

EOLS-GT-20 Series

OLT for ITU-T G.984.2
 Single Fiber Bi-Directional Transceiver
 2.488Gbps Downstream and 1.244Gbps Upstream
 RoHS6 Compliant



Features

- ◆ SFP Package with SC receptacle
- ◆ 1.244Gbps, 1310nm BM APD Receiver
- ◆ 2.488Gbps, 1490nm Transmitter With Isolator
- ◆ Fast Signal Detect feature reduces ranging overhead
- ◆ Simplified OLT Reset Timing
- ◆ Compliant With ITU-T G.984.2
- ◆ Up to 20km distance at 9/125μm G.652 SMF
- ◆ 28dB Link Budget
- ◆ Operating Case Temperature
 Commercial: 0°C~+70°C
 Industrial: -40°C~+85°C
- ◆ Compliant with SFP MSA

Applications

- ◆ GPON 20km OLT Side
- ◆ Access Networks
- ◆ Fiber to the Home, Curb, Office (FTTx)

Ordering information

Part No.	Input	Output	Burst-mode	DDM	Interface	Temp.
EOLS-GT-20 ^(note1)	AC	DC	LVTTTL	YES	SC	0~70°C
EOLS-GT-20I	AC	DC	LVTTTL	YES	SC	-40~85°C

Note1: Standard version

Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	Class 1C (>1000 V)
Electrostatic Discharge to the enclosure	EN 55024:1998+A1+A2 IEC-61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022:2006 CISPR 22B :2006 VCCI Class B	Compatible with standards Noise frequency range: 30 MHz to 6 GHz. Good system EMI design practice required to achieve Class B margins. System margins are dependent on customer host board and chassis design.
Immunity	EN 55024:1998+A1+A2 IEC 61000-4-3	Compatible with standards. 1kHz sine-wave, 80% AM, from 80 MHz to 1 GHz. No effect on transmitter/receiver performance is detectable between these limits.
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1:2007 EN (IEC) 60825-2:2004+A1	CDRH compliant and Class I laser product. TüV Certificate No. 50135086
Component Recognition	UL and CUL EN60950-1:2006	UL file E317337 TüV Certificate No. 50135086 (CB scheme)
RoHS6	2002/95/EC 4.1&4.2 2005/747/EC 5&7&13	Compliant with standards ^{*note2}

Note2: For update of the equipments and strict control of raw materials, EOPTOLINK has the ability to supply the customized products since Jan 1th, 2007, which meet the requirements of RoHS6 (Restrictions on use of certain Hazardous Substances) of European Union.

In light of item 5 in RoHS exemption list of RoHS Directive 2002/95/EC, Item 5: Lead in glass of cathode ray tubes, electronic components and fluorescent tubes.

In light of item 13 in RoHS exemption list of RoHS Directive 2005/747/EC, Item13: Lead and cadmium in optical and filter glass. The three exemptions are being concerned for Eoptolink's transceivers, because Eoptolink's transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Product Description

Eoptolink's high performance GPON OLT transceiver module is designed for Passive Optical Network application, 2.488Gbps downstream and 1.244Gbps upstream. It is fully compliant with ITU-T G.984.2.

The GPON OLT transceiver is packaged of small form factor pluggable with SC receptacle. The digital diagnostic monitoring function is fully compliant with SFP MSA.

The module consists of 1490nm DFB Laser, APD detector and WDM filter in a high-integrated optical sub-assembly. It transmits 2.488Gbps at 1490nm, and receives 1.244Gbps at 1310nm in burst mode.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_s	-40	+85	°C
Supply Voltage	V_{CC}	0	4.0	V
Operating Relative Humidity		5	95	%
Wave Soldering Conditions			400/5	°C/s, soldering by iron.
Temp/Time			260/10	°C/s, wave soldering.

*Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V
Power Supply Current	I_{CC}			300	mA
Operating Temperature, EOLS-GT-20	T_o	0		+70	°C
Operating Temperature, EOLS-GT-20I		-40		85	
Supply Voltage	V_{CC}	0		4.0	V
Relative Humidity	RH	5		95	%
Date Rate	Upstream/Downstream		1.244/2.488		Gbps

Performance Specifications - Electrical

Parameter	Symbol	Min.	Typ	Max	Unit	Notes
Transmitter						
LVPECL Compatible Inputs(Differential)	V_{in}	200		1600	mVpp	AC coupled internally
Power Supply Current	I_{CC_Tx}			200	mA	
Input Impedance	Z_{in}	90	100	110	ohms	$R_{in} > 100$

(Differential)						kohms @ DC
Tx Disable		2		Vcc	V	
Tx Enable		0		0.8		
Tx Fault_High		2.4		Vcc	V	
Tx Fault_Normal		0		0.4		
Receiver						
LVPECL Outputs (Differential)	Vout	400		1600	mVpp	DC coupled outputs
Power Supply Current	I _{CC_Rx}			150	mA	
Rx_SD	Normal	2		Vcc	V	
	SD	0		0.8	V	
Signal Detected Response Time	Tsd			6.4	ns	

Performance Specifications - Optical

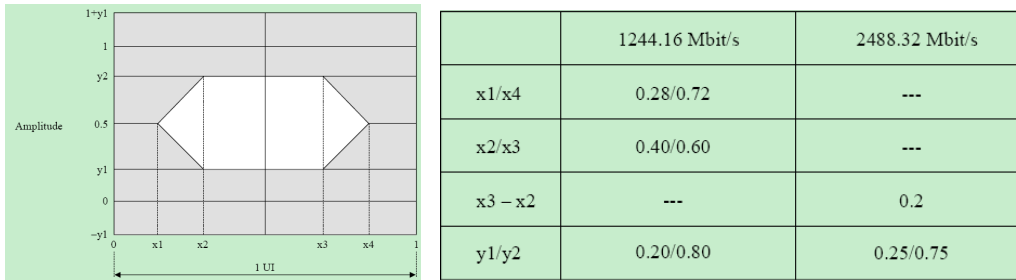
Parameter	Symbol	Min.	Typical	Max.	Unit
9µm Core Diameter SMF			20		km
Date Rate (Upstream/Downstream)			1.244/2.488		Gbps
Transmitter					
Centre Wavelength	λ_c	1480	1490	1500	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Side Mode Suppression Ratio	SMSRR	30			dB
Average Output Power ^{*(note3)}	P _{out}	1.5		5	dBm
Extinction Ratio ^{*(note4)}	ER	10			dB
Tolerance to Tx back reflection		-15			dB
Rise/Fall Time(20%~80%) ^{*(note4)(note5)}	tr/tf			160	ps
Output Optical Eye ^{*(note4)(note6)}	ITU-T G.984.2 Compliant				
Optical Output Power with TX OFF	P _{off}			-40	dBm
Receiver					
Centre Wavelength	λ_c	1260	1310	1360	nm
Receiver Sensitivity ^{*(note7)}	P _{min}			-28	dBm
Receiver Overload ^{*(note7)}	P _{max}	-8			dBm
Receiver Burst-Mode Dynamic Range ^{*(note8)}		15	20		dB
Receiver Reflectance	CR			-20	dB
Signal Detect Assert Level	SDA			-28	dBm
Receiver CID Tolerance	CID	72			bits
Damage Threshold for Receiver	P _{in, damage}	3			dBm
Maximum Receiver Reflectance	R _{x_r}			-20	dB

Note3: Measured with 9/125µm G.652 SMF.

Note4: Filtered, Measured with PRBS2²³-1 test pattern @2.488Gbps.

Note5: Measured with the Bessel-Thompson filter OFF.

Note6: Eye pattern mask

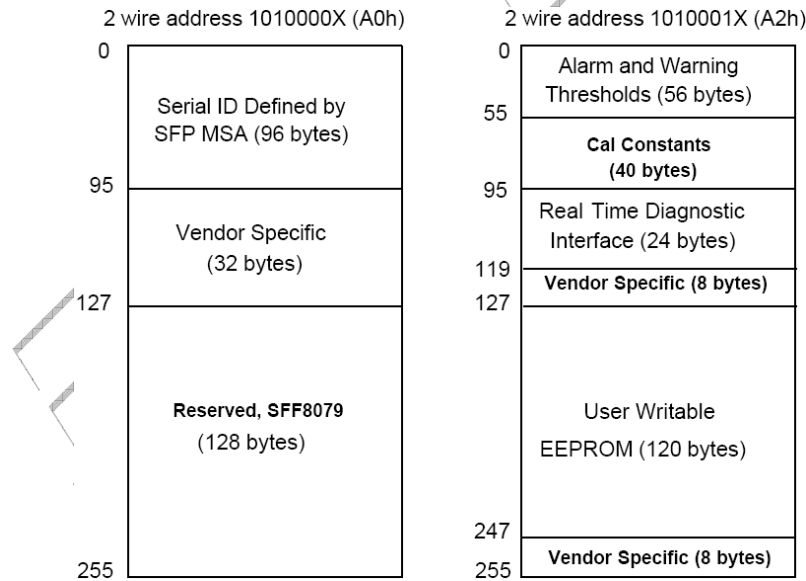


Note 7: Measured with a PRBS $2^{23}-1$ test pattern @1.244Gbps, BER 1×10^{-10} .

Note 8: The input power difference between two subsequent high and low burst data.

Digital Diagnostic Interface

The memory map in the following describes an extension to the memory map defined in SFP-8472. The enhanced interface uses the two wire serial bus address 1010001X (A2h) to provide diagnostic information about the module's present operating conditions.



EEPROM Serial ID Memory Contents (2-Wire Address A0h)

The following diagnostic information is according to the EOLS-GT-20 Series.

Address	Name of Field	Hex	Description
Base ID Fields			
00	Identifier	03	SFP physical device (soldered device)
01	Ext. Identifier	04	Serial ID module supported
02	Connector	01	SC

03-10	Transceiver Codes	00 00 00 00 00 00 00 00	Ext Calibration, Average Power Measurement
11	Encoding	03	NRZ
12	BR, Nominal	19	Nominal 2.488Gbps (indicate transmitter data rate)
13	Reserved	00	-
14	Length (9um)-km	14	20km @9/125um fiber
15	Length (9um)-100m	C8	20000m @9/125um fiber
16-18	Length for MMF	00	Undefined for GPON
19	Reserved	00	-
20-35	Vendor Name	45 4F 50 54 4F4C 49 4E 4B 20 49 4E 43 20 20 20	EOPTOLINK INC (ASC II)
36	Channel Spacing	00	-
37~39	Vendor OUI	00 00 00	-
40-55	Vendor P/N	45 4F 4C 53 2D 47 54 2D 32 30 20 20 20 20 20 20	EOLS-GT-20 (ASC II)
56-59	Vendor P/N Rev.	XX XX XX 20	31 2E 30 20 means 1.0 revision.
60-61	Laser Wavelength	05 D2	1490nm in Hex byte
62	DWDM Wavelength Fraction	00	Undefined
63	CC_BASE	XX	Check sum of byte 0-62
Extended ID Fields			
64-65	Options	00 1C	TX_Fault, TX_Dis, Signal Detect are implemented
66	BR, Max.	00	-
67	BR, Min.	00	-
68-83	Vendor SN	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	Vendor serial number in ASCII
84-91	Date Code	XX XX XX XX XX XX 20 20	Vendor date code in ASCII (Year Month Date)
92	Diagnostic Monitoring Type	58	Implemented with external calibration and received power measurement type by Avg. power
93	Enhanced options	E0	Alarm/Warning flags, soft TX_DIS, TX_FAULT if SP implemented.
94	SFF-8472 compliant	02	SFP-8472 compliant with revision 9.5
95	CC_EXT	XX	Check sum of bytes 64-94
Vendor Specific ID Fields			
96-127	Vendor Specific	00	Vendor specific EEPROM

128-256	Reserved	00	Reserved for future use
---------	----------	----	-------------------------

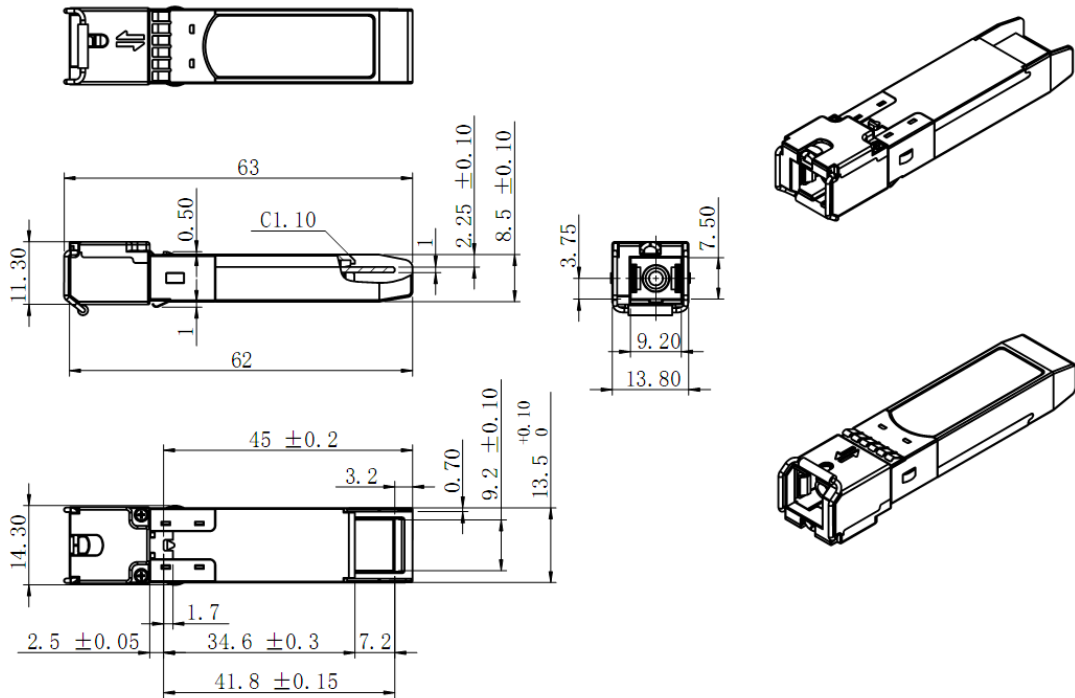
*The “XX” byte should be filled in according to practical case. For more information, please refer to the related document of SFP Multi-Source Agreement (MSA).

SFP Pin Function Definitions

Below figure shows the pin information of electrical interface and mounting studs. Functions are described in the following table.

Pin No.	Pin Name	Description
1	Veet	Tx Ground
2	Tx Fault	Tx Fault Alarm. LVTTTL Output Active High
3	Tx DIS	Tx Disable. LVTTTL input. Laser output is disabled when this pin is asserted high or left unconnected. Laser output is enabled when this pin is asserted low.
4	MOD_DEF(2)	2-Wire Serial Data I/O Pin.
5	MOD_DEF(1)	2-Wire Serial Clock Input.
6	MOD_DEF(0)	Internally Grounded
7	Reset	CMOS input. Assert “Reset” high at the end of previous burst, 2 bytes in duration
8	BRST_Det	LVTTTL output. BRST_Det assert low when module receives “reset” signal, assert high when incoming burst is present.
9	RSSI_ACQ	RSSI acquire/hold LVTTTL Input. Digital RSSI output through I2C
10	Veer	Rx Ground
11	Veer	Rx Ground
12	RXD-	Negative Data Output, LVPECL; DC coupled
13	RXD+	Positive Data Output, LVPECL; DC coupled
14	Veer	Rx Ground
15	Vcc_RX	Rx Vcc
16	Vcc_TX	Tx Vcc
17	Veet	Tx Ground
18	TXD+	Positive Data Input, LVPECL or CML (AC coupled; internally 100 ohms differential termination)
19	TXD	Negative Data Input, LVPECL or CML (AC coupled; internally 100 ohms differential termination)
20	Veet	Tx Ground
	F	Mounting Studs

Mechanical Specifications



Obtaining Document

You can visit our website:

<http://www.eoptolink.com>

Or contact Eoptolink Technology Inc., Ltd. listed at the end of the documentation to get the latest documents.

Revision History

Revision	Initiate	Review	Approve	DCN	Date
V1.a	Kelly	Phlio, Alex		Initialed.	Feb 20, 2010

Notice:

Eoptolink reserves the right to make changes to or discontinue any optical link product or service identified in this publication, without notice, in order to improve design and/or performance. Applications that are described herein for any of the optical link products are for illustrative purposes only. Eoptolink makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Contact:

Add: Floor 5 Building 2 No. 21 Gaopeng Avenue High-Tech District CHENGDU, SICHUAN 610041

P.R. CHINA

Tel: (+86) 028-85122709 ext 816 & 809

Fax: (+86) 028-85121912

Postal: 610041

E-mail: sales@eoptolink.com

<http://www.eoptolink.com>