

SFP-MR-LR1



Features

- Single 3.3 V supply
- 25dB minimum, 29.5 dB typical link budget
- -5 to 70 °C temperature operation
- 1310nm DFB laser
- APD Receiver
- SFP MSA SFF-8074i compliant
- GR 253/STM G.957 compliant
- Digital Diagnostic SFF-8472 compliant
- Bellcore GR-468 compliant
- Red color coated bail latch

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 (case)	T_{op}	-5	-	70	°C
Storage Temperature	T_{st}	-40	-	85	°C
Data Rate	DR	100	-	2700	Mbps

a) 20Hz to 155MHz

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{op}	-2	0.5	3	dBm
Average Launch Power Of Off Tx	P_{off}	-	-	-30	dBm
Extinction Ratio	ER	8.2	-	-	dB
Eye Mask		-	-	-	IEEE 802.3Z, SONET/SDH compliant
Optical Jitter Generation	J_{gen}	-	-	0.007	UI
Optical Rise Time ^b	t_r	-	-	160	ps
Optical Fall Time ^b	t_f	-	-	160	ps
Mean Wavelength	λ	1280	1310	1335	nm
Spectral Width (20dB)	$\Delta\lambda$	-	-	1	nm
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Reflection Tolerance ^c	rp	-24	-	-	dB

b) 20%-80% values

c) 1 dB 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	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 ^d	$R_{sens,low}$	-27	-29	-	dBm
Receive Power High	$R_{sens,high}$	-	-	-9	dBm
Damage Threshold For Receiver	$P_{in,damage}$	-	-	4	dBm
Wavelength	λ	1200	-	1625	nm
Maximum Reflectance Of Receiver	RX_r	-	-	-27	dB
LOS Assert		-38	-	-	dBm
LOS De-assert		-	-	-28	dBm
LOS Hysteresis		0.5	-	-	dB

d) 10^{-10} BER, PRBS 2²³-1 for SONET, 10^{-12} BER, PRBS 27-1 for Gigabit Ethernet

Electrical Output

Parameter	Symbol	Min	Typical	Max	Unit
PECL Single Ended Data Output Swing	$V_{out,p-p}$	300	400	600	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}	-	-	1	ms
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}	-	-	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}	-	$V_{ee}+0.5$	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

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Diagnostics

Parameter	Range	Accuracy	Unit	Calibration	Formula
Temperature	-40 to 102	± 3	° C	Internal	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement}) / 256$
Voltage	0 to V_{cc}	0.1	V	Internal	$V(\text{Volts}) = V_{ad}(16 \text{ bit unsigned integer}) * 0.1$
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 3mW	±3 dB	mW	External	$TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$
RX Power	-27 to -9 dBm	±3 dB	mW	External	$RX_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$

EEPROM Serial ID

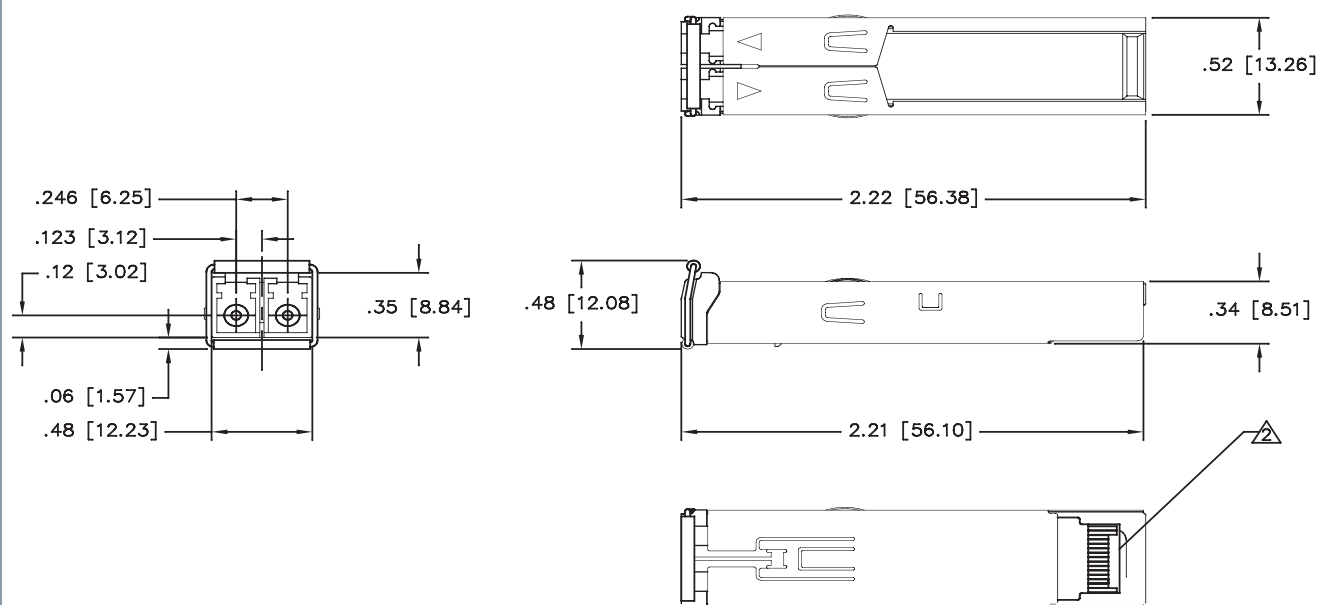
Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor Name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
Vendor OUI	IEEE Vendor OUI Code For LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor PN	Part Number in ASCII, e.g. SFP-MR-LR1	40	53	S
		41	46	F
		42	50	P
		43	4D	M
		44	52	R
		45	4C	L
		46	52	R
		47	31	1

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Pin	Function	Notes
1	V _{ee} T	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 _{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 GND
15	V _{cc} R	RX Power
16	V _{cc} T	TX Power
17	V _{ee} T	TX GND
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	V _{ee} T	TX GND

Outline Drawing

Units in inches [mm]



SFP-MR-LR1

Ordering Information

Available Options:

SFP-MR-LR1
SFP-MR-LR1-D1

Part numbering Definition:

SFP-MR-LR1 - Digital Diagnostics - Customer Specific

- Blank=No Diagnostic
- D1= External Calibration
- D2= Internal Calibration

- Labelling, Serial number, or Shipping Instructions etc.

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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