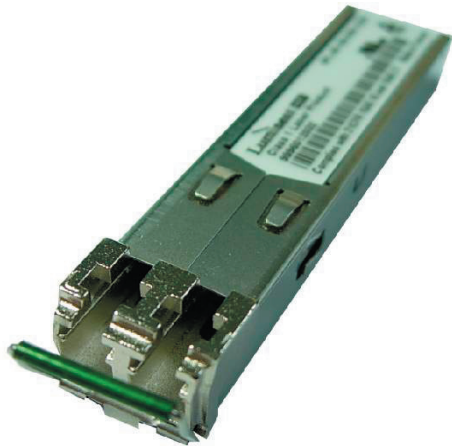


SP-4F-04-CDA



Features

- Single 3.3 V supply
- 40 km reach
- Supports 1.06/2.125/4.25Gb/s Fibre Channel Operation
- Compatible with 1.25Gb/s Ethernet
- 1550nm DFB Laser
- Commercial Temperature Available
- SFP MSA SFF-8074i compliant
- Digital Diagnostic SFF-8472 compliant
- Telcordia GR-468 compliant
- Color code Bail Latch : Green
- RoHS Compliant

General Operating

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Total Current	I_{cc}	-	-	300	mA
Power Supply Noise Rejection ^a	PSR	100	-	-	mV _{p-p}
Operating Temperature	T_{op}	-5	-	70	°C
Storage Temperature	T_{st}	-40	-	85	°C
Data Rate FC-400 Fibre Channel	DR	-	4250	-	Mbps

a) 20Hz to 155MHz

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{op}	0	2	4	dBm
Average Launch Power Of Off Tx	P_{off}	-	-	-45	dBm
Eye Mask		Fibre Channel Compliant			
Extinction Ratio	ER	5	-	-	dB
Optical Rise Time ^b	t_r	-	-	120	ps
Optical Fall Time ^b	t_f	-	-	120	ps
Mean Wavelength	λ	1530	1550	1570	nm
Spectral Width (20dB)	$\Delta\lambda_{20}$	-	-	1	nm
Dispersion Penalty (40 km, 800 ps/nm) ^c	dp	-	1	2	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflection Tolerance ^d	rp	-24	-	-	dB

b) 20%-80% values

c) Measured at BER of 1E-12, PRBS of 2⁷-1, at eye center

d) 1 dB degradation of receiver sensitivity

SP-4F-04-CDA

Transmitter Specifications (Electical)

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

Parameter	Symbol	Min	Typical	Max	Unit
Receive Power Low ^e	$R_{sens,low}$	-	-19.5	-18	dBm
Receive Power High ^e	$R_{sens,high}$	-3	-	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	5	-	-	dBm
Wavelength	λ	1200	-	1625	nm
Maximum Reflectance Of Receiver	RX_r	-	-	-27	dB
LOS Assert		-28	-	-	dBm
LOS De-assert		-	-	-18	dBm
LOS Hysteresis		0.5	-	-	dB

e) at 4.25Gb/s, 1E-12 BER, PRBS 2⁷-1

Electrical Output

Parameter	Symbol	Min	Typical	Max	Unit
PECL Single Ended Data Output Swing	$V_{out,p-p}$	185	-	800	mV
Data Output Rise Time	t_r	-	-	175	ps
Data Output Fall Time	t_f	-	-	175	ps

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_{on}	-	-	50	μ s
Tx Disable Assert Time	t_{off}	-	-	10	μ s
Time To Initialize, Including Reset Of Tx Fault	t_{init}	-	-	300	ms
Tx Fault Assert Time	t_{fault}	-	-	100	μ s
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}	2	-	100	kHz
RX_LOS Voltage (High)		2	-	V_{cc}	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}	-	$V_{ee}+0.5$	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

SP-4F-04-CDA

Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature	-5 to 70	± 3	° C	External	$T_c(C) = T_{slope} * T_{ad}(16 \text{ bit signed twos complement value}) + T_{offset}$
Voltage	0 to V_{cc}	0.1	V	External	$V(\text{Volts}) = V_{slope} * V_{ad}(16 \text{ bit unsigned integer}) + V_{offset}$
Bias Current	0 to 120	5	mA	External	$I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$
TX Power	0 to 4	±3 dB	dBm	External	$TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$
RX Power	-18 to -3	±3 dB	dBm	External	$RX_PWR(\mu W) = A_0 + A_1 * x + A_2 * x^2 + A_3 * x^3 + A_4 * x^4$

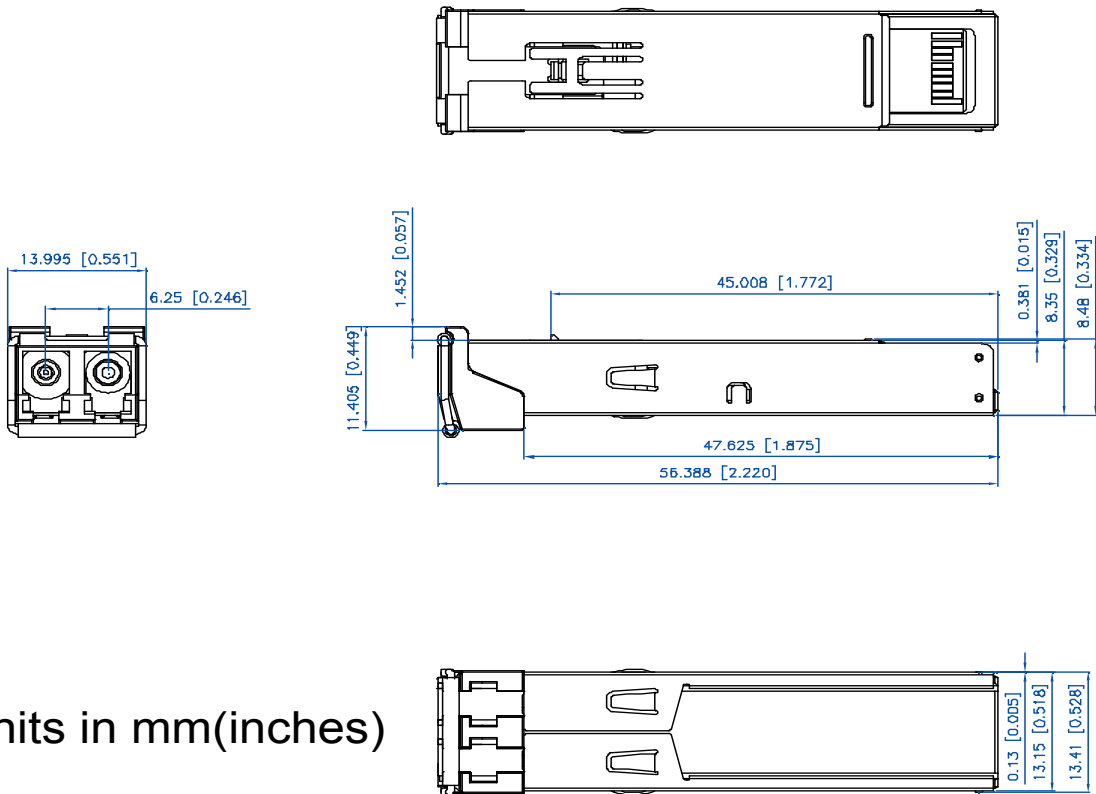
Pin	Function	Notes
1	V_{eeT}	TX GND
2	TX_FAULT	Open Collector
3	TX_DISABLE	Internally Pulled High
4	MOD_DEF2	Serial Data Input
5	MOD_DEF1	Serial Clock Input
6	MOD_DEF0	Internally Grounded
7	NC	Not Connected
8	LOS	Open Collector
9	V_{eeR}	RX Ground
10	V_{eeR}	RX Ground
11	V_{eeR}	RX Ground
12	RXD-	RX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

SP-4F-04-CDA

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 PN	Part Number in ASCII, e.g. SP-4F-04-CDA	40	53	S
		41	50	P
		42	34	4
		43	46	F
		44	30	0
		45	34	4
		46	43	C
		47	44	D
		48	41	A

SP-4F-04-CDA

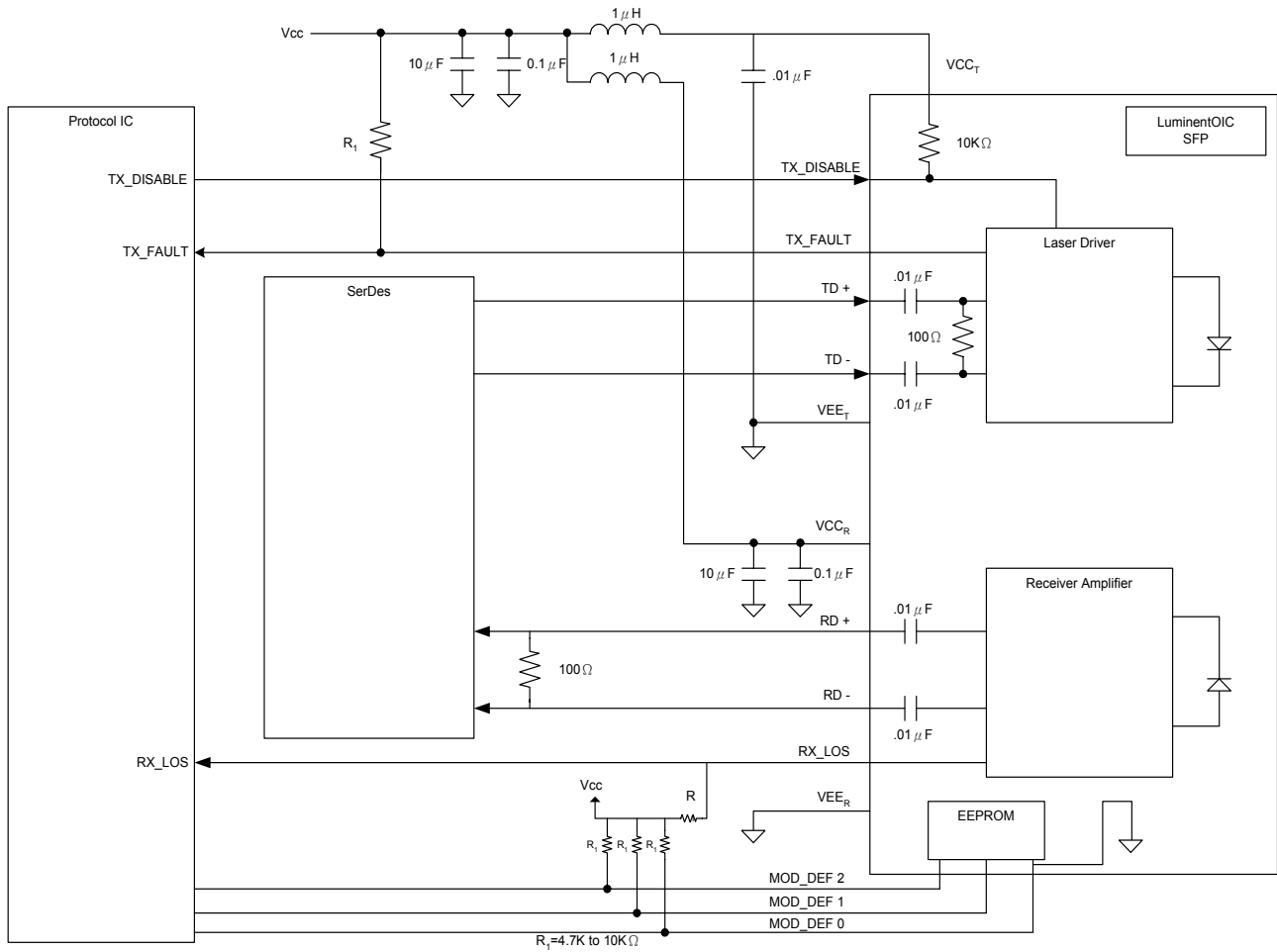
Outline Drawing



Units in mm(inches)

SP-4F-04-CDA

Suggested Transceiver Interface



SP-4F-04-CDA

Ordering Information

Available Options:
SP-4F-04-CDA

Part numbering Definition:

SP - 4F - 04 - Temperature Diagnostic Revision - Customer Specifics

- SP = Small Form Pluggable
- 4F = 4x Fibre Channel
- 04 = 40 km

- Operating Temperature
- C = Commercial Temperature (-5 to 70°C)

- D = Digital Diagnostic (SFF-8472)

- Design Revision
- A = RoHS compliant

- Customer Specifics

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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