GB-GEPON-ONU-1-1G

GEPON SFP ONU Transceiver

Features

- Single fiber Bi-Directional transceiver with single mode SC receptacle
- 1310nm burst-mode 1.25Gbps transmitter with FP laser
- 1490nm continuous-mode 1.25Gbps receiver with PIN-TIA
- Complies with IEEE Std 802.3ah™ -2004 1000BASE-PX20
- Digital diagnostic interface compliant with SFF-8472 Rev 9.4 ,
  Digital Diagnostic Monitoring (DDM) with external calibration
- 3.3V Single power supply
  LVPECL interface logic level for data input
  CML interface logic level for data output
  Differential line input/output impedance 100 ohm
  LVTTL for burst signal input and signal detect output
- Complies with RoHS directive (2002/95/EC)
- Operating case temperature:
  Standard : 0 to +70°C

Applications

- Gigabit Ethernet Passive Optical Network (GEPON) ONU

Description

The GB-GEPON-ONU-1-1G 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 1000BASE-PX20. The optical transceiver is compliant with the Small Form- Factor Pluggable (SFP) Multi-Source Agreement (MSA).

The transmitter section uses a 1310nm FP 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

Parameter	Symbol	Min.	Max.	Units	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

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	-	-	500	mA

Optical and Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Tx Data Rate	R_T	-	1.25	-	Gb/S	-
Centre Wavelength	λc	1260	1310	1360	nm	-
Spectral Width	Δλ	-	-	3	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Average Output Power	Pout	0	-	4	dBm	1
Extinction Ratio	ER	9	-	-	dB	-
Burst Enable Delay	Ton	-	-	32	ns	Fig.1

Burst Disable Delay		Toff	-	-	32	ns	Fig.1
Average Launch Power-OFF Transmitter		Poff			-41	dBm	
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			-26	dBm	3
Receiver Overload		Sat	-3			dBm	3
Receiver Reflectance					-12	dB	
Signal Detect De-Assert		SDD	-44			dBm	
Signal Detect Assert		SDA			-27	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		1000	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^{-10}.

Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to 70	°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	0 to 4	dBm	±3dB	Internal / External
RX Power	-26 to -3	dBm	±3dB	Internal / External

Transmitter Burst Mode Timing Characteristics

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

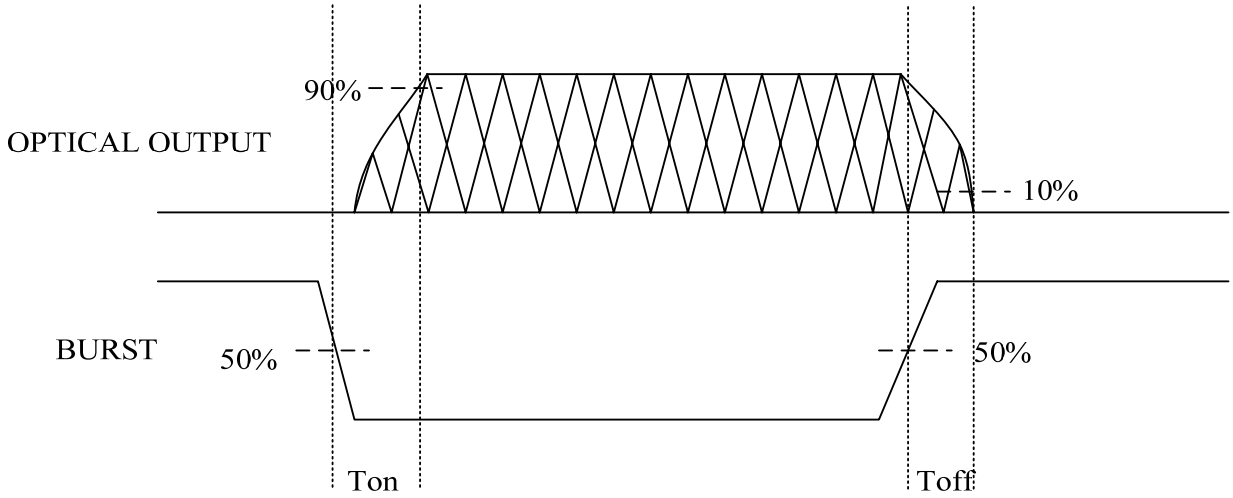


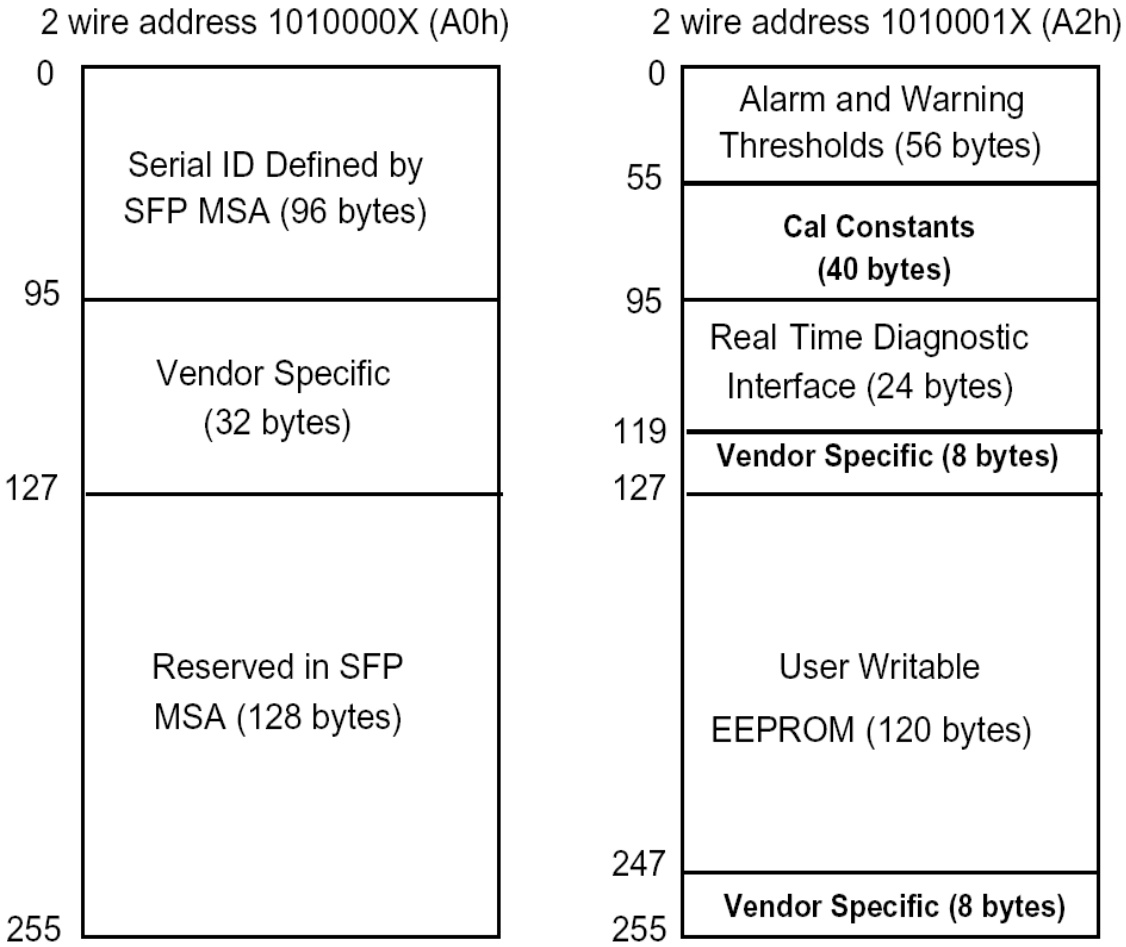
Fig.1

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).

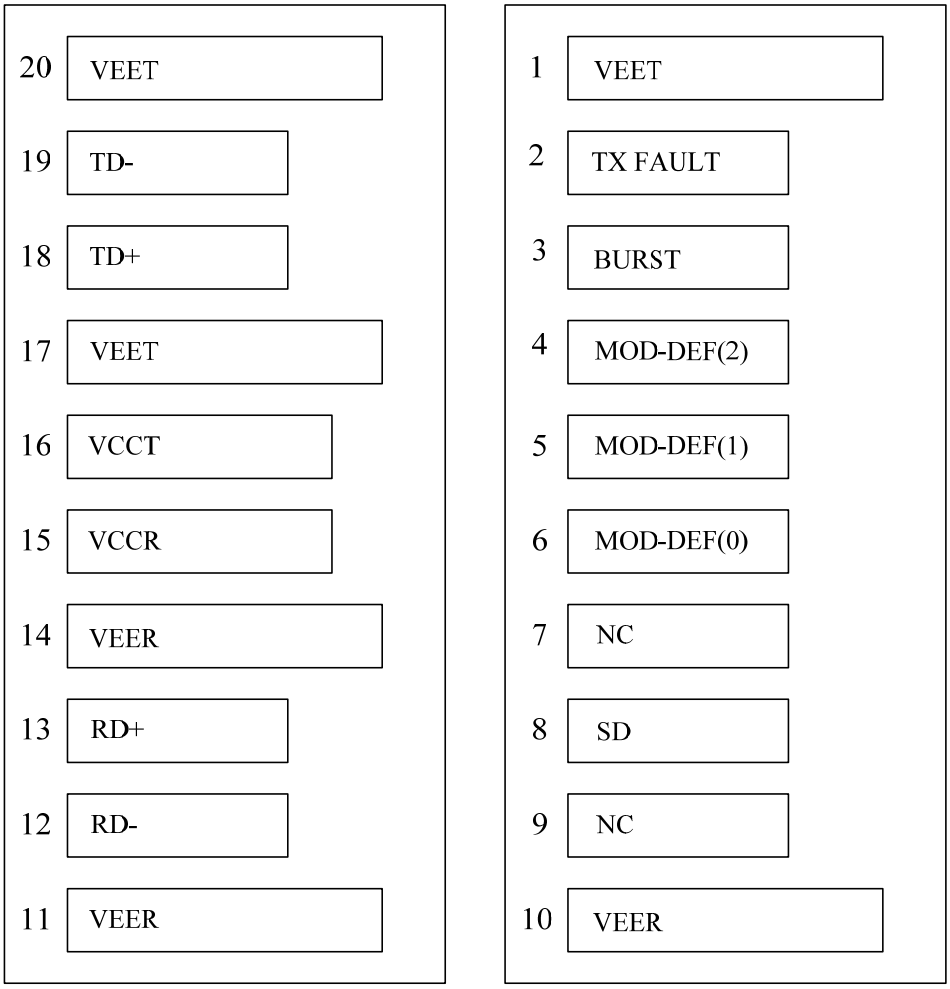
The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

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



Pin Definitions

Pin Diagram



Pin Descriptions

Pin	Signal Name	Description	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 duration	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	Note6
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:

Plug Seq.: Pin engagement sequence during hot plugging.

1) 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 Vcc+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.

2) 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. Its 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

3) 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 VccT or VccR.

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

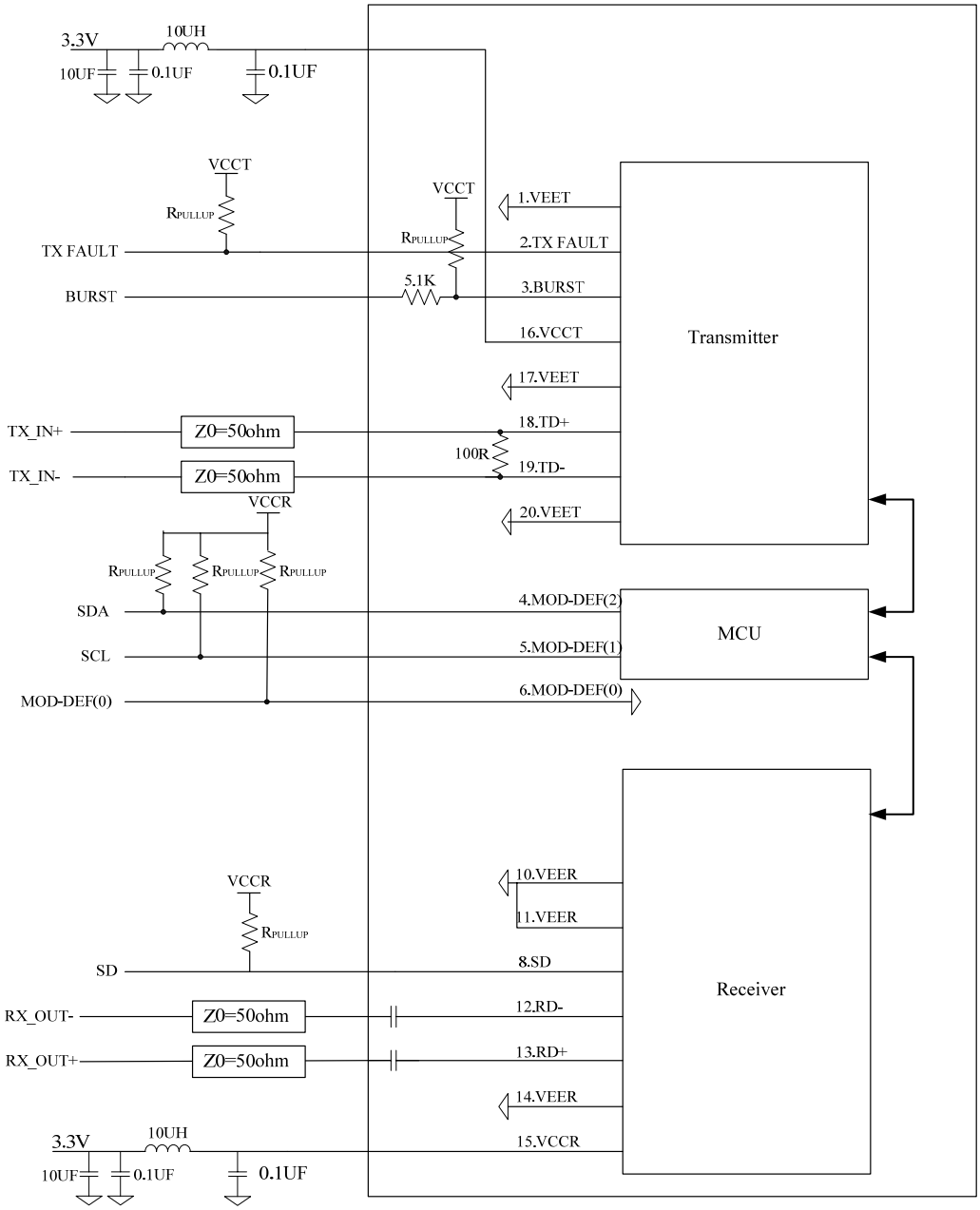
4) RSSI TRIG is a CMOS input. Assert high after 300ns delay time of the beginning of the monitored burst package,at least 600ns in duration.

5) 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 VccT, 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.

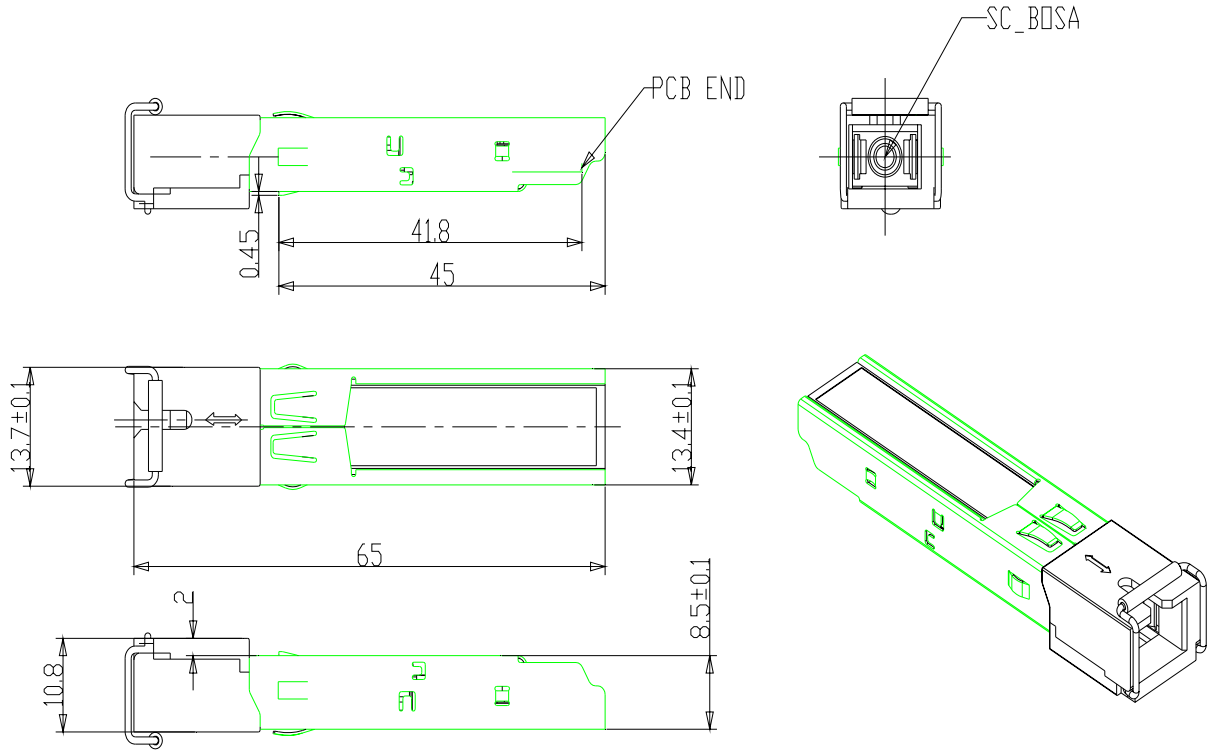
6) RD-/+: These are the differential receiver outputs. They are internally DC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.

7) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommend Application Circuit



Mechanical Dimensions



Ordering information

Part Number	Product Description
GB-GEPON-ONU-1-1G	Tx1310nm, Rx1490nm, 1.25Gbps/1.25Gbps, 1000BASE-PX20, 0ºC ~ +70ºC with Digital Diagnostic Monitoring

E-mail: sales@GB-Link.com
Web : http://www.GB-Link.com