

SFPD-4F-08-xx-A-TL

**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 <1.5W 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 -24dBm at 4.25Gb/s
- Long Reach 80 km Version

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 ^b	dp	-	-	2	dB
Relative Intensity Noise	RIN	-	-	-135	dB/Hz
Reflection Tolerance ^c	rp	-24	-	-	dB

b) Measured at BER of 10^{-12} , PRBS of 2^7-1 , at eye center, 4.25Gb/s, 80km fiber.

c) 2dB degradation of receiver sensitivity

SFPD-4F-08-xx-A-TL

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	V_d	2	-	V_{cc}	V
TxDisable_Enable	V_{en}	V_{ee}	-	$V_{ee}+0.8$	V

Receiver Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Receive Power Low ^d	$R_{sens,low}$	-	-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

d) at 10⁻¹² BER, PRBS 27-1, 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	-	-	μ s
LOS Assert Time	t_{loss_on}	-	-	100	μ s
LOS De-assert Time	t_{loss_off}	-	-	100	μ s
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

SFPD-4F-08-xx-A-TL

λ Wavelength Ordering

SFPD-4F-08-xx-A-TL

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			

SFPD-4F-08-xx-A-TL

Diagnostics

Parameter	Range	Accuracy	Unit
Temperature	-40 to 102	± 3	$^{\circ}\text{C}$
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 ^e	20 to 70	± 0.25	$^{\circ}\text{C}$

e) Relative accuracy. Absolute accuracy is $\pm 3^{\circ}\text{C}$

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

SFPD-4F-08-xx-A-TL

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. SFPD4F08xxATL	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	xx	x
		49	xx	x
		50	41	A
		51	54	T
		52	4C	L

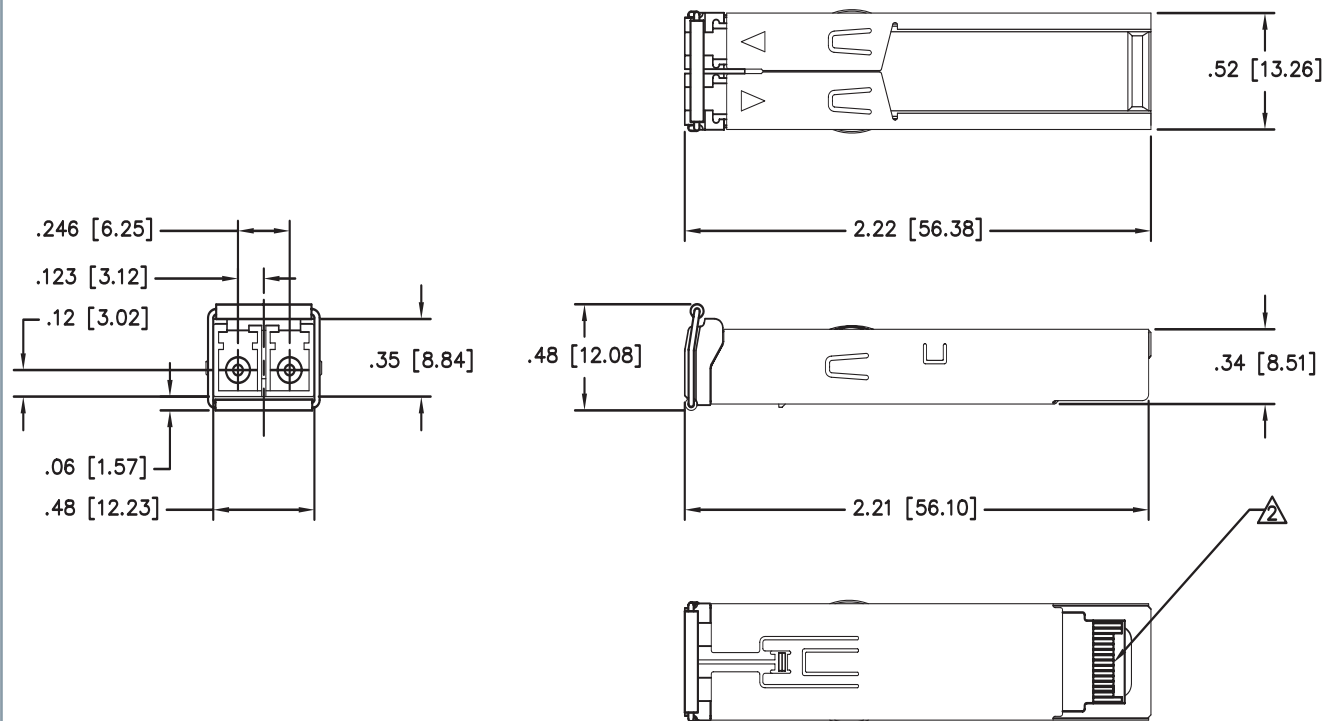
SFPD-4F-08-xx-A-TL

EEPROM Serial ID

Name of Field		Discription of Field		Address	-290 Hex	-300 Hex	-310 Hex	-320 Hex	-330 Hex	-340 Hex	-350 Hex	-360 Hex
Customization data (A0h)	e.g. Tellabs TR-0032-xxx		96	54	54	54	54	54	54	54	54	54
			97	65	65	65	65	65	65	65	65	65
			98	6C	6C	6C	6C	6C	6C	6C	6C	6C
			99	6C	6C	6C	6C	6C	6C	6C	6C	6C
			100	61	61	61	61	61	61	61	61	61
			101	62	62	62	62	62	62	62	62	62
			102	73	73	73	73	73	73	73	73	73
			103	00	00	00	00	00	00	00	00	00
			104	00	00	00	00	00	00	00	00	00
			105	00	00	00	00	00	00	00	00	00
			106	00	00	00	00	00	00	00	00	00
			107	01	01	01	01	01	01	01	01	01
	Tellabs part no.		Vendor Ordering Core	108	54	54	54	54	54	54	54	54
	TR-0032-290	SFPD-4F-08-29-A-TL	109	52	52	52	52	52	52	52	52	52
	TR-0032-300	SFPD-4F-08-30-A-TL	110	2D	2D	2D	2D	2D	2D	2D	2D	2D
	TR-0032-310	SFPD-4F-08-31-A-TL	111	30	30	30	30	30	30	30	30	30
	TR-0032-320	SFPD-4F-08-32-A-TL	112	30	30	30	30	30	30	30	30	30
	TR-0032-330	SFPD-4F-08-33-A-TL	113	33	33	33	33	33	33	33	33	33
	TR-0032-340	SFPD-4F-08-34-A-TL	114	32	32	32	32	32	32	32	32	32
	TR-0032-350	SFPD-4F-08-35-A-TL	115	2D	2D	2D	2D	2D	2D	2D	2D	2D
	TR-0032-360	SFPD-4F-08-36-A-TL	116	32	33	33	33	33	33	33	33	33
	117	39	30	31	32	33	34	35	36			
	118	30	30	30	30	30	30	30	30	30	30	30
	119	02	02	02	02	02	02	02	02	02	02	02
	120	02	02	02	02	02	02	02	02	02	02	02
	121	67	67	67	67	67	67	67	67	67	67	67
	122	06	06	06	06	06	06	06	06	06	06	06
	123	40	40	40	40	40	40	40	40	40	40	40
	124	00	00	00	00	00	00	00	00	00	00	00
	125	00	00	00	00	00	00	00	00	00	00	00
126	04	04	04	04	04	04	04	04	04	04	04	
127	59	51	50	53	52	55	54	57				

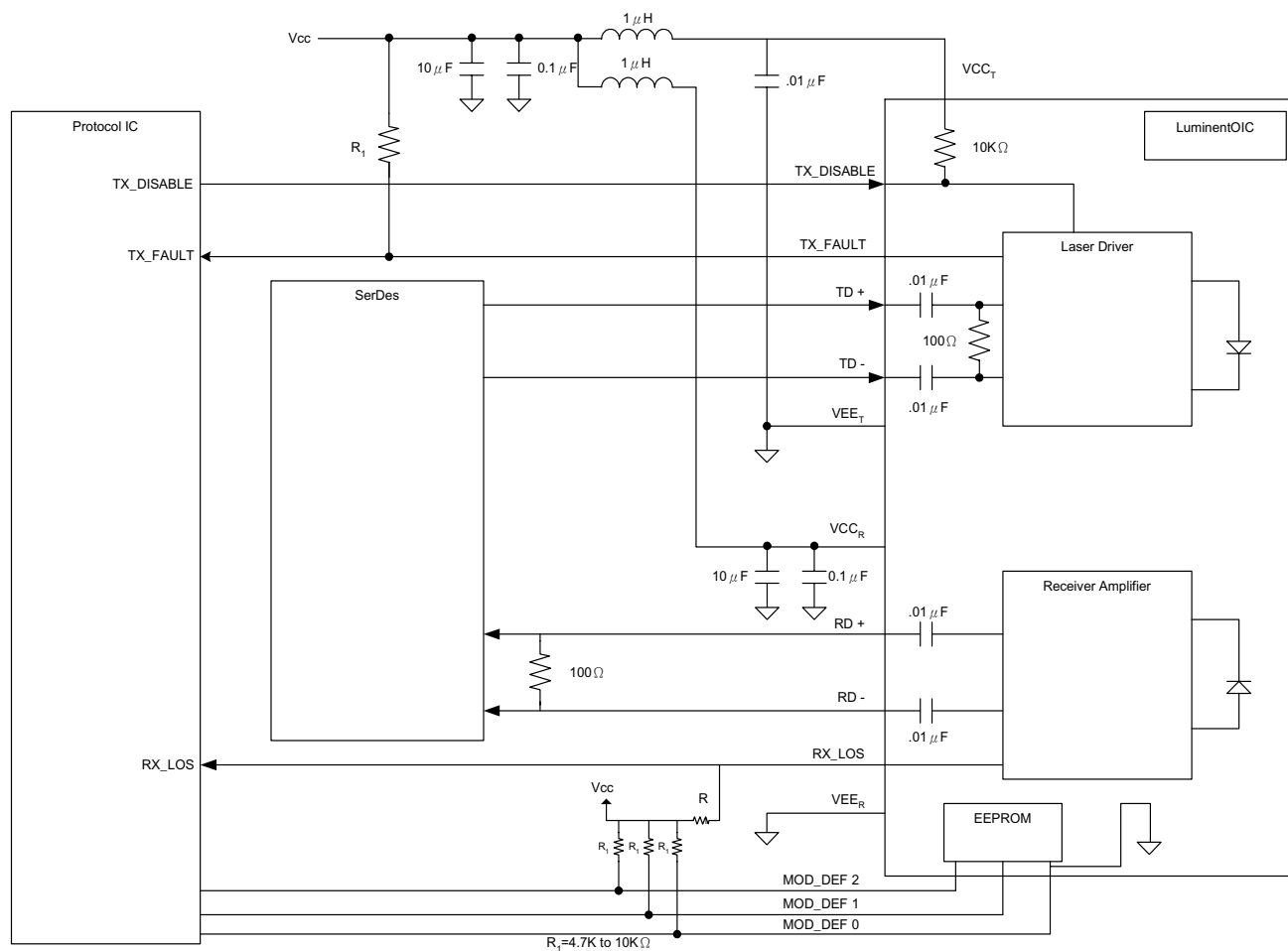
SFPD-4F-08-xx-A-TL

Outline Drawing



SFPD-4F-08-xx-A-TL

Suggested Transceiver Interface

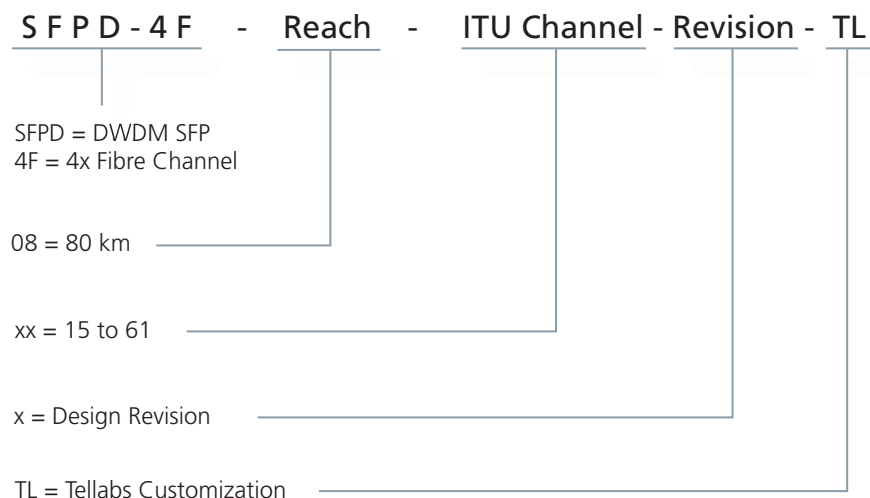


SFPD-4F-08-xx-A-TL

Ordering Information

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

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:

IMPORTANT NOTICE!

All information contained in this document is subject to change without notice, at LuminentOIC's sole and absolute discretion. LuminentOIC warrants performance of its products to current specifications only in accordance with the company's standard one-year warranty; however, specifications designated as "preliminary" are given to describe components only, and LuminentOIC expressly disclaims any and all warranties for said products, including express, implied, and statutory warranties, warranties of merchantability, fitness for a particular purpose, and non-infringement of proprietary rights. Please refer to the company's Terms and Conditions of Sale for further warranty information.

LuminentOIC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents, services, or intellectual property described herein. No license, either express or implied, is granted under any patent right, copyright, or intellectual property right, and LuminentOIC makes no representations or warranties that the product(s) described herein are free from patent, copyright, or intellectual property rights. Products described in this document are NOT intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. LuminentOIC customers using or selling products for use in such applications do so at their own risk and agree to fully defend and indemnify LuminentOIC for any damages resulting from such use or sale.

THE INFORMATION CONTAINED IN THIS DOCUMENT IS PROVIDED ON AN "AS IS" BASIS. Customer agrees that LuminentOIC is not liable for any actual, consequential, exemplary, or other damages arising directly or indirectly from any use of the information contained in this document. Customer must contact LuminentOIC to obtain the latest version of this publication to verify, before placing any order, that the information contained herein is current.

© LuminentOIC, Inc. 2003
All rights reserved