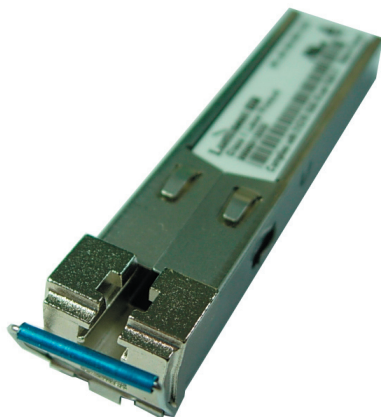


SPL-35-MR-IR1



Features

- Compatible with IEEE 802.3ah, 1000Base-BX10
- Compatible with OC-48/STM-16 Standards
- GR 253/ STM G.957 compliant
- Single 3.3V Supply
- Simplex LC Connector
- Digital Diagnostic SFF-8472 Compliant
- SFP MSA SFF-8074i Compliant
- 13dB Minimum Power Budget
- 15km Minimum Reach
- Commercial temperature available (-Cxx)
- Industrial temperature available (-Txx)
- 1310nm DFB Laser
- Telcordia GR-468 Compliant
- Color code Bail Latch : Bule
- RoHS compliant (lead free soldered)

General Operation

Parameter	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	V_{cc}	3.135	3.3	3.465	V
Total Current	I_{cc}	-	-	300	mA
Power Supply Noise Rejection		100	-	-	mVp-p
Operating Temperature (-Cxx)	T_{opr}	-5	-	70	°C
Operating Temperature (-Txx)	T_{opr}	-40	-	85	°C
Storage Temperature	T_{stg}	-40	-	85	°C
Data Rate OC-48	DR	-	2488.32	-	Mbps
Data Rate FEC	DR	-	2700	-	Mbps
Data Rate Gigabit Ethernet	DR	-	1250	-	Mbps
Data Rate FC	DR	-	1062.5	-	Mbps
Data Rate 2xFC	DR	-	2125	-	Mbps

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	P_{op}	-5	-2.5	0	dBm
Optical Crosstalk	XT	-	-	-45	dB
Average Launch Power (Tx:Off)	P_{off}	-	-	-45	dBm
Extinction Ratio	ER	8.2	-	-	dB
Eye Mask		SONET/IEEE 802.3ah Compliant			
Optical Rise Time (20% to 80% values)	t_r	-	-	160	ps
Optical Fall Time (20% to 80% values)	t_f	-	-	160	ps
Mean Wavelength	λ	1280	1310	1335	nm
Spectral Width (20dB)	$\Delta\lambda$	-	-	1	nm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Dispersion penalty (15km) ^a	dp	-	0.5	1	
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Transmitter Reflectance	-	-	-	-12	dB
Reflectance Tolerance	rp	-24	-	-	dB

a) Measured at 2.7 Gb/s, BER of 10^{-12} , PRBS of $2^{23}-1$, at eye center

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Transmitter Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedance	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
Receiver Power Low ^b	$R_{sens, low}$	-	-20	-18	dBm
Receiver Power High ^b	$R_{sens, high}$	0	-	-	dBm
Damage Threshold for Receiver	$P_{in, damage}$	-	-	0	dBm
Wavelength	λ	1480	-	1600	nm
LOS Assert	-	-28	-	-	dBm
LOS De-Assert	-	-	-	-18	dBm
LOS Hysteresis	-	0.5	-	-	dB
Receiver Reflectance	-	-	-	-12	dB

^b Measured at 10^{-10} BER, 2.7 Gb/s, $2^{23}-1$ PRBS, and 10^{-12} BER, 1250 Mb/s, 2^7-1 PRBS

Receiver Specifications (Electrical)

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}	-	-	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)	RX_LOS_H	2	-	-	V
RX_LOS Voltage (Low)	RX_LOS_L	-	-	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	Bit value	Formula
Temperature (-Cxx)	-5 to 70	±3	°C	Internal	1/256 C	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Temperature (-Txx)	-40 to 85	±3	°C	Internal	1/256 C	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Voltage	0 to V_{CC}	0.1	V	Internal	100 μ V	$V(\text{Volts}) = V_{ad}(16 \text{ bit unsigned integer}) * 0.1$
Bias current	0 to 120	5	mA	External	0.002mA	$I(\text{mA}) = I_{slope} * I_{ad}(16 \text{ bit unsigned integer}) + I_{offset}$
TX Power	-5 to 0	±2dB	dBm	External	0.1 μ W	$TX_PWR(\mu W) = TX_PWR_{slope} * TX_PWR_{ad}(16 \text{ bit unsigned integer}) + TX_PWR_{offset}$
RX Power	-18 to 0	±2dB	dBm	External	0.1 μ W	$RX_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$

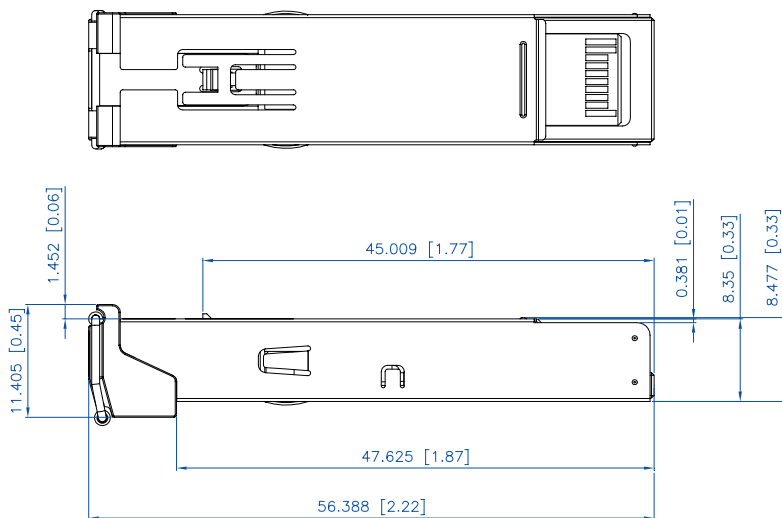
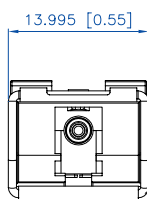
Pinout Definitions

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

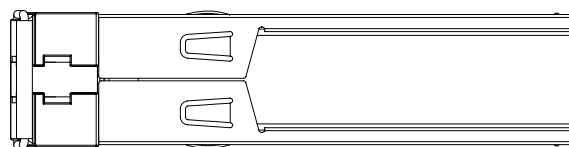
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EEPROM Serial ID				
Name of Field	Description of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor name(ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE vendor OUI code for LuminentOIC Inc.	37	00	
		38	06	
		39	B5	
Vendor PN	Part number in ASCII, e.g. SPL-35-MR-IR1-CDA	40	53	S
		41	50	P
		42	4C	L
		43	33	3
		44	35	5
		45	4D	M
		46	52	R
		47	49	I
		48	52	R
		49	31	1
		50	43	C
		51	44	D
		52	41	A

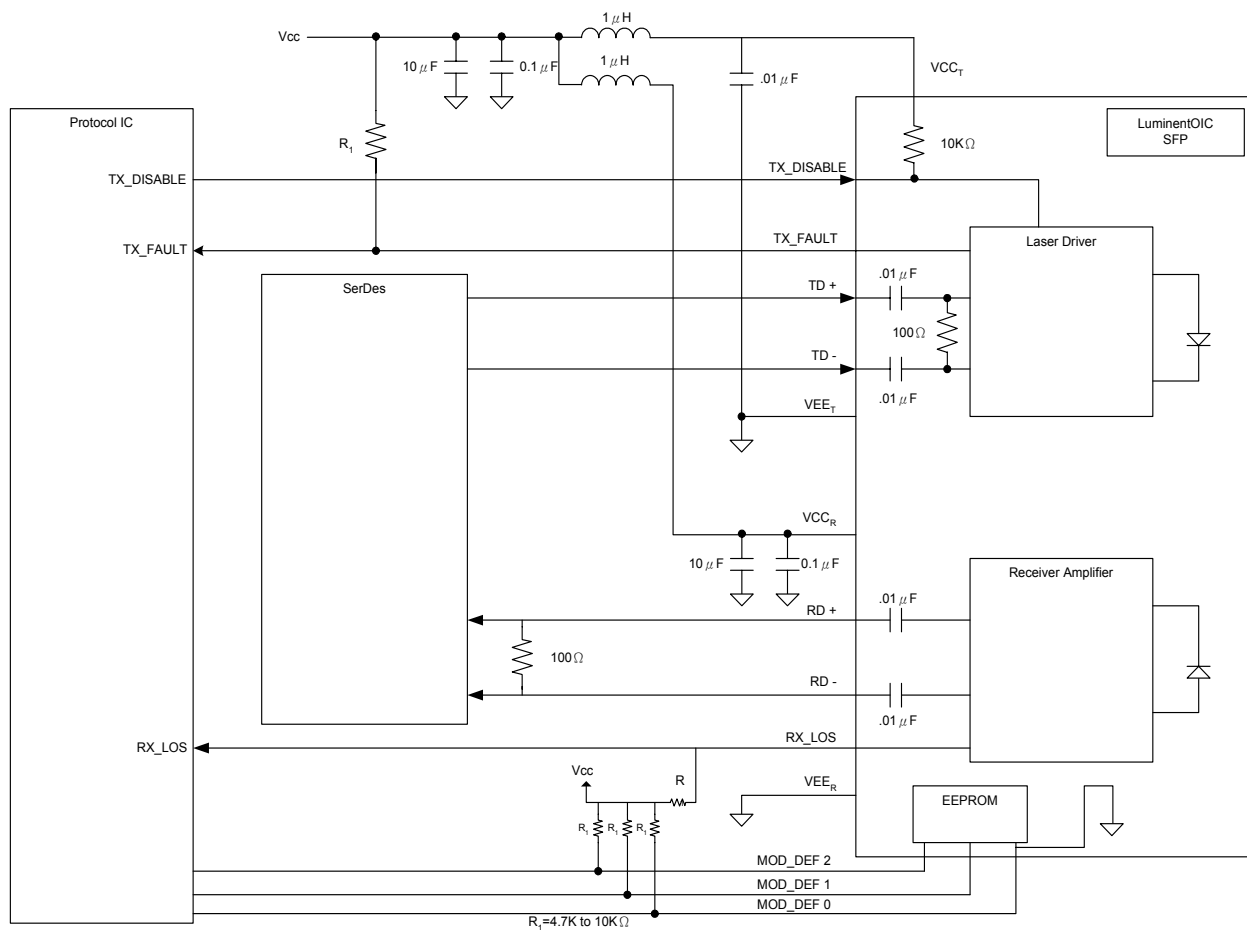
Mechanicals



Units in mm (inches)



Suggested Transceiver Interface



SPL-35-MR-IR1

Ordering Information

Available Options:

SPL-35-MR-IR1-CDA
SPL-35-MR-IR1-CNA
SPL-35-MR-IR1-TDA
SPL-35-MR-IR1-TNA

Part numbering Definition:

SPL - 35 - MR - IR1 - Temperature Diagnostic Revision

- SPL = LC connector
- 35 = Tx 1310nm/Rx 1550nm
- MR = Multi Rate
- IR1 = Reach 15 km
- Operating Temperature
 - C = Commercial temperature (-5 to 70°C)
 - T = Industrial temperature (-40 to 85°C)
- D = Digital Diagnostic (SFF-8472)
 - N = No Diagnostic
- Design Revision
 - A = RoHS compliant (lead free soldered)

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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