

**1.25Gb/s SFP Optical Transceiver without DDMI (OP-MP415L1SN-40)**  
**Hot Pluggable, Duplex LC, +3.3V**  
**1550nm, DFB-LD, Single-Mode**



**Features:**

- \* Compliant with Specifications for IEEE802.3Z
- \* Multi-Source Package with Duplex LC Connector
- \* Eye Safety Designed to Meet Laser Class1, Compliant with IEC60825
- \* Up to 1.25Gb/s Data Links
- \* Single +3.3V Power Supply
- \* Hot-Pluggable
- \* Compliant with Bellcore TA-NWT-000983
- \* RoHS Compliant Products Available

**Applications:**

- \* Gigabit Ethernet
- \* 1x Fiber Channel
- \* Switch to Switch Interface
- \* Switched Backplane Applications
- \* Router/Server Interface
- \* Other Optical Links

**Specification:**

**Electrical and Optical Characteristics: (Condition:  $T_a=T_{OP}$ )**

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter Differential Input Volt	+/-TX_DAT	200		2400	mV p-p
Supply Current	I <sub>CC</sub>		130	180	mA
Tx_Disable Input Voltage – Low	V <sub>IL</sub>	0		0.8	V
Tx_Disable Input Voltage – High	V <sub>IH</sub>	2.0		V <sub>CC</sub>	V
Tx_Fault Output Voltage – Low	V <sub>OL</sub>	0		0.8	V
Tx_Fault Output Voltage – High	V <sub>OH</sub>	2.0		V <sub>CC</sub>	V
Receiver Differential Output Volt	+/-RX_DAT	600		1400	mV p-p
Rx_LOS Output Voltage- Low	V <sub>OL</sub>	0		0.8	V
Rx_LOS Output Voltage- High	V <sub>OH</sub>	2.0		V <sub>CC</sub>	V

**Transmitter**

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate	B	-	1250	-	Mb/s
Output Center Wavelength	$\lambda$	1480	1550	1580	nm
Output Spectral Width	$\Delta\lambda$	-	-	1	nm
Average Output Power	P	-	-	0	dBm
Extinction Ratio	E.R.	1	-	-	dB
Data Input Voltage-High	V <sub>IHS</sub>	V <sub>CC</sub> -1.16	-	V <sub>CC</sub> -0.89	V

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Data Input Voltage -Low	V <sub>ILS</sub>	V <sub>cc</sub> -1.82	-	V <sub>cc</sub> -1.48	V
Supply Current	I <sub>CC</sub>	-	90	130	mA
Output Optical Eye	Compliant with IEEE802.3Z				
<b>Receiver</b>					
<b>Parameter</b>	<b>Symbol</b>	<b>Min.</b>	<b>Typical</b>	<b>Max.</b>	<b>Unit</b>
Receive Sensitivity	P <sub>min</sub>	-	-	-23	dBm
Maximum Input Power	P <sub>MAX</sub>	-3	0	-	dBm
Threshold-Assertion:	SD <sub>HIGH</sub>	-	-	-25	dBm
Signal Detect Threshold-Deassertion:	SD <sub>LOW</sub>	-35	-	-	dBm
Hysteresis	-	-	2.0	-	dBm
Output High Voltage	V <sub>OH</sub>	V <sub>cc</sub> -1.03	-	V <sub>cc</sub> -0.89	V
Output Low Voltage	V <sub>OL</sub>	V <sub>cc</sub> -1.82	-	V <sub>cc</sub> -1.63	V
Operating Wavelength	λ <sub>c</sub>	1100	-	1600	nm
Supply Current	I <sub>CC</sub>	-	80	110	mA

**Absolute Maximum Ratings: (T<sub>c</sub>=25°C)**

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T <sub>ST</sub>	-40	+85	°C
Operating Temperature	T <sub>IP</sub>	0	+70	°C
Input Voltage	T <sub>CC</sub>	0	+5	V

**Recommended Operating Environment:**

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V <sub>CC</sub>	+3.0	+3.3	+3.6	V
Operating Temperature	T <sub>OP</sub>	0	-	+70	°C

**Timing Characteristics:**

Parameter	Symbol	Min.	Typical	Max.	Unit
TX_DISABLE Assert Time	t <sub>off</sub>		3	10	usec
TX_DISABLE Negate Time	t <sub>on</sub>		0.5	1	msec
Time to initialize include reset of TX_FAULT	t <sub>int</sub>		30	300	msec
TX_FAULT from fault to assertion	t <sub>fault</sub>		20	100	usec
TX_DISBEL time to start reset	t <sub>reset</sub>	10			usec
Receiver Loss of Signal Assert Time (off to On)	T <sub>A,RX_LOS</sub>			100	usec
Receiver Loss of Signal Assert Time (on to off)	T <sub>d,RX_LOS</sub>			100	usec

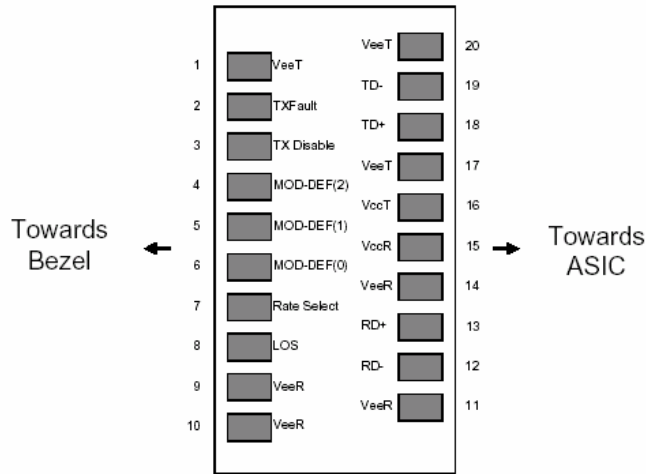
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**Pin Assignment:**



**Pin out of Connector Block on Host Board**

**Pin Description:**

Pin	Symbol	Name/Description	Ref.
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault. <b>Low normal operation, High Fault indication</b>	
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	4
9	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
10	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
11	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V <sub>EER</sub>	Receiver Ground (Common with Transmitter Ground)	1
15	V <sub>CCR</sub>	Receiver Power Supply	
16	V <sub>CCT</sub>	Transmitter Power Supply	
17	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1

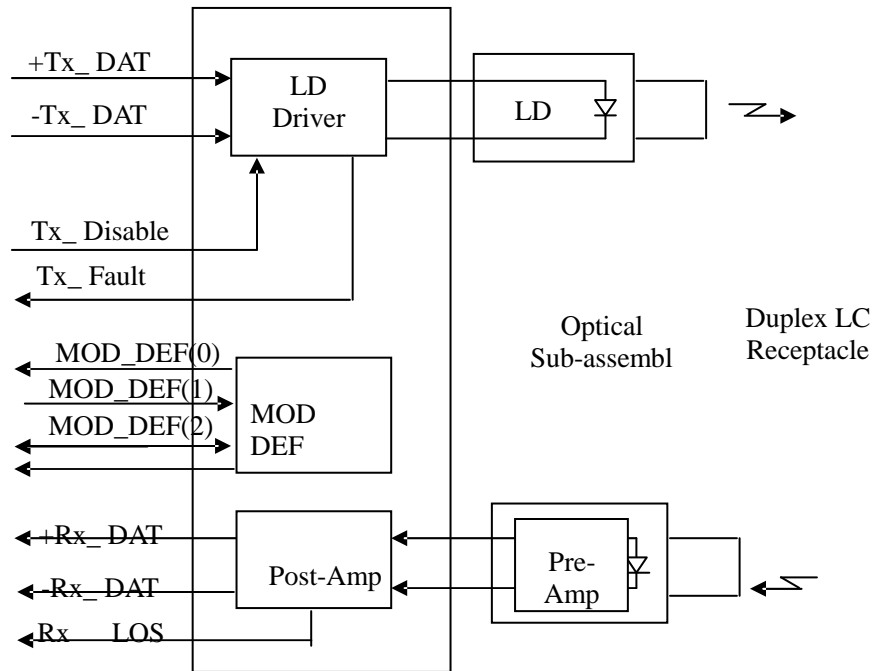
**Notes:**

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. MOD\_DEF(0) pulls line low to indicate module is plugged in.
4. LOS is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

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**Block Diagram of Transceiver:**



**Serial ID Memory Contents:**

Data Address	Length (Byte)	Name of Length	Description and Contents
<b>Base ID Fields</b>			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	Gigabit Ethernet 1000Base-SX & Fiber Channel
11	1	Encoding	8B10B (01h)
12	1	BR,Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name: OP
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID

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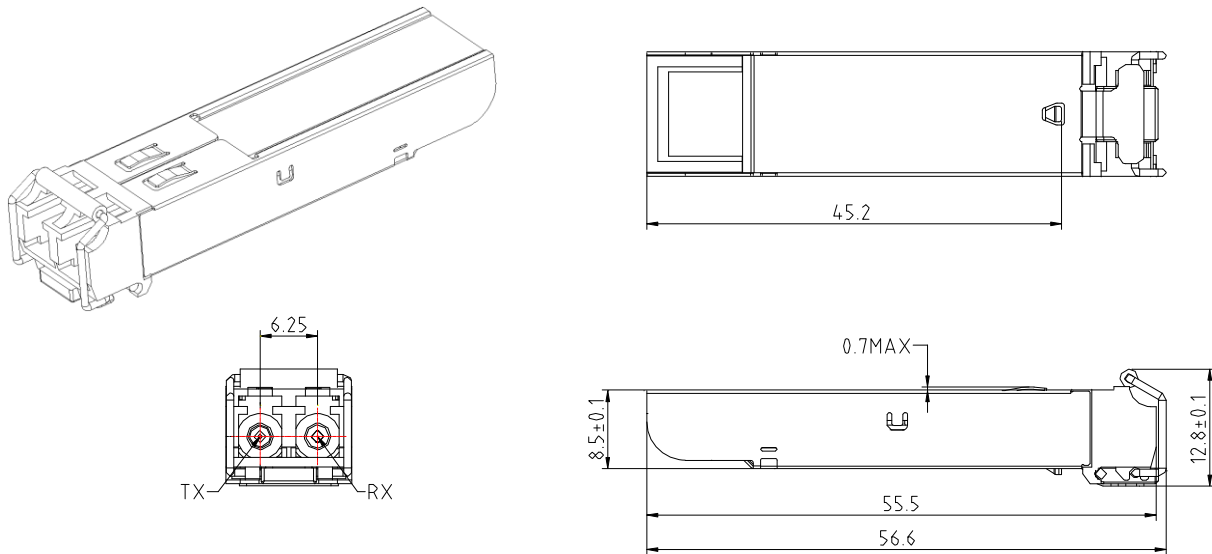
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40-55	16	Vendor PN	Part Number: "OP-xxxxxx" (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
<b>Extended ID Fields</b>			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	OP's Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
<b>Vendor Specific ID Fields</b>			
96-127	32	Readable	OP specific date, read only

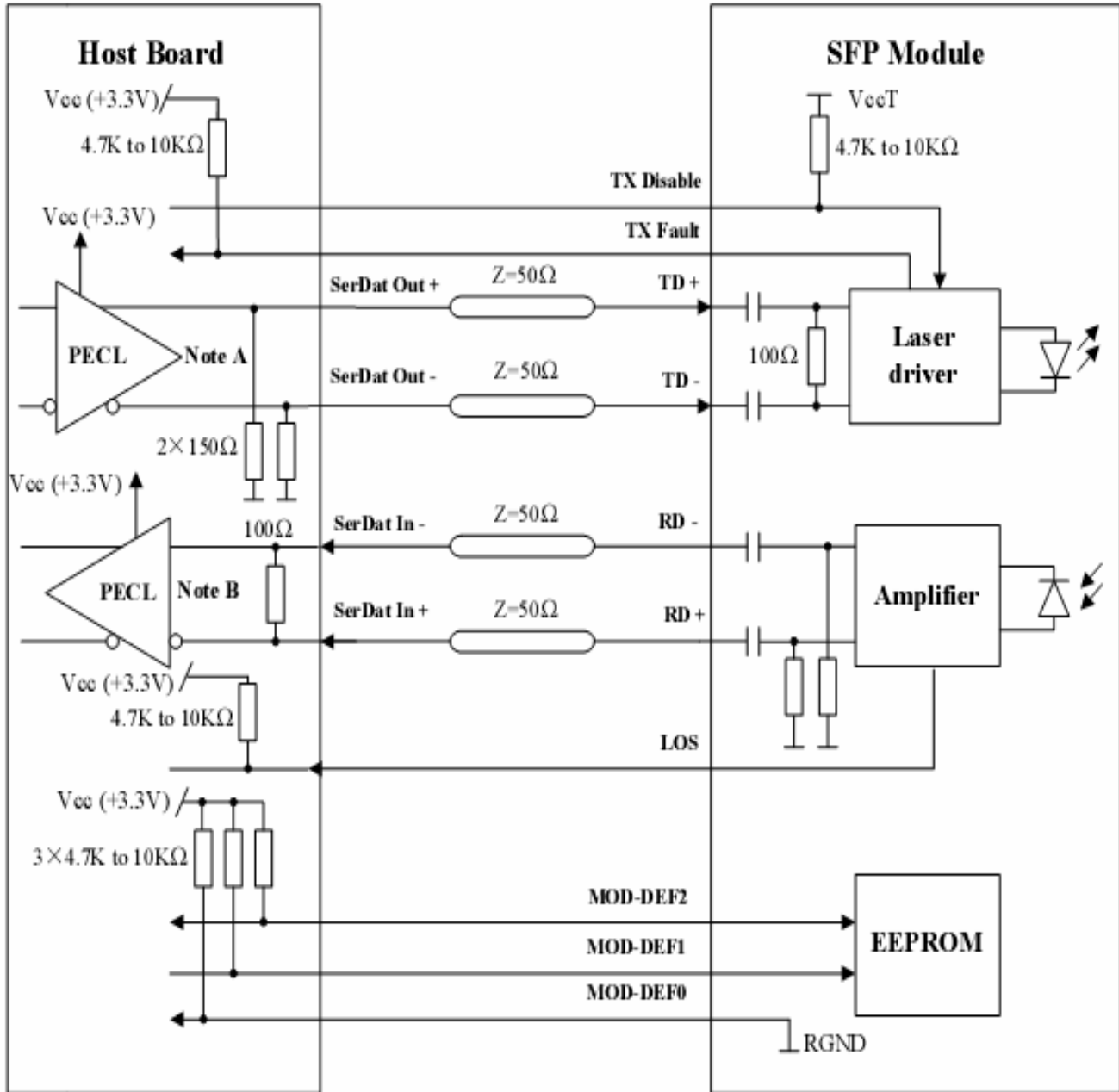
## Mechanical Dimensions:



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**Recommended Circuit:**



**Note A:** Circuit assumes open emitter output

**Note B:** Circuit assumes high impedance internal bias @Vcc-1.3V