SOURCE PHOTONICS

Preliminary
SP-25E-LM-xxIDFA

Features:

- Support CPRI wireless and 25G Ethernet application
- Support data rate up to 25.78125Gbps
- Up to 30km transmission on SMF
- LAN WDM EML laser and APD receiver
- SFI high speed electrical interface
- 2-wire interface with integrated Digital Diagnostic monitoring
- SFP+ MSA package with duplex LC connector
- Single +3.3V power supply
- Power consumption lower than 2.5W
- Operating case temperature: -40~+85°C

Regulatory Compliance

Table 1 – Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000V for SFI pins, >2000V for other pins.)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B)	Compatible with standards
Immunity	IEC 61000-4-3	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class I laser product.
RoHS	2011/65/EU	Compliant with standards

Absolute Maximum Ratings

Table 2 – Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	TS	-40	-	+85	°C	
Operating Relative Humidity	RH	5	-	+95	%	

Recommended Operating Conditions

Table 3 – Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_{OPR}	-40	-	85	ºC	
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V	
Power Supply Current	I_{CC}	-	-	750	mA	1
Power Dissipation	P	-	-	2.5	W	
Date rate	BR	-	24.33	25.78125	Gbps	
Transmission Distance	TD	0.5	20	30	km	2

Note:

1. Max. current at 3.3V;
2. Measured with SMF.

Optical and Electrical Characteristics

Table 4 – Transmitter Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Range	λ_1	1285.65	1286.66	1287.69	nm	xx:86
	λ_2	1294.53	1295.56	1296.59	nm	xx:95
	λ_3	1303.54	1304.58	1305.63	nm	xx:04
	λ_4	1290.07	1291.10	1292.12	nm	xx:91
	λ_5	1299.02	1300.05	1301.09	nm	xx:00
	λ_6	1308.09	1309.14	1310.19	nm	xx:09
Average Output Power	P_{0UT}	0	-	6	dBm	1
OMA-TDP		-1			dBm	
Average Output Power (Laser Off)	$P_{0UT-OFF}$	-	-	-40	dBm	1
Extinction Ratio	ER	4	-	-	dB	2
Spectral width(-20dB)	DI	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
TDP				2.7	dB	
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3} Hit ratio 5 x 10^{-5} hits per sample.	-	{0.31, 0.4, 0.45, 0.34, 0.38, 0.4}				2
$RIN_{20}OMA$	-	-	-	-130	dB/Hz	
Optical return loss tolerance	-	-	-	20	dB	

Note:

1. The optical power is launched into SMF.
2. Measured with a PRBS 2^{31}-1 test pattern @25.78125Gbps.

Table 5 – Receiver Optical Specifications

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Center Wavelength Range	λ_1	1290.07	1291.10	1292.12	nm	xx:86
	λ_2	1299.02	1300.05	1301.09	nm	xx:95
	λ_3	1308.09	1309.14	1310.19	nm	xx:04
	λ_4	1285.65	1286.66	1287.69	nm	xx:91
	λ_5	1294.53	1295.56	1296.59	nm	xx:00
	λ_6	1303.54	1304.58	1305.63	nm	xx:09
Receiver sensitivity (OMA)				-19	dBm	Note
Receiver Overload	P_{IN-OL}	-4	-	-	dBm	Note
Damage threshold		-3			dBm	Note
LOS Assert	LOS_A	-35	-		dBm	
LOS De-assert	LOS_D	-	-	-22	dBm	
LOS Hysteresis	LOS_H	0.5	-	-	dB	

Note: Measured with a PRBS 2^{31}-1 test pattern @25.78125Gbps, BER≤$5x10^{-5}$.

Table 6 – Electrical Specifications

Transmitter (Module Input)							
Parameter		Symbol	Min.	Typical	Max.	Unit	Notes
Differential Data Input Amplitude		$V_{IN,P-P}$	190	-	700	mVpp	
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
Tx_Fault	Normal Operation	V_{OL}	-0.3	-	0.4	V	
	Transmitter Fault	V_{OH}	2.4	-	V_{CC}	V	
Tx_Disable	Normal Operation	V_{IL}	-0.3	-	0.8	V	
	Laser Disable	V_{IH}	2.0	-	V_{CC}+0.3	V	
Receiver (Module Output)							
Differential Data Output Amplitude		$V_{OUT,P-P}$	300	-	900	mVpp	
Output Differential Impedance		Z_O	90	100	110	Ω	
Rx_LOS	Normal Operation	V_{OL}	-0.3	-	0.4	V	
	Lose Signal	V_{OH}	2.4	-	V_{CC}	V	

Network Optical Equipment

Recommended Host Board Power Supply Circuit

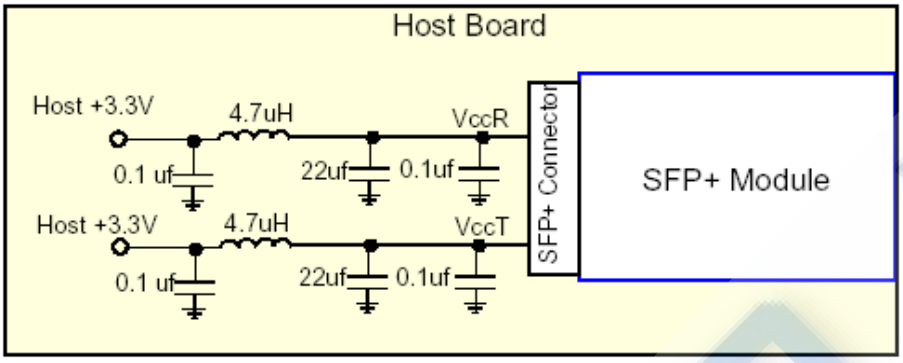

Figure 1, Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

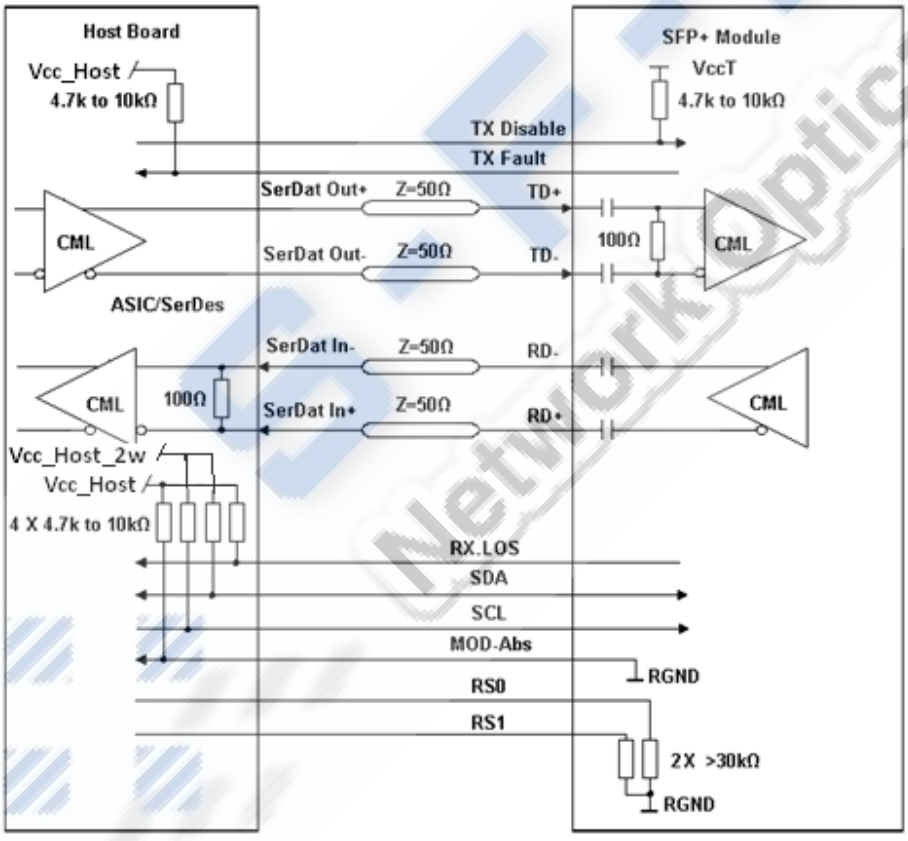

Figure 2, Recommended Interface Circuit

Pin Definitions

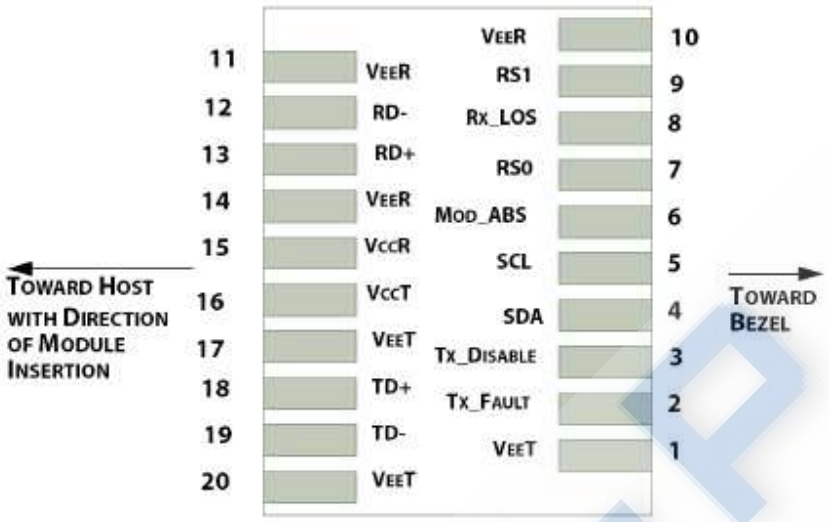

Figure 3, Pin View

Table 7 – Pin Definitions

Contacts	Logic	Symbol	Description	Notes
case		case	Module case	2
1		$V_{EE}T$	Module Transmitter Ground	3
2	LVTTL-O	TX_FAULT	Module Transmitter Fault	4
3	LVTTL-I	TX_DISABLE	Transmitter Disable; Turns off transmitter laser output	5
4	LVTTL-I/O	SDA	2-wire Serial Interface Data Line(Same as MOD-DEF2 in INF-8074i)	6
5	LVTTL-I/O	SCL	2-wire Serial Interface Clock (Same as MOD-DEF1 in INF-8074i)	6
6		MOD_ABS	Module Absent, connected to $V_{EE}T$ or $V_{EE}R$ in the module	7
7	LVTTL-I	RS0	Rate Select 0, optionally controls SFP+ module receiver.	8
8	LVTTL-O	RX_LOS	Receiver Loss of Signal Indication(In FC designated as Rx_LOS and in Ethernet designated as Signal Detect)	4
9	LVTTL-I	RS1	Rate Select 1, optionally controls SFP+ module transmitter	8
10		$V_{EE}R$	Module Receiver Ground	3
11		$V_{EE}R$	Module Receiver Ground	3
12	CML-O	RD-	Receiver Inverted Data Output	
13	CML-O	RD+	Receiver Non-Inverted Data Output	

14		$V_{EE}R$	Module Receiver Ground	3
15		$V_{CC}R$	Module Receiver 3.3 V Supply	
16		$V_{CC}T$	Module Transmitter 3.3 V Supply	
17		$V_{EE}T$	Module Transmitter Ground	3
18	CML-I	TD+	Transmitter Non-Inverted Data Input	
19	CML-I	TD-	Transmitter Inverted Data Input	
20		$V_{EE}T$	Module Transmitter Ground	3

Notes:

1. Labeling as inputs (I) and outputs (O) are from the perspective of the module.
2. The case makes electrical contact to the cage before any of the board edge contacts are made.
3. The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.
4. This contact is an open collector/drain output contact and shall be pulled up on the host. Pull ups can be connected to one of several power supplies, however the host board design shall ensure that no module contact has voltage exceeding module VccT/R + 0.5 V.
5. Tx_Disable is an input contact with a 4.7 kOhms to 10 kOhms pullup to VccT inside the module.
6. 2-wire interface.
7. The pins shall be pulled up with 4.7K-10Kohms to a voltage between 3.14V and 3.46V on host board.
8. The pins are pulled low to $V_{EE}T$ with a >30kΩ resistor in the module.

Mechanics Drawing

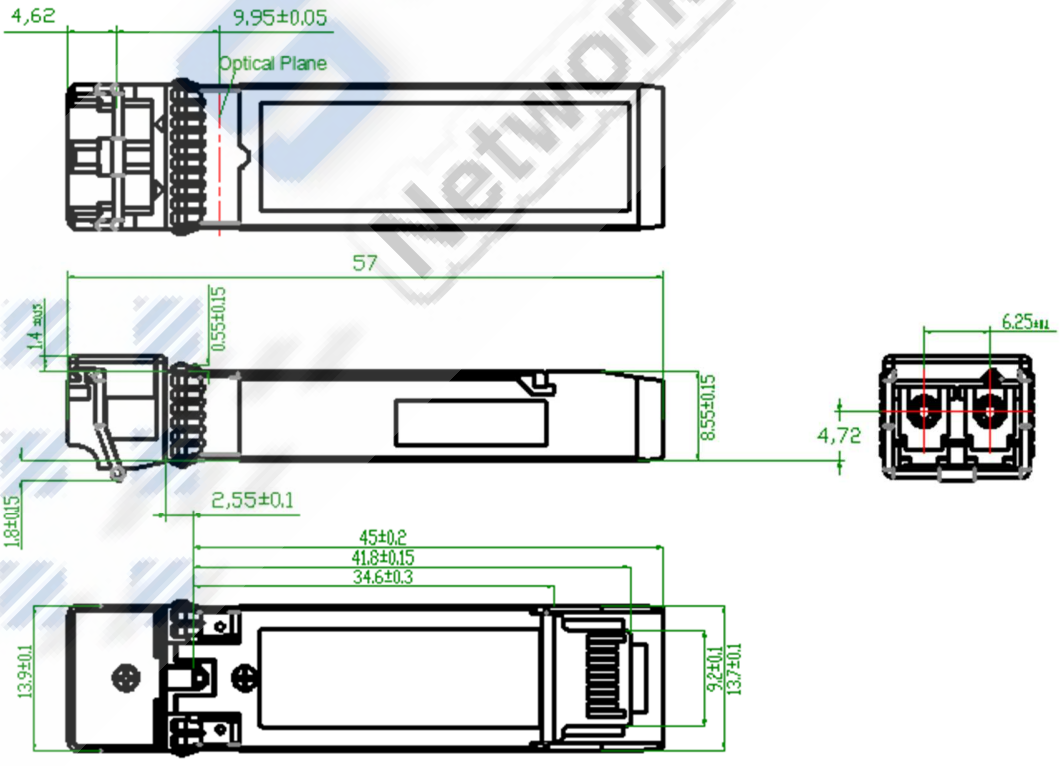

Figure 4 Mechanics drawing

Order Information

Table 8 – Order Information

Part No.	Application	Data Rate	Laser Source	Fiber Type
SP-25E-LM-xxIDFA	CPRI /25GBASE-ER application	25.78125Gb/s	EML	SMF

S·F·P.RU Network Optical Equipment

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

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