GEPON ONU SFF 2X10
GEUF-3411S-E2CDB

Features

- Single fiber Bi-Directional transceiver with SC Receptacle Connector
- 1310nm burst-mode 1.25Gbps transmitter with DFB LD laser
- 1490nm continuous-mode 1.25Gbps receiver with APD-TIA
- Burst mode:"low" active
- Complies with IEEE Std 802.3ah™ -2004
- Digital diagnostic interface compliant with SFF-8472 Rev 9.5 ,
- Digital Diagnostic Monitoring (DDM) with external calibration
- 3.3V Single power supply
- Complies with RoHS directive (2002/95/EC)
- Operating case temperature:Standard : 0 to +70°C

Applications

- IEEE 802.3ah 1000BASE-PX20++
- GE-PON ONU
- Burst mode application.
- FTTx WDM Broadband Access

Description

The GEUF-3411S-E2CDB Bi-Directional Transceiver is the high performance module for single fiber communications by using 1310nm 1.25Gbps burst mode transmitter and 1490nm 1.25Gbps continuous receiver. It is Optical Network Unit (ONU) for IEEE Std 802.3ah™ -2004. The optical transceiver is compliant with Multi-Source Agreement (MSA) Small Form Factor (SFF) 2x10 footprint.

The transmitter section uses a 1310nm DFB laser diode with automatic power control (APC) function and temperature compensation circuitry to ensure stable extinction ratio over all operating temperature range, and full IEC825 and CDRH class 1 eye safety. The receiver has a hermetically packaged PIN-TIA (trans-impedance amplifier) pre-amplifier and a limiting amplifier with CML compatible differential outputs.

Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	Tst	-40	+85	°C	-
Operating Case Temperature	Tc	0	70	°C	-
Operating Humidity	RH	5	90	%	Non-condensing
Input Voltage	-	GND	Vcc	V	-
Power Supply Voltage	Vcc-Vee	0	3.6	V	-

Recommended Operating Conditions

Table 2 - 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
Power Supply Current		Icc	-	-	300	mA

Optical and Electrical Characteristics

Table 3 - Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Tx Data Rate	R_T	-	1.25	-	Gb/S	-
Centre Wavelength	λc	1276	1310	1356	nm	-
Spectral Width	Δλ	-	-	1	nm	-
Total Jitter	TJ	-	-	0.35	UI	-
Side Mode Suppression Ratio	SMSR	30				
Average Output Power	Pout	2	-	5	dBm	1
Average Launch Power-OFF Transmitter	Poff			-45	dBm	
Extinction Ratio	ER	9	-	-	dB	-

Burst Enable Delay		Ton	-	-	32	ns	Fig.1
Burst Disable Delay		Toff	-	-	32	ns	Fig.1
Relative Intensity Noise		RIN_{15}_OMA			-115	dB/Hz	
Transmitter & dispersion penalty		TDP			1.8	dB	
Optical Eye Diagram		Compliant with of IEEE 802.3ah (Fig. 60-6) transmitter eye mask definition					
Optical Rise/Fall Time (20%~80%)		tr/tf			260	ps	
Data Input Swing Differential		V_{IN}	200		1600	mV	2
Input Differential Impedance		Z_{IN}	90	100	110	Ω	
Burst	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Rx Data Rate		R_R	-	1.25	-	Gb/s	3
Centre Wavelength		λc	1480		1500	nm	
Receiver Sensitivity(BOL)		Sen			-30	dBm	3
Receiver Overload		Sat	-8			dBm	3
Receiver Reflectance					-12	dB	
Signal Detect De-Assert		SDD	-44			dBm	
Signal Detect Assert		SDA			-30	dBm	
Signal Detect Hysteresis		SDH	0.5		6	dB	
Output Differential Impedance		Z_{IN}	90	100	110	Ω	
Data Output Swing Differential		V_{out}	400		1400	mV	
SD Output Voltage	High		2.0		Vcc	V	
	Low		0		0.8	V	

Notes:
1. The optical power is launched into SMF.
2. PECL input, internally DC-coupled and terminated.
3. Measured with a PRBS 2^7-1 test pattern @1250Mbps, BER ≤1×10^{-12}.

Diagnostics

Table 4 – Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 100	mA	±10%	Internal
TX Power	2 to 5	dBm	±3dB	Internal
RX Power	-30 to -8	dBm	±3dB	Internal

Transmitter Burst Mode Timing Characteristics

Definition of Burst Enable Delay (T_{on}) and Burst Disable Delay (T_{off})

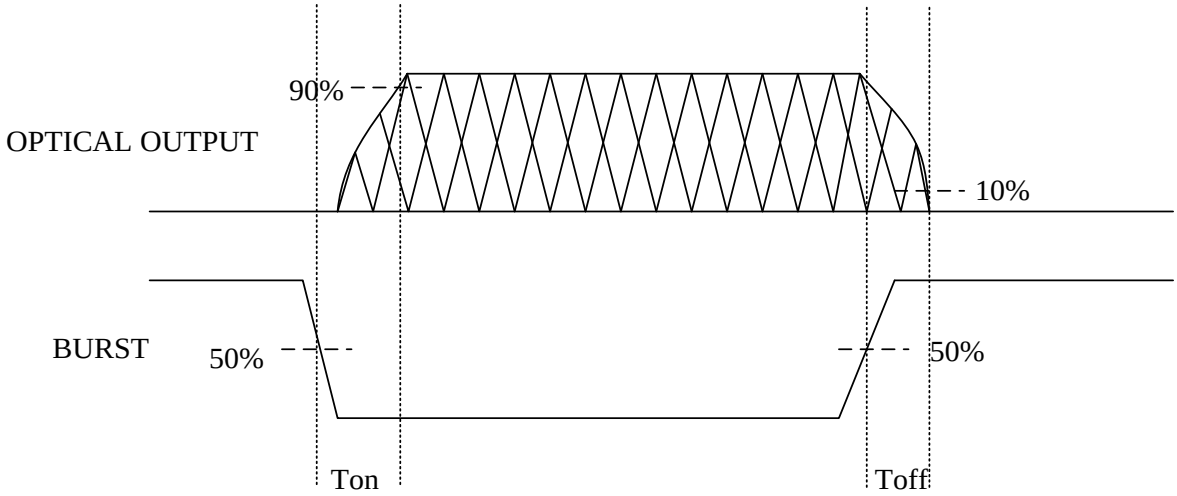


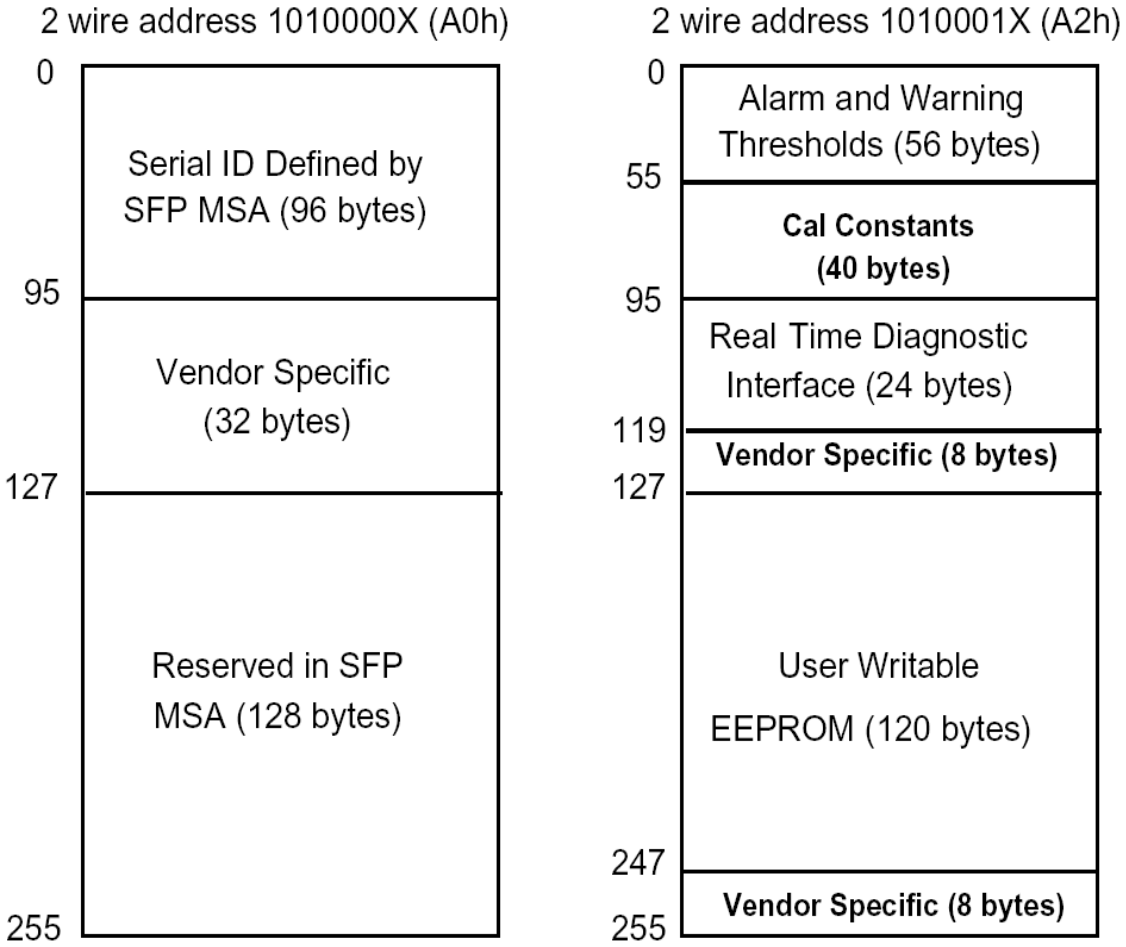
Fig.1

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.



Pin Definitions

Pin Diagram

Pin Descriptions

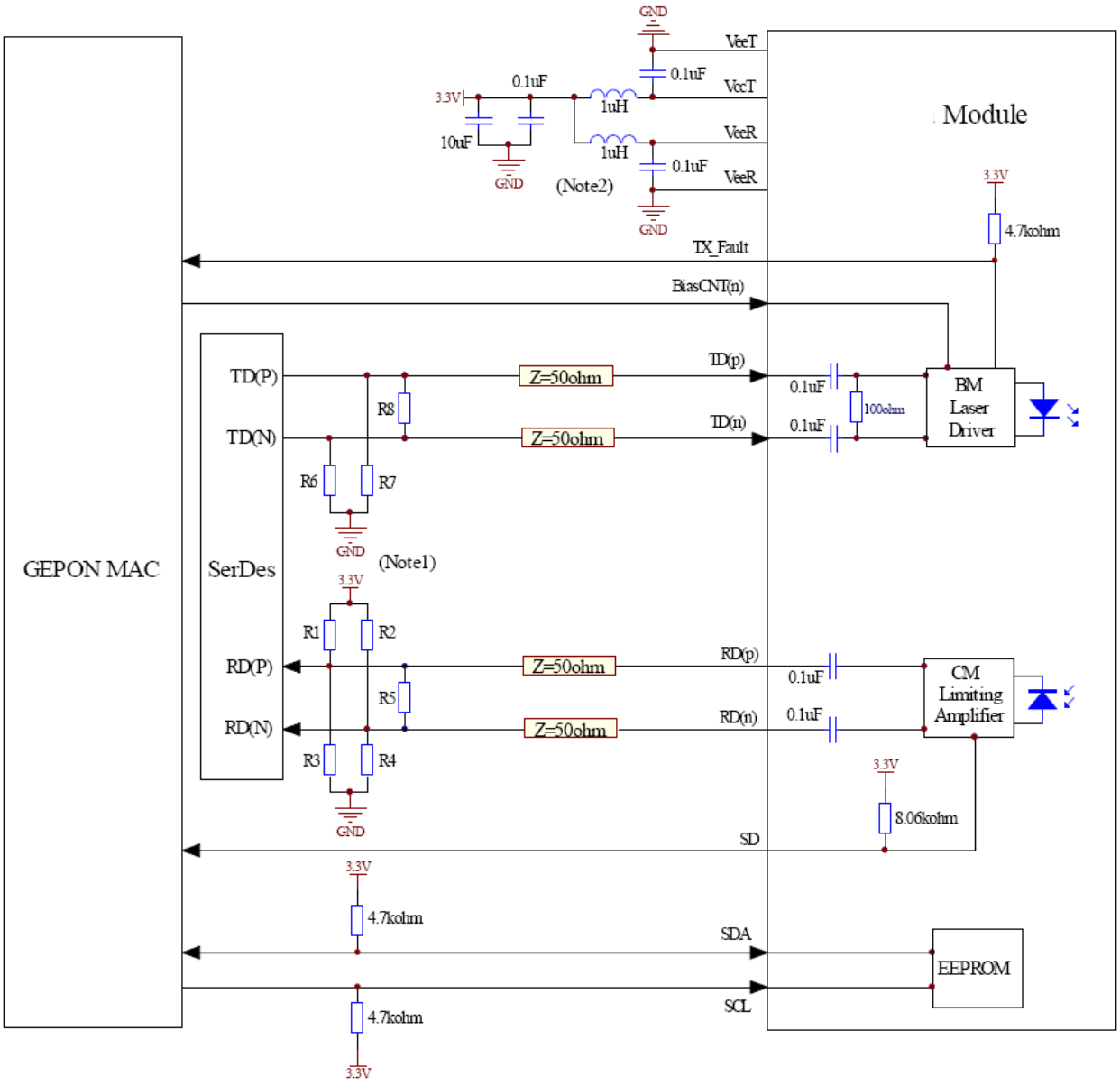
Pin	Signal Name	Description	Notes
1	NC	Not Connect	
2	V_{EER}	Receiver ground	
3	V_{EER}	Receiver ground	
4	NC	Not Connect	
5	NC	Not Connect	
6	V_{EER}	Receiver ground	
7	V_{CCR}	Receiver Power Supply	
8	SD	Signal Detect Output	Note 1
9	RD-	Inv. Received Data CML Output, internal AC Coupling	Note 2
10	RD+	Received Data CML Output, internal AC Coupling	Note 2
11	V_{CCT}	Transmitter Power Supply	
12	V_{EET}	Transmitter Ground	
13	BURST	Transmitter Burst Control	Note 3
14	TD+	Transmit Data LVPECL Input, Internal AC Coupling	Note 4
15	TD-	Inv. Transmit Data LVPECL Input, Internal AC Coupling	Note 4
16	V_{EET}	Transmitter Ground	
17	SCL	Serial Clock Signal	Note 5
18	SDA	Serial Data Signal	Note 5
19	TX_F	TX Fault Alarm,LVTTL Output	
20	TX_SD	TX Signal Detected	

Notes:

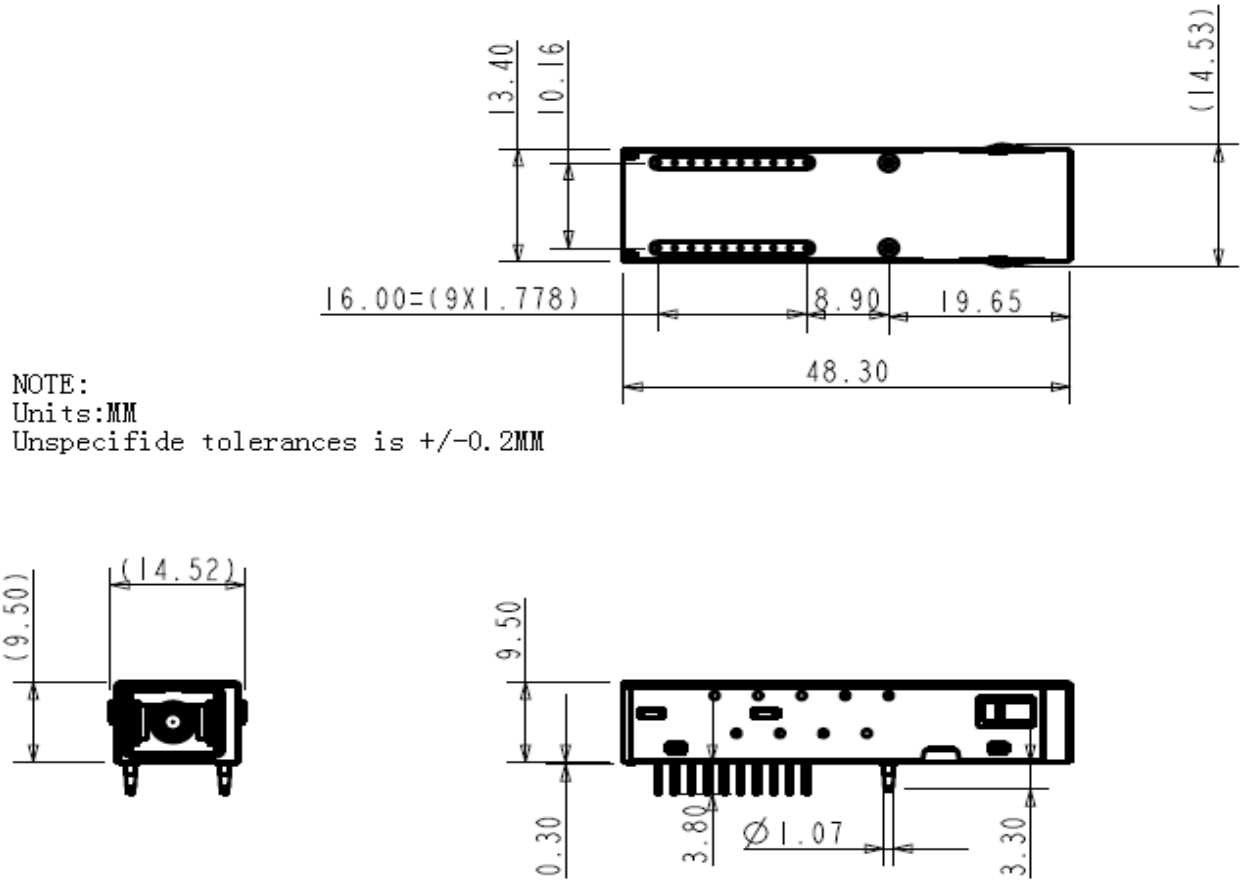
Plug Seq.: Pin engagement sequence during hot plugging.

1) Logic 0 indicates loss of signal; Logic 1 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
2) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
3) BURST is a TTL input. When it is low, LD is on; when it is high, LD is off.
4) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module。
5) SCL,SDA should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
   SCL is the clock line of two wire serial interface for serial ID
   SDA is the data line of two wire serial interface for serial ID

Recommend Application Circuit



Mechanical Dimensions



Ordering information

Part Number	Product Description
GEUF-3411S-E2CDB	Tx1310nm, Rx1490nm, 1.25Gbps/1.25Gbps, 1000BASE-PX20++, Burst low, 0ºC ~ +70ºC with Digital Diagnostic Monitoring

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