

EPON ONU SFP 1.25Gbps 1000Base-PX20 Tx1310/Rx1490nm DDMI

SLEU-1134-P



Overview

The SLEU-1134-P transceiver module is designed for Gigabit Ethernet Passive Optical Network (EPON) 20km transmission.

The transmitter section uses a 1310nm FP laser and an integrated BM laser driver which is designed to perform very small burst enable/disable delay time. The laser driver also includes digital APC and temperature compensation circuit, which are used for keeping the launch optical power and extinction ratio constant over temperature and aging.

The receiver section uses an integrated 1490nm InGaAs Pin photodiode and preamplifier mounted together. It has the function that indicates receiver signal-detected status (active high).

An integrated WDM coupler can separate 1490nm input light and 1310nm output light.

Ordering Information

Part Number	Product Description
SLEU-1134-P	EPON ONU SFP 1.25G Tx1310/Rx1490nm 1000BASE-PX20 DDMI

Features

- ◆ IEEE 802.3-2008 1000BASE-PX20 EPON ONU side application
- ◆ bi-directional transmission with symmetric 1.25Gbps upstream/downstream
- ◆ 1310nm FP laser Burst-mode Transmitter and 1490nm PIN Continuous receiver(with WDM)
- ◆ SFP Package with SC Receptacle
- ◆ +3.3V single power supply
- ◆ Low power consumption
- ◆ Excellent EMI and EMC characteristics
- ◆ Complies with IEEE Std 802.3ah™ 1000BASE-PX20
- ◆ Digital diagnostic interface compliant with SFF-8472 Rev 9.5
- ◆ Compliant with RoHS
- ◆ Operating case temperature:
Standard: 0 to +70°C

Applications

- ◆ Optical transceiver for px-20 Gigabit-capable Passive Optical Networks (EPON) ONU side

Datasheet

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Notes
Storage Temperature	Tst	-40	+85	°C	-
Operating Case Temperature	Tc	0	70	°C	1
Operating Humidity	RH	5	95	%	Non-condensing
Power Supply Voltage	Vcc-Vee	0	4	V	-
Receiver Damage Threshold	-	7		dBm	

Notes:

1. When ambient temperature is above 60°C, airflow at rate higher than 1m/sec is required.

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard Tc	0	-	+70	°C
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Humidity	RH	5	-	95	%
Data Rate Drift	-	-100	-	+100	PPM

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes	
Transmitter							
Data Rate			1.25		Gb/S		
Centre Wavelength	λ_c	1276		1356	nm		
Spectral Width	$\Delta\lambda$			2.8	nm		
Launch Optical Power	P0	0	-	+4	dBm	1	
Average Launch Power-OFF		-	-	-45	dBm		
Extinction Ratio	EX	9	-	-	dB	2	
Burst turn off time	TBURST_OFF	-	-	30	ns		
RIN15OMA				-115	dB/hz		
Total Jitter	TJ	-	-	0.35	UI	2	
RIN ₁₅ OMA		-	-	-115	dB/Hz		
Optical Return Loss Tolerance		-	-	15	dB		
Maximum reflectance		-	-	-10	dB		
Burst Enable Duration	T _{EN_DUR}	600			Ns	4	
Burst Disable Duration	T _{DIS_DUR}	100			ns		
Optical Eye Diagram		Compliant with IEEE802.3ah-2004 PX20					2, 5
Optical Rise/Fall Time (20%~80%)	tr/tf			260	ps	2, 3	
Receiver							
Data Rate			1.25		Gb/S		

Datasheet

Centre Wavelength	λ_c	1480	1490	1500	nm	
Receiver Sensitivity	Sen			-26.5	dBm	6
Saturation	P_{IN}	-3	-	-	dBm	6
LOS De-assert Level	LOS_D			-27	dBm	8
LOS Assert Level	LOS_A	-35			dBm	7
LOS Detect Hysteresis		0.5		6	dBm	
Receiver Reflectance				-12	dB	
WDM Filter Isolation	ISO(1550)	38			dB	
	ISO(1650)	35			dB	

Notes:

- The optical power is launched into 9/125um SMF.
- Measured with PRBS 2⁷-1 test pattern @1.25Gbps.
- Measured with the Bessel-Thompson filter OFF.
- Refer to Timing Parameter Definition in Burst Mode Sequence
- Transmitter eye mask definition {0.22UI, 0.375UI, 0.20UI, 0.20UI, 0.30UI}.
- Measured with a PRBS 2⁷-1 test pattern @1.25Gbit/s and ER=9dB, BER =10⁻¹²
- An increase in optical power above the specified level will cause the Signal Detect output to switch from a high state to a low state.
- A decrease in optical power below the specified level will cause the Signal Detect output to switch from a low state to a high state

Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Supply Current	I_{CC}	-	-	200	mA	
Data Input Swing Differential	V_{IN}	200	-	1600	mV _{p-p}	1
Transmitter Disable Voltage-Low	$V_{TDIS,L}$	0	-	0.8	V	2
Transmitter Disable Voltage-High	$V_{TDIS,H}$	2.0	-	V_{CC}	V	
Input Differential Impedance	Z_{IN}	90	100	110	Ω	
Receiver						
Supply Current	I_{CC}	-	-	150	mA	
Data Output Swing Differential	$V_{OL}-V_{CC}$	400	-	1600	mV _{p-p}	3
Loss of Signal Voltage – Low	$V_{LOS,L}$	0	-	0.8	V	4
Loss of Signal Voltage - High	$V_{LOS,H}$	2	-	V_{CC}	V	
Loss of Signal Assert Time	T_{ASS}			100	ns	
Loss of Signal De-assert Time	T_{DAS}			100	ns	

Notes:

- Compatible with LVPECL /CML input, AC coupled internally.
- TX_Burst (See Pin Function Definitions).
- LVPECL output, AC coupled internally, guaranteed in the full range of input optical power (-3dBm to -26.5dBm).
- LOS (See Pin Function Definitions).

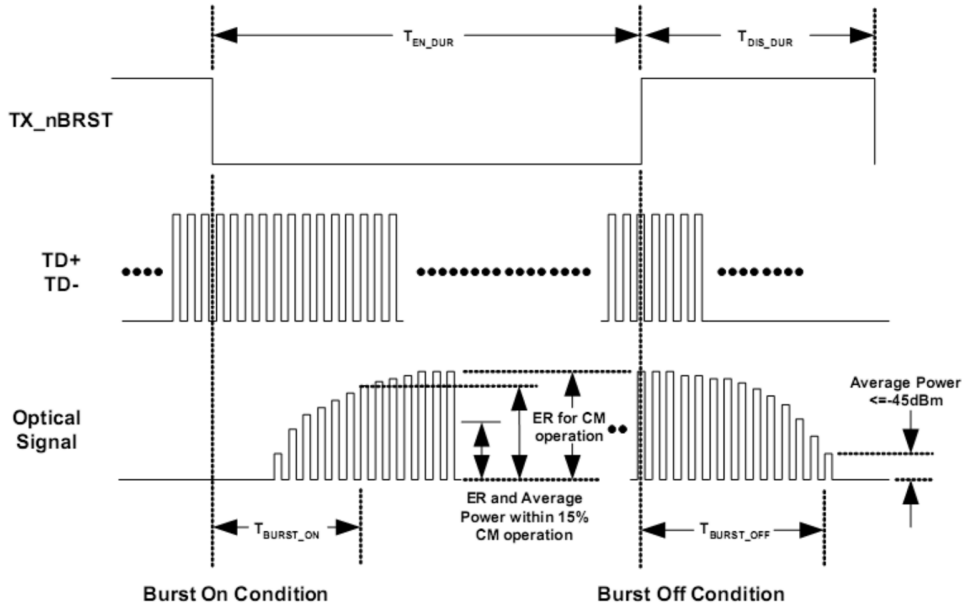


Figure1. Timing Parameter Definition in Burst Mode Sequence

Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +80	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-1 to 5	dBm	±3dB	Internal / External
RX Power	-27 to -3	dBm	±3dB	Internal / External

Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.

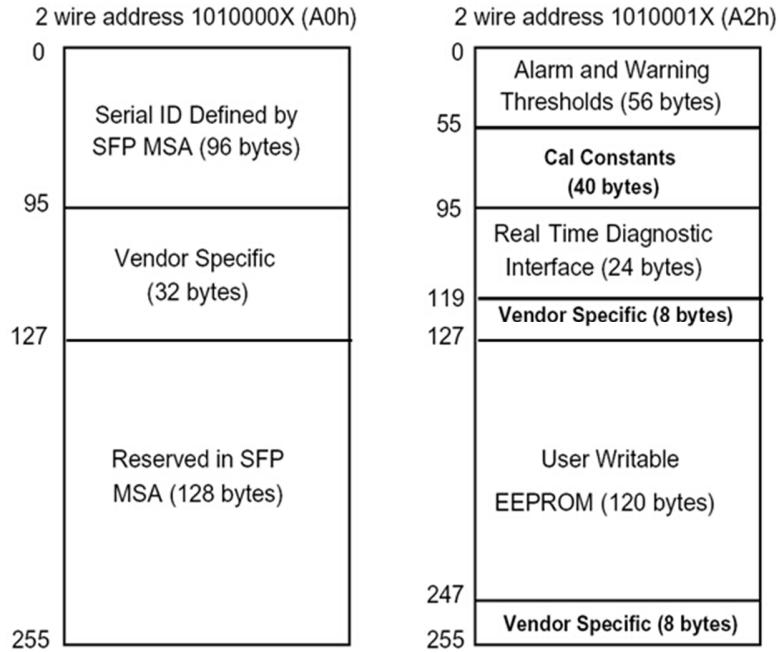


Figure2. digital diagnostic memory map

Pin Definitions

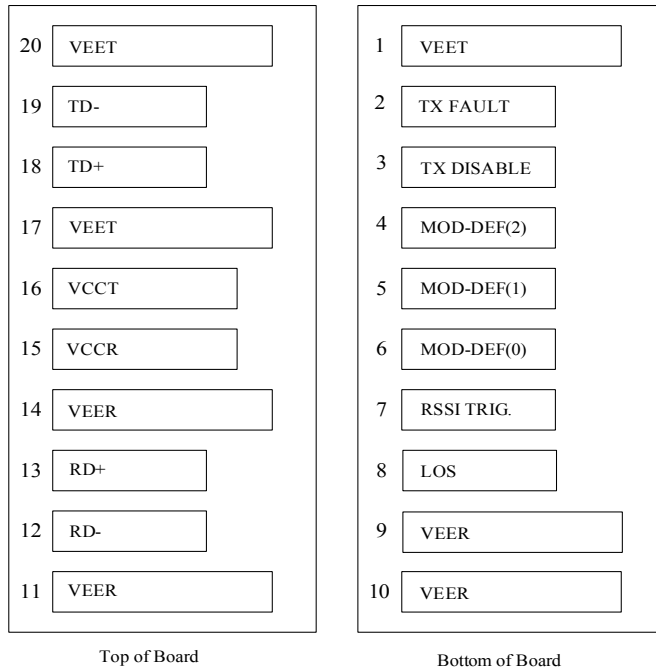


Figure3. Pin Diagram

Datasheet

Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	RSSI TRIG.	CMOS input. Assert high at the beginning of the monitored burst package, at least 600ns in	3	Note 4
8	LOS	Burst signal detect	3	Note 5
9	V _{EER-}	Receiver ground	1	
10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 7
19	TD-	Inv. Transmit Data In	3	Note 7
20	V _{EET}	Transmitter Ground	1	

Notes:

- TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and V_{CC}+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. It's states are:
 Low (0 to 0.8V) : Transmitter on
 (>0.8V, < 2.0V) : Undefined
 High (2.0 to 3.465V) : Transmitter Disabled
 Open : Transmitter Disabled
- Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be V_{CC}T or V_{CC}R.
 Mod-Def 0 is grounded by the module to indicate that the module is present
 Mod-Def 1 is the clock line of two wire serial interface for serial ID
 Mod-Def 2 is the data line of two wire serial interface for serial ID
- RSSI TRIG is a CMOS input. Assert high after 300ns delay time of the beginning of the monitored burst package, at least 600ns.
- LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor. Pull up voltage between 2.0V and V_{CC}T, R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
- RD-/+ : These are the differential receiver outputs. They are internally DC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit

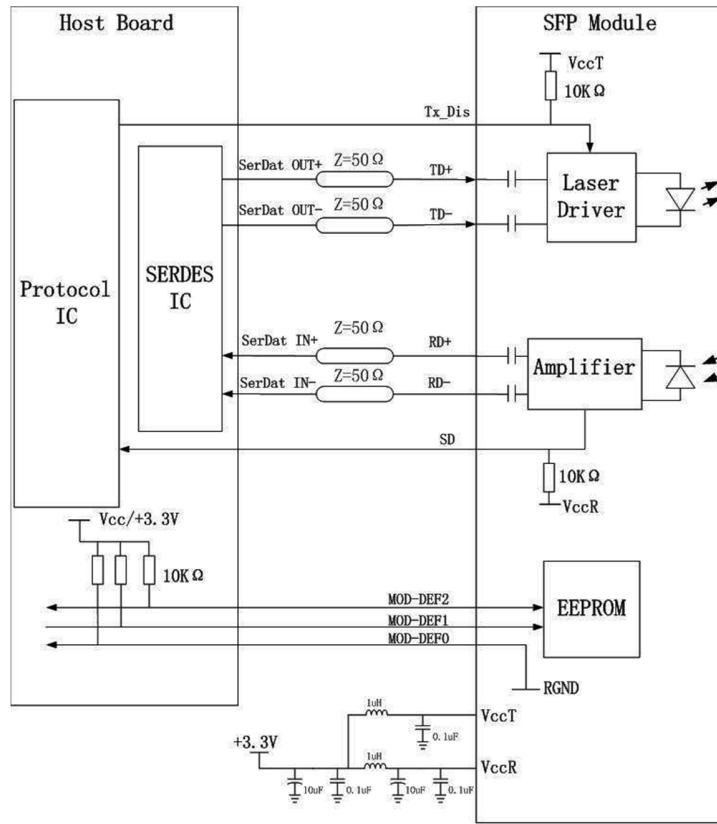


Figure4. Recommended Interface Circuit

Mechanical Dimensions

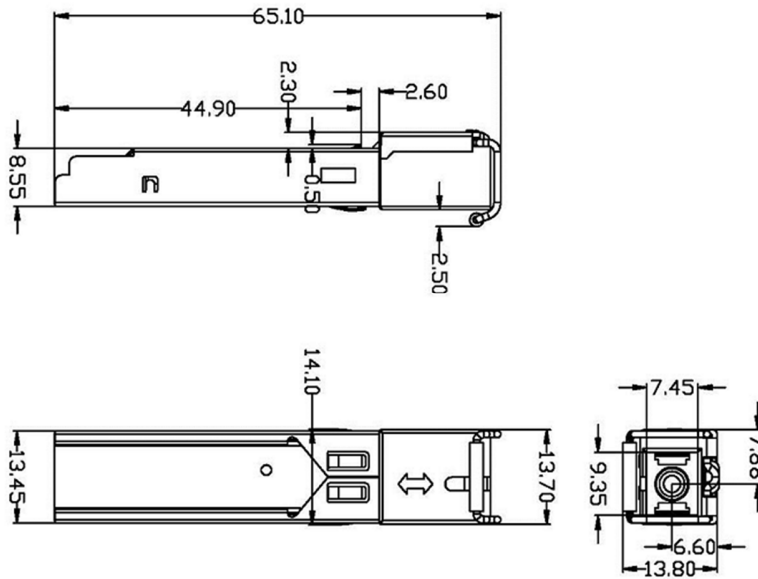


Figure5. Mechanical Specification

Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1 (>1.5kV) – Human Body Model
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B EN55022 Class B	Compliant with standards
Immunity	IEC61000-4-3 Class 2 EN55024	Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure.
Eye Safety	FDA 21 CFR 1040.10 and 1040.11	Compliant with Class 1 laser product
	UL	
	TUV EN 60825-1	

Shenzhen Sourcelight Technology Co., Ltd

Sourcelight Technology reserves the right to make changes to or discontinue any optical link product or service identified in this document without notice in order to improve design and/or performance. If you have any question regarding this specification sheet, please contact our sales representative or send email to sales@sourcelight.com.cn