

**Bi-Di SFP 155Mb/s Optical Transceiver with DDMI**  
**SFP-100A/B 20km LC**  
**Hot Pluggable, 1310/1550 FP-LD SFP with LC Receptacle**

**Features:**

- ☞ Single Mode bi-directional Transmission
- ☞ SFP Multi-source Package with LC Receptacle
- ☞ Up to 155Mb/s Data Links
- ☞ Hot-Pluggable Capability
- ☞ Single +3.3V Power Supply
- ☞ Isolation > 30dB, Cross Talk < -45dB
- ☞ Compliant with Specifications for IEEE802.3Z
- ☞ Compliant with Bellcore TA-NWT-000983
- ☞ Eye Safety Designed to Meet Laser Class1, Compliant with IEC60825-1

**Applications:**

- ☞ Fast Ethernet
- ☞ SDH/SONET
- ☞ WDM Application

**Specification:**

● **Electrical and Optical Characteristics: (Condition: T<sub>a</sub>=T<sub>OP</sub>)**

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter Differential Input Voltage	+/-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 Voltage	+/-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 (SFP-100A 20km LC):**

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate	B	-	155	-	Mb/s
Centre Wavelength	λ <sub>c</sub>	1290	1310	1330	nm
Output Spectral Width	Δλ (RMS)	-	-	4	nm
Average Output Power	P <sub>o</sub>	-13	-	-6	dBm
Extinction Ratio	EXT	10	-	-	dB
Data Input Voltage-High	V <sub>IHS</sub>	V <sub>CC</sub> -1.16	-	V <sub>CC</sub> -0.89	V
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	150	mA
Output Optical Eye	Compliant with IEEE802.3Z				

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**Receiver (SFP-100A 20km LC):**

Parameter	Symbol	Min.	Typical	Max.	Unit
Receive Sensitivity	$P_{min}$	-	-	-33	dBm
Maximum Input Power	$P_{MAX}$	-3	-	-	dBm
Signal Detection-Asserted	$SD_{HIGH}$	-	-	-34	dBm
Signal Detection-Deserted	$SD_{LOW}$	-44	-	-	dBm
Hysteresis	-	-	3.0	-	dBm
Output High Voltage	$V_{OH}$	$V_{cc}-1.03$	-	$V_{cc}-0.89$	V
Output Low Voltage	$V_{OL}$	$V_{cc}-1.82$	-	$V_{cc}-1.63$	V
Operating Wavelength	$\lambda_c$	1480	1550	1580	nm
Supply Current	$I_{CC}$	-	80	110	mA

**Transmitter (SFP-100B 20km LC):**

Parameter	Symbol	Min.	Typical	Max.	Unit
Data Rate	B	-	155	-	Mb/s
Centre Wavelength	$\lambda_c$	1480	1550	1580	nm
Output Spectral Width	$\Delta \lambda$	-	-	1	nm
Average Output Power	$P_o$	-13	-	-6	dBm
Extinction Ratio	EXT	10	-	-	dB
Data Input Voltage-High	$V_{IHS}$	$V_{cc}-1.16$	-	$V_{cc}-0.89$	V
Data Input Voltage -Low	$V_{ILS}$	$V_{cc}-1.82$	-	$V_{cc}-1.48$	V
Supply Current	$I_{CC}$	-	90	150	mA
Output Optical Eye	Compliant with IEEE802.3Z				

**Receiver (SFP-100B 20km LC):**

Parameter	Symbol	Min.	Typical	Max.	Unit
Receive Sensitivity	$P_{min}$	-	-	-33	dBm
Maximum Input Power	$P_{MAX}$	-3	-	-	dBm
Signal Detection-Asserted	$SD_{HIGH}$	-	-	-34	dBm
Signal Detection-Deserted	$SD_{LOW}$	-44	-	-	dBm
Hysteresis	-	-	3.0	-	dBm
Output High Voltage	$V_{OH}$	$V_{cc}-1.03$	-	$V_{cc}-0.89$	V
Output Low Voltage	$V_{OL}$	$V_{cc}-1.82$	-	$V_{cc}-1.63$	V
Operating Wavelength	$\lambda_c$	1260	1310	1360	nm
Supply Current	$I_{CC}$	-	80	110	mA

● **Absolute Maximum Ratings: ( $T_C=25^\circ C$ )**

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	$T_{ST}$	-40	+85	$^\circ C$
Operating Temperature	$T_{IP}$	0	+70	$^\circ C$
Input Voltage	$T_{CC}$	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

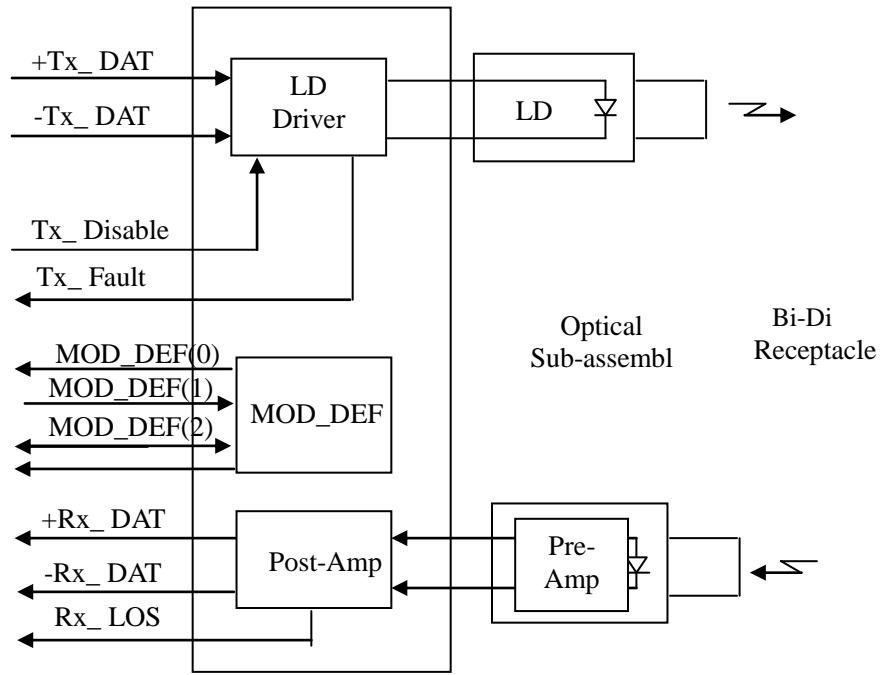
● **Timing Characteristics:**

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_DISABLE 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

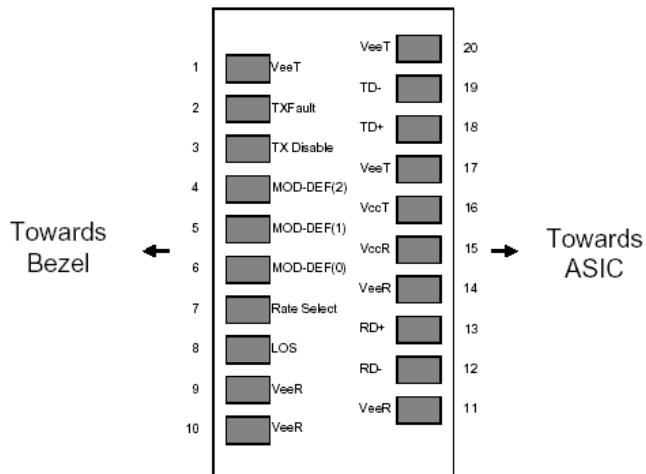
● **Serial ID Memory Contents:**

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
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number:
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	
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)

**Block Diagram of Transceiver:**



**Pin Assignment:**



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

**Pin Description:**

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**Hot Pluggable, 1310/1550 FP-LD SFP with LC Receptacle**

Pin	Symbol	Name/Description	Ref.
1	V <sub>EET</sub>	Transmitter Ground (Common with Receiver Ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault. Not supported.	
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

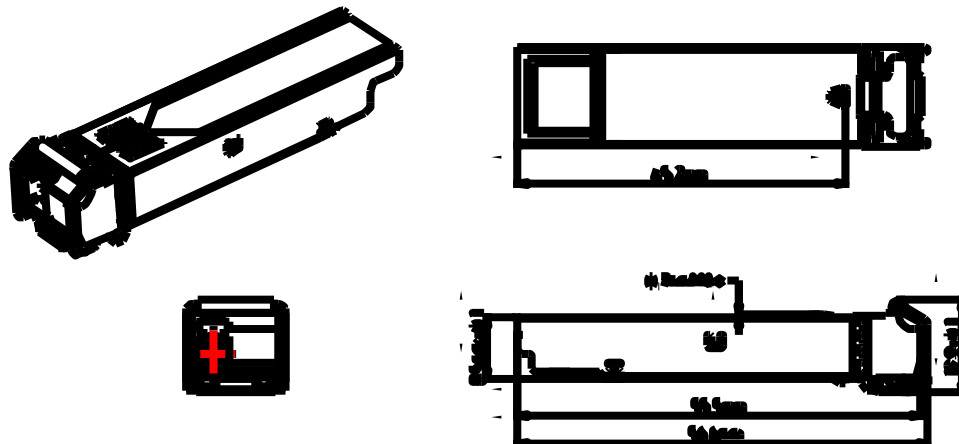
**Notes:**

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.

**Ordering information:**

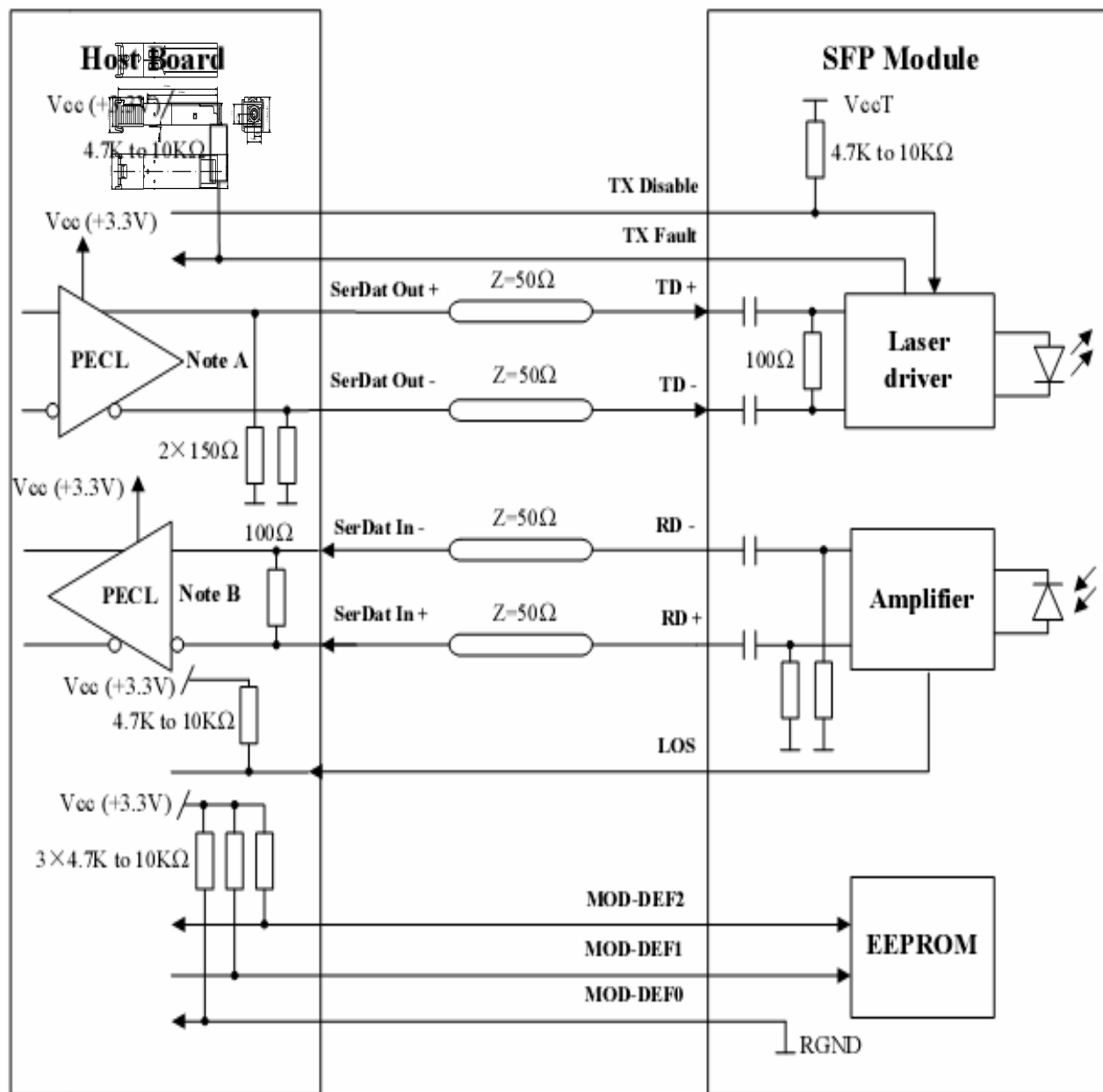
Part Number	Product Description
SFP-100A 20KM	1310nm, 155Mbps, LC, 20km, 0°C~+70°C
SFP-100B 20KM	1550nm, 155Mbps, LC, 20km, 0°C~+70°C

**Mechanical Dimensions:**



FP 155Mb/s Optical Transceiver with DDMI  
 10A/B 20km LC  
 SFP, 1310/1550 FP-LD SFP with LC Receptacle

**Recommended Circuit:**



Note A: Circuit assumes open emitter output

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