A product Line of
Diodes Incorporated

PI5L200

Precision Wide Bandwidth LanSwitch Quad 2:1 Mux/DeMux

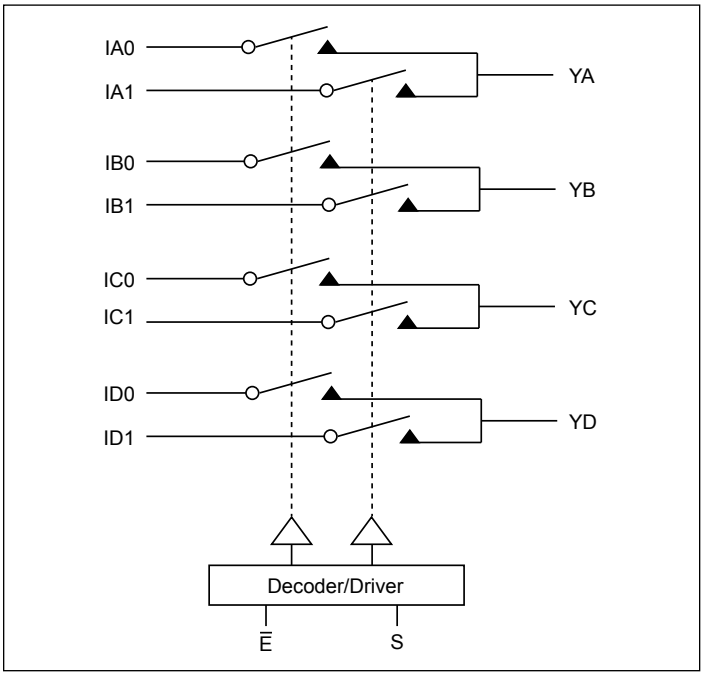
Features

- 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: –70dB @ 30 Mbps
- Low insertion loss and On-Resistance: 6-ohms typical
- Off isolation: –55dB @ 30 Mbps
- Wide bandwidth data rates >135 Mbps
- Low Quiescent Supply Current (100nA typical)
- Packaging (Pb-free & Green available):
  - 16-pin 150-mil wide plastic QSOP (Q)
  - 16-pin 150-mil wide plastic SOIC (W)
  - 16-pin 173-mil wide plastic TSSOP (L)

Applications

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

Block Diagram

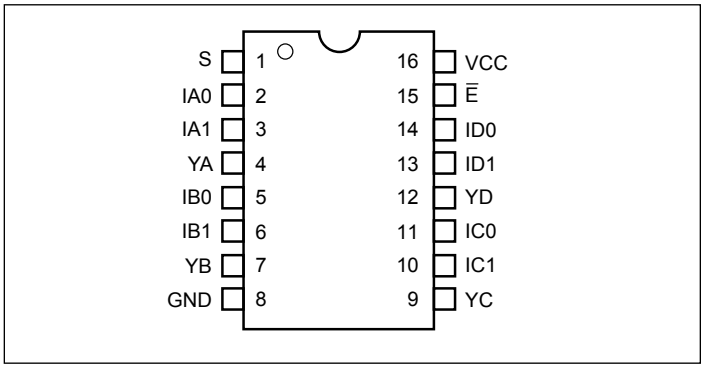


Description

Diodes' PI5L200 is a Rail-to-Rail Quad 2:1 multiplexer/demultiplexer LanSwitch with 3-state outputs. The On-Resistance typically varies from 5 ohms to 7 ohms with data inputs of 0V to 5V. 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 100-ohm UTP cables, the switch distortion is typically less than two percent. Crosstalk @30 MHz is –70dB. The PI5L200 operates from a single 3.3V/5V supply and interface to TTL logic.

Pin Configuration



Pin Description

Pin Name	Description
IAn-IDn	Data Inputs
S	Select Inputs
$\overline{E}$	Enable
YA-YD	Data Outputs
GND	Ground
V_{CC}	Power

Truth Table

$\overline{E}$	S	YA	YB	YC	YD	Function
H	X	Hi-Z	Hi-Z	Hi-Z	Hi-Z	Disable
L	L	$_IA_0$	$_IB_0$	$_IC_0$	$_ID_0$	S = 0
L	H	$_IA_1$	$_IB_1$	$_IC_1$	$_ID_1$	S = 1

Note:
H = High Voltage Level,
L = Low Voltage Level, S
witches 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	–0.5V to +7.0V
DC Input Voltage	–0.5V to V_{CC}+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, T_A = -40°C to +85°C, V_{CC} = 5V ±10%, GND = 0V)

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} = 10mA to 30mA	—	6	12	Ω
ΔR_{ON}	Match Between Channels		—	0.4	2	
$R_{FLAT(ON)}$	R_{ON} Flatness	I_{ON} = 1mA, V_{NO}, V_{NC} = 0V to 5V	—	3	5	
$I_{NO(OFF)}$, $I_{NO(ON)}$	On/Off Leakage Current	V_{NO}, V_{NC} = 4.5V	–100	—	100	nA
I_{CC}	Quiescent Supply Current	V_{CC} = 5.5V, V_{IN} = 0V or V_{CC}	—	—	1	µA
I_O	Output Current	V_{NO}, V_{NC} or V_{COM} = 0V to 5V	100	—	—	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	
I_{IH}	Input HIGH Current	V_{CC} = Max., V_{IN} = V_{CC}	—	—	±1	µA
I_{IL}	Input LOW Current	V_{CC} = Max., V_{IN} = GND	—	—	±1	

Dynamic Electrical Characteristics (Over the Operating Range, T_A = -40°C to +85°C, V_{CC} = 5V ±10%, GND = 0V)

Parameters	Description	Test Conditions(1)	Min.	Typ.(2)	Max.	Units
t_{ON}	Turn-on Time	V_{ON} or V_{NC} = 3.0V, see Fig. 2	—	10	20	ns
t_{OFF}	Turn-off Time	V_{ON} or V_{NC} = 3.0V, see Fig. 2	—	5	10	
X_{TALK}	Crosstalk	R_L = 100 ohms, f = 30 MHz, see Fig. 4	—	–70	—	dB
$C_{(OFF)}$	NC or NO Capacitance	f = 1 kHz	—	13	—	pF
O_{IRR}	Off Isolation	R_L = 100 ohms, f = 30 MHz, see Fig. 5	—	–55	—	dB
BW	Bandwidth -3dB	R_L = 100 ohms, see Fig. 3	—	137	—	MHz
D	Distortion DR_{ON}/RL	R_L = 100 ohms	—	2	—	%

Note:

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°C to +85°C, V_{CC} = 3.3V ±10%, GND = 0V)

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} = 10mA to 30mA	—	15	22	Ω
ΔR_{ON}	Match Between Channels		—	1	3	
$R_{FLAT(ON)}$	R_{ON} Flatness	I_{ON} = 1mA, V_{NO}, V_{NC} = 0V to 5V	—	7	12	
$I_{NO(OFF)}$, $I_{NO(ON)}$	On/Off Leakage Current	V_{NO}, V_{NC} = 3.0V	−100	—	100	nA
$I_{COM(ON)}$	On Leakage Current	V_{NO}, V_{NC} = 3.0V	−100	—	100	µA
I_O	Output Current	V_{NO}, V_{NC} or V_{COM} = 0V	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	
I_{IH}	Input HIGH Current	V_{CC} = Max., V_{IN} = V_{CC}	—	—	±1	µA
I_{IL}	Input LOW Current	V_{CC} = Max., V_{IN} = GND	—	—	±1	

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

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

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

Parameters	Description	Test Conditions[1]	Min.	Typ.[2]	Max.	Units
I_{CC}	Quiescent Positive Power Supply Current	V_{CC} = 3.6V, V_{IN} = 0V or V_{CC} All Channesl ON or OFF	—	—	1	µA

Note:

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

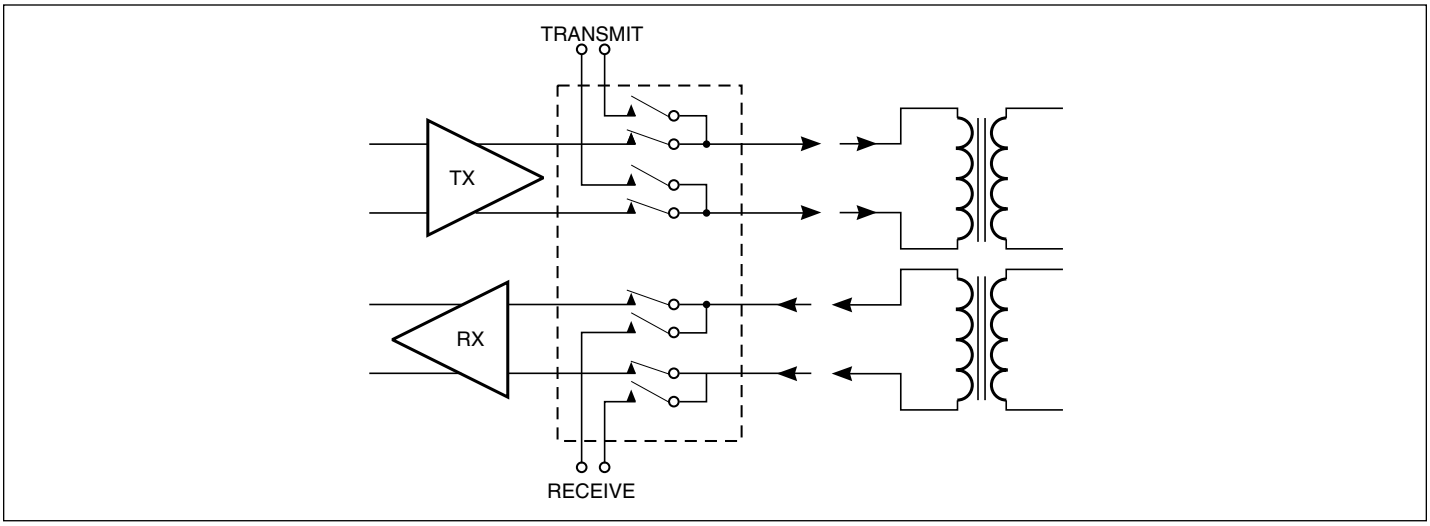


Figure 1a. Full Duplex Transceiver

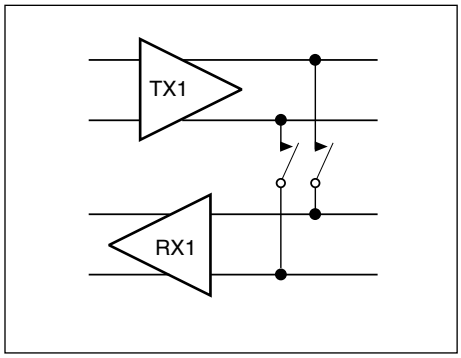


Figure 1b. Loop Back

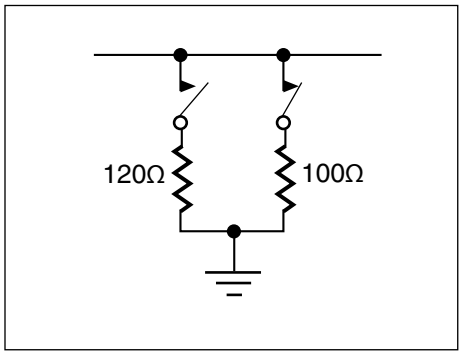


Figure 1c. Line Termination

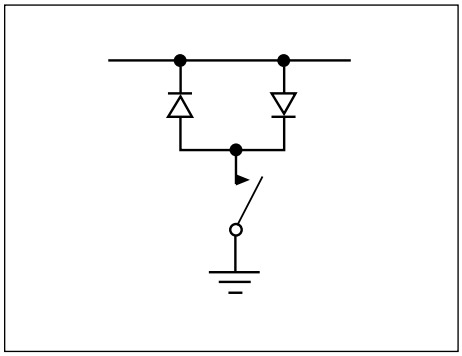


Figure 1d. Line Clamp

Test Circuits

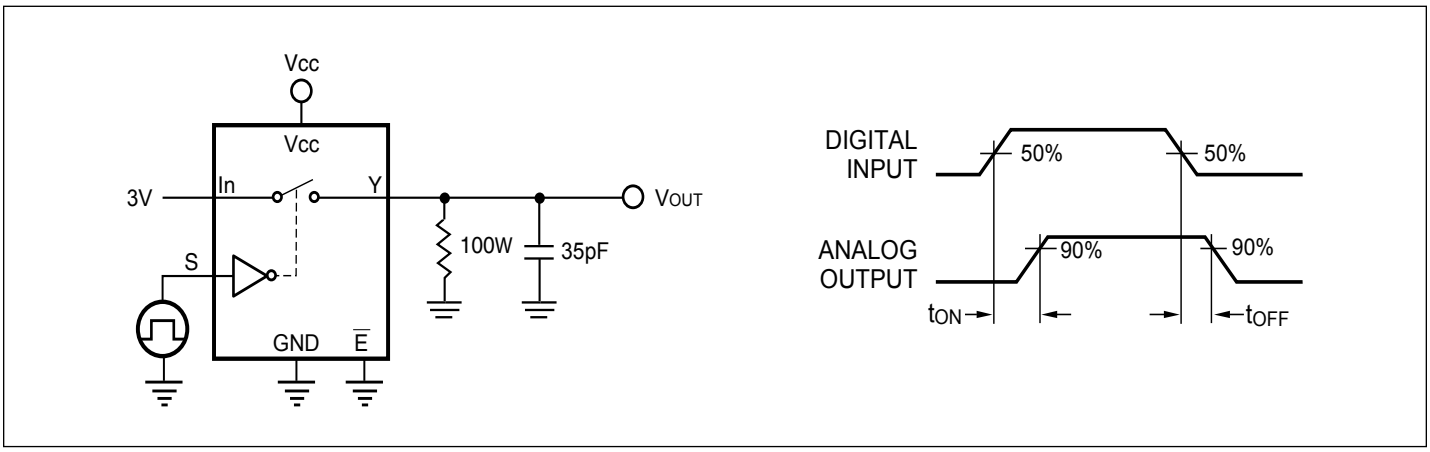


Figure 2. Switching Time

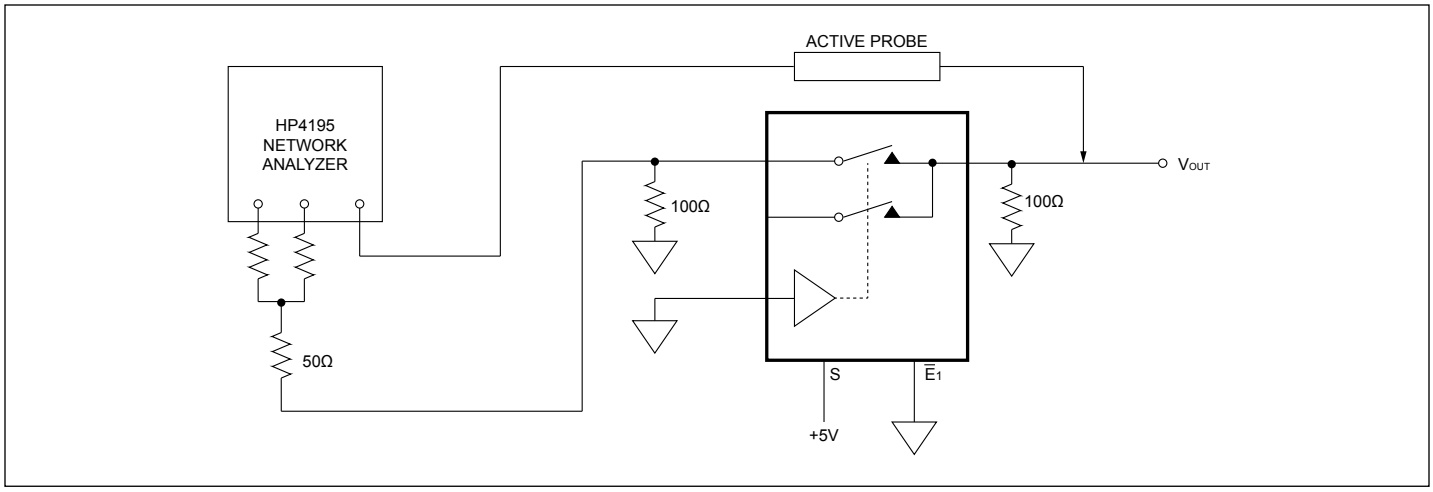


Figure 3. Bandwidth

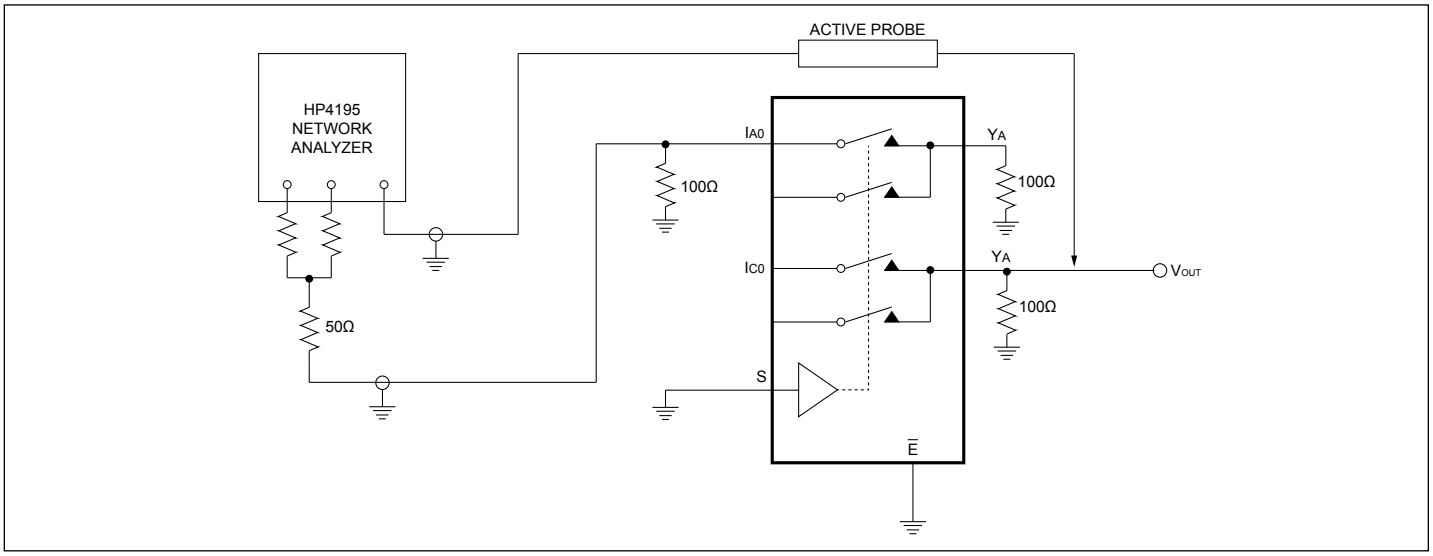


Figure 4. Crosstalk

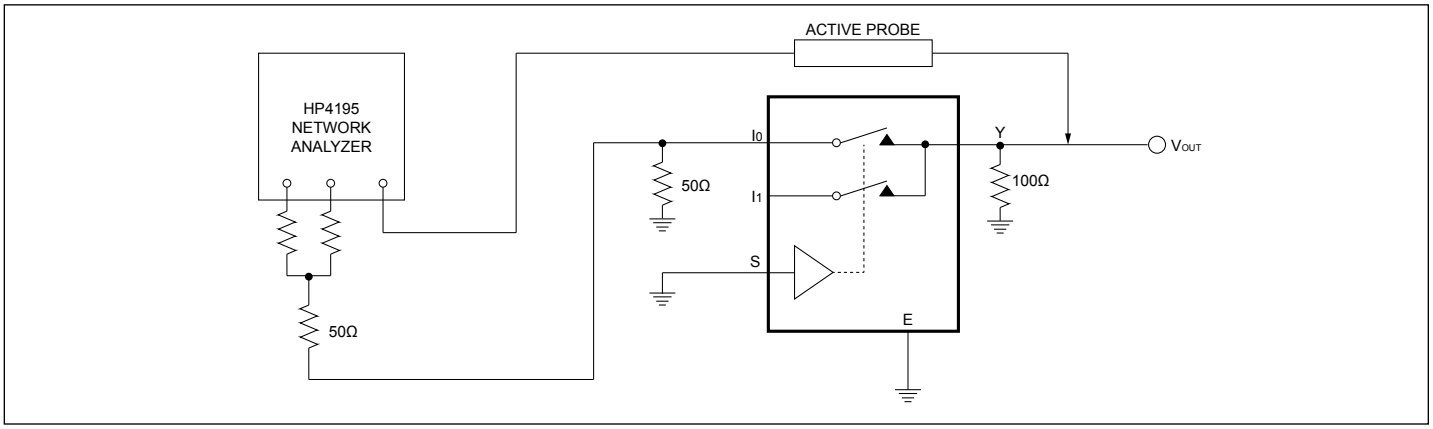


Figure 5. Off Isolation

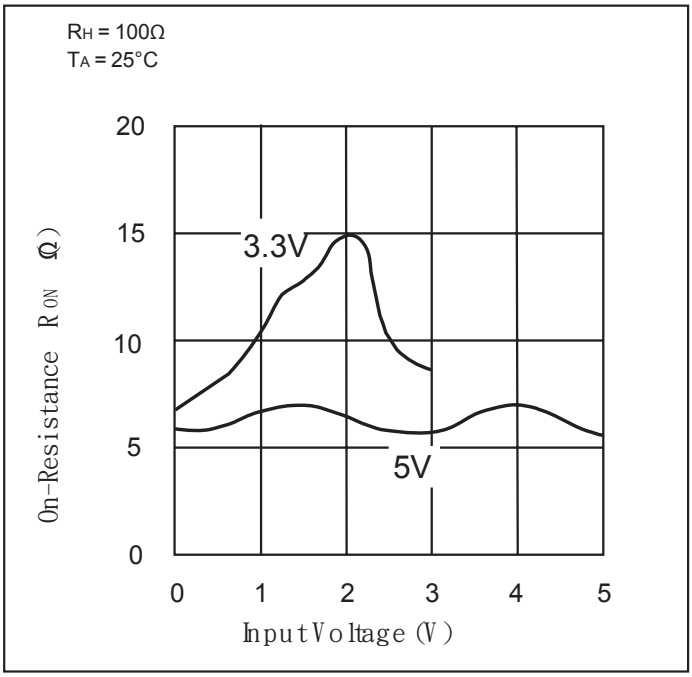


Figure 6. On-Resistance vs. Input Voltage

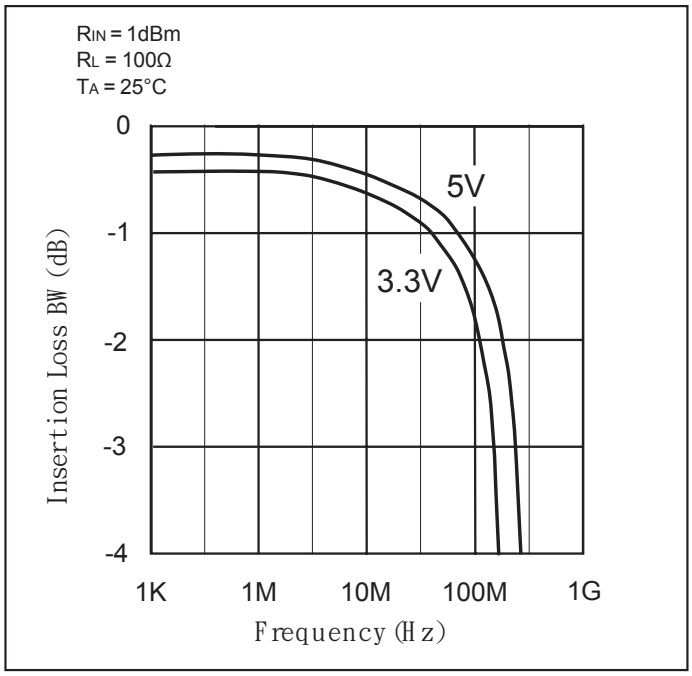


Figure 7. Insertion Loss vs. Frequency

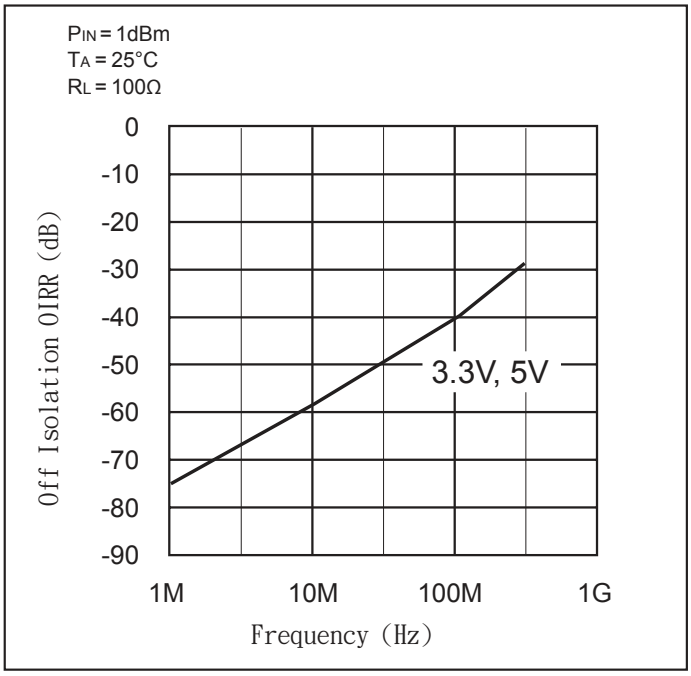


Figure 8. Off Isolation vs. Frequency

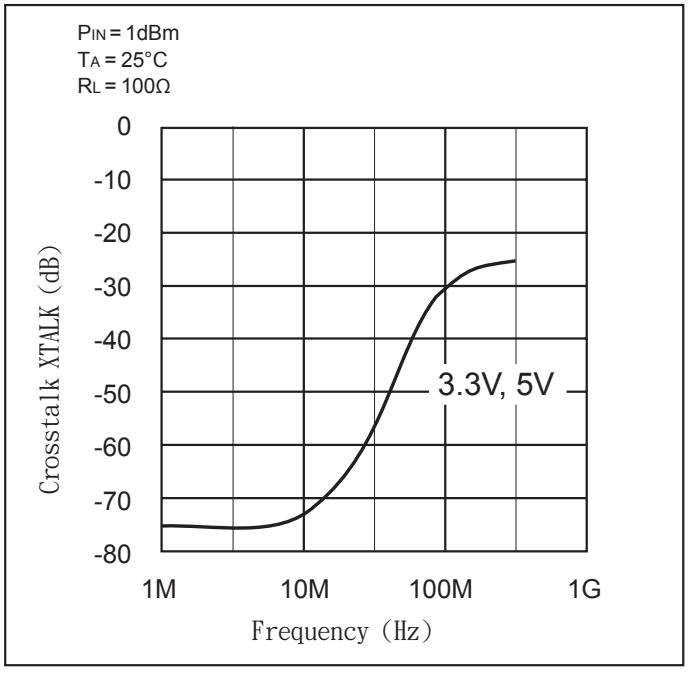
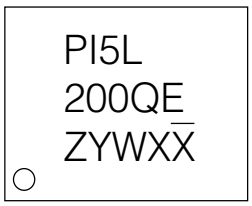


Figure 9. Crosstalk vs. Frequency

Part Marking

Q Package

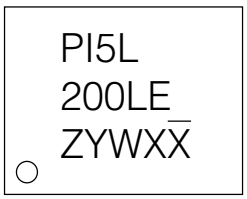


Z: Die Rev Code
Y: Year
W: Workweek
1st X: Assembly Code
2nd X: Fab Code

W Package

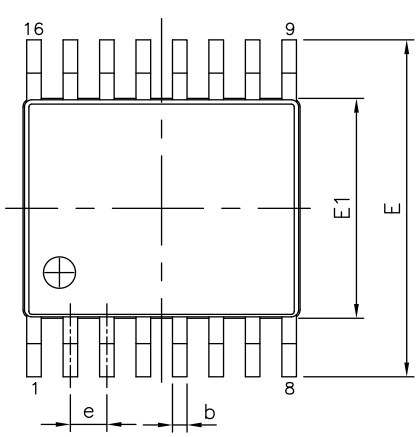
B: Port Code
Z: Die Rev
YY: Year
WW: Workweek
1st X: Assembly Code
2nd X: Fab Code

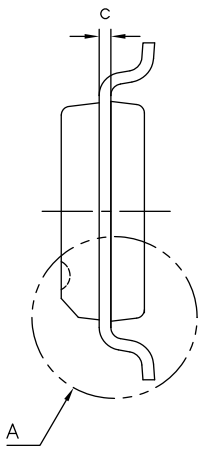
L Package



Z: Die Rev
Y: Year
W: Workweek
1st X: Assembly Code
2nd X: Fab Code

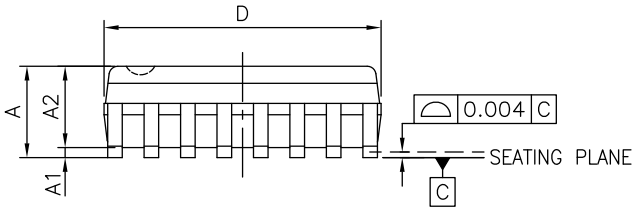
Packaging Mechanical: 16-QSOP (Q)

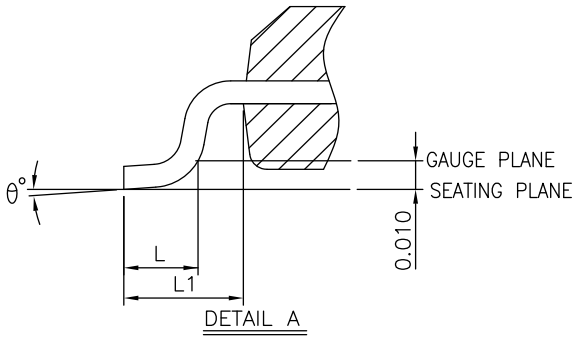




SYMBOLS	MIN.	NOM.	MAX.
A	—	—	0.069
A1	0.004	—	0.0098
A2	0.049	—	—
b	0.008	—	0.012
c	0.004	—	0.010
D	0.189	0.193	0.197
E1	0.150	0.154	0.158
E	0.228	0.236	0.244
L	0.016	—	0.050
L1		0.041 REF.	
e		0.025 BSC.	
θ°	0	—	8

UNIT : INCH





NOTES:
1. ALL DIMENSIONS IN INCH. ANGLES IN DEGREES.
2. JEDEC MO-137E
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

PERICOM Enabling Serial Connectivity

DATE: 04/08/16

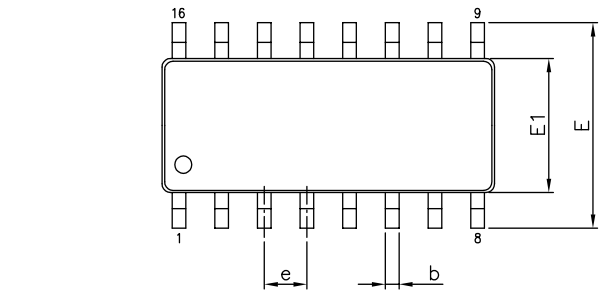
DESCRIPTION: 16-Pin, 150mil Wide QSOP

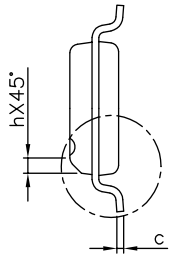
PACKAGE CODE: Q (Q16)

DOCUMENT CONTROL #: PD-1201 **REVISION: H**

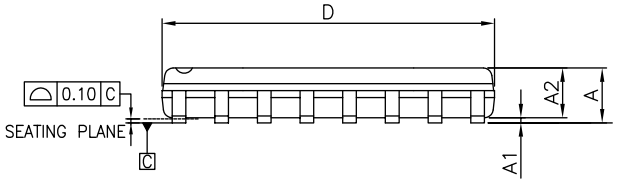
16-0056

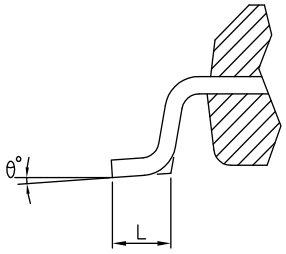
Packaging Mechanical: 16-SOIC (W)





SYMBOLS	MIN.	NOM.	MAX.
A	–	–	1.75
A1	0.10	–	0.25
A2	1.00	–	–
b	0.31	–	0.51
c	0.10	–	0.25
D	9.80	9.90	10.0
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e		1.27 BSC	
L	0.40	–	1.27
h	0.15	–	0.50
θ°	0	–	8



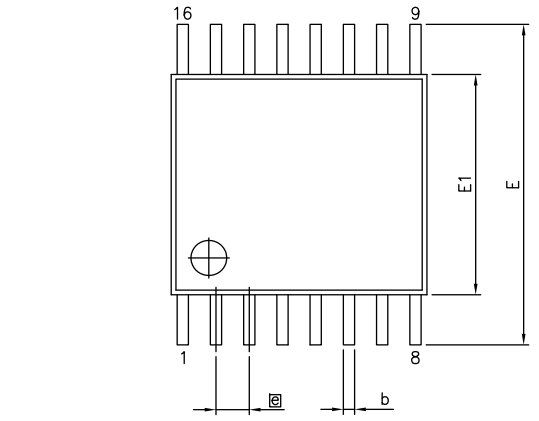


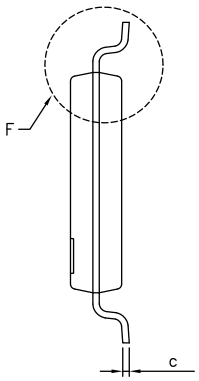
NOTES:
1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.
2. JEDEC OUTLINE : MS-012 AC
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.
4. THE MIN. DIMENSION OF A2 AND h ARE OUT OF JEDEC SPEC.

DIODES INCORPORATED / PERICOM ENABLING SERIAL CONNECTIVITY	DATE: 06/30/16
DESCRIPTION: 16-Pin, 150mil Wide SOIC	
PACKAGE CODE: W	
DOCUMENT CONTROL #: PD-1004	REVISION: G

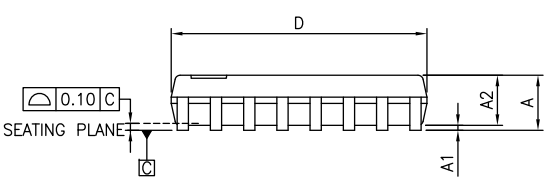
16-0145

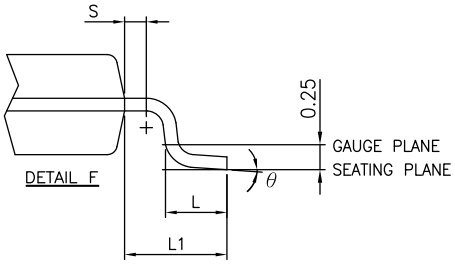
Packaging Mechanical: 16-TSSOP (L)





SYMBOLS	MIN.	NOM.	MAX.
A	–	–	1.20
A1	0.05	–	0.15
A2	0.80	1.00	1.05
b	0.19	–	0.30
c	0.09	–	0.20
D	4.90	5.00	5.10
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65 BSC		
L1	1.00 REF		
L	0.45	0.60	0.75
S	0.20	–	–
θ	0°	–	8°





NOTES:
1. ALL DIMENSIONS IN MILLIMETERS. ANGLES IN DEGREES.
2. JEDEC MO–153F
3. DIMENSIONS DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

PERICOM Enabling Serial Connectivity

DATE: 03/24/16

DESCRIPTION: 16-Pin, 173mil Wide TSSOP

PACKAGE CODE: L (L16)

DOCUMENT CONTROL #: PD-1310 REVISION: G

16-0061

For latest package info.

please check: http://www.diodes.com/design/support/packaging/pericom-packaging/packaging-mechanicals-and-thermal-characteristics/

Ordering Information

Ordering Code	Packaging Code	Package Description
PI5L200QEX	Q	16-pin, 150mil Wide (QSOP)
PI5L200WEX	W	16-pin, 150mil Wide (SOIC)
PI5L200LEX	L	16-pin, 173mil Wide (TSSOP)

Notes:

1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com/quality/lead-free/ for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free. Thermal characteristics can be found on the company web site at www.diodes.com/design/support/packaging/
3. E = Pb-free and Green
4. X suffix = Tape/Reel

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1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

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