LF5-xMxx01-xxAC

155M 2X5 SFF Transceiver Module

Product Features

- VCSEL/FP/DFB Laser Diode Transmitter
- Up to 2Km on 62.5/125μm MMF， Up to 120 Km on 9/125μm SMF
- 3.3Vpower supply
- LC duplex optical interface
- LVPECL Differential Inputs and LVPECL Differential Outputs and LVPECL signal detect
- Class 1 Laser International Safety Standard IEC 825 Compliant
- Operating case temperature range (Standard：0 to +70°C) or (Industrial：-40°C to +85°C)

Product Description

LINK-PP's LF5-xMxx01-xxAC series of transceiver modules are the perfect solution for low -speed communication networks.

These transceiver modules support data rates up to 200Mbps. The module is fully compliant with the 2X5 standard package defined by the Small Form Factor Multi-Sourcing Agreement (MSA).

These transceiver modules provide the system designer with products to implement a range of FDDI and ATM designs at the 100Mbps/125Mbps rate and SONET/OC-3, SDH/STM-1 for Telecommunication.

Order Information

Type	Fiber Type	Wavelength/nm	Fiber Length/Km
LF5-MM8501-02AC	MM	850(VCSEL)	2
LF5-MM3101-02AC	MM	1310(FP)	2
LF5-SM3101-20AC	SM	1310(FP)	20
LF5-SM3101-40AC	SM	1310(FP)	40
LF5-SM3101-60AC	SM	1310(FP)	60

LF5-SM5501-80AC	SM	1550(DFB)	80
LF5-SM5501-A0AC	SM	1550(DFB)	100
LF5-SM5501-A2AC	SM	1550(DFB)	120

Application

- ATM 155Mbps
- SONET/SDH
- 100Mbps Ethernet
- Digital Video system
- Other optic link

Absolute Maximum Ratings

Operating of the transceiver beyond the Absolute Conditions Listed in Table 1 will degrade or damage the product. It's not implied that the product would function above the recommended operating environment, it's possible to reduce the reliability and lifetime of device if Recommended Operating Environment is exceeded (Refer to table 2)

Table 1--- Absolute Maximum Conditions

Parameter	Symbol	Min	Max	Units	Note
Storage Temperature	T_{ST}	-40	+85	℃	-
Relative Humidity	RH	5	95	%	-
Supply Voltage	V_{CC}	0	+3.6	V	-

Table 2--- Recommended Operating Environment and Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Units	Note
Supply Voltage	V_{CC}	+3.1	+3.3	+3.5	V	-
Supply Current	Icc	-	-	260	mA	-
Operating Case Temperature	T_{OP}	0	-	+70	℃	1
		-40	-	+85		2
Data Rate	B	10	155	200	Mbps	-
Soldering temperature	-	-	-	350	℃	3
Soldering duration	-	-	-	10	Sec	3

Note 1.standard level
2. industrial level
3. Not recommended wave soldering.

Optical Parameters

Table 3---LF5-MM8501-02AC Transceiver Optical Characteristics
(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						
Data rate	B	10	155	200	Mbps	-
Output Center Wavelength	λc	830	850	860	nm	-
Output Spectral width (RMS)	λ	-	-	0.85	nm	-
Average Optical Output Power	Po	-14	-	-3	dBm	1,2
Extinction Ratio	ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957						1,2

Receiver							
Receiver Sensitivity		P_{min}	-	-	-30	dBm	1,2
Receiver Saturation		P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength		λc	770	-	860	nm	-
SD	Deassert	PD	-45	-	-	dBm	1,2
	Assert	PA	-	-	-30	dBm	1,2
SD Hysteresis		SDHYS	0.5	-	-	dB	-

Note1：The optical power is launched into 62.5/125μm MMF. Note2：
With a PRBS 2^{23}-1 test pattern@ 155Mbps.

Table 4--- LF5-MM3101-02AC Transceiver Optical Characteristics
(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter		Symbol	Min	Typ	Max	Units	Note
Transmitter							
Data rate		B	10	155	200	Mbps	-
Output Center Wavelength		λc	1260	1310	1360	nm	-
Output Spectral width (RMS)		λ	-	-	4	nm	-
Average Optical Output Power		Po	-20	-	-14	dBm	1,2,3
			-18	-	-10		1,2,4
Extinction Ratio		ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957							1,2
Receiver							
Receiver Sensitivity		P_{min}	-	-	-32	dBm	1,2
Receiver Saturation		P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength		λc	1260	-	1620	nm	-
SD	Deassert	PD	-45	-	-	dBm	1,2
	Assert	PA	-	-	-32	dBm	1,2
SD Hysteresis		SDHYS	0.5	-	-	dB	-

Note1：The optical power is launched into 62.5/125μm MMF. Note2：
With a PRBS 2^{23}-1 test pattern@ 155Mbps.
Note3：Average Optical Output Power range 1. Note4：
Average Optical Output Power range 2.

Table 5---LF5-SM3101-20AC Transceiver Optical Characteristics
(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						

Data rate		B	10	155	200	Mbps	-
Output Center Wavelength		λc	1260	1310	1360	nm	-
Output Spectral width (RMS)		λ	-	-	4	nm	-
Average Optical Output Power		Po	-14	-	-5	dBm	1,2
Extinction Ratio		ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957							1,2
Receiver							
Receiver Sensitivity		P_{min}	-	-	-32	dBm	1,2
Receiver Saturation		P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength		λc	1260	-	1620	nm	-
SD	Deassert	PD	-45	-	-	dBm	1,2
	Assert	PA	-	-	-32	dBm	1,2
SD Hysteresis		SDHYS	0.5	-	-	dB	-

Note1：The optical power is launched into 9/125μm SMF.

Note2：With a PRBS 2^{23}-1 test pattern@ 155Mbps.

Table 6--- LF5-SM3101-40AC Transceiver Optical Characteristics

(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter		Symbol	Min	Typ	Max	Units	Note
Transmitter							
Data rate		B	10	155	200	Mbps	-
Output Center Wavelength		λc	1260	1310	1360	nm	-
Output Spectral width (RMS)		λ	-	-	4	nm	-
Average Optical Output Power		Po	-10	-	-3	dBm	1,2
Extinction Ratio		ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957							1,2
Receiver							
Receiver Sensitivity		P_{min}	-	-	-34	dBm	1,2
Receiver Saturation		P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength		λc	1260	-	1620	nm	-
SD	Deassert	PD	-45	-	-	dBm	1,2
	Assert	PA	-	-	-34	dBm	1,2
SD Hysteresis		SDHYS	0.5	-	-	dB	-

Note1：The optical power is launched into 9/125μm SMF.

Note2： With a PRBS 2^{23}-1 test pattern@ 155Mbps.

Table 7--- LF5-SM3101-60AC Transceiver Optical Characteristics
(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter		Symbol	Min	Typ	Max	Units	Note
Transmitter							
Data rate		B	10	155	200	Mbps	-
Output Center Wavelength		λc	1260	1310	1360	nm	-
Output Spectral width (RMS)		λ	-	-	4	nm	-
Average Optical Output Power		Po	-5	-	0	dBm	1,2
Extinction Ratio		ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957							1,2
Receiver							
Receiver Sensitivity		P_{min}	-	-	-34	dBm	1,2
Receiver Saturation		P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength		λc	1260	-	1620	nm	-
SD	Deassert	PD	-45	-	-	dBm	1,2
	Assert	PA	-	-	-34	dBm	1,2
SD Hysteresis		SDHYS	0.5	-	-	dB	-

Note1： The optical power is launched into 9/125μm SMF.
Note2： With a PRBS 2^{23}-1 test pattern@ 155Mbps.

Table 8--- LF5-SM5501-80AC Transceiver Optical
Characteristics
(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						
Data rate	B	10	155	200	Mbps	-
Output Center Wavelength	λc	1480	1550	1580	nm	-
Output Spectral width (-20dB)	λ	-	-	1	nm	-
Average Optical Output Power	Po	-5	-	0	dBm	1,2
Extinction Ratio	ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957						1,2

Receiver							
Receiver Sensitivity		P_{min}	-	-	-36	dBm	1,2
Receiver Saturation		P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength		λc	1260	-	1620	nm	-
SD	Deassert	PD	-45	-	-	dBm	1,2
	Assert	PA	-	-	-36	dBm	1,2
SD Hysteresis		SDHYS	0.5	-	-	dB	-

Note1：The optical power is launched into 9/125μm SMF.

Note2：With a PRBS 2^{23}-1 test pattern@ 155Mbps.

Table 9--- LF5-SM5501-A0AC Transceiver Optical Characteristics

(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter		Symbol	Min	Typ	Max	Units	Note
Transmitter							
Data rate		B	10	155	200	Mbps	-
Output Center Wavelength		λc	1480	1550	1580	nm	-
Output Spectral width (-20dB)		λ	-	-	1	nm	-
Average Optical Output Power		Po	-3	-	+2	dBm	1,2
Extinction Ratio		ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957							1,2
Receiver							
Receiver Sensitivity		P_{min}	-	-	-36	dBm	1,2
Receiver Saturation		P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength		λc	1260	-	1620	nm	-
SD	Deassert	PD	-45	-	-	dBm	1,2
	Assert	PA	-	-	-36	dBm	1,2
SD Hysteresis		SDHYS	0.5	-	-	dB	-

Note1：The optical power is launched into 9/125μm SMF.

Note2：With a PRBS 2^{23}-1 test pattern@ 155Mbps.

Table 10--- LF5-SM5501-A2AC Transceiver Optical Characteristics

(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter	Symbol	Min	Typ	Max	Units	Note
Transmitter						

Data rate	B	10	155	200	Mbps	-
Output Center Wavelength	λc	1480	1550	1580	nm	-
Output Spectral width (-20dB)	λ	-	-	1	nm	-
Average Optical Output Power	Po	0	-	+5	dBm	1,2
Extinction Ratio	ER	10	-	-	dB	1,2
Optic Output Eye: Compliant with Bellcore TR-NWT-000253 and ITU recommendation G.957						1,2
Receiver						
Receiver Sensitivity	P_{min}	-	-	-36	dBm	1,2
Receiver Saturation	P_{max}	-3	-	-	dBm	1,2
Operation Center Wavelength	λc	1260	-	1620	nm	-
SD Deassert	PD	-45	-	-	dBm	1,2
SD Assert	PA	-	-	-36	dBm	1,2
SD Hysteresis	SDHYS	0.5	-	-	dB	-

Note1： The optical power is launched into 9/125μm SMF.

Note2： With a PRBS 2^{23}-1 test pattern@ 155Mbps.

Electrical Parameters

Table 11--- Transceiver Electrical Characteristics

(Ambient Operating Temperature Ta=+25±5°C, VCC = 3.3±0.2V)

Parameter	Symbol	Min	Typ	Max	Units	Note
Supply Voltage	V_{CC}	+3.1	+3.3	+3.5	V	-
Supply Current	I_{CC}	-	-	260	mA	-
Transmitter						
Differential Input Voltage	Vin	400	-	2000	mV_{P-P}	-
Input Differential Impedance	Zin	90	100	110	Ω	-
Data Input Voltage - Low	V_{IL}	V_{CC} -1.81	-	V_{CC} -1.48	V	-
Data Input Voltage - High	V_{IH}	V_{CC} -1.17	-	V_{CC} -0.88	V	-
Receiver						
Differential Output Voltage	V_{OUT}	400	-	2000	mV_{P-P}	-
Data Output Voltage – Low	V_{OL}	V_{CC} -1.83	-	V_{CC} -1.56	V	-
Data Output Voltage – High	V_{OH}	V_{CC} -1.09	-	V_{CC} -0.88	V	-

SD Output Voltage-Low	V_{OL}	V_{CC} -2.0	-	V_{CC} -1.56	V	1
SD Output Voltage-High	V_{OH}	V_{CC} -1.1	-	V_{CC} -0.75	V	1

Note1：LVPECL signal detect

Pin Definitions

Table 12---Connector pin assignment

Pin	Pin Name	Description	Note
1	VEER	Receiver Ground	-
2	VCCR	Receiver Power Supply	-
3	SD	Signal detect output(LVPECL), high logical level indicates loss of signal	1
4	RD-	Inv. Received Data Out (LVPECL)	-
5	RD+	Received Data Out (LVPECL)	-
6	VCCT	Transmitter Power Supply	-
7	VEET	Transmitter Ground	-
8	TXDIS	Transmitter disable(LVTTL), high logical level indicates transmitter is disabled.	2,3
9	TD+	Transmit Data In (LVPECL)	-
10	TD-	Inv. Transmit Data In (LVPECL)	-

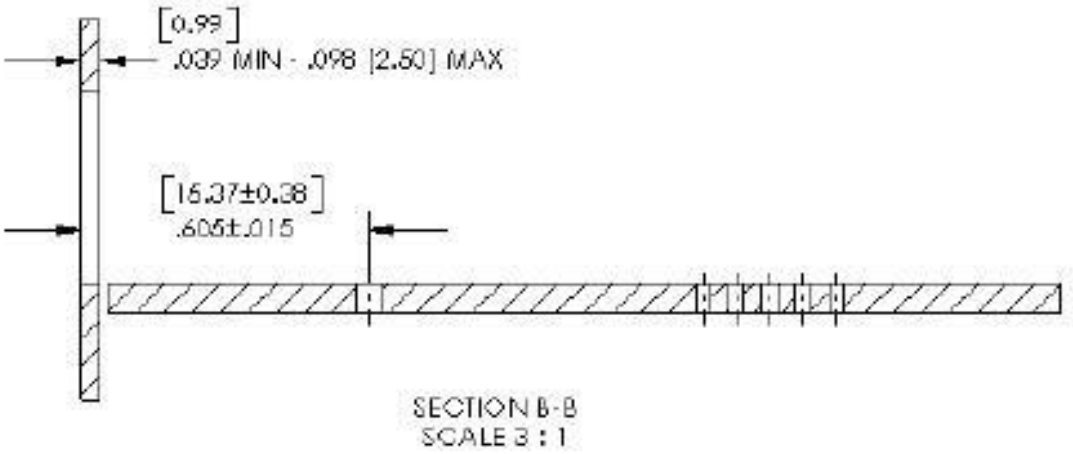
Note1：LVPECL-Normal optical input levels to the receiver result in logic "0" output，pull-down 130Ω resistor.

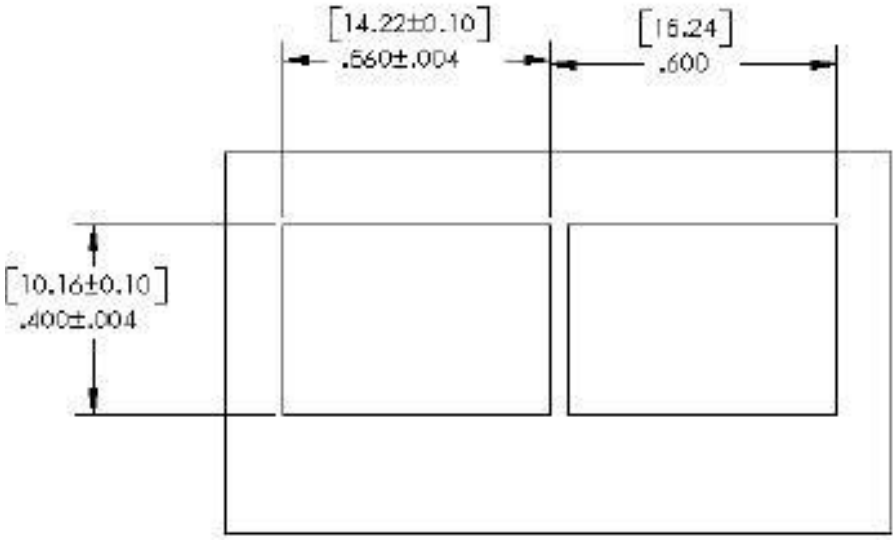
Note2：TX_ Disable is an input that is used to shut down the transmitter optical output. Its states are:

Low (0 – 0.8V): Transmitter on
(>0.8, < 2.0V): Undefined
High (2.0 – V_{CC}): Transmitter Disabled

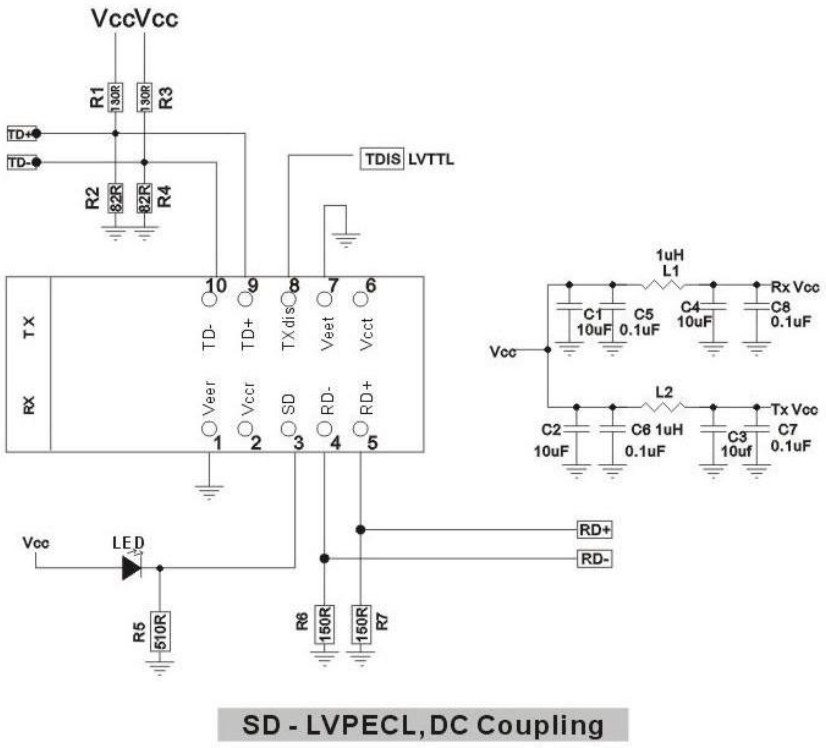
Note3：If not be used, PIN of TX_Disable will be set low inside the module.

Recommended Board Layout Hole Pattern



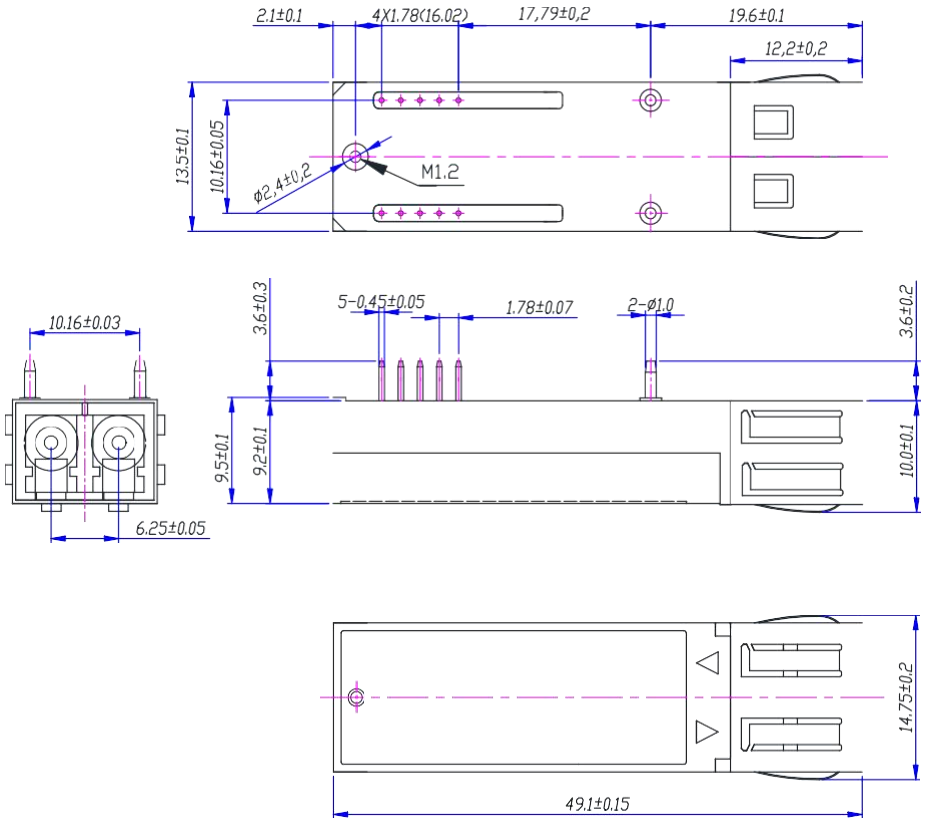


Recommended Circuit Schematic



Circuit Schematic : 3.3V SD LVPECL

Module Outline Drawing（Units in mm)



LC receptacle