# GEPON PX20+ SFP OLT Transceiver

ZP5432033-PCS

1. Features

- SFP with SC/PC Connector Transceiver
- 1490 nm DFB Tx
- 1310 nm APD Rx
- Digital diagnostics SFF-8472 Compliant
- 1250 Mbps continuous mode Transmission
- 1250 Mbps Burst mode receiver Data Rate
- Provide fast RSSI function
- Operation case temperature: -5~70°C
- Complies with RoHS directive (2002/95/EC)

2. Application

- GEPON OLT IEEE802.3ah 1000BASE-PX20+
- FTTx

3. Function Diagram
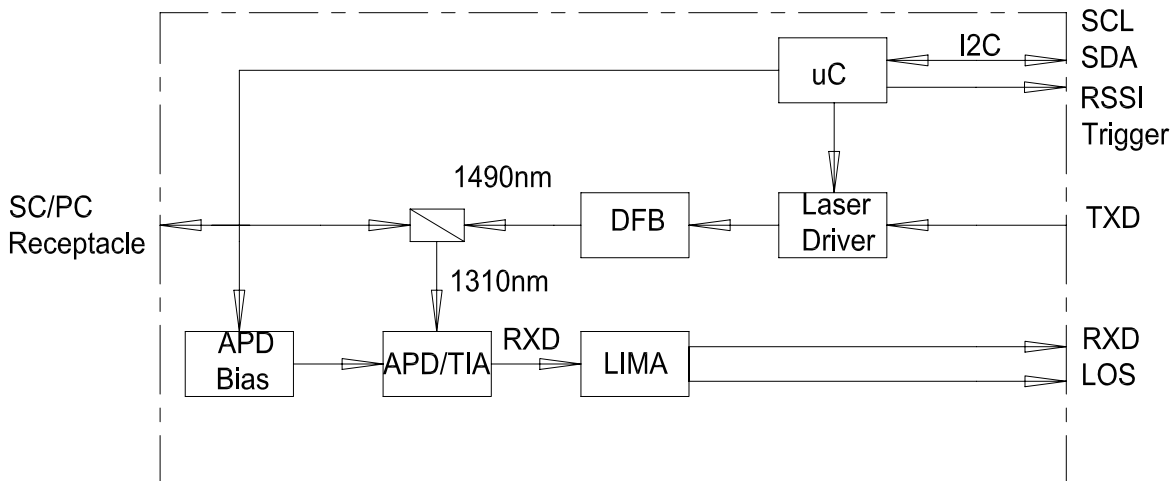
4. Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	TSTG	-40	85	°C
Operating Case Temperature	TC	-5	70	°C
Power Supply Voltage	VCC	3.1	3.5	V
Total Power Supply Current	ICC	-	350	mA

5. Transmitter Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Optical Transmitter Power	P0	2.5	-	7	dBm	
Optical Transmitter Power off	POFF	-	-	-50	dBm	
Output Center Wavelength	λ	1480	-	1500	nm	
Output Spectrum Width	Δλ	-	-	1.0	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	1
Extinction Ratio	ER	9	-	-	dB	
Optical Rise Time	-	-	-	260	ps	
Optical Fall Time	-	-	-	260	ps	
Optical Eye Diagram	Compliant with IEEE Std 802.3ahTM-2004					
Tolerence to Tx Back Reflection	-	-15	-	-	dB	
Data Rate	-	-	1.25	-	Gb/s	
Single Ended Data Input Voltage Swing	VPP	200	-	1200	mV	
Differential Input Impedance	ZIN	80	100	120	ohm	
Tx_fault Output Voltage- High	VOH	2.4	-	-	V	
Tx_fault Output Voltage- Low	VOL	-	-	0.4	V	
Tx_Dis Input Voltage- High	VIH	2.0	-	-	V	
Tx_Dis Input Voltage- Low	VIL	-	-	0.8	V	

Note 1: 1.25Gbps continuous-mode , PRBS2^7-1.

6. Receiver Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Wavelength of Operation	-	1260	-	1360	nm	-

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Data Rate	-	-	1.25	-	Gb/s	-
Sensitivity	Sen	-	-	-30	dBm	1
Saturation Optical Power	Sat	-8	-	-	dBm	1
LOS Assert Level	LOSA	-45	-	-	dBm	2
LOS Deassert Level	LOSD	-	-	-31	dBm	2
Reflectance of equipment	-	-	-	-20	dB	
Receiver Burst-mode Dynamic Range	-	15	-	-	dB	3
Data Output Voltage - High	VOH	VccR -1.05	-	VccR -0.85	V	-
Data Output Voltage - Low	VOL	VccR -1.84	-	VccR -1.60	V	-
RSSI accuracy	-	-3	-	3	dB	4
LOS Output Voltage- High	VLOSH	2	-	-	V	
LOS Output Voltage- Low	VLOSL	-	-	0.8	V	
LOS Assert Time	TA	-	-	500	ns	
LOS Deassert Time	TD	-	-	500	ns	

Note 1: Measured with 1310nm, 1.25Gbps PRBS2^7-1 Single burst packet optical input, ER=10dB, BER=1x10^{-10}.

Note 2: Measured at continuous mode.

Note 3: Input optical power level difference of adjacent burst packets.

Note 4: Receiver optical power ranged from -8dBm to -30dBm, measured with 1310nm, 1.25Gbps PRBS2^7-1 burst-mode optical input, ER=10dB, 50%duty cycle.

7. RSSI Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Units
RSSI Trigger Delay Time	TTRI	25	-	-	ns
RSSI Sampling Time	TSAMPLE	350	-	-	ns
RSSI Data Available Delay Time	TRSSI_DATA	-	-	500	us

8. Digital Diagnostic Monitoring Accuracy

Parameter	Accuracy	Units	Notes
Transceiver Temperature	±3	°C	Temperature sensor
Power Supply Voltage	±3	%	Vcc=3.13~3.47V
TX Bias Current	±10	mA	
TX Optical Power	±3	dB	Average Power

9. Pin Definitions

Pin#	Name	Function
1	VeeT	Transmitter Ground
2	TX_Fault	Transmitter Fault Indication, LVTTL Output, Active High
3	TX_Disable	Transmitter Disable, LVTTL Input. Optical output power is off when this PIN is high or left unconnected.
4	SDA	I2C Data
5	SCL	I2C Clock
6	MOD-DEF(0)	Internally grounded
7	RSSI_Trigger	RSSI Trigger Signal from Host, LVTTL input, Active High.
8	LOS	Loss of Signal, LVTTL Output, Active High.
9	VeeR	Receiver Ground
10	VeeR	Receiver Ground
11	VeeR	Receiver Ground
12	RD-	Inv. Received Data Out, LVPECL,DC coupled
13	RD+	Received Data Out, LVPECL,DC coupled
14	VeeR	Receiver Ground
15	VccR	Receiver Power
16	VccT	Transmitter Power
17	VeeT	Transmitter Ground
18	TD+	Transmit Data In, LVPECL or CML (AC coupled; internally 100 ohms differential termination)
19	TD-	Inv. Transmit Data In, LVPECL or CML (AC coupled; internally 100 ohms differential termination)
20	VeeT	Transmitter Ground

4

10. Outline Drawing
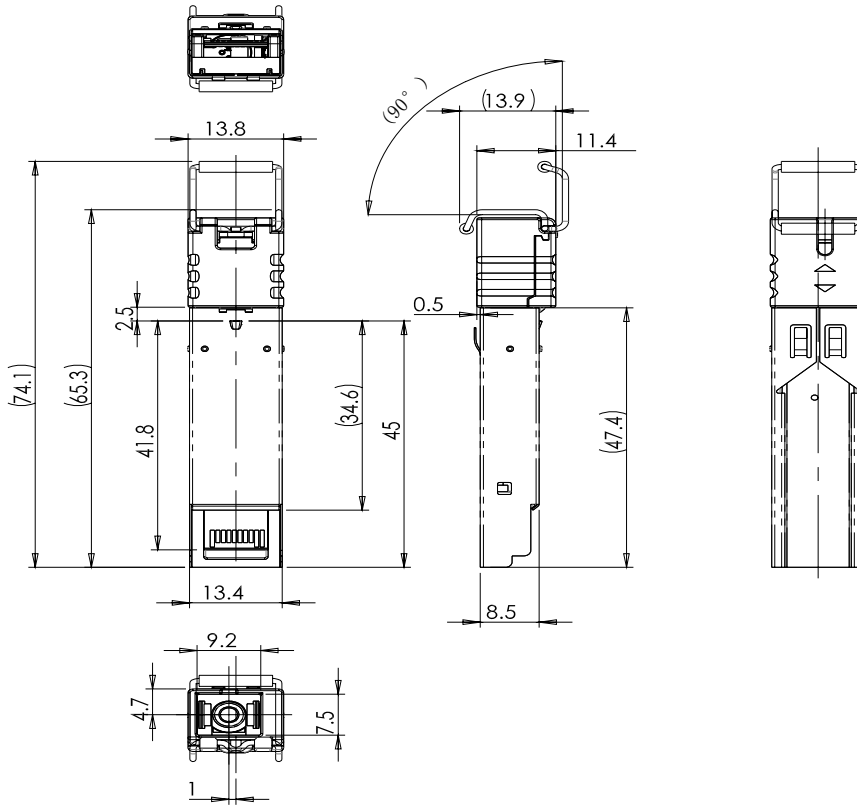
11. Recommended Application Circuit
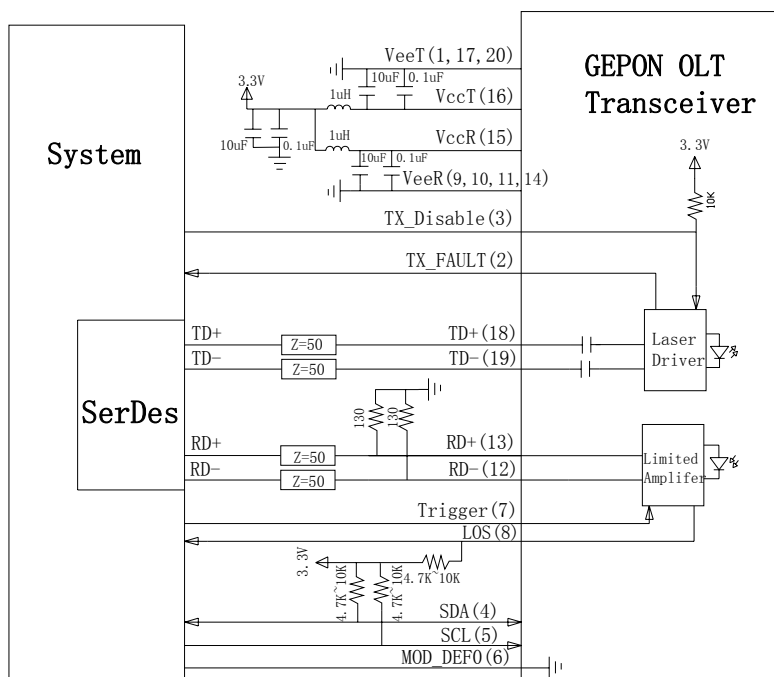
12. EEPROM serial ID memory contents (A0h)

Address (DEC)	Field Size (Byte)	Name of Field	Hex	Description
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	
2	1	Connector	01	SC
3-10	8	Transceiver	00 00 00 80 00 00 00 00	BASE-PX
11	1	Encoding	01	8B10B encoding code
12	1	BR, Nominal	0C	1.2 Gbps
13	1	Reserved	xx	Reserved
14	1	Length (9um)-km	14	20(km)
15	1	Length (9um)	C8	200(100m)
16	1	Length (50um)	00	Not Support
17	1	Length (62.5um)	00	Not Support
18	1	Length (Copper)	00	Not Support
19	1	Reserved	xx	Reserved
20-35	16	Vendor name		
36	1	Reserved	xx	Reserved
37-39	3	Vendor OUI	00 00 00	OUI
40-55	16	Vendor PN		
56-59	4	Vendor Rev	31 20 20 20	Revision
60-61	2	Wavelength	05 D2	1490nm Laser Wavelength
62	1	Reserved	xx	Reserved
63	1	CC_BASE	xx	Check sum of byte 0-62
64-65	2	Options	00 1A	LOS, TX_FAULT and TX_DISABLE
66	1	BR, max	00	Not Support
67	1	BR, min	00	Not Support
68-83	16	Vendor SN	xx……..xx	ASCII
84-91	8	Date code	xx……..xx	Year, Month, Day
92	1	Diagnostic Monitoring Type	58	Externally Calibrated Received power measurement type-Average Power
93	1	Enhanced Options	E0	Alarm/warning flags implemented Soft TX_DISABLE control and monitoring implemented Soft TX_FAULT monitoring implemented

Address (DEC)	Field Size (Byte)	Name of Field	Hex	Description
94	1	SFF-8472 Compliance	02	Diagnostics Compliance(SFF-8472 V9.5)
95	1	CC_EXT	xx	Check sum of byte 64-94
96-255	160	Vendor specific	xx	Vendor specific

13. EEPROM serial ID memory contents (A2h)

Address	Field Size (Byte)	Name of Field	Hex	Description
00~01	2	Temp High Alarm Thresholds	xx	MSB at low address, 95°C
02~03	2	Temp Low Alarm Thresholds	xx	MSB at low address, -10°C
04~05	2	Temp High Warning Thresholds	xx	MSB at low address, 90°C
06~07	2	Temp Low Warning Thresholds	xx	MSB at low address, 0°C
08~09	2	Voltage High Alarm Thresholds	xx	MSB at low address, 3.6V
10~11	2	Voltage Low Alarm Thresholds	xx	MSB at low address, 3.0V
12~13	2	Voltage High Warning Thresholds	xx	MSB at low address, 3.5V
14~15	2	Voltage Low Warning Thresholds	xx	MSB at low address, 3.1V
16~17	2	Bias High Alarm Thresholds	xx	MSB at low address, 90mA
18~19	2	Bias Low Alarm Thresholds	xx	MSB at low address, 1mA
20~21	2	Bias High Warning Thresholds	xx	MSB at low address, 70mA
22~23	2	Bias Low Warning Thresholds	xx	MSB at low address, 2mA
24~25	2	TX Power High Alarm Thresholds	xx	MSB at low address, 8dBm
26~27	2	TX Power Low Alarm Thresholds	xx	MSB at low address, 1dBm

Address	Field Size (Byte)	Name of Field	Hex	Description
28~29	2	TX Power High Warning Thresholds	xx	MSB at low address, 7dBm
30~31	2	TX Power Low Warning Thresholds	xx	MSB at low address, 2dBm
32~33	2	RX Power High Alarm Thresholds	xx	MSB at low address, -7dBm
34~35	2	RX Power Low Alarm Thresholds	xx	MSB at low address, -31dBm
36~37	2	RX Power High Warning Thresholds	xx	MSB at low address, -8dBm
38~39	2	RX Power Low Warning Thresholds	xx	MSB at low address, -30dBm
40~55	16	Reserved	xx	Reserved
56~59	4	Rx_PWR(4)	xx	Single precision floating point calibration data - Rx optical power. Bit7 of byte 56 is MSB. Bit 0 of byte 59 is LSB. For "internally calibrated" devices, Rx_PWR(4) should be set to zero , and useless.
60~63	4	Rx_PWR(3)	xx	Single precision floating point calibration data - Rx optical power. Bit 7 of byte 60 is MSB. Bit 0 of byte 63 is LSB. For "internally calibrated" devices, Rx_PWR(3) should be set to zero , and useless.
64~67	4	Rx_PWR(2)	xx	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 64 is MSB, bit 0 of byte 67 is LSB. For "internally calibrated" devices, Rx_PWR(2) should be set to zero, and useless.
68~71	4	Rx_PWR(1)	xx	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 68 is MSB, bit 0 of byte 71 is LSB. For "internally calibrated" devices, Rx_PWR(1) should be set to 1 , and useless.
72~75	4	Rx_PWR(0)	xx	Single precision floating point calibration data, Rx optical power. Bit 7 of byte 72 is MSB, bit 0 of byte 75 is LSB. For "internally calibrated" devices, Rx_PWR(0) should be set to zero , and useless.
76~77	2	Tx_I(Slope)	xx	Fixed decimal (unsigned) calibration data, laser bias current. Bit 7 of byte 76 is MSB, bit 0 of byte 77 is LSB. For "internally calibrated" devices, Tx_I(Slope) should be set to 1, and useless.
78~79	2	Tx_I(Offset)	xx	Fixed decimal (signed two's complement) calibration data, laser bias current. Bit 7 of byte 78 is MSB, bit 0

Address	Field Size (Byte)	Name of Field	Hex	Description
				of byte 79 is LSB. For "internally calibrated" devices, Tx_I(Offset)should be set to zero , and useless.
80~81	2	Tx_PWR(Slope)	xx	Fixed decimal (unsigned) calibration data, transmitter coupled output power. Bit 7 of byte 80 is MSB, bit 0 of byte 81 is LSB. For "internally calibrated" devices, Tx_PWR(Slope) should be set to 1 , and useless.
82~83	2	Tx_PWR(Offset)	xx	Fixed decimal (signed two's complement) calibration data, transmitter coupled output power. Bit 7 of byte 82 is MSB, bit 0 of byte 83 is LSB. For "internally calibrated" devices, Tx_PWR(Offset) should be set to zero , and useless.
84~85	2	T (Slope)	xx	Fixed decimal (unsigned) calibration data, internal module temperature. Bit 7 of byte 84 is MSB, bit 0 of byte 85 is LSB. For "internally calibrated" devices, T(Slope) should be set to 1 , and useless.
86~87	2	T (Offset)	xx	Fixed decimal (signed two's complement) calibration data, internal module temperature. Bit 7 of byte 86 is MSB, bit 0 of byte 87 is LSB. For "internally calibrated" devices, T(Offset) should be set to zero, and useless.
88~89	2	V (Slope)	xx	Fixed decimal (unsigned) calibration data, internal module supply voltage. Bit 7 of byte 88 is MSB, bit 0 of byte 89 is LSB. For "internally calibrated" devices, V(Slope)should be set to 1 , and useless.
90~91	2	V (Offset)	xx	Fixed decimal (signed two's complement) calibration data, internal module supply voltage. Bit 7 of byte 90 is MSB. Bit 0 of byte 91 is LSB. For "internally calibrated" devices, V(Offset) should be set to zero, and useless.
92~94	3	Reserved	xx	Reserved
95	1	Checksum	xx	Byte 95 contains the low order 8 bits of the sum of bytes 0 – 94.
96	1	Temperature MSB	xx	Internally measured module temperature.
97	1	Temperature LSB	xx	
98	1	Vcc MSB	xx	Internally measured supply voltage in transceiver.
99	1	Vcc LSB	xx	
100	1	TX Bias MSB	xx	Internally measured TX Bias Current.
101	1	TX Bias LSB	xx	
102	1	TX Power MSB	xx	Measured TX output power.
103	1	TX Power LSB	xx	

Address	Field Size (Byte)	Name of Field	Hex	Description
104	1	RX Power MSB	xx	Measured RX input power.
105	1	RX Power LSB	xx	
106~109	4	Reserved	xx	Reserved
110	1 Bit	Reserved	x	Reserved
	1 Bit	Soft TX Disable	x	Read/write bit that allows software disable of laser. Writing '1' disables laser.
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	TX Fault	x	Tx Fail Status: 1=TX Fail; 0=TX Normal
	1 Bit	LOS	x	Signal Detect Status. Active High.
	1 Bit	Reserved	x	Reserved
111	1	Reserved	xx	Reserved
112	1 Bit	Temp High Alarm	x	Set when internal temperature exceeds high alarm level.
	1 Bit	Temp Low Alarm	x	Set when internal temperature is below low alarm level.
	1 Bit	Vcc High Alarm	x	Set when internal supply voltage exceeds high alarm level.
	1 Bit	Vcc Low Alarm	x	Set when internal supply voltage is below low alarm level.
	1 Bit	TX Bias High Alarm	x	Set when TX Bias current exceeds high alarm level.
	1 Bit	TX Bias Low Alarm	x	Set when TX Bias current is below low alarm level.
	1 Bit	TX Power High Alarm	x	Set when TX output power exceeds high alarm level.
	1 Bit	TX Power Low Alarm	x	Set when TX output power is below low alarm level.
113	1 Bit	RX Power High Alarm	x	Set when Received Power exceeds high alarm level.
	1 Bit	RX Power Low Alarm	x	Set when Received Power is below low alarm level.
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
114	1	Reserved	xx	Reserved
115	1	Reserved	xx	Reserved
116	1 Bit	Temp High Warning	x	Set when internal temperature exceeds high warning

Address	Field Size (Byte)	Name of Field	Hex	Description
				level.
	1 Bit	Temp Low Warning	x	Set when internal temperature is below low warning level.
	1 Bit	Vcc High Warning	x	Set when internal supply voltage exceeds high warning level.
	1 Bit	Vcc Low Warning	x	Set when internal supply voltage is below low warning level.
	1 Bit	TX Bias High Warning	x	Set when TX Bias current exceeds high warning level.
	1 Bit	TX Bias Low Warning	x	Set when TX Bias current is below low warning level.
	1 Bit	TX Power High Warning	x	Set when TX output power exceeds high warning level.
	1 Bit	TX Power Low Warning	x	Set when TX output power is below low warning level.
117	1 Bit	RX Power High Warning	x	Set when Received Power exceeds high warning level.
	1 Bit	RX Power Low Warning	x	Set when Received Power is below low warning level.
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
	1 Bit	Reserved	x	Reserved
118	1	Reserved	xx	Reserved
119	1	Reserved	xx	Reserved
120-127	8	Vendor Specific	xx	Vendor Specific
128-247	120	User EEPROM	xx	User writable EEPROM
248-255	8	Vendor Specific	xx	Vendor Specific

14. Ordering Information

Part Number	Product description	RoHS Compliant
ZP5432033-PCS	GEPON PX20 OLT SFP with digital RSSI, -5~70°C	RoHS-6

11