

## FPMP851GL-XX

# 1.25G SFP Multi-mode Transceiver Module

### Features

- ✧ Operating data rate up to 1.25Gbps
- ✧ 850nm VCSEL Laser Transmitter
- ✧ Distance up to 550m
- ✧ Single 3.3V Power supply and TTL Logic Interface
- ✧ Duplex LC Connector Interface
- ✧ Hot Pluggable
- ✧ Operating Case Temperature  
Standard: 0°C~+70°C
- ✧ Compliant with MSA SFP Specification
- ✧ Digital diagnostic monitor interface
- ✧ Compatible with SFF-8472



### Applications

- ✧ Gigabit Ethernet Switches and Routers
- ✧ Fiber Channel Switch Infrastructure
- ✧ XDSL Applications
- ✧ Metro Edge Switching

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T <sub>s</sub>	-40	+85	°C
Supply Voltage	V <sub>cc</sub>	-0.5	3.6	V

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Temperature	T <sub>A</sub>	FPMP851GL-XXX	0	+70	°C
Power Supply Voltage	V <sub>CC</sub>	3.15	3.3	3.45	V
Power Supply Current	I <sub>CC</sub>			190	mA
Surge Current	I <sub>Surge</sub>			+30	mA
Baud Rate			1.25		GBaud
Total Supply Current	I <sub>CC</sub>			300	mA
Surge Current	I <sub>Surge</sub>			+30	mA

## PERFORMANCE SPECIFICATIONS - ELECTRICAL

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>TRANSMITTER</b>						
CML/PECL Inputs (Differential)	V <sub>in</sub>	400		1800	mVpp	AC coupled inputs
Input Impedance (Differential)	Z <sub>in</sub>	90	100	110	ohms	R <sub>in</sub> > 100 kohms @ DC
Tx_DISABLE Input Voltage - High		2		3.45	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		V <sub>CC</sub> -0.5		V <sub>CC</sub> +0.3	V	I <sub>o</sub> = 400µA; Host V <sub>CC</sub>
Tx_FAULT Output Voltage -- Low		0		0.5	V	I <sub>o</sub> = -4.0mA
TX_Disable Assert Time	t <sub>off</sub>			10	us	
TX_Disable Negate Time	t <sub>off</sub>			1	us	
<b>RECEIVER</b>						
CML Outputs (Differential)	V <sub>out</sub>	370		1800	mVpp	AC coupled outputs
Output Impedance (Differential)	Z <sub>out</sub>	90	100	110	ohms	
Rx_LOS Output Voltage - High		V <sub>CC</sub> -0.5		V <sub>CC</sub> +0.3	V	I <sub>o</sub> = 400µA; Host V <sub>CC</sub>
Rx_LOS Output Voltage - Low		0		0.8	V	I <sub>o</sub> = -4.0mA

## OPTICAL SPECIFICATIONS

TRANSMITTER						
Optical Center Wavelength	$\lambda$	830	850	860	nm	
Spectral Width	$\Delta\lambda$			1	nm	RMS
Optical Transmit Power	$P_o$	-10		-3	dBm	Average @850nm
Extinction Ratio	ER	9			dB	P1/P0
Total Jitter	TJ			170	ps	Measured with 2 <sup>7</sup> - 1 PRBS
Output Rise Time	t <sub>R</sub>		150	300	ps	20-80%; measured unfiltered
Output Fall Time	t <sub>F</sub>		200	300	ps	20-80%; measured unfiltered
RECEIVER						
Optical Input Wavelength	$\lambda$	760	850	860	nm	
Optical Input Power	$P_{in}$		-20	-18	dBm	BER<1.0E-12 @ 1.25/1.0625GBaud
Optical Return Loss	ORL	12			dB	
RX_LOS - Asserted	$P_a$	-32			dBm	Measured on transition - Low to High
RX_LOS - Deasserted	$P_d$			-19	dBm	Measured on transition - High to Low

## SFP Transceiver Electrical Pad Layout

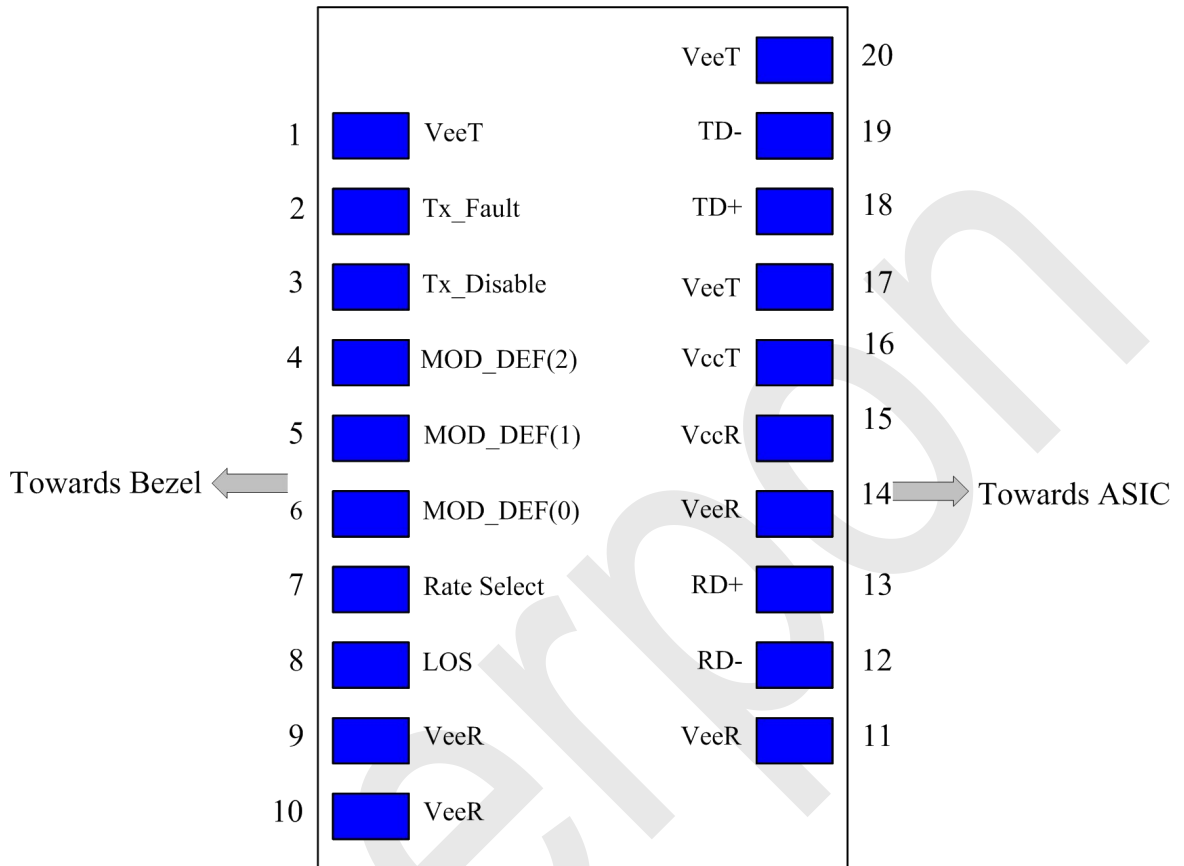


Figure 1 Transceiver pin descriptions

## Pin Function Definitions

Pin Number	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	MOD-DEF2	Module Definition 2	3	Note 3, Data line for Serial ID.
5	MOD-DEF1	Module Definition 1	3	Note 3, Clock line for Serial ID.
6	MOD-DEF0	Module Definition 0	3	Note 3, Grounded within the module.
7	Rate Select	Not Connect	3	Function not available

8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	Note 5
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

**Notes:**

1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT, R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7 – 10 K Ω resistor. Its states are:

- ✧ Low (0 – 0.8V): Transmitter on
- ✧ (>0.8, < 2.0V): Undefined
- ✧ High (2.0 – 3.465V): Transmitter Disabled
- ✧ Open: Transmitter Disabled

3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7K – 10KΩresistor on the host board. The pull-up voltage shall be VccT or VccR (see Section IV for further details). Mod-Def 0 is grounded by the module to indicate that the module is present Mod-Def 1 is the clock line of two wire serial interface for serial ID Mod-Def 2 is the data line of two wire serial interface for serial ID

4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and VccT, R+0.3V. When high, this output indicates the received optical power is

below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to  $< 0.8V$ .

5) VeeR and VeeT may be internally connected within the SFP module.

6) RD-/+: These are the differential receiver outputs. They are AC coupled  $100\Omega$  differential lines which should be terminated with  $100\Omega$  (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185 –1000 mV single ended) when properly terminated.

7) VccR and VccT are the receiver and transmitter power supplies. They are defined as  $3.3V \pm 5\%$  at the SFP connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.

8) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with  $100\Omega$  differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 – 2400 mV (250 – 1200mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600mV single-ended) be used for best EMI performance.

## Digital Diagnostic Memory Map

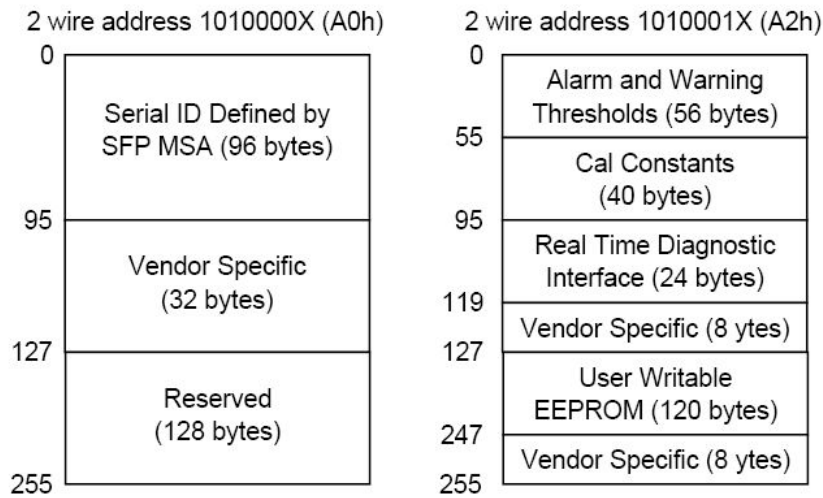


Figure 2 Digital Diagnostic Memory Map

## Recommend Circuit Schematic

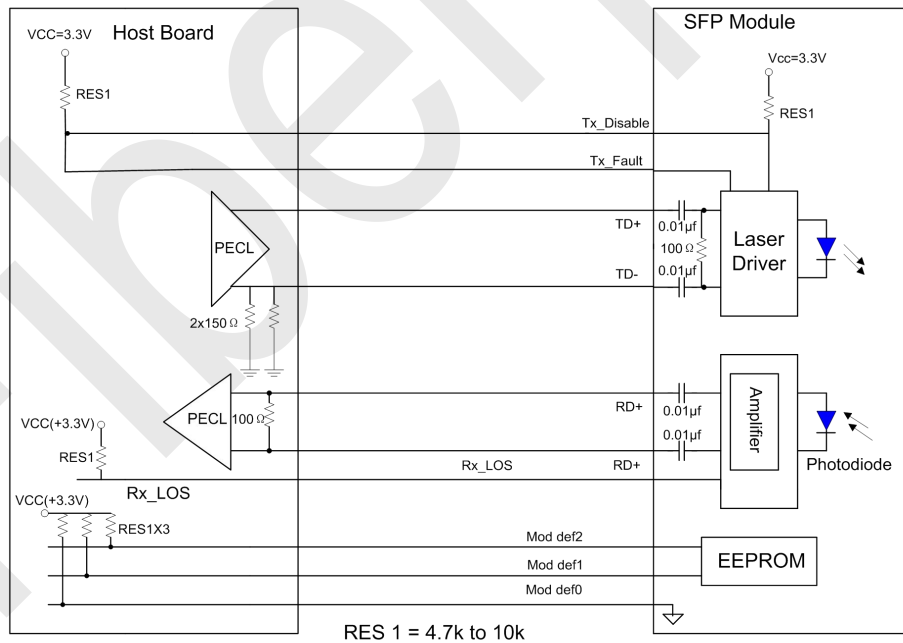
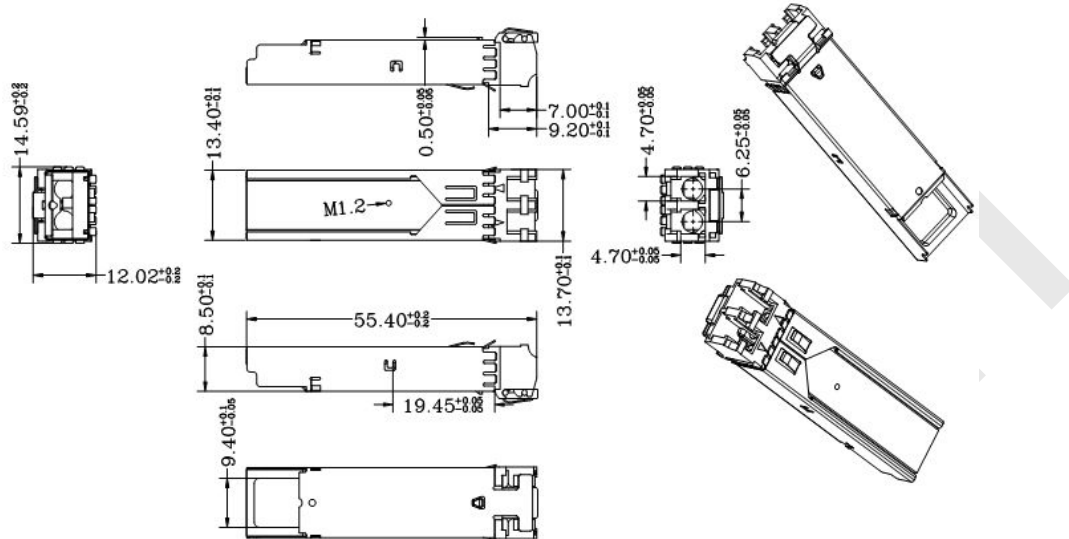


Figure 3 Recommend Circuit Schematic

## Mechanical Specifications



## Ordering information

Product Number	Data Rate	Laser	Fibre Type	Distance	Optical Interface	DDMI
FPMP851GL-05	1.25/1.0625Gbps	850nmVCSEL	MMF	550m	LC	NO
FPMP851GL-05D	1.25/1.0625Gbps	850nmVCSEL	MMF	550m	LC	YES

\*D--- DDMI

## Notice

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