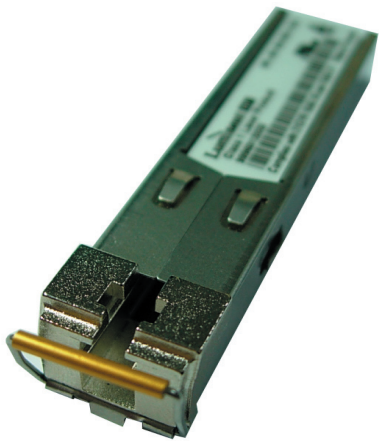


## SPL-53-DR-IR2



## Features

- Compliant with OC-3/STM-1 and OC-12/STM-4 Standards
- Simplex LC connector
- Single 3.3 V supply
- 40 km reach
- 25 dB Minimum Link Budget
- 1550nm DFB Laser
- Commercial temperature available (-Cxx)
- Industrial temperature available (-Txx)
- SFP MSA SFF-8074i compliant
- Telcordia GR-468 compliant
- Digital Diagnostic SFF-8472 compliant
- Color coded bail latch: Yellow
- RoHS compliant (lead free soldered)

## 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 <sup>a</sup>	PSR	100	-	-	mV <sub>p-p</sub>
Operating Temperature (-Cxx)	$T_{op}$	-5	-	70	°C
Operating Temperature (-Txx)	$T_{op}$	-40	-	85	°C
Storage Temperature	$T_{st}$	-40	-	85	°C
Data Rate OC-3/STM-1	DR	-	155	-	Mbps
Data Rate OC-12/STM-4	DR	-	622	-	Mbps
Data Rate Fast Ethernet	DR	-	125	-	Mbps

a) 20Hz to 155MHz

## Transmitter Specifications

Parameter	Symbol	Min	Typical	Max	Unit
Optical Power	POP	-3	-0.5	+2	dBm
Average Launch Power Of Off Tx	POff	-	-	-45	dBm
Extinction Ratio	ER	10	-	-	dB
Eye Mask		IEEE 802.3 and SONET/SDH Compliant			
Optical Rise Time <sup>b</sup>	$t_r$	-	-	500	ps
Optical Fall Time <sup>b</sup>	$t_f$	-	-	500	ps
Mean Wavelength	$\lambda$	1480	-	1580	nm
Spectral Width (20dB)	$\Delta\lambda$	-	-	1	nm
Dispersion Penalty (at 40 Km)		-	0.5	1	dB
Relative Intensity Noise	RIN	-	-	-120	dB/Hz
Optical Crosstalk	XT	-	-	-45	dB
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Reflectance Tolerance	rp	-24	-	-	dB

b) 20%-80% values

## SPL-53-DR-IR2

## Transmitter Specifications (Electical)

Parameter	Symbol	Min	Typical	Max	Unit
Input Differential Impedence	$R_{in}$	80	100	120	$\Omega$
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 <sup>c</sup>	$R_{sens,low}$	-	-30	-28	dBm
Receive Power High <sup>c</sup>	$R_{sens,high}$	-8	-	-	dBm
Damage Threshold For Receiver	$P_{in,damage}$	-	-	0	dBm
Wavelength	$\lambda$	1260	-	1360	nm
LOS Assert		-38	-	-	dBm
LOS De-assert		-	-	-28	dBm
LOS Hysteresis		0.5	-	-	dB
Receiver Reflectance	-	-	-	-12	dB

c) at  $10^{-12}$  BER, FE unbalanced pattern, and  $10^{-10}$  BER, 155.52 Mb/s & 622.08 Mb/s

## 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	$t_r$	-	-	500	ps
Data Output Fall Time	$t_f$	-	-	500	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	$\mu$ s
Time To Initialize, Including Reset Of Tx Fault	$t_{init}$	-	-	300	ms
Tx Fault Assert Time	$t_{fault}$	-	-	100	$\mu$ s
Tx Disable To Reset	$t_{reset}$	10	-	-	$\mu$ s
Los Assert Time	$t_{loss_{on}}$	-	-	100	$\mu$ s
Los De-assert Time	$t_{loss_{off}}$	-	-	100	$\mu$ 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

SPL-53-DR-IR2

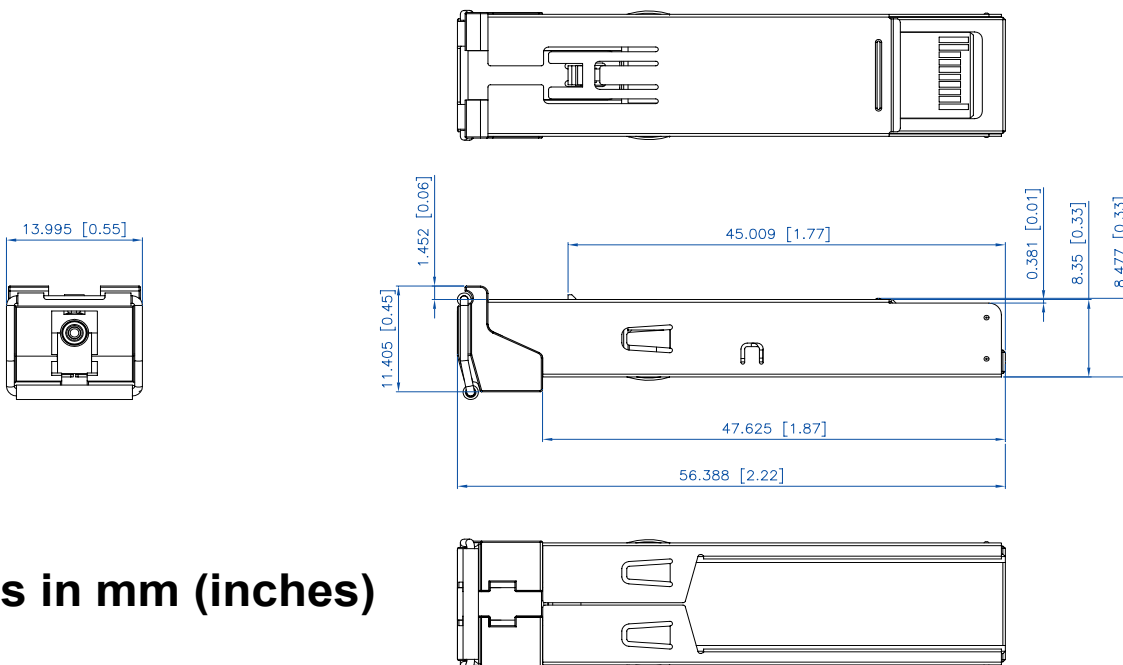
Diagnostics						
Parameter	Range	Accuracy	Unit	Calibration	Bit value	Formula
Temperature (-Cxx)	-5 to 70	±3	°C	Internal	1/256 C	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Temperature (-Txx)	-40 to 85	±3	°C	Internal	1/256 C	$T_c(C) = T_{ad}(16 \text{ bit signed twos complement})/256$
Voltage	0 to $V_{CC}$	0.1	V	Internal	100 $\mu$ 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	-3 to +2	±2dB	dBm	External	0.1 $\mu$ W	$TX\_PWR(\mu W) = TX\_PWR_{slope} * TX\_PWR_{ad}(16 \text{ bit unsigned integer}) + TX\_PWR_{offset}$
RX Power	-28 to -8	±2dB	dBm	External	0.1 $\mu$ W	$RX\_PWR(\mu W) = A0 + A1 * x + A2 * x^2 + A3 * x^3 + A4 * x^4$

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
		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-53-DR-IR2-CDA	40	53	S
		41	50	P
		42	4C	L
		43	35	5
		44	33	3
		45	44	D
		46	52	R
		47	49	I
		48	52	R
		49	32	2
		50	43	C
		51	44	D
		52	41	A

## SPL-53-DR-IR2

Pin	Function	Notes
1	V <sub>ee</sub> T	TX Ground
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 <sub>ee</sub> R	RX Ground
10	V <sub>ee</sub> R	RX Ground
11	V <sub>ee</sub> R	RX Ground
12	RXD-	RX Data Negative
13	RXD+	RX Data Positive
14	V <sub>ee</sub> R	RX Ground
15	V <sub>cc</sub> R	RX Power
16	V <sub>cc</sub> T	TX Power
17	V <sub>ee</sub> T	TX Ground
18	TXD+	TX Data Positive
19	TXD-	TX Data Negative
20	V <sub>ee</sub> T	TX Ground

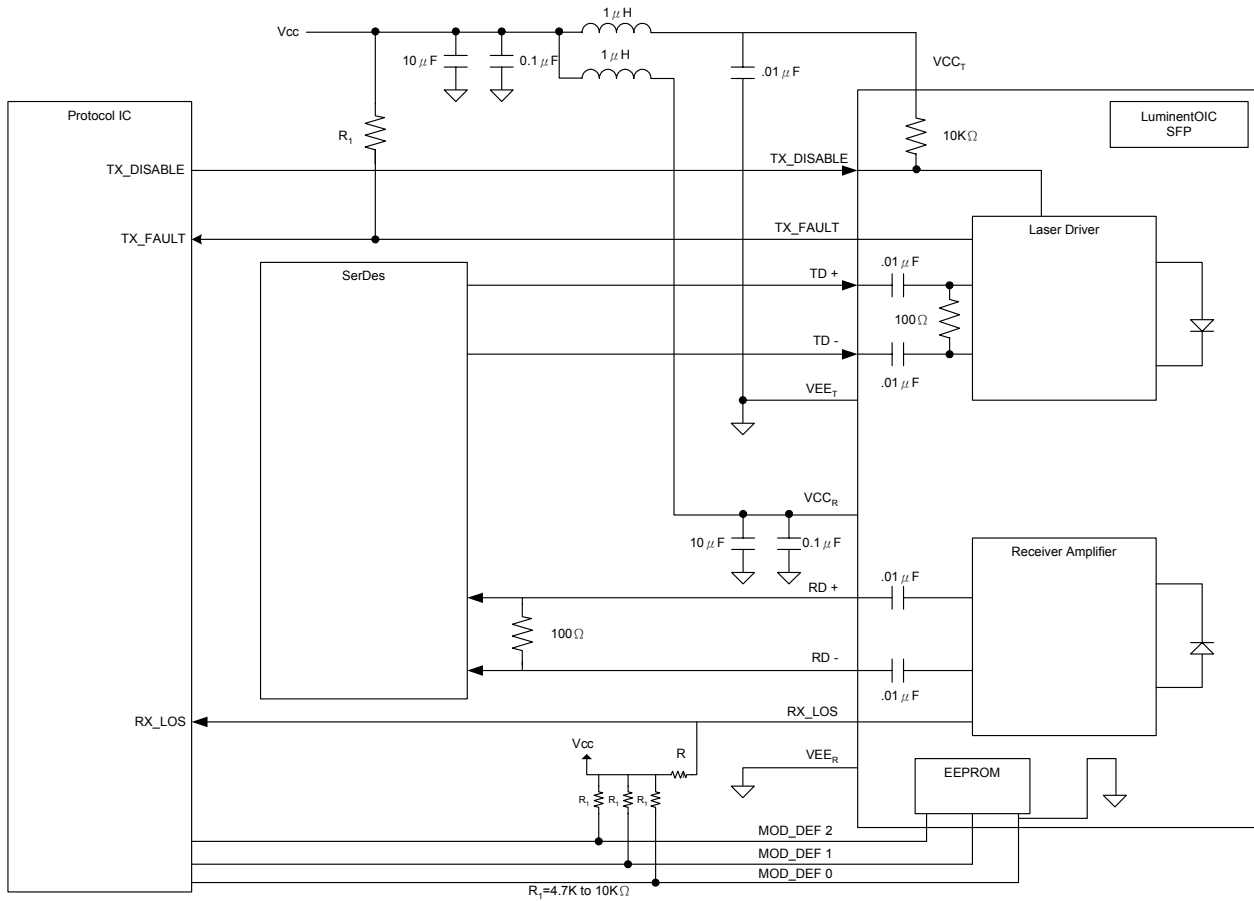
Outline drawing



**Units in mm (inches)**

SPL-53-DR-IR2

Suggested Transceiver Interface



SPL-53-DR-IR2

Ordering Information

**Available Options:**  
 SPL-53-DR-IR2-CDA  
 SPL-53-DR-IR2-CNA  
 SPL-53-DR-IR2-TDA  
 SPL-53-DR-IR2-TNA

Part numbering Definition:

SPL - 53 - DR - IR2 - Temperature Diagnostic Revision

- SPL = LC connector
- 53 = Tx 1550nm/Rx 1310nm
- DR = Dual Rate 155M/622M
- IR2 = Reach 40 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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