



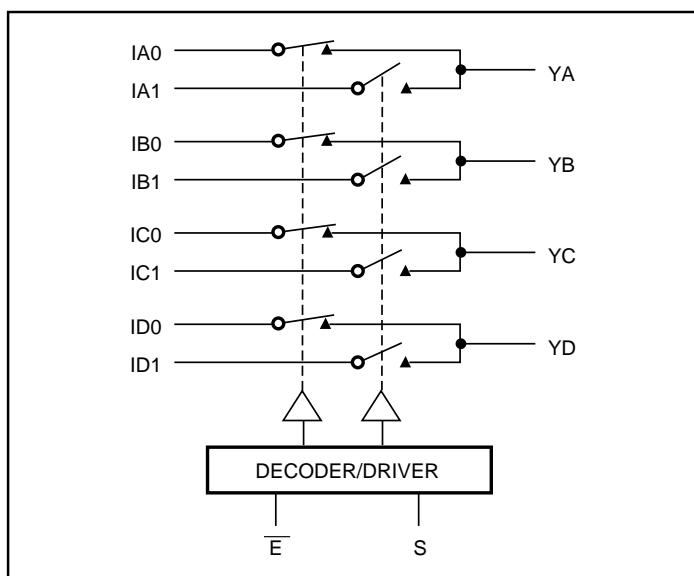
PI5L200

Precision Wide Bandwidth LanSwitch QUAD 2:1 MUX/DEMUX

Product Features:

- Single 3.3V/5V supply operation
- Rail-To-Rail Operation
- Very Low Distortion: 2%
- Replaces mechanical relays
- High-performance, low-cost solution for switching between different LAN signals
- Low crosstalk: -70 dB @ 30 Mbps
- Low insertion loss and on-resistance: 6Ω typical
- Off isolation: -55 dB @ 30 Mbps
- Wide bandwidth data rates > 135 Mbps
- Low Quiescent Supply Current (100nA typical)
- Packages available:
 - 16-pin 150 mil wide plastic SOIC (W)
 - 16-pin 150-mil wide plastic QSOP (Q)

Logic Block Diagram



Product Description:

Pericom Semiconductor's PI5L series of logic circuits are produced in the Company's advanced submicron CMOS technology.

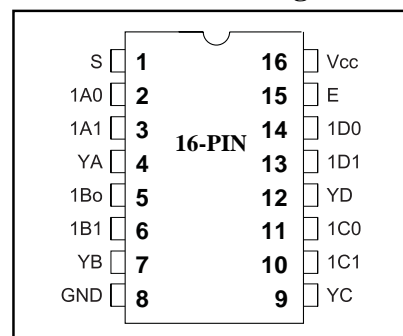
The PI5L200 is a Rail-to-Rail Quad 2:1 multiplexer/demultiplexer LanSwitch with three-state outputs. The On-resistance typically varies from 5Ω to 7Ω with data input of 0V to 5V levels. Generally, this part can be used to replace mechanical relays in low voltage (3.3V/5V systems) LAN applications.

With a wide bandwidth of 135 MHz, the PI5L200 can switch fast ethernet and ATM25 signals. Into 100Ω UTP cables, the switch distortion is typically less than 2%. Crosstalk @30MHz is -70dB. The PI5L200 operates from a single 3.3V/5V supply and interface to TTL logic.

Applications:

- 10/100 Base-TX/T4
- 100VG-AnyLAN
- Token Ring 4/16 Mbps
- ATM25
- NIC Adapter and Hubs
- SONET OCI 51.8Mbps
- T1/E1

16-Pin Product Configuration



Product Pin Description

Pin Name	Description
IAn-IDn	Data Inputs
S	Select Inputs
\bar{E}	Enable
YA-YD	Data Outputs
GND	Ground
Vcc	Power

Truth Table⁽¹⁾

\bar{E}	S	YA	YB	YC	YD	Function
H	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Disable
L	L	IA0	IB0	IC0	ID0	S = 0
L	H	IA1	IB1	IC1	ID1	S = 1

Note:

1. H = High Voltage Level
L = Low Voltage Level
Switches are shown with logic "0" input (Select and Enable)

Maximum Ratings

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

Storage Temperature	-65°C to +150°C
Ambient Temperature with Power Applied	-40°C to +85°C
Supply Voltage to Ground Potential (Inputs & Vcc Only)	-0.5V to +7.0V
Supply Voltage to Ground Potential (Outputs & D/O Only)	-0.5V to +7.0V
DC Input Voltage	-0.5V to Vcc+0.5V
DC Output Current	120 mA
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.

Single 5.0V Supply

DC Electrical Characteristics (Over the Operating Range, TA = -40°C to +85°C, VCC = 5V ±10%, GND = 0V)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ ⁽²⁾	Max.	Units
VANALOG	Analog Signal Range		0	—	Vcc	V
RON	ON-Resistance	ION = 10 mA to 30 mA	—	6	12	Ω
ΔRON	Match Between Channels		—	0.4	2	Ω
RFLAT(ON)	RON Flatness	ION = 1 mA, VNO, VNC = 0V TO 5V	—	3	5	Ω
INO(OFF) INC(ON)	On/Off Leakage Current	VNO, VNC = 4.5V	-100	—	100	nA
ICC	Quiescent Supply Current	VCC = 5.5V, VIN = 0V OR VCC	—	—	1	μA
IO	Output Current	VNO, VNC OR VCOM = 0V TO 5V	100	—	—	mA
VIH	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0	—	—	V
UIL	Input LOW Voltage	Guaranteed Logic LOW Level	-0.5	—	0.8	V
IiH	Input HIGH Current	VCC = Max., VIN = VCC	—	—	±1	μA
IiL	Input LOW Current	VCC = Max., VIN = GND —	—	±1	μA	

Dynamic Electrical Characteristics (Over the Operating Range, TA = -40°C to +85°C, VCC = 5V ±10%, GND = 0V)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ ⁽²⁾	Max.	Units
tON	Turn-on Time	VNO or VNC = 3.0V, see Figure 2	—	10	20	ns
tOFF	Turn-off Time	VNO or VNC = 3.0V, see Figure 2	—	5	10	ns
XTALK	Crosstalk	RL = 100Ω, f = 30 MHz, see Figure 4	—	-70	—	dB
C(OFF)	NC or NO Capacitance	f = 1 kHz	—	13	—	pF
OIRR	Off Isolation	RL = 100Ω, f = 30 MHz, see Figure 5	—	-55	—	dB
BW	Bandwidth -3 dB	RL = 100Ω, see Figure 3	—	137	—	MHz
D	Distortion ΔRON/RL	RL = 100Ω	—	2	—	%

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for applicable device type.
2. Guaranteed by design.

Single 3.3V Supply

DC Electrical Characteristics (Over the Operating Range, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 10\%$, $GND = 0\text{V}$)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ ⁽²⁾	Max.	Units
V_{ANALOG}	Analog Signal Range		0	—	V_{CC}	V
R_{ON}	ON-Resistance	$I_{ON} = 10\text{ mA to }30\text{ mA}$	—	15	22	Ω
ΔR_{ON}	Match Between Channels		—	1	3	Ω
$R_{FLAT(ON)}$	R_{ON} Flatness	$I_{ON} = 1\text{ mA}$, V_{NO} , $V_{NC} = 0\text{V to }V_{CC}$	—	7	12	Ω
$I_{NO(OFF)}$ $I_{NC(ON)}$	Off Leakage Current	V_{NO} , $V_{NC} = 3.0\text{V}$	-100	—	100	nA
$I_{COM(ON)}$	On Leakage Current	V_{NO} , $V_{NC} = 3.0\text{V}$	-100	—	100	nA
I_O	Output Current	V_{NO} , V_{NC} or $V_{COM} = 0\text{V}$	80	—	—	mA
V_{IH}	Input HIGH Voltage	Guaranteed Logic HIGH Level	2.0	—	—	V
V_{IL}	Input LOW Voltage	Guaranteed Logic LOW Level	-0.5	—	0.8	V
I_{IH}	Input HIGH Current	$V_{CC} = \text{Max.}$, $V_{IN} = V_{CC}$	—	—	± 1	μA
I_{IL}	Input LOW Current	$V_{CC} = \text{Max.}$, $V_{IN} = GND$ —	—	± 1	μA	

Dynamic Electrical Characteristics (Over the Operating Range, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 10\%$, $GND = 0\text{V}$)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ ⁽²⁾	Max.	Units
t_{ON}	Turn-on Time	V_{NO} or $V_{NC} = 1.5\text{V}$, see Figure 2	—	28	40	ns
t_{OFF}	Turn-off Time	V_{NO} or $V_{NC} = 1.5\text{V}$, see Figure 2	—	4	20	ns
X_{TALK}	Crosstalk	$R_L = 50\ \Omega$, $f = 1\text{ MHz}$, see Figure 4	—	-75	—	dB
$C_{(OFF)}$	NC or NO Capacitance	$f = 1\text{ kHz}$	—	15	—	pF
$C_{COM(OFF)}$	COM Off Capacitance	$f = 1\text{ kHz}$	—	30	—	pF
O_{IRR}	Off Isolation	$R_L = 50\ \Omega$, $f = 1\text{ MHz}$, see Figure 5	—	-75	—	dB
BW	Bandwidth -3 dB	$R_L = 50\ \Omega$, see Figure 3	—	110	—	MHz
D	Distortion	$R_L = 100\ \Omega$	—	4	—	%

DC Electrical Characteristics (Over the Operating Range, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 10\%$, $GND = 0\text{V}$)

Parameters	Description	Test Conditions ⁽¹⁾	Min.	Typ ⁽²⁾	Max.	Units
I_{CC}	Quiescent Positive Power Supply Current	$V_{CC} = 3.6\text{V}$, $V_{IN} = 0\text{V}$ or V_{CC} All Channels On or Off	—	—	1	μA

Notes:

1. For Max. or Min. conditions, use appropriate value specified under Electrical Characteristics for applicable device type.
2. Guaranteed by design.

Figure 1a. Full Duplex Transceiver

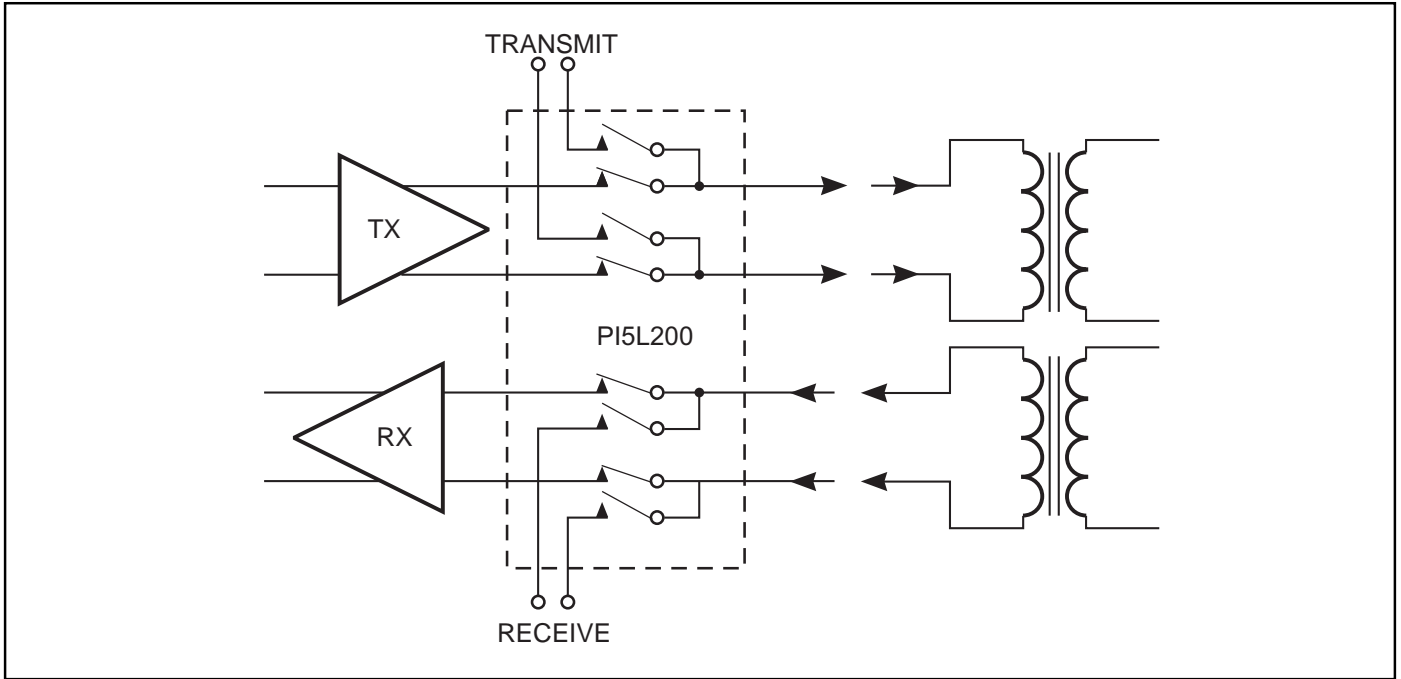


Figure 1b. Loop Back

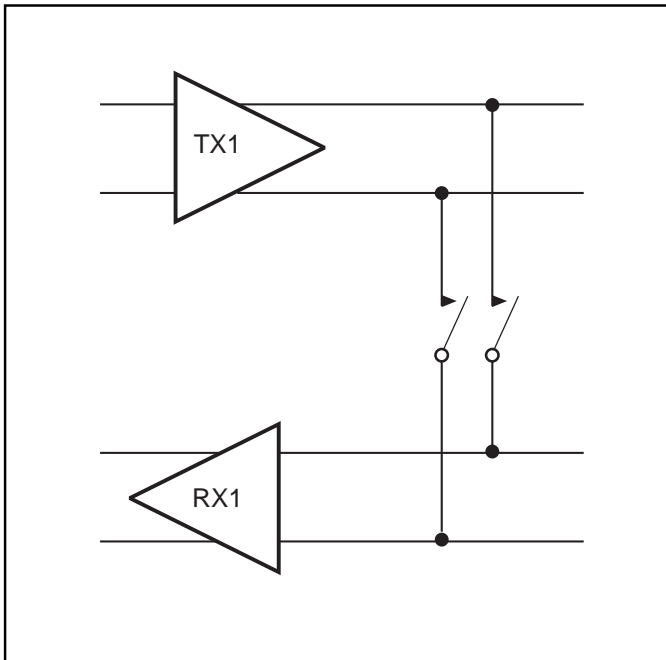


Figure 1c. Line Termination

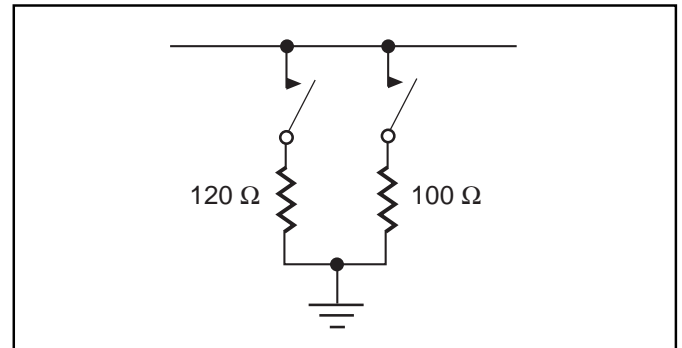
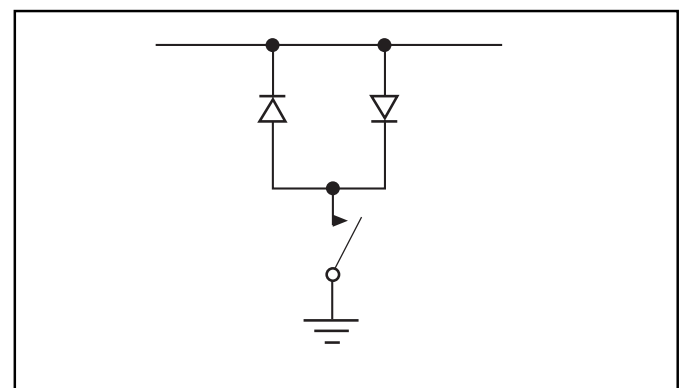


Figure 1d. Line Clamp



Test Circuits

Figure 2. Switching Time

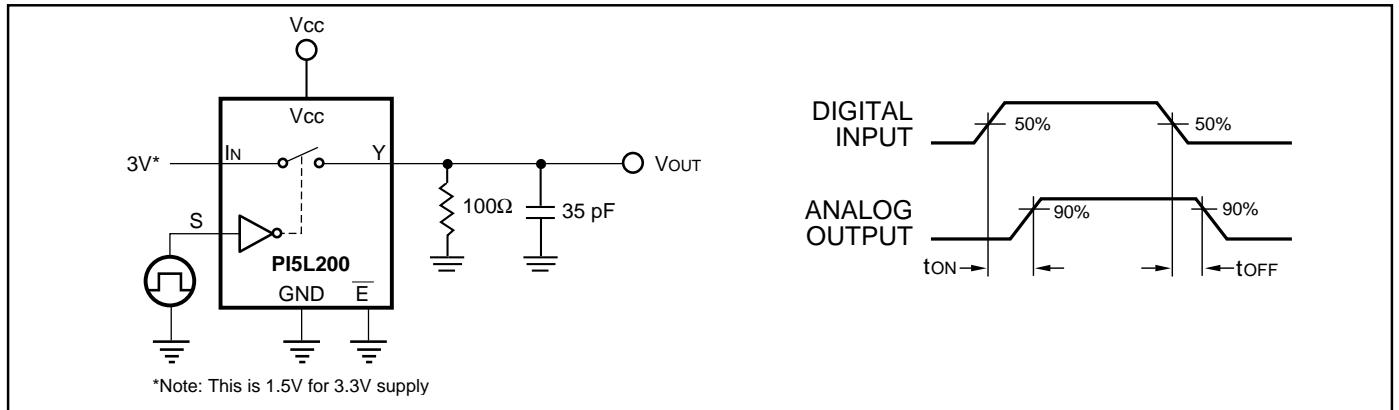
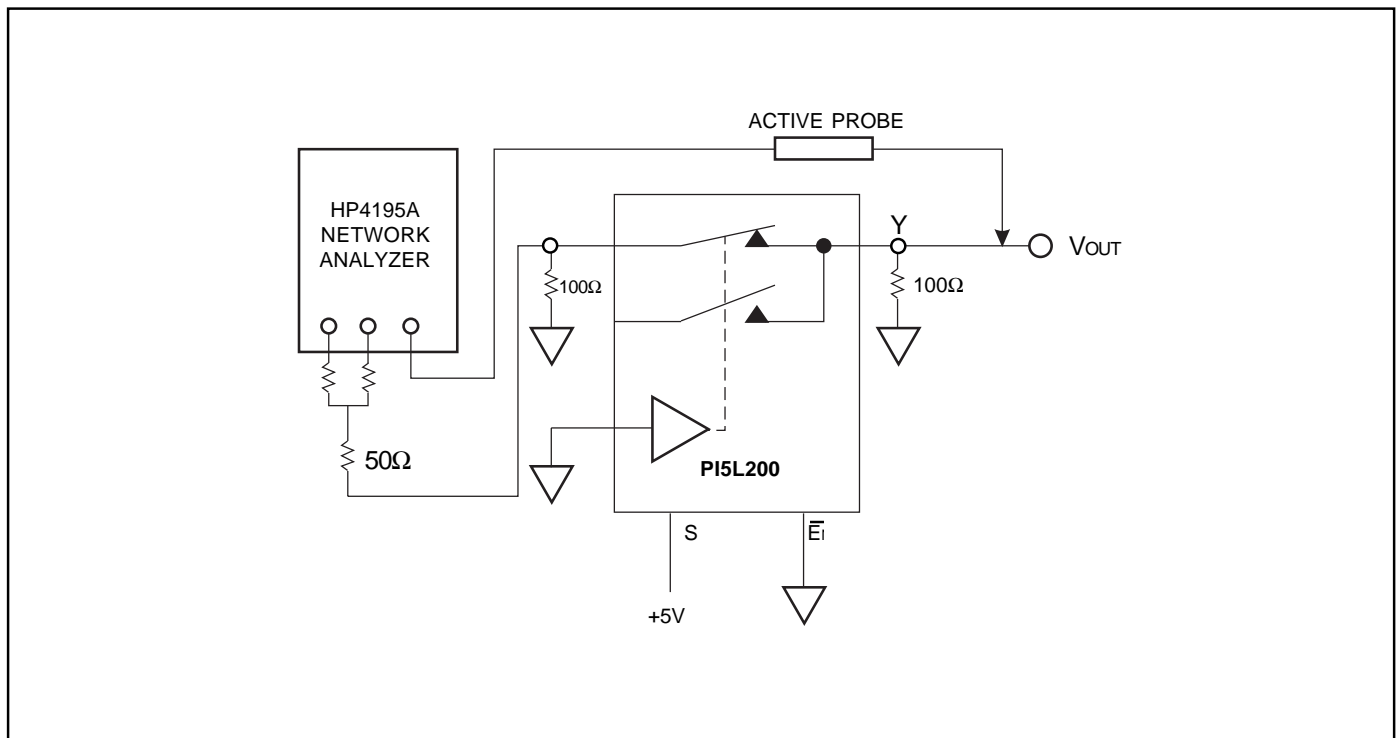


Figure 3. Bandwidth



Typical Operating Characteristics

Figure 4. Crosstalk

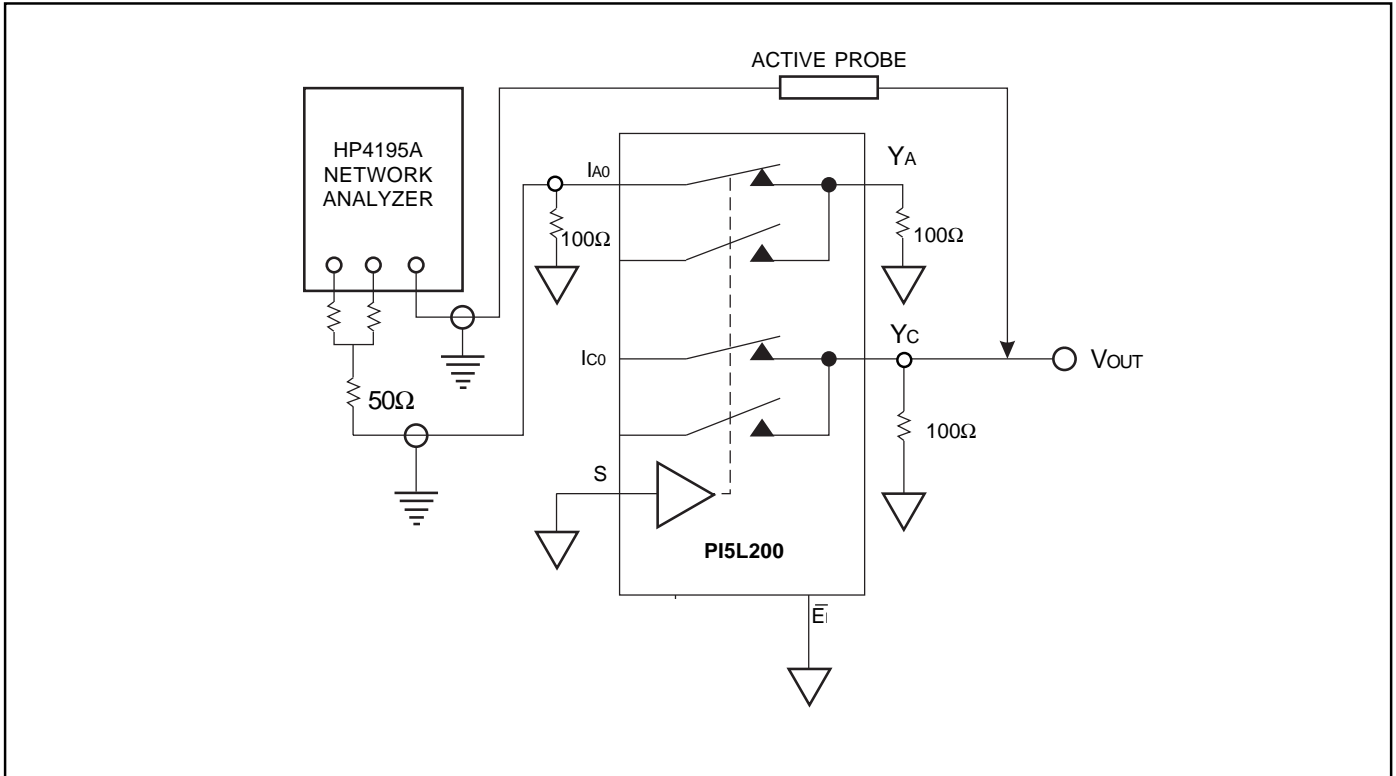


Figure 5. Off Isolation

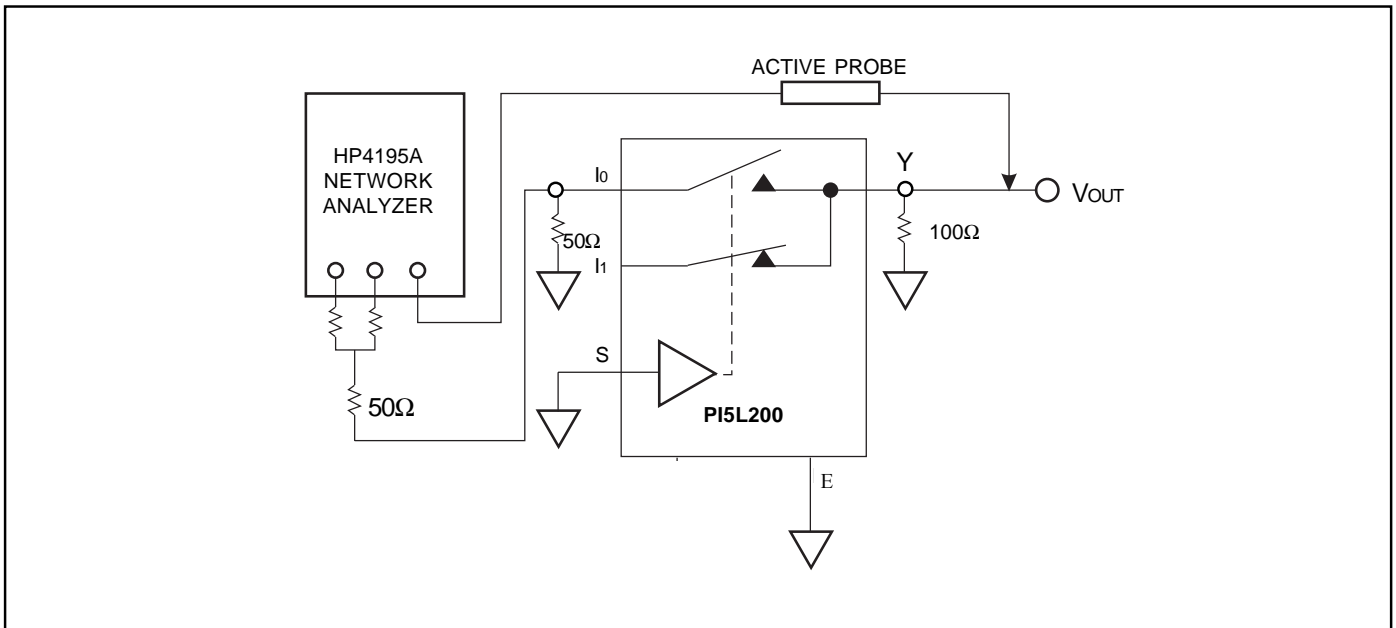


Figure 6. On-Resistance vs Input Voltage

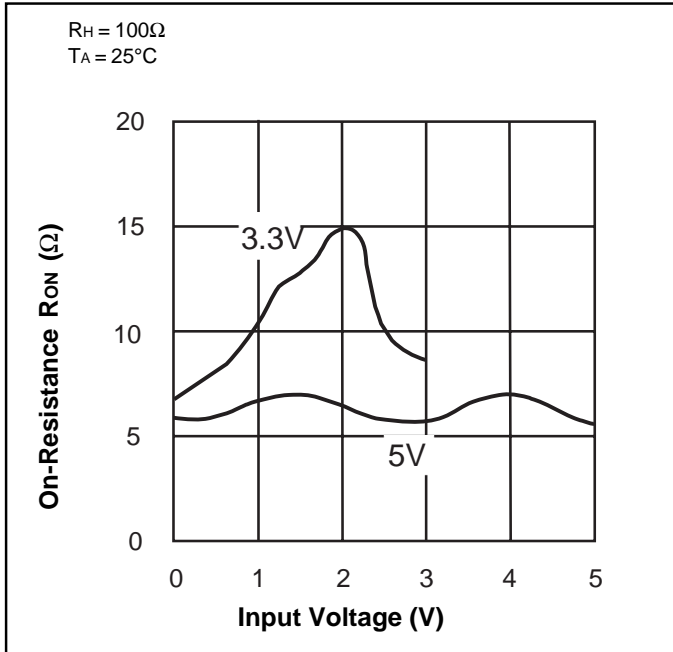


Figure 7. Insertion Loss vs Frequency

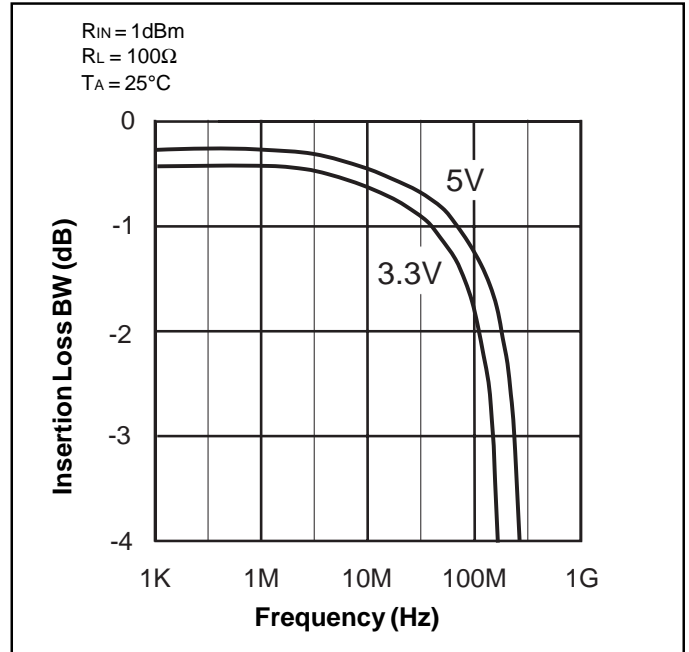


Figure 8. Off Isolation vs Frequency

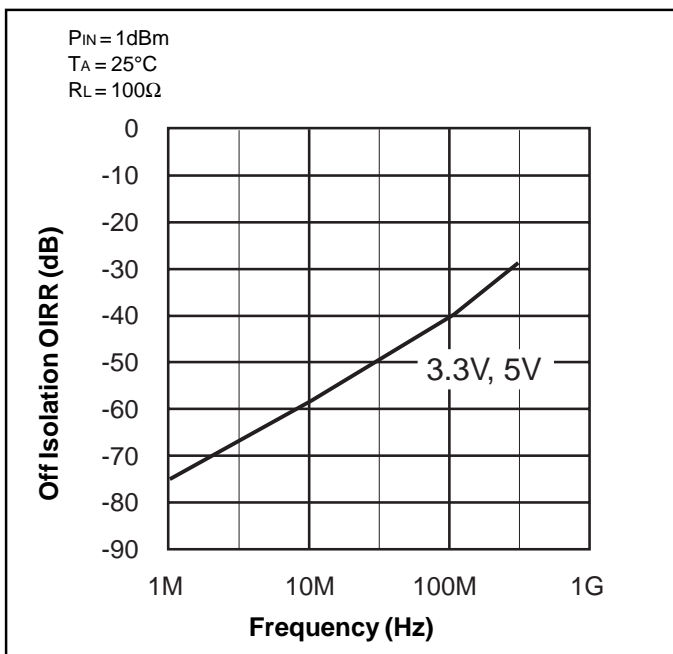


Figure 9. Crosstalk vs Frequency

