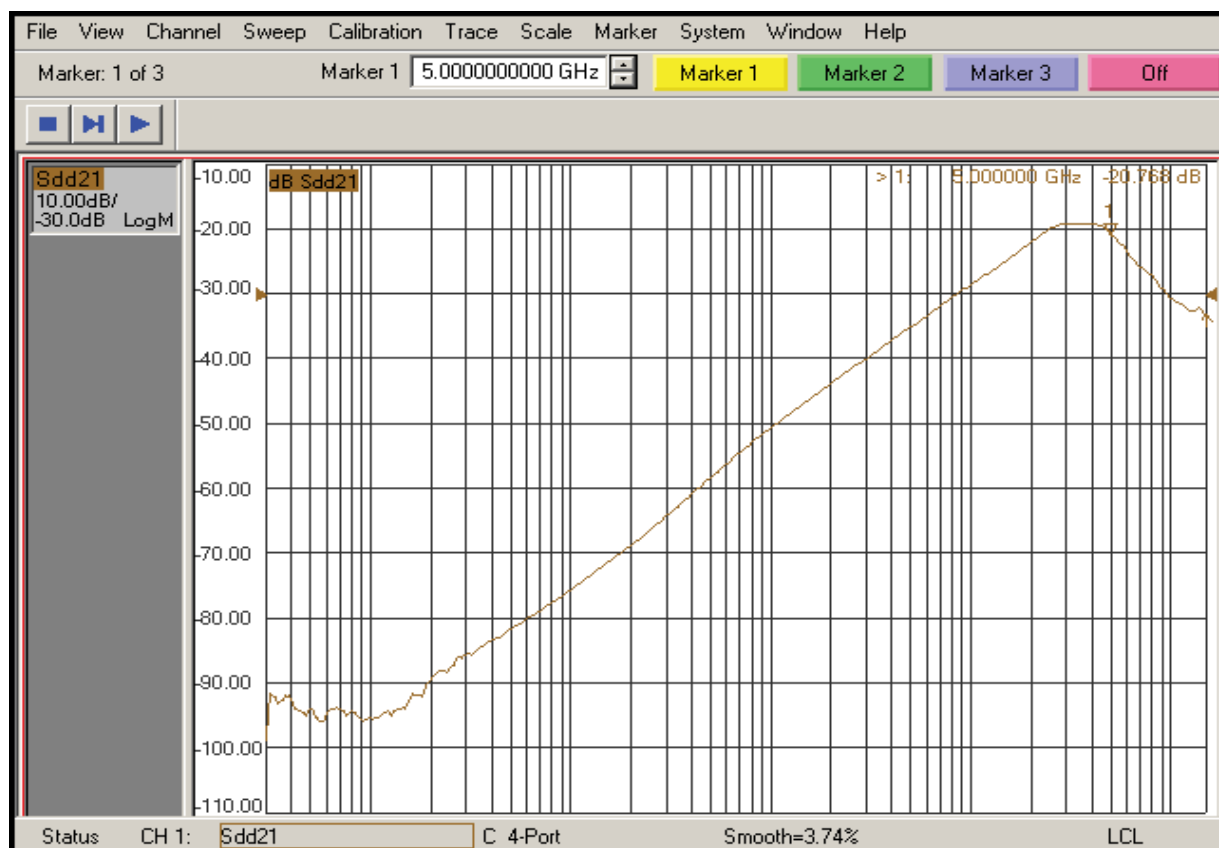


Fig 5. Off Isolation

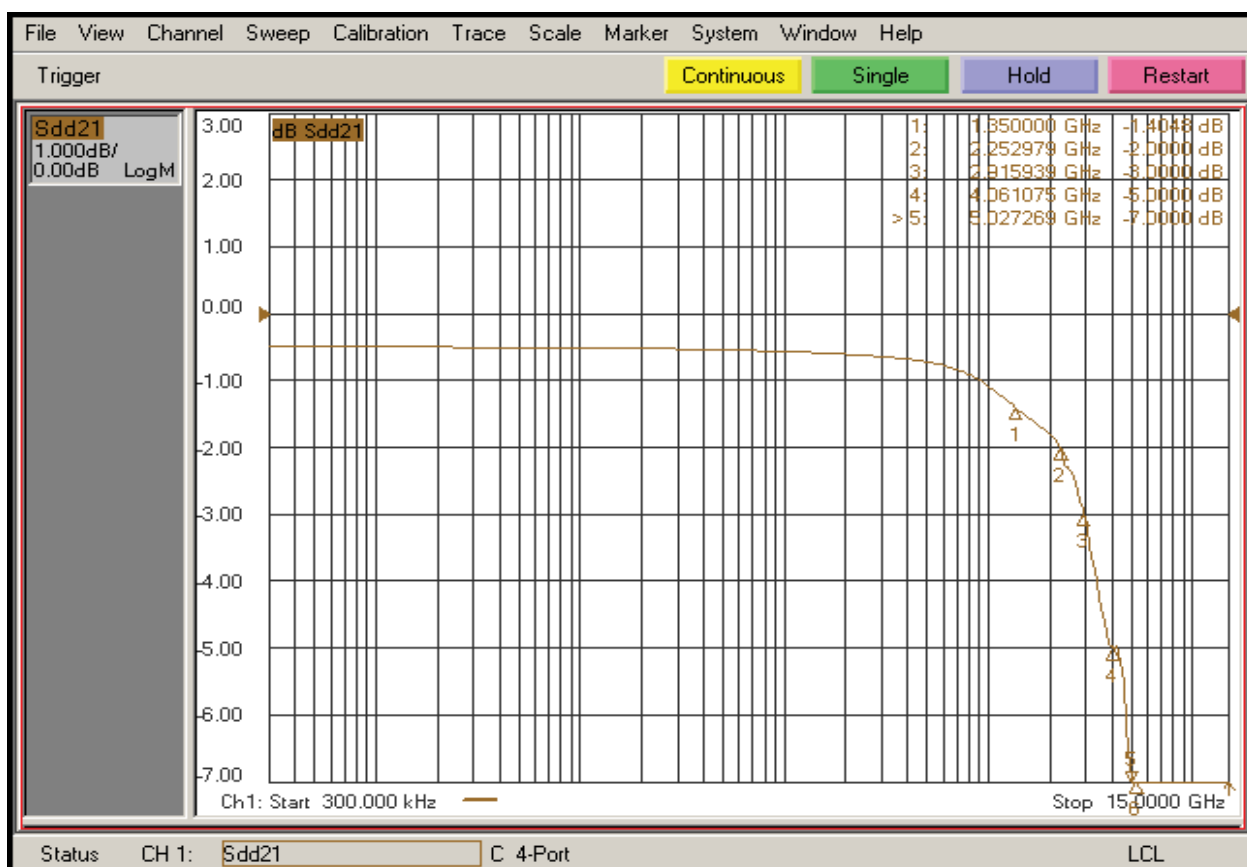


Fig 6. Insertion Loss

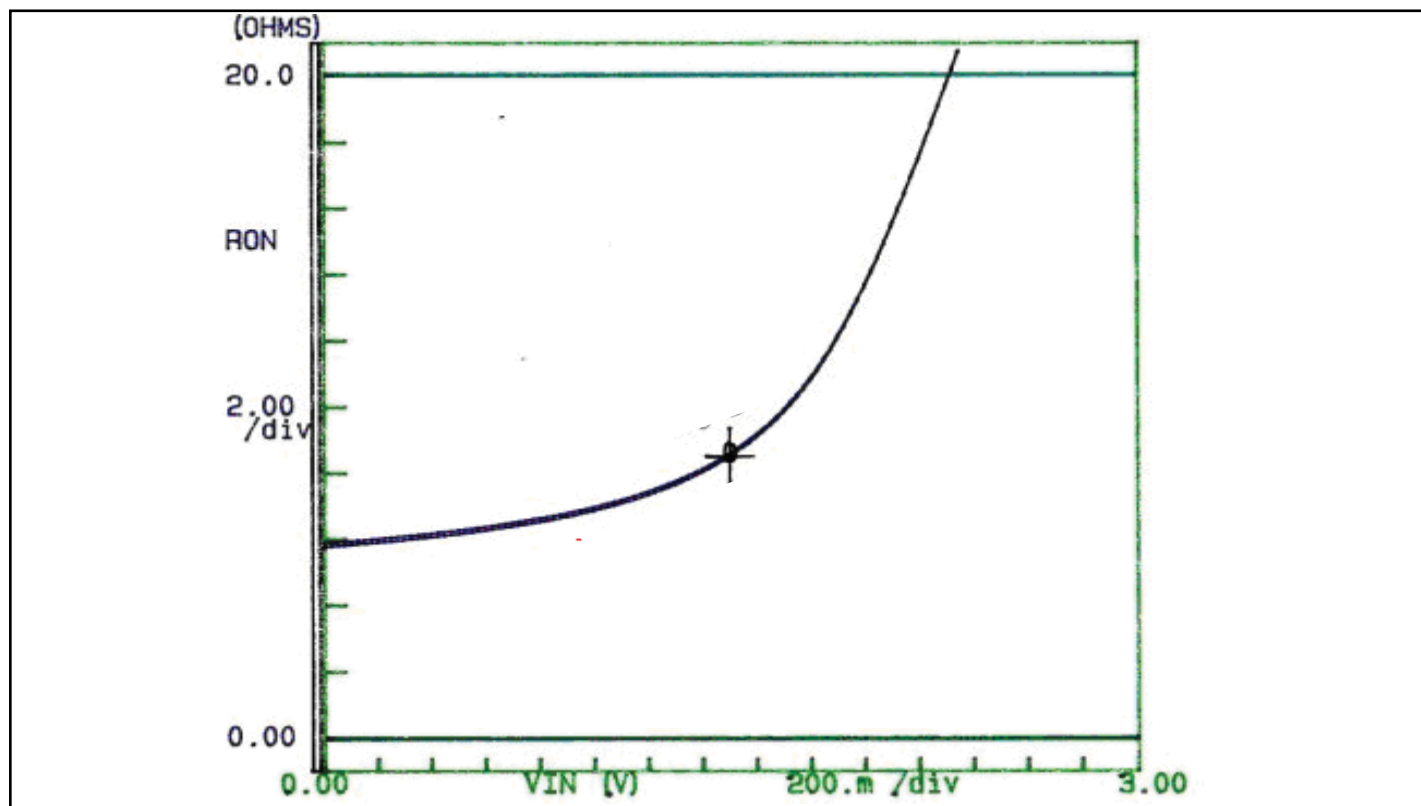
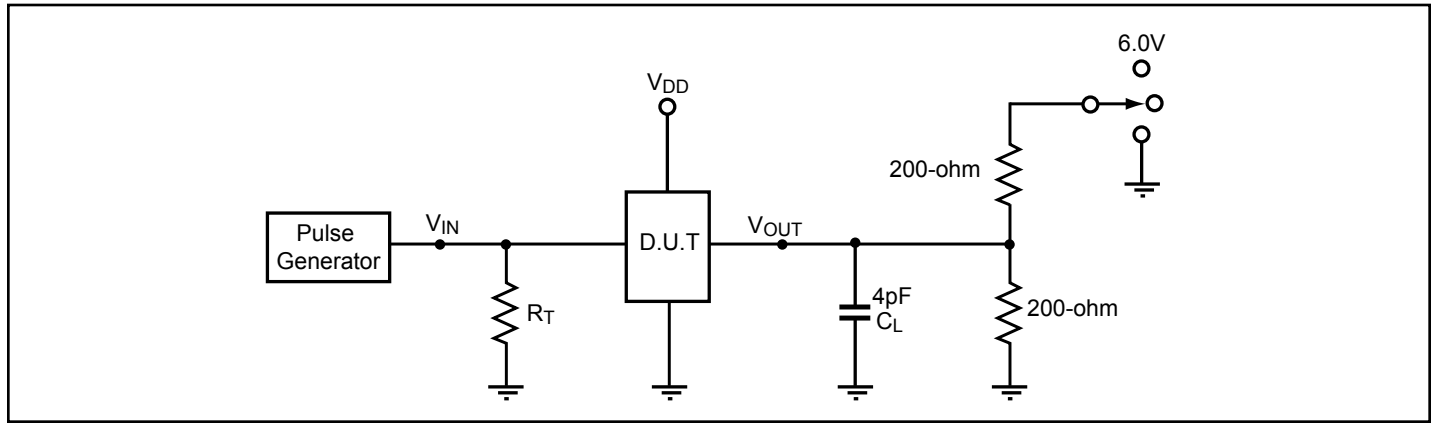


Fig 7. Ron Curve for High Speed Signal Path Only (Dx+/-)

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

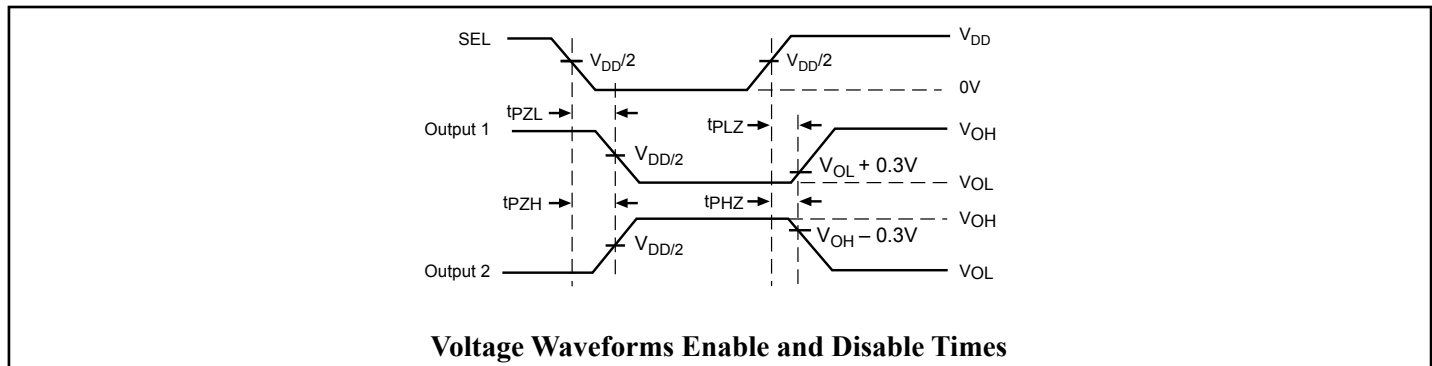
Test Circuit for Electrical Characteristics⁽¹⁻⁵⁾



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

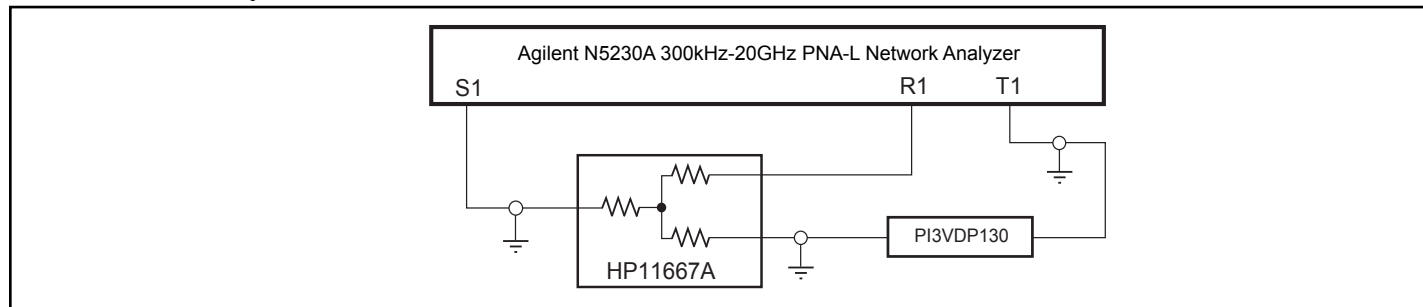
Switching Waveforms



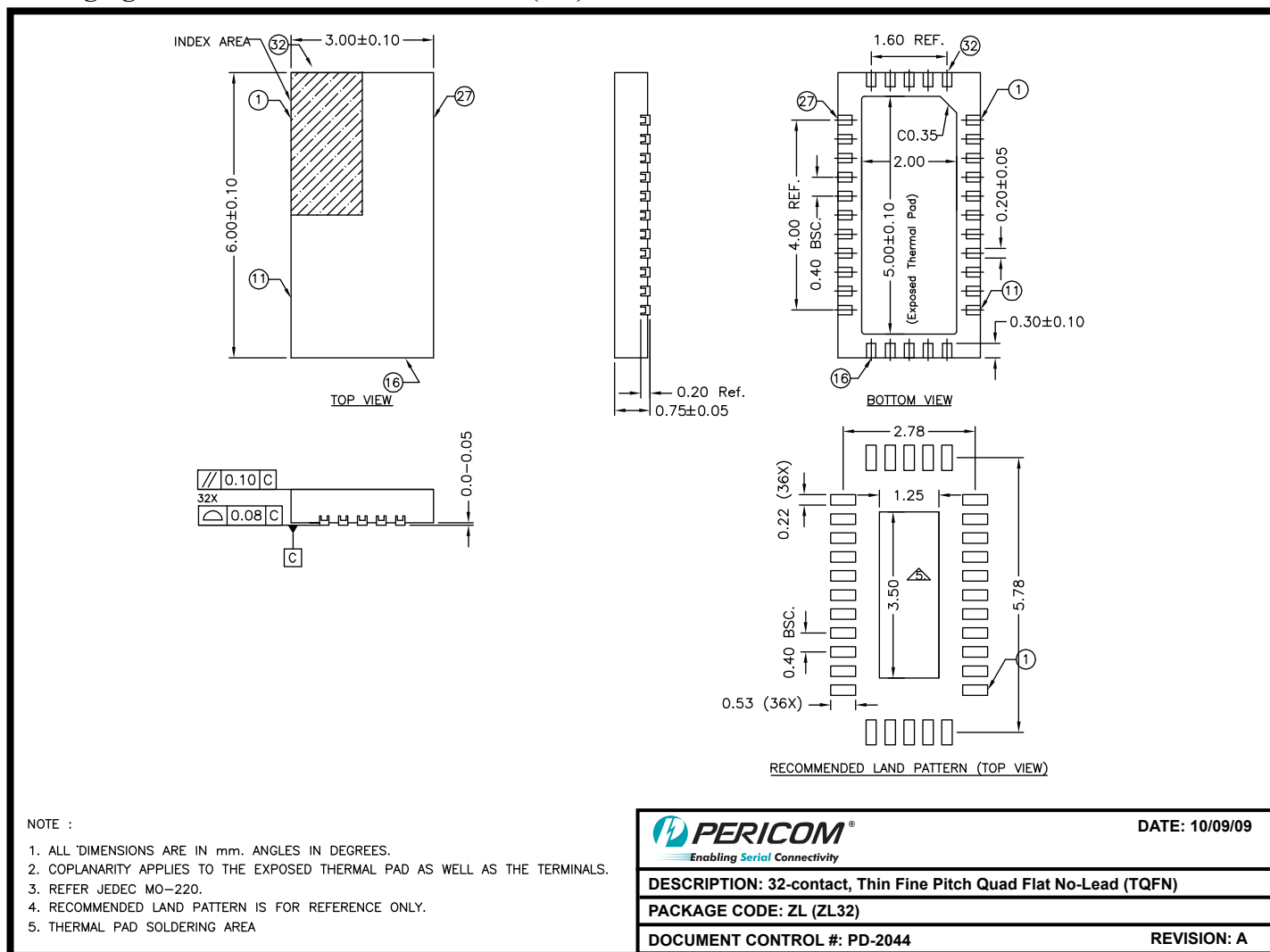
Switch Positions

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/
- "E" denotes Pb-free and Green
- Adding an "X" at the end of the ordering code denotes tape and reel packaging