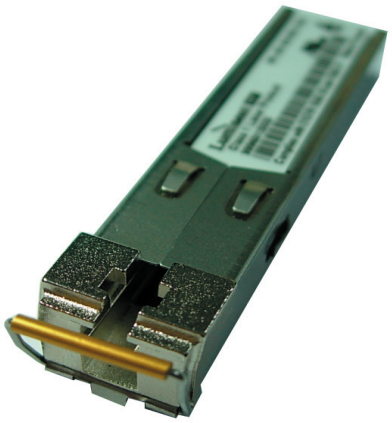
SFP Bi-Directional Transceiver

SPL-53-FE-BX



Features

- Compliant with OC3/STM-1, IEEE 802.3ah, 100BASE-BX10
- Simplex LC Connector
- Digital Diagnostic SFF-8472 Compliant
- SFP MSA SFF-8074i Compliant
- 14dB Minimum Power Budget
- 20km Typical Reach
- Commercial temperature available (-Cxx)
- Industrial temperature available (-Txx)
- Single 3.3V Supply
- 1530 nm FP Laser
- Telocordia GR-468 Compliant
- Color code Bail Latch : Yellow
- RoHS compliant

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 Temerature (-Cxx)	T_{opr}	-5	-	70	°C
Operating Temerature (-Txx)	T_{opr}	-40	-	85	°C
Storage Temperature	T_{stg}	-40	-	85	°C
Data Rate	DR	10	-	155	Mbps

Transmitter Specifications (Optical)

Parameter	Symbol	Min	Typical	Max	Unit
Optical power	P_{op}	-14	-11	-8	dBm
Optical crosstalk	XT	-	-45	-40	dB
Average Launch power of off Tx	P_{off}	-	-	-45	dBm
Extinction Ratio	ER	6.6	-	-	dB
Eye Mask		IEEE 802.3 and SONET/SDH Compliant			
Optical Rise time (20% to 80% values)	t_r	-	-	2	ns
Optical Fall time (20% to 80% values)	t_f	-	-	2	ns
Mean Wavelength	λ	1480	1530	1580	nm
Maximum RMS Width (σ)	σ	-	-	4.6	nm
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Optical Return Loss Tolerance	ORLT	-	-	12	dB

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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	$V_{in,\ p\text{-}p}$	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[a]	$R_{sens,low}$	-	-30	-28.2	dBm
Receiver Power High	$R_{sens,high}$	-8	-	-	dBm
Damage Threshold for Receiver	$P_{in,\ damage}$	4	-	-	dBm
Wavelength	λ	1260	-	1360	nm
LOS Assert	-	-45	-	-	dBm
LOS De-assert	-	-	-	-28.2	dBm
LOS hysteresis	-	0.5	-	-	dB

a) at 10^{-12} BER, PRBS 2^7-1

Receiver Specifications (Electrical)

Parameter	Symbol	Min	Typical	Max	Unit
PECL Single ended data output swing	$V_{out,p\text{-}p}$	185	-	1000	mV
Data output rise time	t_r	-	-	2	ns
Data output fall time	t_f	-	-	2	ns

Timing and Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate time	t_on	-	-	25	ms
Tx Disable assert time	t_off	-	-	10	µs
Time to initialize, including reset of Tx fault	t_init	-	-	300	ms
Tx fault Assert time	t_fault	-	-	100	µs
Tx Disable to reset	t_reset	10	-	-	µs
LOS Assert time	t_loss_on	-	-	300	µs
LOS De-Assert time	t_loss_off	-	-	100	µs
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

Digital Diagnostics (-xDA Versions only)

Parameter	Range	Accuracy	Unit	Calibration	Bit Value	Formula
Temperature (-TDA)	-40 to 85	±3	°C	External	1/256 C	Tc(C) = Tslope*Tad(16 bit signed twos complement value) + Toffset
Temperature (-CDA)	-5 to 70	±3	°C	External	1/256 C	Tc(C) = Tslope*Tad(16 bit signed twos complement value) + Toffset
Voltage	0 to Vcc	0.1	V	External	100µV	V(Volts) = Vslope*Vad (16 bit unsigned integer) + Voffset
Bias Current	0 to 120	5	mA	External	-	I(mA) = Islope * Iad(16 bit unsigned integer)+Ioffset
Tx Power	-14 to -8	±3 dB	dBm	External	-	Tx_PWR(µW) = Tx_PWRslope*Tx_PWRad(16 bit unsigned integer)+Tx_PWRoffset
Rx Power	-28.2 to -8	±3 dB	dBm	External	-	Rx_PWR(µW) = A0+A1*x+A2*x^2+A3*x^3+A4*x^4

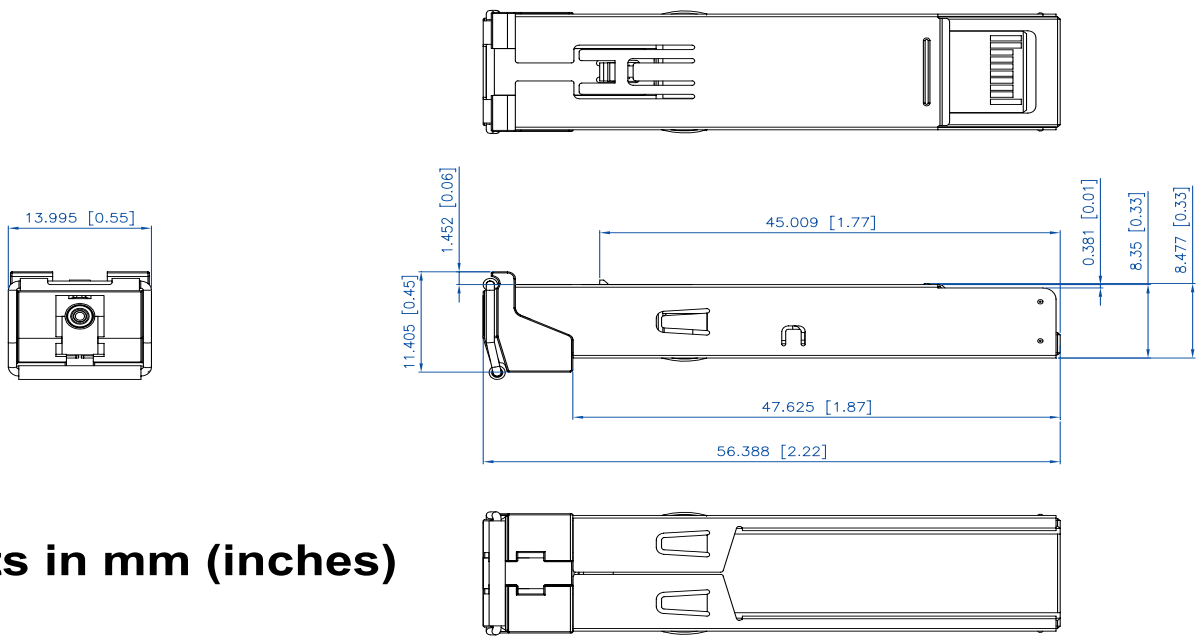
Pinout Definitions

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

EEPROM Serial ID

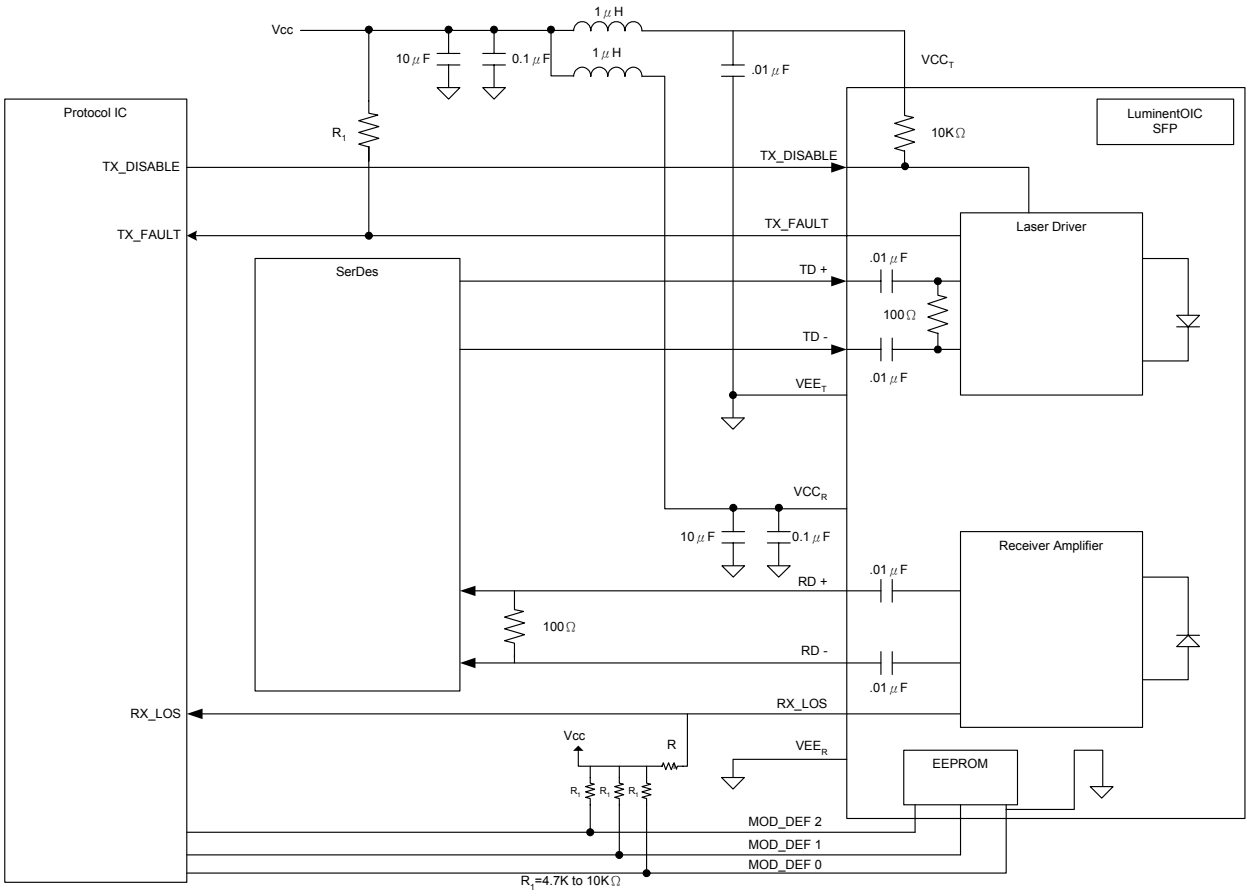
Name of Field	Discription of Field	Address	Hex	ASCII
Vendor Name	SFP Vendor name (ASCII)	20	4C	L
		21	55	U
		22	4D	M
		23	49	I
		24	4E	N
		25	45	E
		26	4E	N
		27	54	T
		28	4F	O
		29	49	I
		30	43	C
Vendor OUI	IEEE vendor OUI code for Luminent Inc.	37	00	
		38	06	
		39	B5	
Vendor P/N	Part number in ASCII, e.g. SPL-53-FE-BX-TDA	40	53	S
		41	50	P
		42	4C	L
		43	35	5
		44	33	3
		45	46	F
		46	45	E
		47	42	B
		48	58	X
		49	54	T
		50	44	D
		51	41	A

LC Connector Mechanicals



Units in mm (inches)

Suggested Transceiver Interface



Ordering Information

Available Options:
SPL-53-FE-BX-CDA
SPL-53-FE-BX-TDA
SPL-53-FE-BX-CNA
SPL-53-FE-BX-TNA

Part numbering Definition:

S P L - 5 3 - F E - B X - Temperature Diagnostic Revision

- **SPL = LC connector**
- **Wavelength**
  53 = Tx 1530nm/Rx 1310nm
- **Data Rate**
  FE = Fast Ethernet (100Mbps)
- **Standard**
  BX = 100BASE-BX10
- **Operating Temperature**
  C = Commercial temperature (-5 to 70°C)
  T = Industrial temperature (-40 to 85°C)
- **D = Digital Diagnostic (SFF-8472)**
  N = No Digital Diagnostic
- **Design Revision**
  A = RoHS compliant

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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