4.25Gb/s Fibre Channel DWDM SFP Transceiver
Preliminary

SFPD-4F-08-xx-A

Features

- Available in all 100 GHz C-Band Wavelengths on the DWDM ITU Grid
- DWDM SFP MSA Compliant
- Cold Start Up Wavelength Compliance
- Low Power Dissipation <1.3W Maximum
- -5°C to 70°C Operating Case Temperature
- Supports 1.06/2.125/4.25Gb/s Fibre Channel Operation
- Compatible with 1.25Gb/s Ethernet
- Pluggable Into Existing Standard SFP Cages
- Diagnostic Performance Monitoring of Transmit Power, Receive Power, Laser Bias, Module Temperature, Laser Temperature, APD Bias Voltage, TEC Current
- APD Based Receiver Sensitivity of -26dBm at 4.25Gb/s
- 80km Reach

General Operation

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Total Current (BOL)	I_{cc}	-	-	375	mA
Power Supply Noise Rejection[a]	PSR	100	-	-	mV_{p-p}
Operating Case Temperature	T_{op}	-5	-	70	°C
Storage Temperature	T_{st}	-40	-	85	°C
Data Rate Multirate	MR	-	4.25	-	Gb/s

a) 20Hz to 155MHz

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{OP}	0	2	4	dBm
Average Launch Power (Tx:Off)	P_{Off}	-	-	-30	dBm
Channel Spacing	Δf	-	100	-	GHz
Deviation From Central Frequency, EOL				±12	GHz
Spectral Width (20dB)	$\Delta\lambda$	-	-	0.3	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Dispersion Penalty at specified distance[c]	dp	-	-	3	dB
Relative Intensity Noise	RIN	-	-	-135	dB/Hz
Reflection Tolerance[d]	rp	-24	-	-	dB

b) 20%-80% values
c) Measured at BER of 10^{-12}, PRBS of 2^7-1, at eye center, 4.25Gb/s, 80km (1600ps/nm) fiber.
d) 2dB degradation of receiver sensitivity

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Transmitter Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedence	R_{in}	80	100	120	Ω
PECL Single-Ended Data Input Swing	$V_{in,p-p}$	250	-	1200	mV
TxFault_Fault	V_{fault}	2	-	V_{cc}	V
TxFault_Normal	V_{normal}	V_{ee}	-	V_{ee}+0.5	V
TxDisable_Disable	Vd	2	-	V_{cc}	V
TxDisable_Enable	Ven	V_{ee}	-	V_{ee}+0.8	V

Receiver Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Receive Power Low[e]	$R_{sens,low}$	-	-26	-24	dBm
Receive Power High	$R_{sens,high}$	-6	-	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	4	-	-	dBm
Wavelength	λ	1528	-	1564	nm
Maximum Reflectance Of Receiver	RX_r	-	-	-27	dB

e) at 10^{-12} BER, PRBS 2^7-1, 4.25Gb/s

Receiver Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
Single-Ended Data Output	$V_{out, p-p}$	185	-	800	mV

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on	-	-	20	ms
Tx Disable Assert Time	t_off	-	-	20	ms
Time To Initialize After Reset of Tx_Fault/INT in Normal Operation	t_init	-	-	300	ms
Start-up Time	t_startup	-	-	90	secs
Tx Fault/INT Assert Time	t_fault	-	-	50	ms
Tx Disable To Reset	t_reset	10	-	-	µs
LOS Assert Time	t_loss_on	-	-	100	µs
LOS De-assert Time	t_loss_off	-	-	100	µs
Serial ID Clock Rate	f_serial_clock	-	-	100	kHz
RX_LOS Voltage (High)		2	-	-	V
RX_LOS Voltage (Low)		-	-	0.8	V
LOS Output Voltage-Fault	V_{LOS} fault	2	-	V_{cc}	V
LOS Output Voltage-Normal	V_{LOS}normal	V_{ee}	-	V_{ee}+0.55	V
MOD_DEF (0:2)-High	V_H	2	-	V_{cc}	V
MOD_DEF (0:2)-Low	V_L	V_{ee}	-	V_{ee}+0.5	V

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λ Wavelength Ordering

SFPD-4F-08-xx-A

See table below for "XX" values

λc Wavelength Guide

ITU Channel/Product Code	Frequency (THz)	Wavelength (nm)	ITU Channel/Product Code	Frequency (THz)	Wavelength (nm)
15	191.5	1565.495	39	193.9	1546.119
16	191.6	1564.678	40	194.0	1545.322
17	191.7	1563.863	41	194.1	1544.526
18	191.8	1563.047	42	194.2	1543.730
19	191.9	1562.233	43	194.3	1542.936
20	192.0	1561.419	44	194.4	1542.142
21	192.1	1560.606	45	194.5	1541.349
22	192.2	1559.794	46	194.6	1540.557
23	192.3	1558.983	47	194.7	1539.766
24	192.4	1558.173	48	194.8	1538.976
25	192.5	1557.363	49	194.9	1538.186
26	192.6	1556.555	50	195.0	1537.397
27	192.7	1555.747	51	195.1	1536.609
28	192.8	1554.940	52	195.2	1535.822
29	192.9	1554.134	53	195.3	1535.036
30	193.0	1553.329	54	195.4	1534.250
31	193.1	1552.524	55	195.5	1533.465
32	193.2	1551.721	56	195.6	1532.681
33	193.3	1550.918	57	195.7	1531.898
34	193.4	1550.116	58	195.8	1531.116
35	193.5	1549.315	59	195.9	1530.334
36	193.6	1548.515	60	196.0	1529.553
37	193.7	1547.715	61	196.1	1528.773
38	193.8	1546.917			

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Diagnostics

Parameter	Range	Accuracy	Unit
Temperature	-40 to 102	± 3	° C
Voltage	0 to V_{CC}	0.1	V
Bias Current	0 to 120	5	mA
TX Power	0 to 4	±2	dBm
RX Power	-24 to -6	±2	dBm
TEC Current	-1200 to 1200	±60	mA
TEC Temperature[f]	20 to 70	±0.25	°C

f) Relative accuracy. Absolute accuracy is +/-3°C

EEPROM Serial ID

Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor Name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE Vendor OUI Code For LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor P/N	Part Number in ASCII, e.g. SFPD-4F-08-xx-A	40	53	S
		41	46	F
		42	50	P
		43	44	D
		44	34	4
		45	46	F
		46	30	0
		47	38	8
		48	x	x
		49	x	x
		50	41	A

Pin	Function	Notes
1	$V_{ee}T$	TX Ground
2	TX_FAULT/INT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	$V_{ee}R$	RX Ground
10	$V_{ee}R$	RX Ground
11	$V_{ee}R$	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	$V_{ee}R$	RX Ground
15	$V_{cc}R$	RX Power
16	$V_{cc}T$	TX Power
17	$V_{ee}T$	TX Ground
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	$V_{ee}T$	TX Ground

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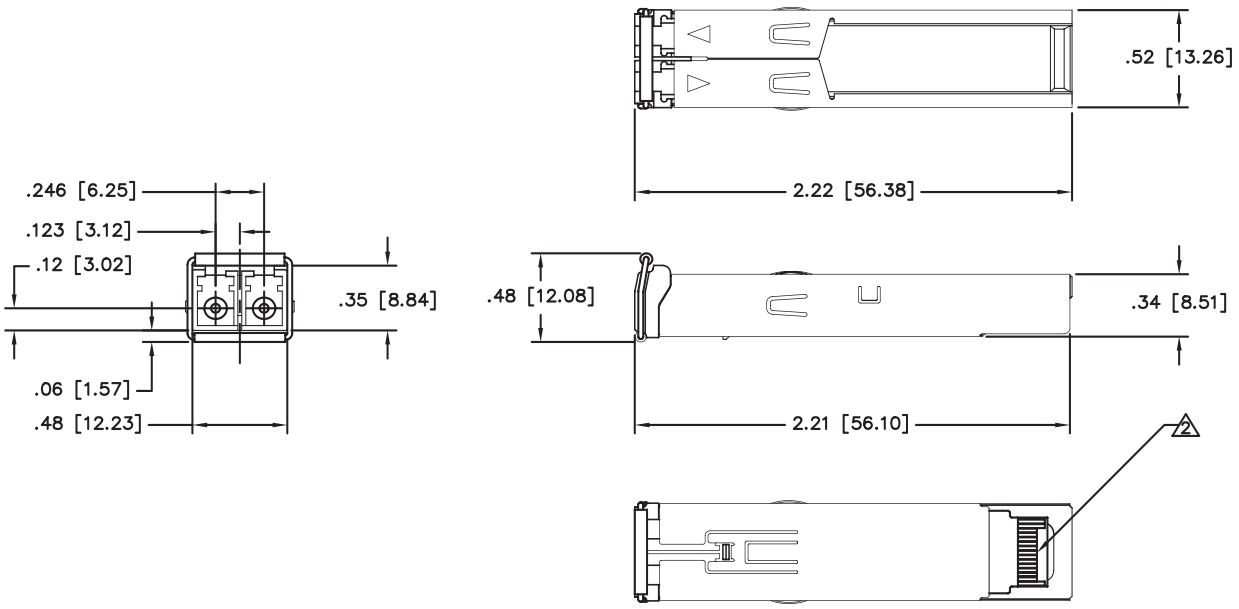
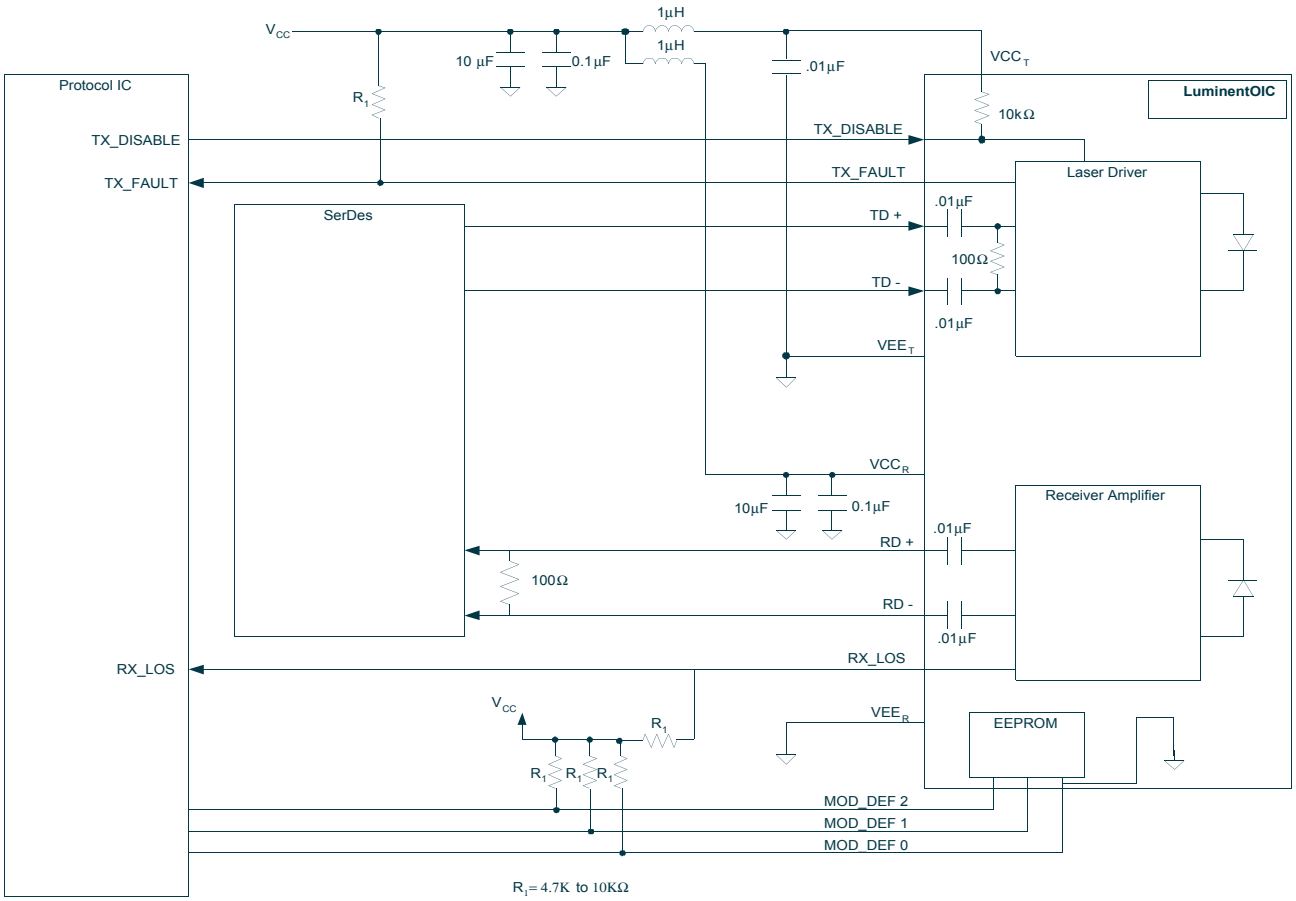
Outline Drawing



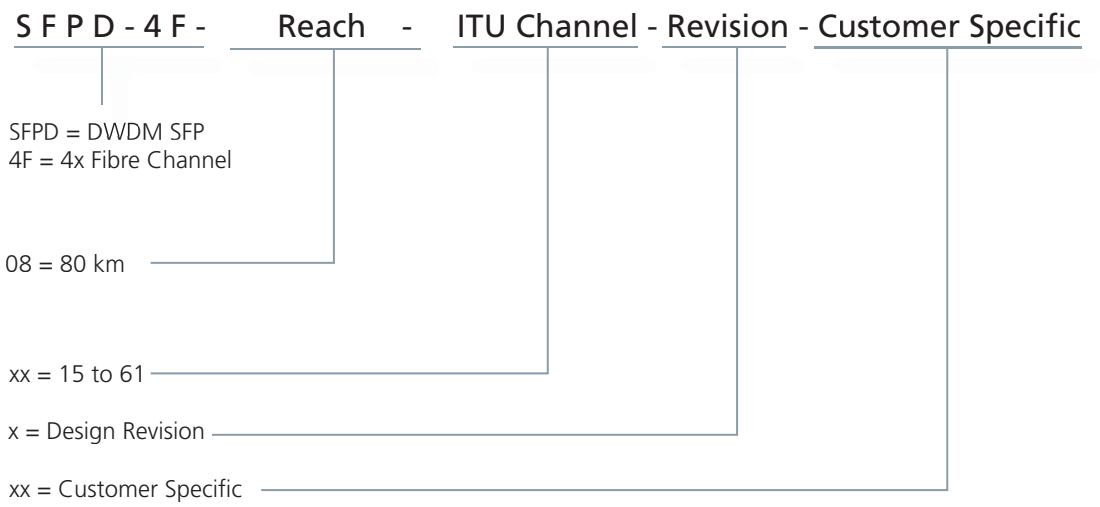
Suggested Transceiver Interface



Ordering Information

Available Options:
SFPD-4F-08-xx-A

Part Numbering Definition:



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.

Legal Notes:

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