EPON-OLT-SFP-20

Features

- Package compliant with SFP MSA
- Compliant with IEEE Std 802.3ah™ -2004
- Single fiber bi-di data links with symmetric 1.25Gbps upstream and downstream
- 1490nm Continuous mode operation of transmitter
- 1310nm Burst mode operation of receiver
- Integrated with micro-optics WDM filter for dual wavelength Tx/Rx operation
- at 1490/1310nm
- 1490nm DFB laser for continuous mode transmitter
- 1310nm APD-TIA for burst mode receiver
- Support more than 20dB dynamic range in system
- SC or other optional connectors with high return loss
- 0℃ to +70℃ operating ambient range
- Single 3.3V power supply
- Class Ⅰ laser safety standard IEC-60825 compliant
- Low power consumption
- Low EMI and excellent ESD protection

Applications

- Gigabit Ethernet Passive Optical Networks—OLT side

Standard

- Compliant With IEEE Std 802.3ah™ -2004
- Compliant with FCC 47 CFR Part 15, Class B
- Compliant with FDA 21 CFR 1040.10 and 1040.11, Class Ⅰ

Product Description

The EPON-OLT-20 is an optical OLT transceiver for IEEE802.3ah™ -2004 1000BASE-PX20 application. The transmit and receive functions are contained in a standard Small Form Plugable (SFP) package with a single fiber interface terminated with a standard SC or other optional connectors with high return loss.

The transceiver is the high performance module for 1.25Gbps data rates. The transceiver comprises a 1310nm Burst Mode optical receiver and a 1490nm Continuous Mode optical transmitter. The transmitter utilized a multiple quantum well 1490nm DFB laser is compliant with Class Ⅰ laser safety standard IEC-60825. The receiver uses an integrated 1310nm APD and preamplifier mounted in an optical header and limiting post-amplifier IC.

The transmitter incorporates an Automatic Laser Power Control circuit to maintain the optical power and extinction ratio over an ambient temperature of 0℃ to +70℃. Included in the module is a Transmit Disable input and a Transmitter Fault Indicator. The transmitter data inputs and receiver data outputs are LVPECL compatible.

Absolute Maximum Ratings

Absolute Maximum Ratings shown in Table1 are those values, beyond which, some damage may occur to the EPON-OLT-20 .

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	Ts	-40	+85	℃
Operating Temperature	To	0	+70	℃
Power Supply Voltage	Vcc	0	3.6	V
Input Voltage		GND	Vcc	V
Receiver Damaged Threshold		0		dBm
Bending Radius		30		mm
Pigtail Fiber Contact Temperature			85	℃

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power Supply Voltage	VCC	3.13	3.3	3.47	V

Operating Ambient Temperature	To	0		70	℃
Operating Humidity	Ho	5		95	%
Data Rate			1.25		Gbps
Data Rate Drift		-100		+100	PPM

Transmitter Characteristics

The optical and electrical characteristics shown in Table3 are measured at 0℃< To < 70℃ and 3.13V< VCC <3.45V.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	Vcc	3.15	3.3	3.45	V	
Power Supply Current	Icc			150	mA	
Nominal Bit Rate			1.25		Gbps	
Operating Wavelength	λ	1470	1490	1500	nm	
Spectral Width (RMS)	Δ λ RMS			0.1	nm	
Average Optical Output Power	Po	+2		+7	dBm	1
Optical Power OFF Transmitter	Poff			-39	dBm	
Extinction Ratio	Er	9			dB	
TX Enable Timing				0.1	ms	
TX Enable Voltage			Vcc		V	
TX Disable Voltage		0		0.8	V	
Transmitter and dispersion Penalty	TDP			2.3	dB	2
Transmitter Eye Diagram	Compliant With IEEE Std 802.3ah™-2004					
Total Jitter	Tj			0.45	UI	
Rise/Fall Time (20%~80%)	TR/TF			260	ps	3
Data Input Differential Swing	VIN	200		1600	mV	4
Input Differential Impedance	ZIN	90	100	110	Ω	

Note 1: Launched into 9/125um SMF.

Note 2: Maximum sensitivity penalty due to transmitter and dispersion effect through 20km of SMF optical fiber.

Note 3: Measured with PRBS $2^7 - 1$ test pattern @1.25Gbps.

Note 4: Compatible with LVPECL/CML input, AC coupled internally.

Receiver Characteristics

The optical and electrical characteristics shown in Table4 are measured at 0℃< To < 70℃ and 3.13V< VCC <3.45V.

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage	Vcc	3.15	3.3	3.45	V	
Power Supply Current	Icc			110	mA	
Nominal Bit Rate			1.25		Gbps	
Operating Wavelength	λ		1310		nm	
Data Output Voltage - Low	VOL-Vcc	-2.0		-1.55	V	1
Data Output Voltage - High	VOH-Vcc	-1.07		-0.69	V	
Receiver Sensitivity	PMIN			-29.2	dBm	2
Saturation	PSAT	-9.2			dBm	
Receiver Threshold Settling Time	TSET			0.4	ms	2,3
Receiver Reflectance				-12	dB	
Dynamic Range		-29.2		-9.2	dBm	2,4
Total Jitter	Tj			0.65	UI	
Receiver Eye Diagram	Compliant With IEEE Std 802.3ah™-2004					
LOS Deassert Level	PLOSD			-29.2	dBm	5
LOS Assert Level	PLOSA	-45			dBm	6
LOS Deassert Time	TASS			500	ns	
LOS Assert Time	TDAS			500	ns	

Note 1: LVPECL output, DC coupled internally.

Note 2: Measured with a PRBS 2^7-1 test pattern @1.25Gbps and ER=13dB, BER $\leqslant 1\times 10^{-12}$.

Note 3: For multiple ONUs application, It isn't easy to test TSET directly, but there is a relationship TSET = TGAP-TGUARD when TON=TOFF, then TSET can be calculated by TGAP and a certain guard time at ONU side.

Note 4: TGAP be less than 400ns is guaranteed.

Note 5: An increase in optical power above the specified level will cause Los of Signal (LOS) output to switch from a high state to a low state.

Note 6: A decrease in optical power below the specified level will cause Los of Signal (LOS) output to switch from a low state to a high state.

Serial Data ID Fields And Function Description

	Address	FieldSize (Byte)	Name of Field	Data	Description of Field
	0	1	Identifier	03h	Type of serial transceiver

BASE ID FIELDS	1	1	Ext. Identifier	04h	Extended identifier of type of serial transceiver
	2	1	Connector	0Bh	Code for connector type
	3	1	Transceiver	00h	Reserved
	4	1		00h	Part of SONET Compliance Codes
	5	1		00h	SONET Compliance Codes
	6	1		02h	Gigabit Ethernet Compliance Codes
	7	1		00h	Fiber Channel link length & part of transmitter technology
	8	1		00h	Part of Fiber Channel transmitter technology
	9	1		00h	Fiber Channel transmission media
	10	1		00h	Fiber Channel speed
	11	1	Encoding	01h	Code for serial encoding algorithm
	12	1	BR, Nominal	0Ch	Nominal bit rate, units of 100 MBits/sec.
	13	1	Reserved	00h	Reserved
	14	1	Length (9m)-Km	14h	Link length supported for 9/125um fiber, units of Km
	15	1	Length (9m)	C8h	Link length supported for 9/125um fiber, units of 100m
	16	1	Length (50m)	00h	Link length supported for 50/125um fiber, units of 10m
	17	1	Length (62.5m)	00h	Link length supported for 62.5/125um fiber, units of 10m
	18	1	Length (Copper)	00h	Link length supported for copper, units of meters
	19	1	Reserved	00h	Reserved

	20-35	16	Vendor name	EOPTOLINK INC.	SFP transceiver vendor name (ASCII)
	36	1	Reserved	00h	Reserved
	37-39	3	Vendor OUI	00h	SFP transceiver vendor IEEE company ID
	40-55	16	Vendor PN	EOLS-OLT-20	Part number provided by SFP transceiver (ASCII)
	56-59	4	Vendor Rev	10	Revision level for part number provided by vendor (ASCII)
	60-62	3	Reserved	00h	Reserved
	63	1	CC_BASE		Check code for Base ID Fields (addresses 0 to 62)
EXT. ID FIELDS	64	1	Options	00h	Indicates which optional SFP signals are implemented
	65	1		1Ah	
	66	1	BR, max	00h	Upper bit rate margin, units of %
	67	1	BR, min	00h	Lower bit rate margin, units of %
	68-83	16	Vendor SN		Serial number provided by vendor (ASCII)
	84-91	8	Date code		Vendor's manufacturing date code (ASCII)
	92-94	3	Reserved	00h	Reserved
	95	1	CC_EXT		Check code for the Extended ID Fields (addresses 64 to 94)
VENDOR SPECIFIC ID FIELDS	96-255	160			Vendor specific data, read only

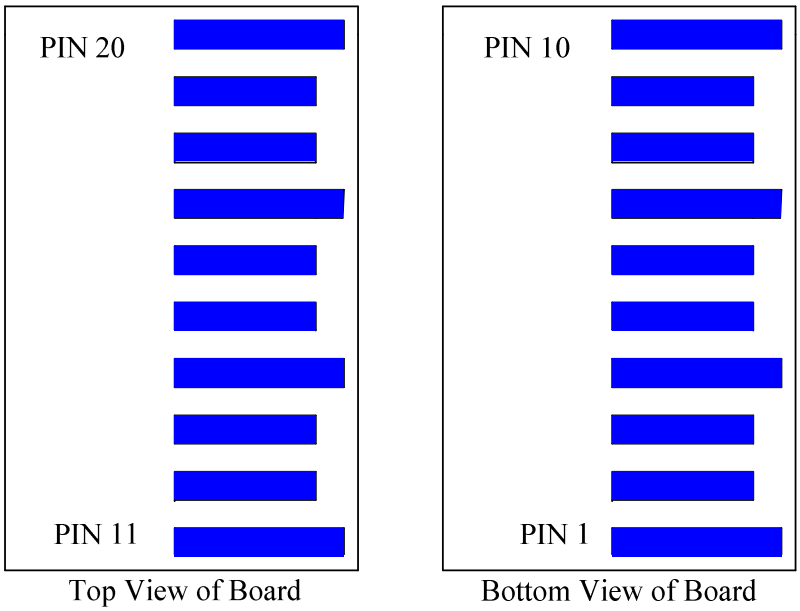
Pin Function Definitions

The EPON-OLT-20 is compliant with the SFP MSA. Table6 shows these pins function.

PIN	NAME	Function

1	VeeT	Transmitter Ground
2	TX Fault	Transmitter Fault Indication
3	TX Disable	Transmitter Disable
4	MOD-DEF2	Module Definition 2
5	MOD-DEF1	Module Definition 1
6	MOD-DEF0	Module Definition 0
7	Debug Port	Reserved for Debug
8	LOS	Los of Signal
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inv. Receiver Data Out
13	RD+	Receiver Data Out
14	VeeR	Receiver Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmitter Data In
19	TD-	Inv. Transmitter Data In
20	VeeT	Transmitter Ground

Figure1 shows the pin view of EOLS-OLT-XX.



Finger 1 SFP PIN View

Recommended Power Supply Filtering Network

EPON-OLT-20 is hot pluggable SFP transceiver. Figure 2 shows the recommended host board supply filtering network.

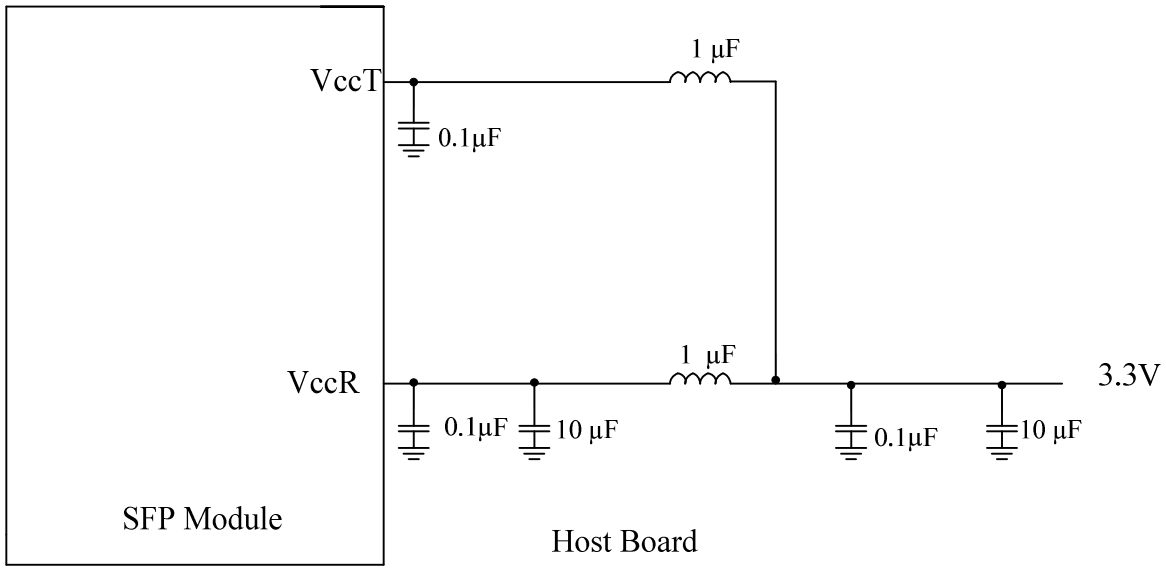


Figure 2 Recommended Host Board Supply Filtering Network

Recommended Interface Circuit

Figure3 shows the recommended interface circuit of EOLS-OLT-XX.

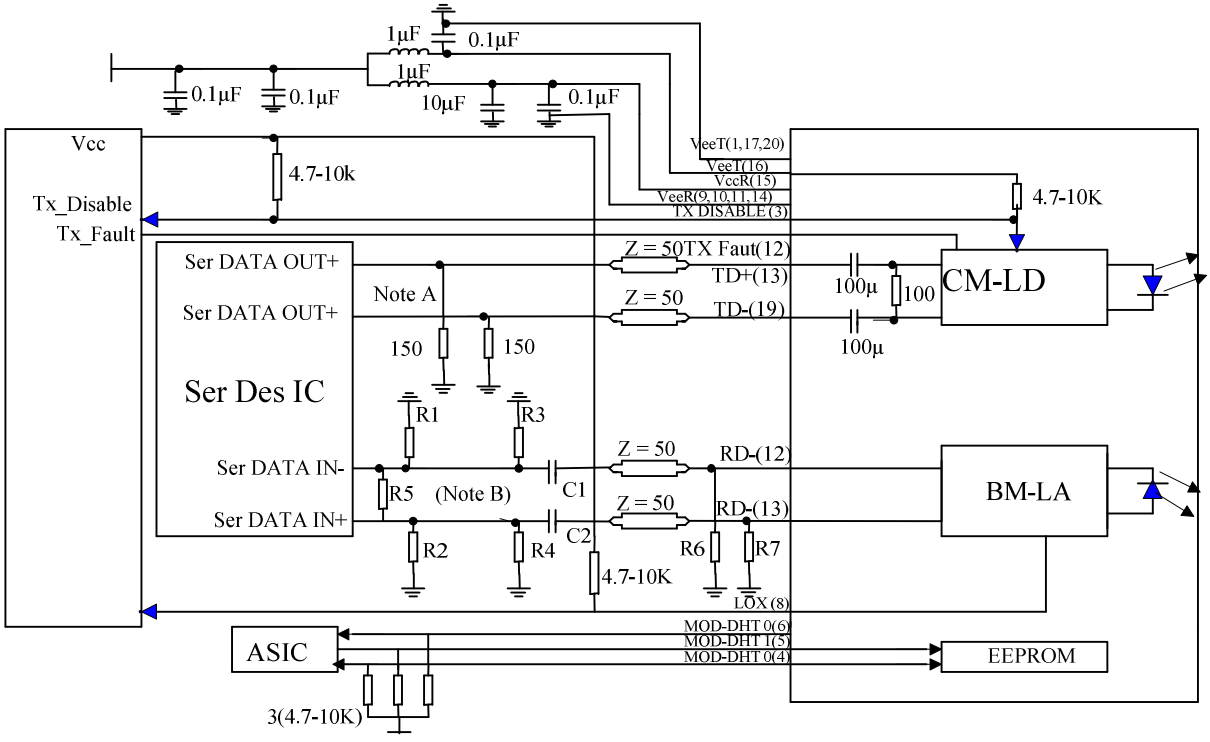


Figure3 Recommended Interface Circuit of Module

Note A: Open emitter output assumed.

Note B: LVPECL output, DC coupled internally. DC-couple mode: R1=R2=130Ω, R3=R4=82Ω, R5,R6,R7=N.C, C1=C2=0Ω. AC-couple mode: Input stage in

Serdes IC is assumed with high impedance and internal bias to Vcc-1.3V, R1=R2=R3=R4=N.C, R5=100Ω,R6=R7=150Ω, C1=C2=1nF, Input stage in Serdes IC is assumed without internal bias to Vcc-1.3V, R1=R2=82Ω,R3=R4=130Ω,R5=N.C,R6=R7=150Ω, C1=C2=1nF.

Ordering Information

Part No.	Specification			
	Package	Detector	Reach	Standard
EPON-OLT-SFP-20	SFP	1310nm APD	20km	1000BASE-PX20

NOTICE:

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