Truth Table

SEL(pin8)	Function(1)
L	CLK → CLKA
L	D_x → D_xA
H	D_x → D_xB
H	CLK → CLKB

$\overline{EN}$(pin23)	IN(pin21)	Function(2)
L	L	$A_n \rightarrow {}_nB_1$
L	H	$A_n \rightarrow {}_nB_2$
H	X	$A_n = {}_nB_1 = {}_nB_2 = H_1$-Z

Note:
1) x=0,1,2,3
2) n=0,1

Pin Description

Pin Name	Description
V_{DD}33	3.3V Power supply
CP	Tie this pin to GND via 0.1µF capacitor for optimal operation
V_{DD}50	5.0V Power supply
Dx	High Speed TMDS signal I/O
DxA, DxB	High Speed TMDS signal I/O
SEL	High Speed Signal Control
IN	Side Band Signal Control
Ax, xB1, xB2	Side Band Signal I/O
GND	GND pin
EN\	Global Enable for Side Band Signals
CLK, CLKA/B	TMDS CLK signal I/O

Maximum Ratings

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

Storage Temperature.....–65°C to +150°C

DC Input Voltage for side band signals.....-0.5V to 5.5V
DC Output Current.....20mA
Power Dissipation.....0.5W
Supply Voltage V_{DD}33.....3.0V to 3.6V
Supply Voltage V_{DD}50.....4.2V to 5.5V

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 Power Supply Characteristics

Paramenter	Description	Min.	Max.	Units
V_{DD}^{33}	3.3V Power Supply	3.0	3.6	V
V_{DD}^{50}	5.0 Power Supply	4.2	5.5	V

DC Electrical Characteristics for Switching over Operating Range

(T_A = –40°C to +85°C for high speed signals only)

Paramenter	Description	Test Conditions	Min.	Typ(2)	Max.	Units
$V_{IH_{SEL}}$(3)	Input HIGH Voltage	Guaranteed HIGH level	2.8			V
$V_{IL\ SEL}$(3)	Input LOW Voltage	Guaranteed LOW level			2.0	
$V_{IK_{HS}}$	Clamp Diode Voltage	V_{DD}=Max., I_{IN}=–18mA			0.9	

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at T_A = 25°C ambient and maximum loading.
3. $V_{IH_{SEL}}$ + $V_{IL\text{-}SEL}$ are for SEL input only (pin 8)

DC Electrical Characteristics for Switching over Operating Range

(T_A = –40°C to +85°C) for side band signals only

Paramenter	Description	Test Conditions	Min.	Typ(2)	Max.	Units
$V_{IH_{IN}}$(3)	Input HIGH Voltage	Guaranteed HIGH level	2.1			V
$V_{IL_{IN}}$(3)	Input LOW Voltage	Guaranteed LOW level			0.8	
$V_{IK_{SB}}$ (4)	Clamp Diode Voltage	V_{DD}=Max., I_{IN}=–18mA			-0.5	
I_{IH}	Input HIGH Current	V_{DD}=Max., V_{IN}=V_{DD}			±5	µA
I_{IL}	Input LOW Current	V_{DD}=Max., V_{IN}=V_{SS}			±5	

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at T_A = 25°C ambient and maximum loading.
3. $V_{IH_{IN}}$ + $V_{IL_{IN}}$ are for IN input only.

Power Supply Characteristics

Parameters	Description	Test Conditions[1]	Min.	Typ.[2]	Max.	Units
I_{CC}	Quiescent Power Supply Current	V_{DD} = Max., V_{IN} = V_{DD} or V_{SS}		11	15	mA

Notes:
1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for the applicable device type.
2. Typical values are at T_A = 25°C ambient and maximum loading.

Dynamic Electrical Characteristics Over the Operating Range (T_A= -40º to +85ºC)

Parameter	Description	Test Conditions	Min.	Typ.[3]	Max.	Units
$X_{TALK_{HS}}$[1]	Crosstalk	See Fig. 1 for Measurement Setup, f = 1.65Gbps		-30		dB
$X_{TALK_{SB}}$[2]		f = 10MHz		-62		
$O_{IRR_{HS}}$[1]	OFF Isolation	See Fig. 2 for Measurement Setup, f = 1.65Gbps		-40		
$O_{IRR_{SB}}$[2]		10MHz		-67		
BW_{HS}[1] DATA	-3dB Bandwith for HS data			2.3		GHz
IL_{HS}[1]	Insertion Loss	@1.65 Gbps (8-bit deep color)		-.87		dB
		@2.0625 Gbps (10-bit deep color)		-0.96		
		@2.475 Gbps (12-bit deep color)		-1.18		
		@3.3 Gbps (16-bit deep color)		-1.84		
BW_{CLOCK}[4]	-3dB Bandwidth for CLK			1.7		GHz

Notes:
1. High-speed signal path only
2. Side-band signal path only
3. Typical values are @ T_A = 25˚C ambient
4. BW measured on CLK pins only (11, 12, 32, 33, 41 & 42)

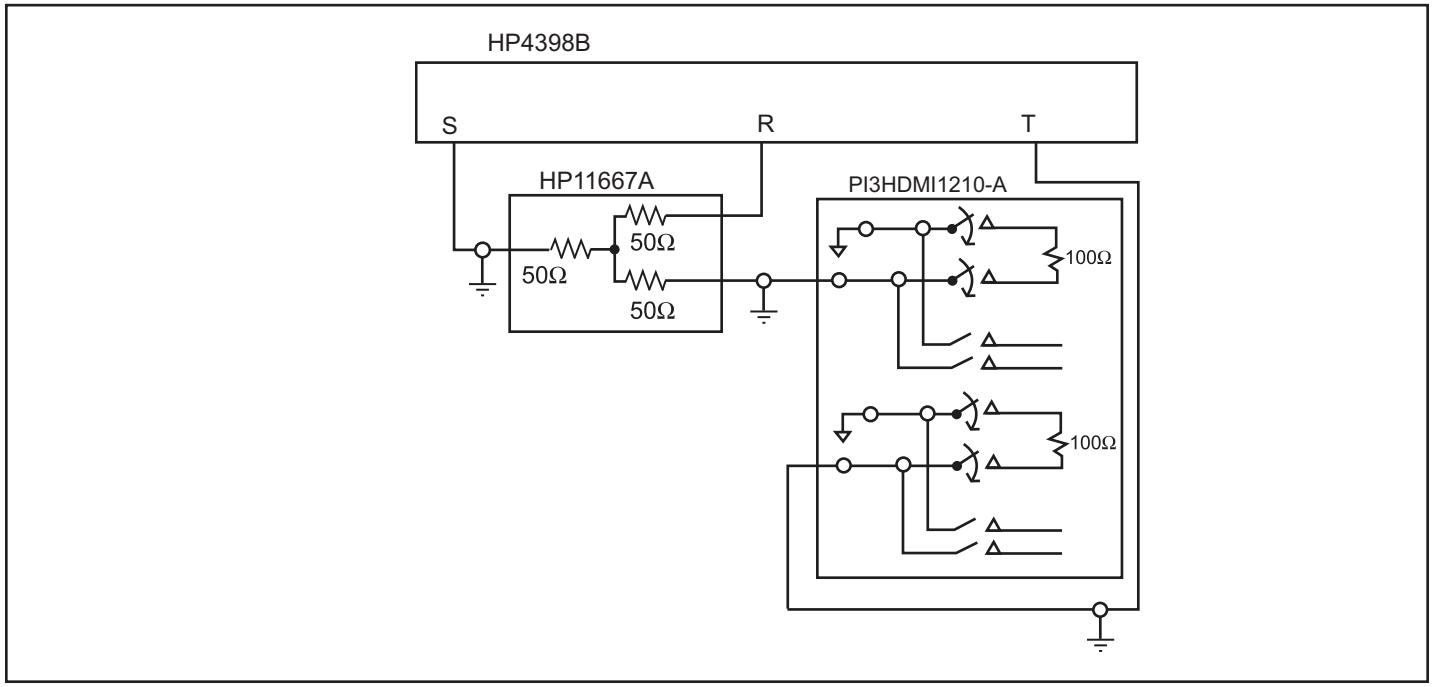


Fig 1. Crosstalk Setup

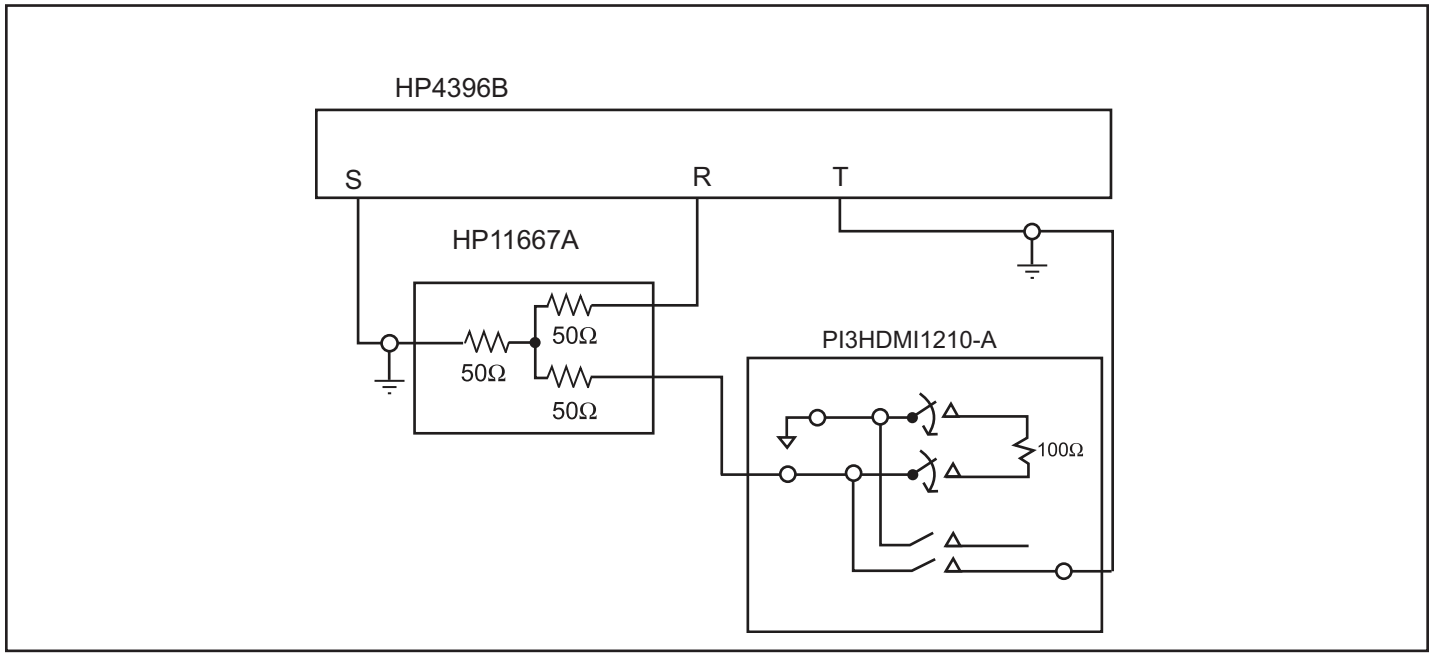


Fig 2. Off-isolation setup

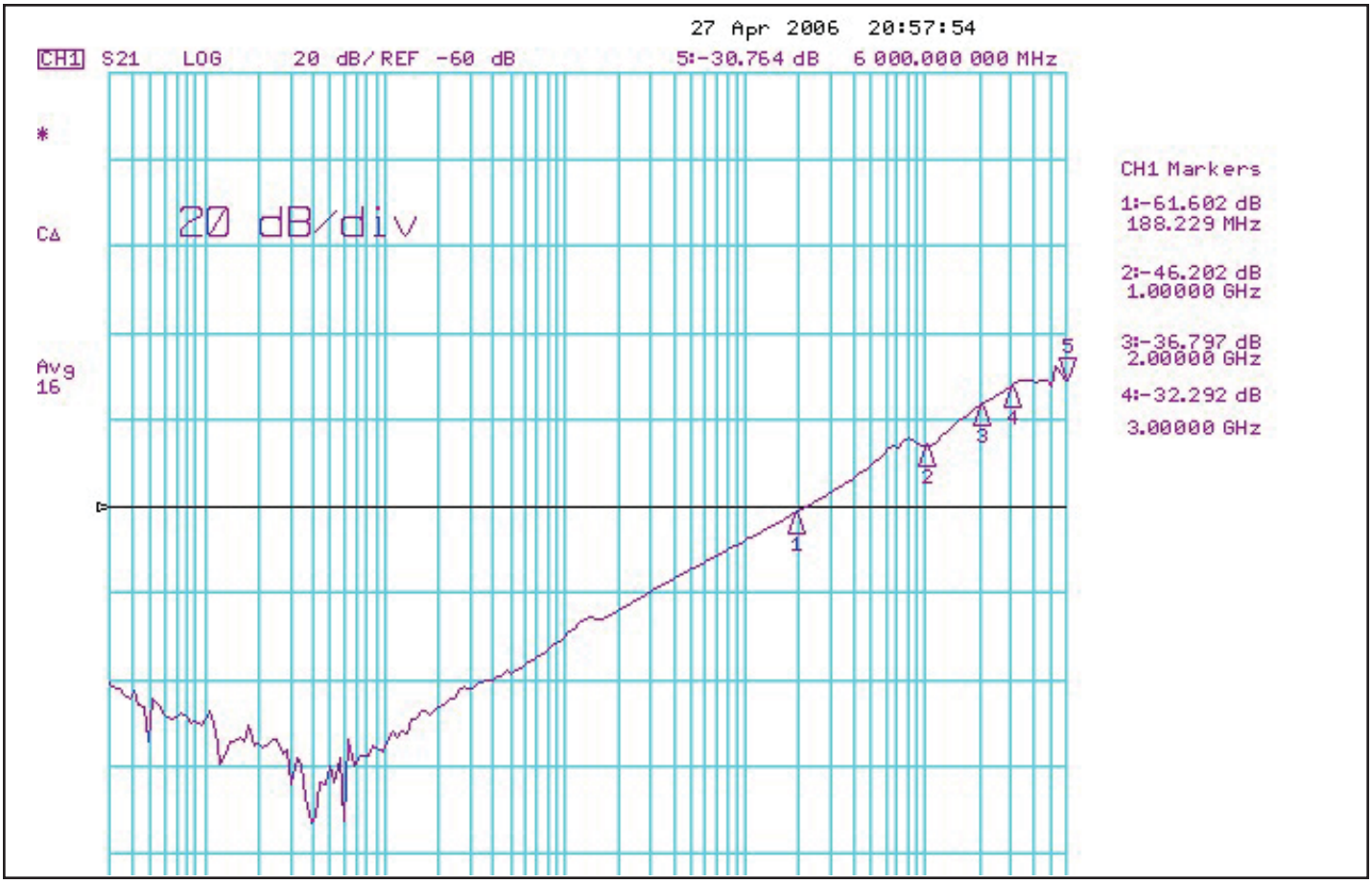


Fig 3. Crosstalk for High-speed data signals only

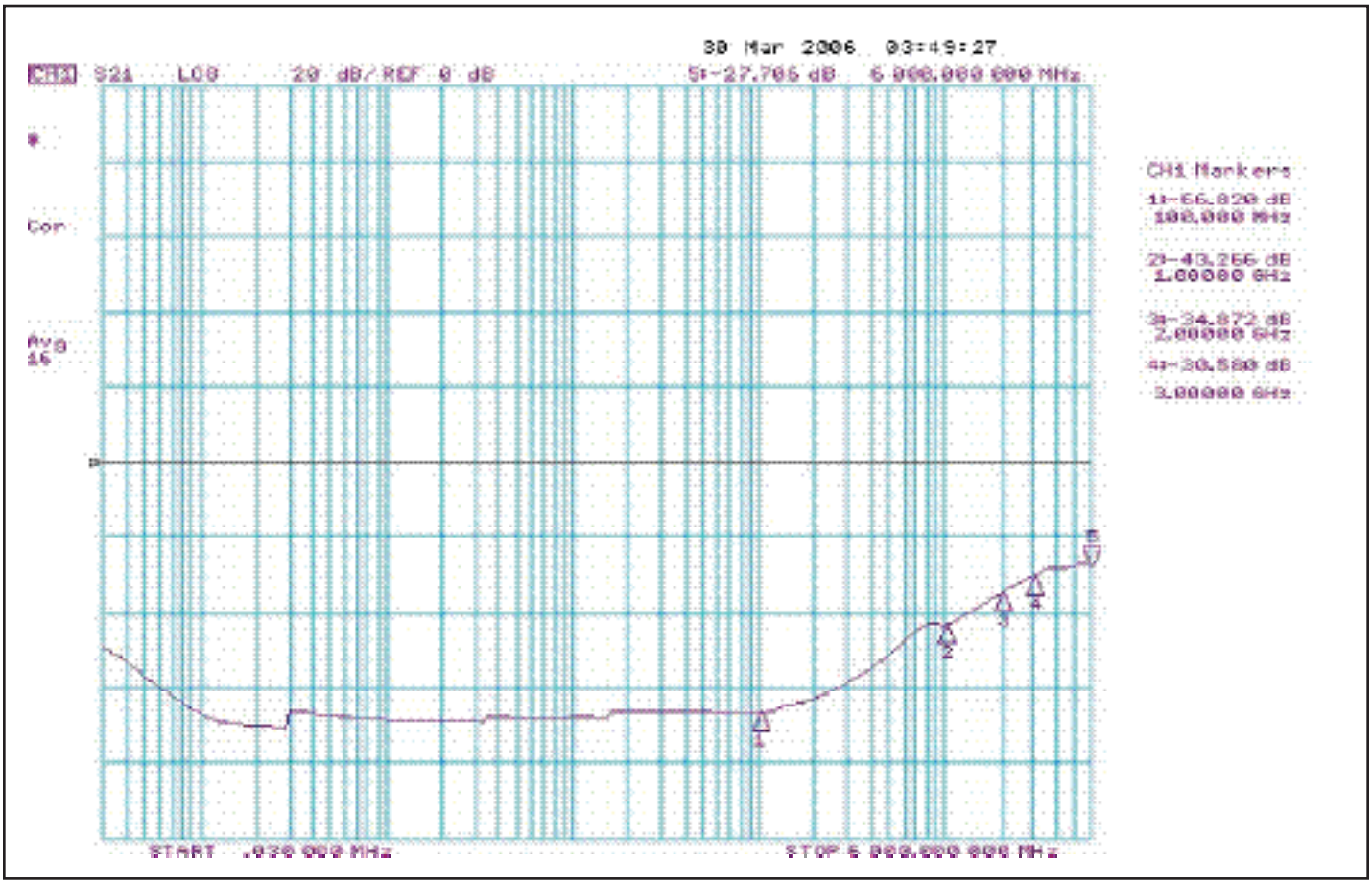


Fig 4. Off Isolation for high-speed data signals only

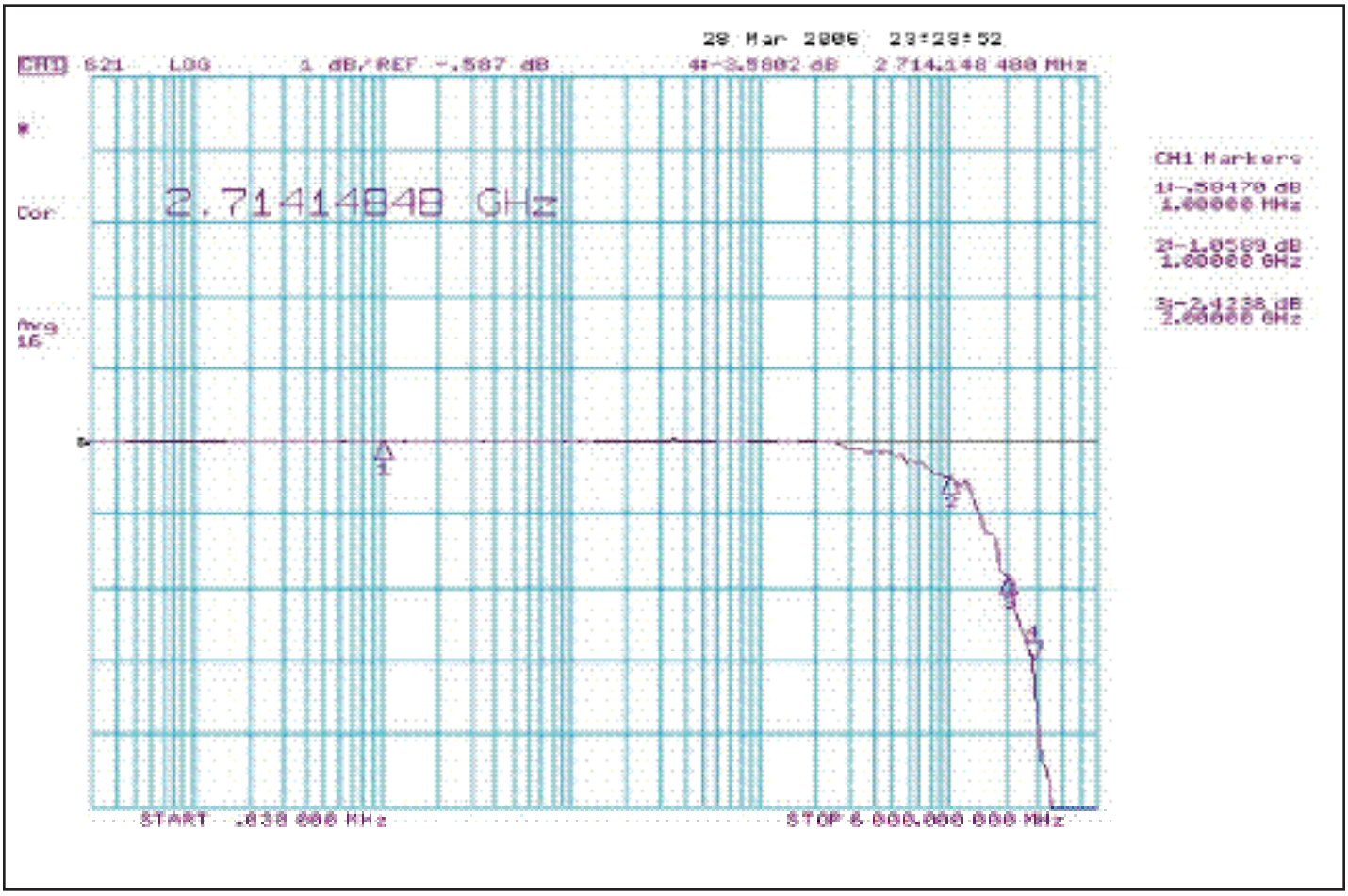


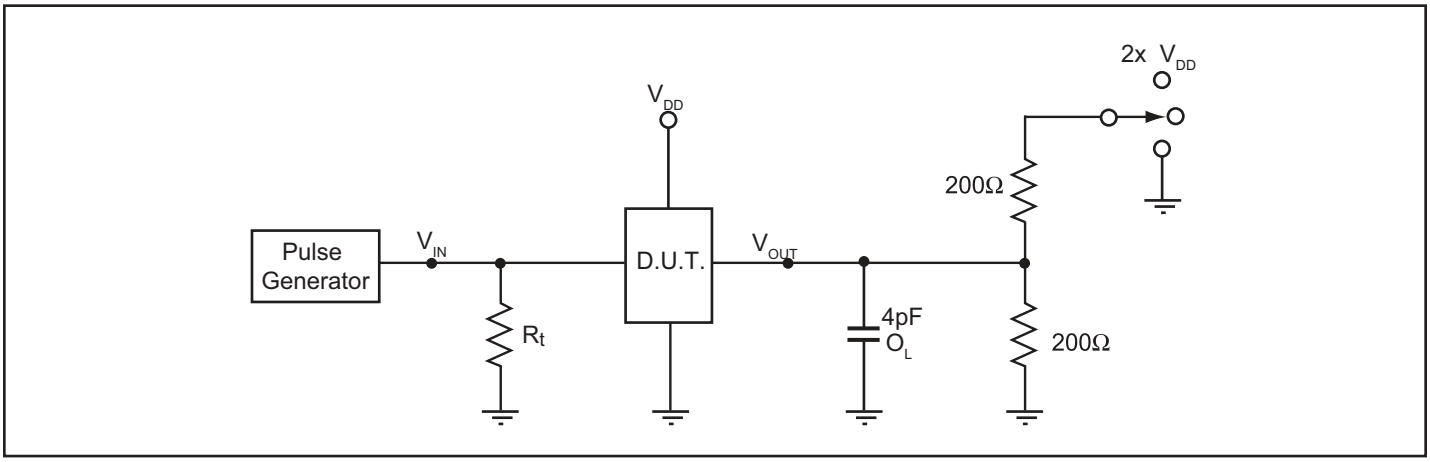
Fig 4. Insertion loss for high-speed data signals only

Switching Characteristics (T_A= -40º to +85ºC, $V_{DD}33$= 3.3V±10%, $V_{DD}50$= 5.0V±10%

Paramenter	Description	Min.	Typ.(2)	Max.	Units
t_{PZH}, t_{PZL}	Line Enable Time - SEL to A_N, B_N	0.5		8.0	ns
t_{PHZ}, t_{PLZ}	Line Disable Time - SEL to A_N, B_N	0.5		4.0	

Notes:
1. For measurement setup, please see “Test Circuit For Electrical Characteristic” on page 6, and “Switching waveforms” on page 7

Test Circuit for Electrical Characteristics(1)

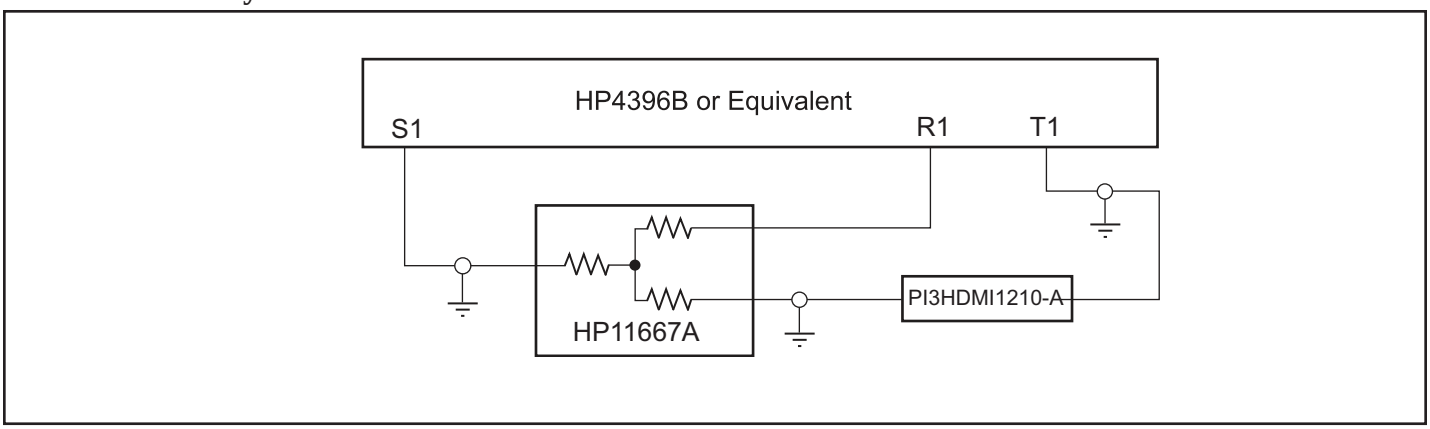


Notes:
1. C_L = Load capacitance: includes jig and probe capacitance.
2. R_T = Termination resistance: should be equal to Z_{OUT} of the Pulse Generator
3. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
   Waveform 2 is for 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 ≤ MHz, Z_O = 50Ω, t_R ≤ 2.5ns, t_F ≤ 2.5ns.
5. The outputs are measured one at a time with one transition per measurement.

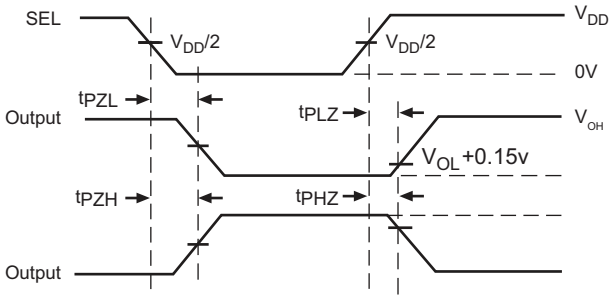
Switch Positions

Test	Switch
t_{PLZ}, t_{PZL} (output on B-side)	2 x (V_{DD}33)
t_{PHZ}, t_{PZH} (output on B-side)	GND
Prop Delay	Open

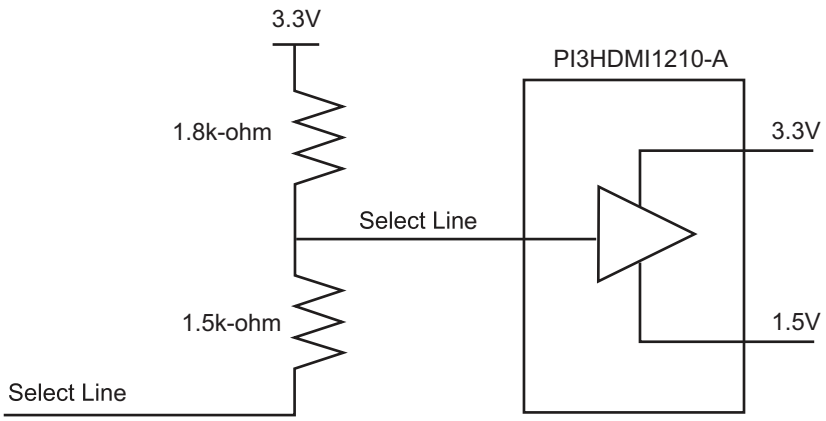
Test Circuit for Dynamic Electrical Characteristics



Switching Waveforms



Voltage Waveforms Enable and Disable Times



Example of a circuit that needs to be connected to the SEL pin (8) of the PI3HDMI1210-A of our device

Application Test Results

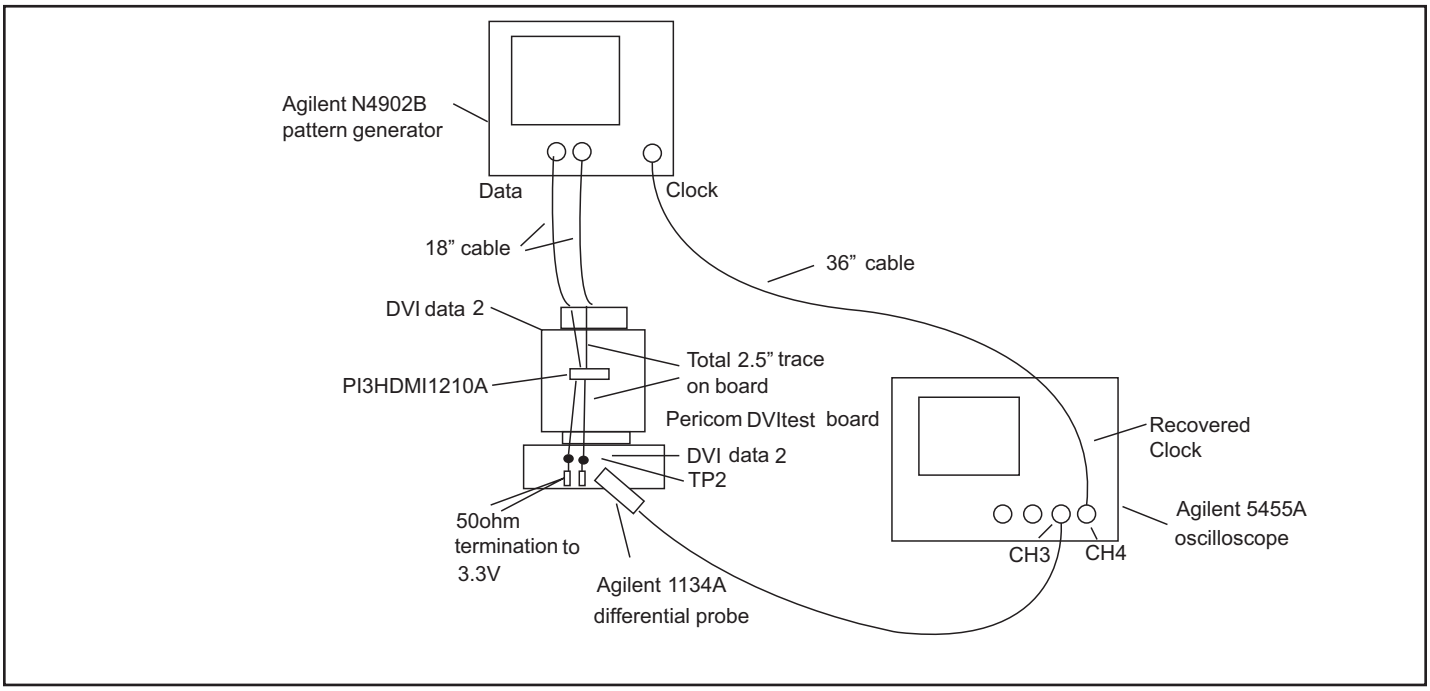


Figure 1. TMDS TP2 Tx eye compliance test setup

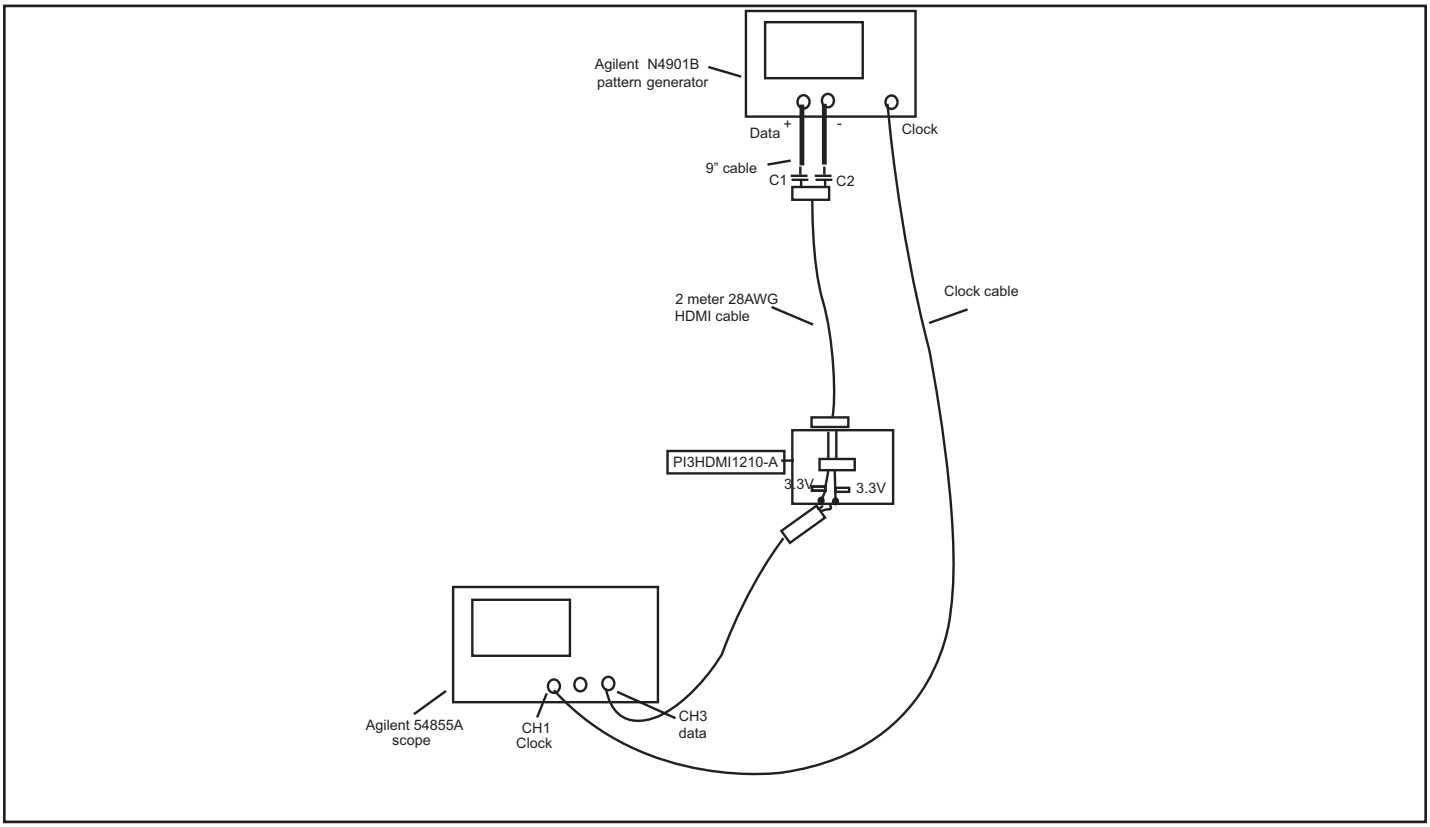


Figure 2. TMDS TP3 Rx "switch at receiver" eye compliance test setup

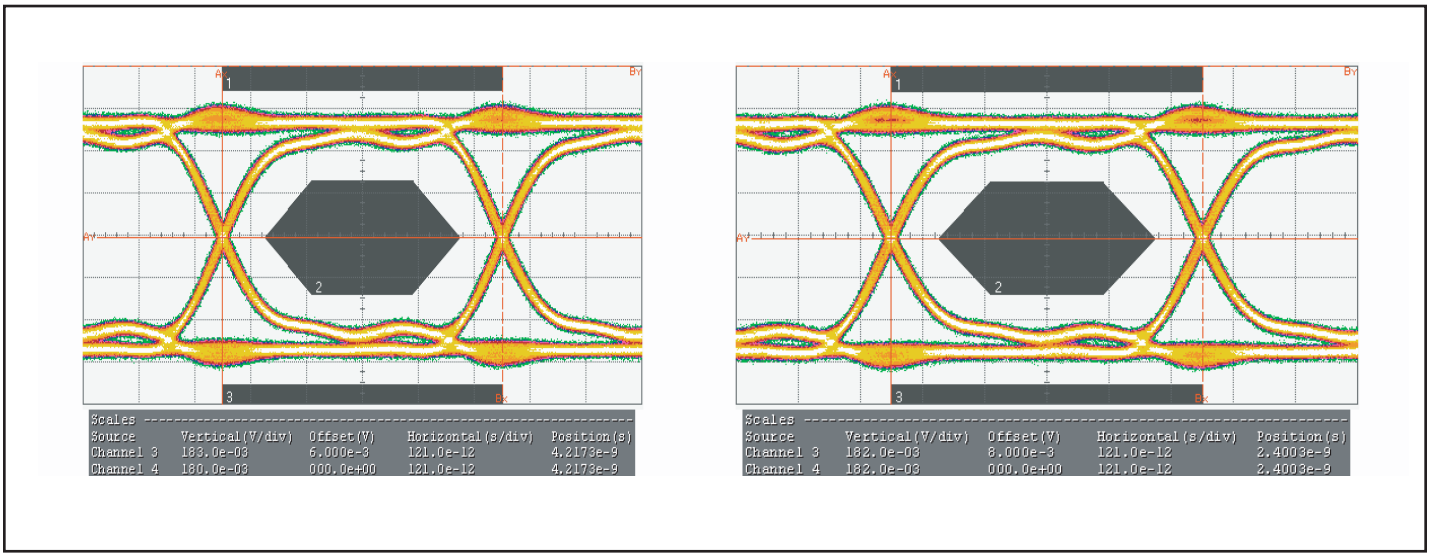


Figure 3. TP2 (Tx) eye-measurements (left is with switch, right is without switch), refer to figure 1 for the test set up

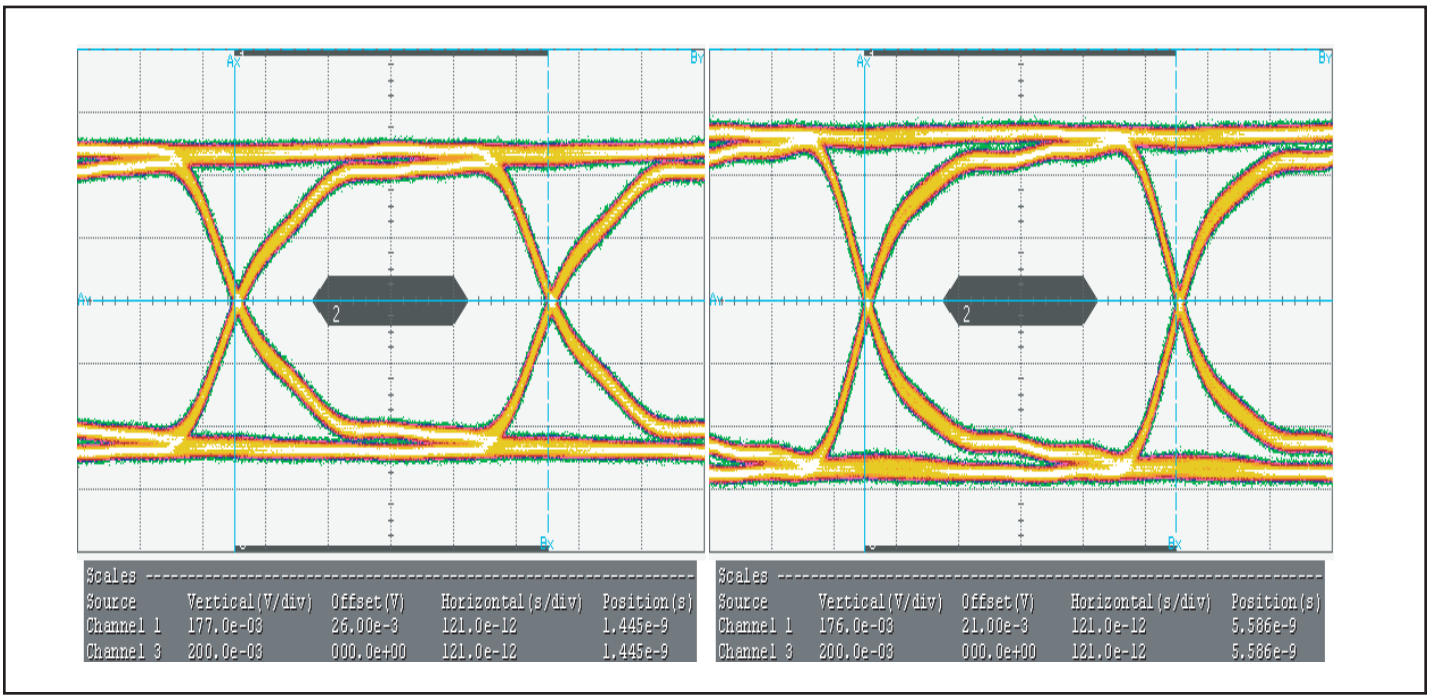
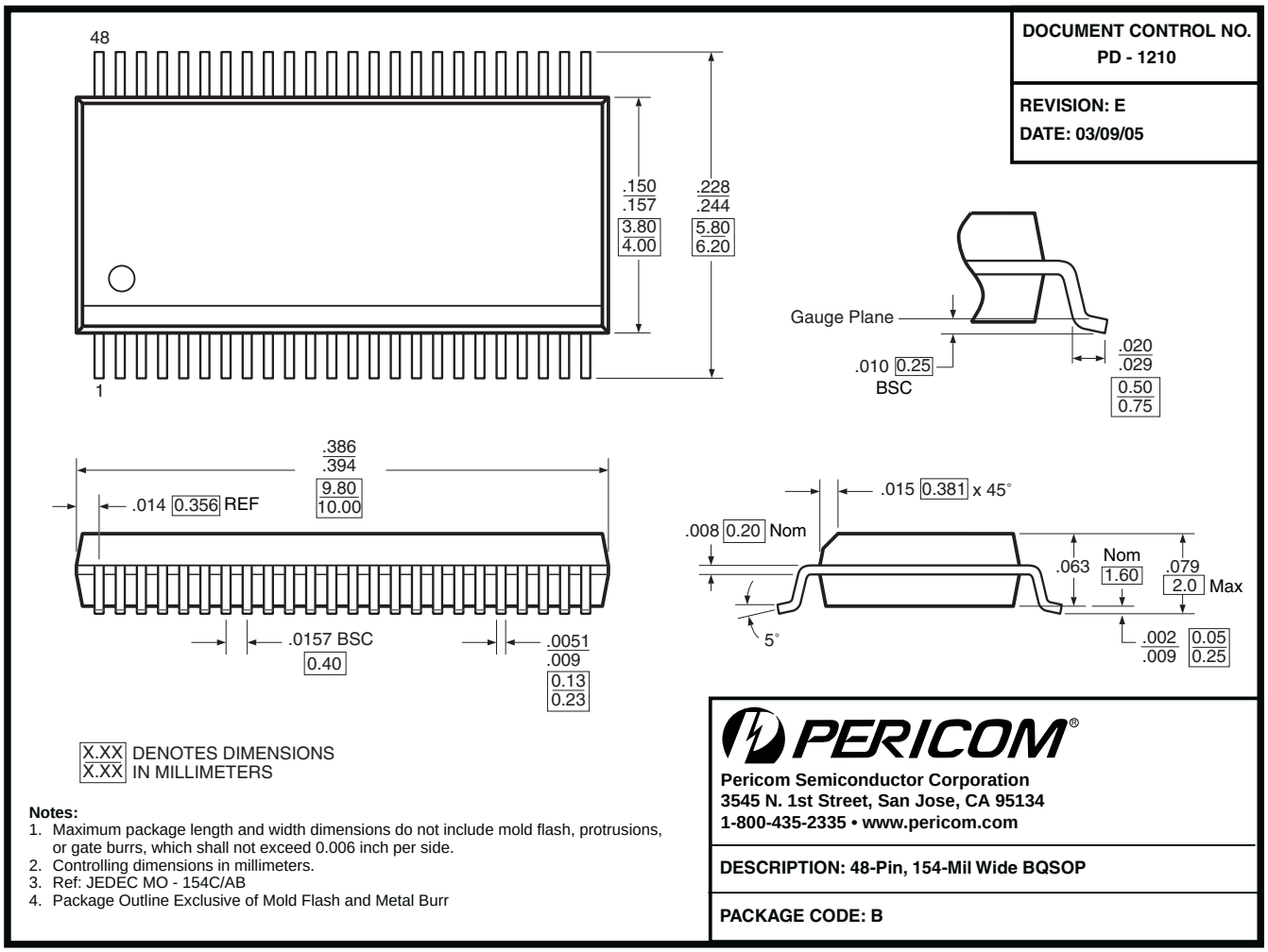


Figure 4. TP3 (Rx) - "Switch at receiver side" with 2-meter cable eye-measurements (left is with switch, right is without switch), refer to figure 2 for the test set up.

Packaging Mechanical: 48-pin BQSOP (B)



Notes:
1. Maximum package length and width dimensions do not include mold flash, protrusions, or gate burrs, which shall not exceed 0.006 inch per side.
2. Controlling dimensions in millimeters.
3. Ref: JEDEC MO - 154C/AB
4. Package Outline Exclusive of Mold Flash and Metal Burr

Ordering Information

Ordering Code	Package Code	Package Description
PI3HDMI1210-ABE	B	Pb-free & Green, 48-pin BQSOP

Notes:
1. Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
2. E = Pb-free and Green
3. X Suffix = Tape/Reel
4. HDMI & Deep Color are trademarks of Silicon Image

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