

**10GEPON OLT PR30 SFP+ Transceiver**  
**PES96-BC5423-20****Features**

Single fiber bi-directional data links TX 10.3125Gbps/ Burst Mode RX10.3125Gbps application  
Single fiber bi-directional data links TX 10.3125Gbps/ Burst Mode RX1.25Gbps application  
Single fiber bi-directional data links TX 1.25Gbps/ Burst Mode RX1.25Gbps application  
0 to 70°C operating case temperature  
3.3V,5V power supply  
SFP+ package with SC Receptacle connector  
Hot-pluggable capability  
High power 1577nm EML transmitter  
High power 1490nm DFB LD  
High sensitivity 1270nm and 1310nm APD  
Support 20km transmission distance with SMF  
Low EMI and excellent ESD protection  
Digital diagnostic monitor interface  
RoHS compliance

**Applications**

Symmetric 10GEPON OLT  
Asymmetric 10GEPON OLT  
GEPON PX20 OLT

**Standards**

Complies with INF-8472  
Complies with IEEE 802.3av  
Complies with IEEE 802.3ah  
Complies with FCC 47 CFR Part 15, Class B  
Complies with FDA 21 CFR 1040.10 and 1040.11  
Complies with China Telecom EPON equipment technology requirement V2.1

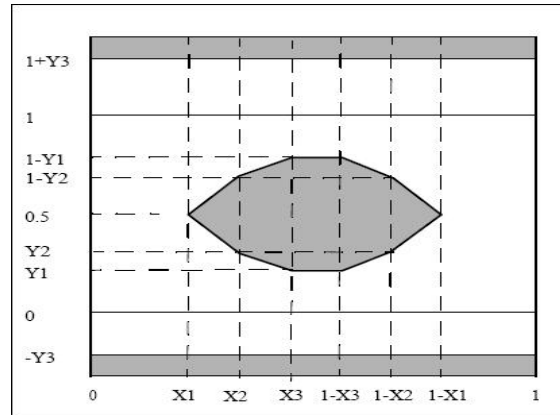
ABSOLUTE MAXIMUM RATINGS						
Parameter	Symbol	Min	Max	Units	Notes	
Storage Temperature	T <sub>stg</sub>	-40	+85	°C	Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.	
Operating Case Temperature	T <sub>case</sub>	0	+70	°C		
DC Supply Voltage	V <sub>cc</sub>	0	3.6	V		
Relative Humidity - Operating	RH <sub>o</sub>	5	85	%		
Receiver Damaged Threshold			0	dBm		

RECOMMENDED OPERATING CONDITION						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Case Temperature	T <sub>c</sub>	0		70	°C	
Power Supply Voltage	V <sub>cc</sub>	3.13	3.3	3.47	V	
Power Supply Current				750	mA	
Operating Relative Humidity		5		95	%	
Data Rate(TX/RX)	TX		10.3125 1.25		Gbit/s	
	RX		10.3125 1.25			
Data Rate Drift		-100		+100	PPM	

10GEPON TRANSMITTER OPTICAL SEPCIFICATION						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Type		1577nm EML Continuous Mode				
Data Rate	Stx		10.3125		Gbit/s	
Centre Wavelength	λ <sub>c</sub>	1575	1577	1580	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launched Power (BOL)	P <sub>out</sub>	2.5		5	dBm	Room Temperature
Average Launched Power (EOL)		2		5		0~70°C
Mean Launched Power (TX Off)	P <sub>out</sub>			-39	dBm	
Extinction Ratio	ER	6			dB	Note 1
Transmitter dispersion Penalty	TDP			1.5	dB	Transmit on 20km SMF
Eye Diagram		Compliant with IEEE Std 802.3ah™-2004				Note 2

Note 1: Measured with PRBS 2<sup>23</sup>-1 test pattern @10.3125Gbps, Low Pass Filter is on.

Note 2: Transmitter eye mask definition



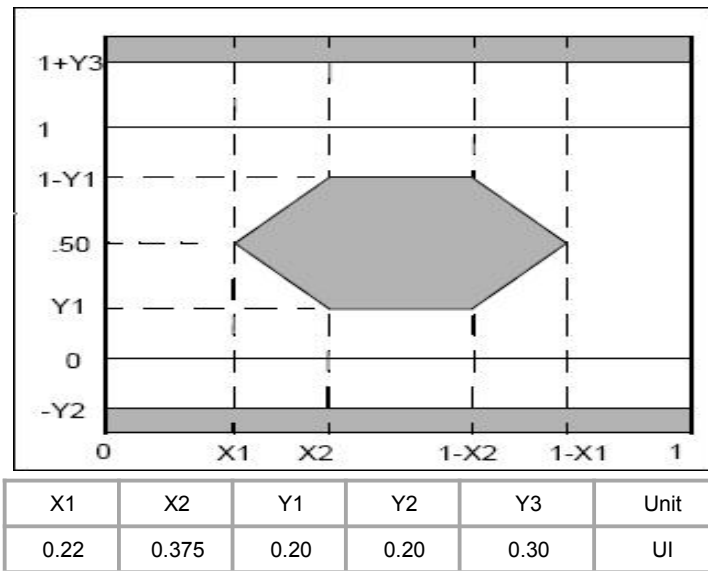
X1	X2	X3	Y1	Y2	Y3	Unit
0.25	0.40	0.45	0.25	0.28	0.40	UI

Figure 1 10GEPON Transmitter Eye Mask Definitions

GEPON TRANSMITTER OPTICAL SPECIFICATION						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter Type		1490nm DFB Continuous Mode				
Data Rate	Stx		1.25		Gbit/s	
Centre Wavelength	$\lambda_c$	1480	1490	1500	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launched Power	Pout	3		7	dBm	0~70°C
Mean Launched Power (TX Off)	Pout			-39	dBm	
Extinction Ratio	ER	9			dB	Note 3
Transmitter dispersion Penalty	TDP			1	dB	Transmit on 20km SMF
Eye Diagram		Compliant with IEEE Std 802.3ah™-2004				Note 4

Note 3: Measured with PRBS 27-1 test pattern @1.25Gbit/s, Low Pass Filter is on.

Note 4: Transmitter eye mask definition



**Figure 2 GEPON Transmitter Eye Mask Definitions**

TRANSMITTER ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Tx_Data Differential Input Voltage	$V_{IH}-V_{IL}$	200		1600	mV	LVPECL, AC coupled
Input Differential Impedance	$R_{in}$	90	100	110	$\Omega$	
Transmitter Disable control Voltage - Low	$V_{IL}$	0		0.8	V	LVTTL
Transmitter Disable control Voltage - High	$V_{IH}$	2.0		$V_{cc}$	V	
TX_Fault indicate voltage - Low	$V_{OL}$	0		0.4	V	
TX_Fault indicate voltage - High	$V_{OH}$	2.4		$V_{cc}$	V	

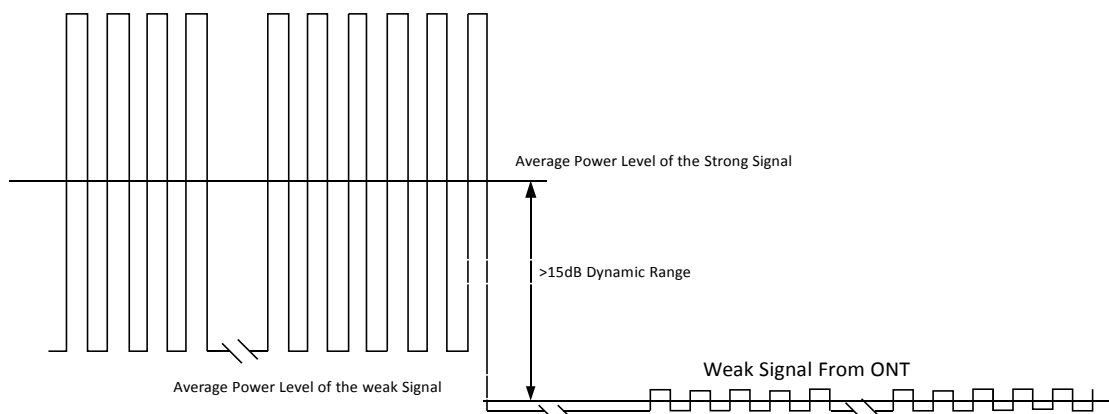
10GEPON RECEIVER OPTICAL SPECIFICATIONS						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Receiver Type		1270nm Burst-mode APD/TIA				
Data Rate	$S_{tx}$		10.3125		Gbit/s	
Receive Wavelength	$\lambda_c$	1260	1270	1280	nm	
Sensitivity ( BOL )	SEN			-28.5	dBm	Note 5
Sensitivity ( EOL )				-28		
Overload	SAT	-6			dBm	
RX Dynamic Range		15			dB	Note 7
RX Loss of Signal De-assert level				-30.5	dBm	
RX Loss of Signal Assert level		-44			dBm	
Loss of Signal Hysteresis		0.5	6		dB	

Note 5: Measured with a PRBS  $2^{31}-1$  test pattern @10.3125Gbit/s and ER=10dB, BER  $\leq 10^{-3}$

GEPON RECEIVER OPTICAL SPECIFICATIONS						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Receiver Type		1310nm Burst-mode APD/TIA				
Data Rate	Stx		1.25		Gbit/s	
Receive Wavelength	$\lambda_c$	1260	1310	1360	nm	
Sensitivity ( BOL )	SEN			-31	dBm	Note 6
Sensitivity ( EOL )				-30		
Overload	SAT	-6			dBm	
RX Dynamic Range		15			dB	Note 7
RX Loss Of Signal De-assert level				-31.5	dBm	
RX Loss Of Signal Assert level		-44			dBm	
Loss Of Signal Hysteresis		0.5	6		dB	

Note 6: Measured with a PRBS 2<sup>7</sup>-1 test pattern @1.25Gbit/s and ER=10dB, BER <=10<sup>-12</sup>

Note 7: RX Dynamic Range Definition



**Figure 3 Burst Mode Receiver Dynamic Range in 10GEPON System**

RECEIVER ELECTRICAL CHARACTERISTICS						
Parameter	Symbol	Min	Typ	Max	Unit	Notes
Rx_Data Differential Output Voltage	$V_{IH}-V_{IL}$	400		1600	mV	
Receiver Threshold Settling Time	$T_{SETTLING}$			800	ns	Receiver Threshold Settling Time
Loss Of Signal Assert Time	$T_{LOSD}$			512	ns	
Loss Of Signal De-assert Time	$T_{LOSA}$			512	ns	
Loss Of Signal Voltage - Low	$V_{OL}$	0		0.4	V	LVTTTL
Loss Of Signal Voltage - High	$V_{OH}$	2.4		$V_{CC}$	V	

**DIGITAL RSSI TIMING CHARACTERISTICS**

Parameter	Symbol	Min	Typ	Max	Unit	Notes
RSSI Trigger-Low		0		0.8	V	
RSSI Trigger-High		2.0		Vcc	V	
RSSI Trigger Delay	T <sub>D</sub>	496	512	528	ns	Refer to first bit of the preamble
RSSI Trigger Width	T <sub>W</sub>	584	600	616	ns	
Optical Signal During Time	T <sub>ONT_EN_DUR</sub>	525			ns	For RSSI Measurement
I2C Access Prohibited Time	V <sub>OL</sub>	500			µs	

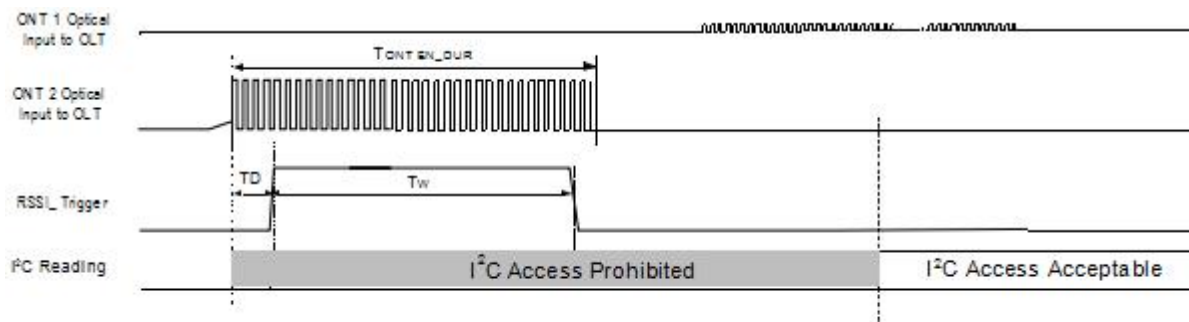
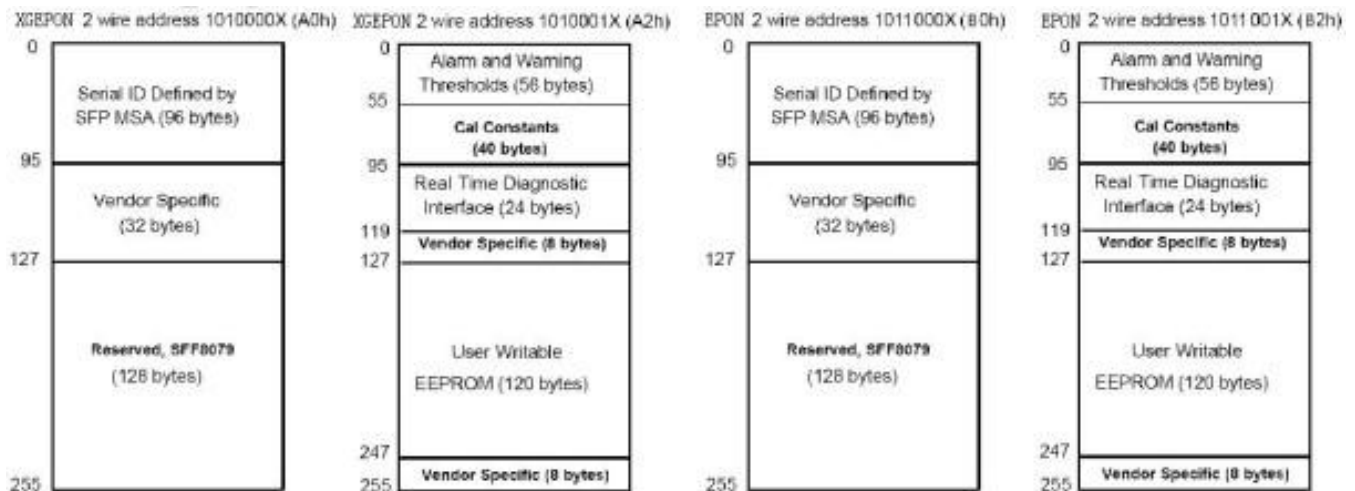


Figure 4 RSSI Timing Sequence

**I2C SERIAL LOGIC**

Parameter	Symbol	State	Min	Typ	Max	Unit
I2C Serial Data	SDA <sub>H</sub>	HIGH	2.0		Vcc	V
	SDA <sub>L</sub>	LOW	0		0.8	V
I2C Serial Clock	SCL <sub>H</sub>	HIGH	2.0		Vcc	V
	SCL <sub>L</sub>	LOW	0		0.8	V

**EEPROM INFORMATION**



DIGITAL DIAGNOSTIC MONITORING INTERFACE				
Parameter	Range	Accuracy	Calibration	Notes
Temperature	0 to 70°C	±3%	Internal	
Voltage	2.97 to 3.63V	±3%	Internal	
Bias Current_1G	0 to 100mA	±10%	Internal	LSB:4uA
TX Power_1G	3 to 7dBm	±3dB	Internal	LSB:0.2uW
Bias Current_10G	0 to 150mA	±10%	Internal	LSB:4uA
TX Power_10G	2 to 5dBm	±2dB	Internal	LSB:0.2uW
RX Power monitor	-31 to -6dBm	±2dB	Internal	

PES96-BC5423-20 PIN ASSIGNMENT			
PIN	Name	Description	Notes
1	EPON_TD+	Non-Inverted Transmit Data in	LVPECL input, AC coupled
2	EPON_TD-	Inverted Transmit Data in	LVPECL input, AC coupled
3	GND	Module Ground	
4	SDA	The data line	The data line of two wire serial interface
5	SCL	The clock line	The clock line of two wire serial interface
6	EPON_RD-	Inverted 1G Received Data Out	CML Output, DC coupled
7	NC/RX_RateSe I	NC	
8	LOS	Loss of signal	LVTTTL output
9	Trig/Txdis	dual-purpose pins	LVTTTL, Notes 8
10	EPON_RD+	Non-inverted 1G Received Data Out	CML Output, DC coupled
11	GND	Module Ground	
12	10GEPON _RD-	Inverted 10G Received Data Out	CML
13	10GEPON _RD+	Non-inverted 10G Received Data Out	CML
14	TX-Fault	Transmitter Fault Indication	LVTTTL, High Level Indicates Transmitter Fault
15	VCC3_RX	Receiver 3.3V Power Supply	
16	VCC3_TX	Transmitter 3.3V Power Supply	
17	NC	NC	
18	10GEPON _TD+	Non-Inverted Transmit Data in	CML input, AC coupled
19	10GEPON _TD-	Inverted Transmit Data in	CML input, AC coupled
20	GND	Module Ground	

Notes 8: RSSI Select: 0xA2 【118】 bit 6 When set “0”, PIN9 input as TX\_Disable input. When set “1”, PIN9 as RSSI input. Default power up value is “0” .

MECHANICAL SPECIFICATIONS(Unit: mm)

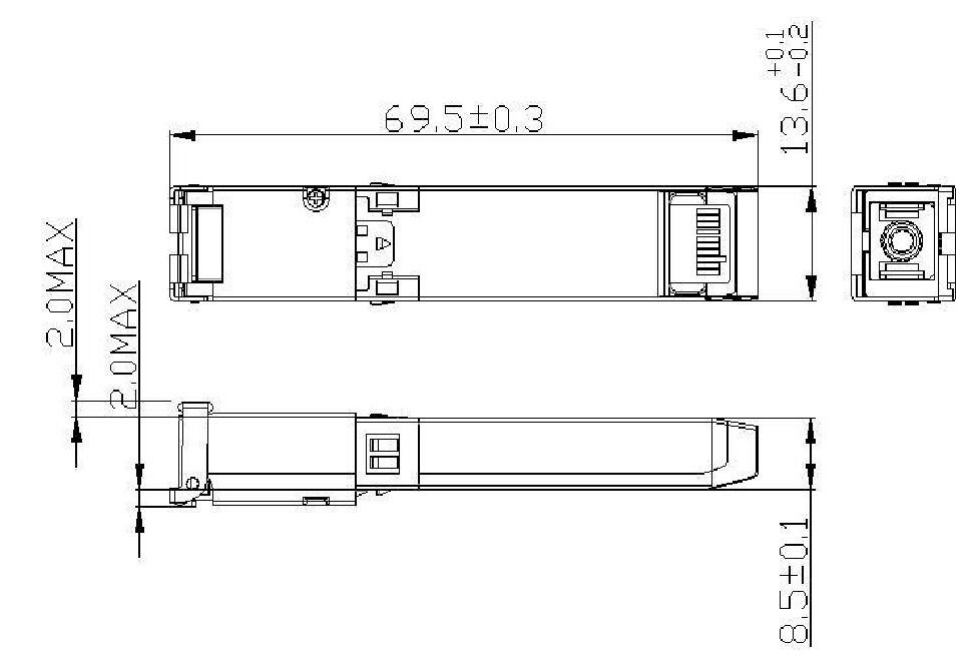


Figure 5 Mechanical Outline Drawing

RECOMMENED INTERFACE CIRCUIT

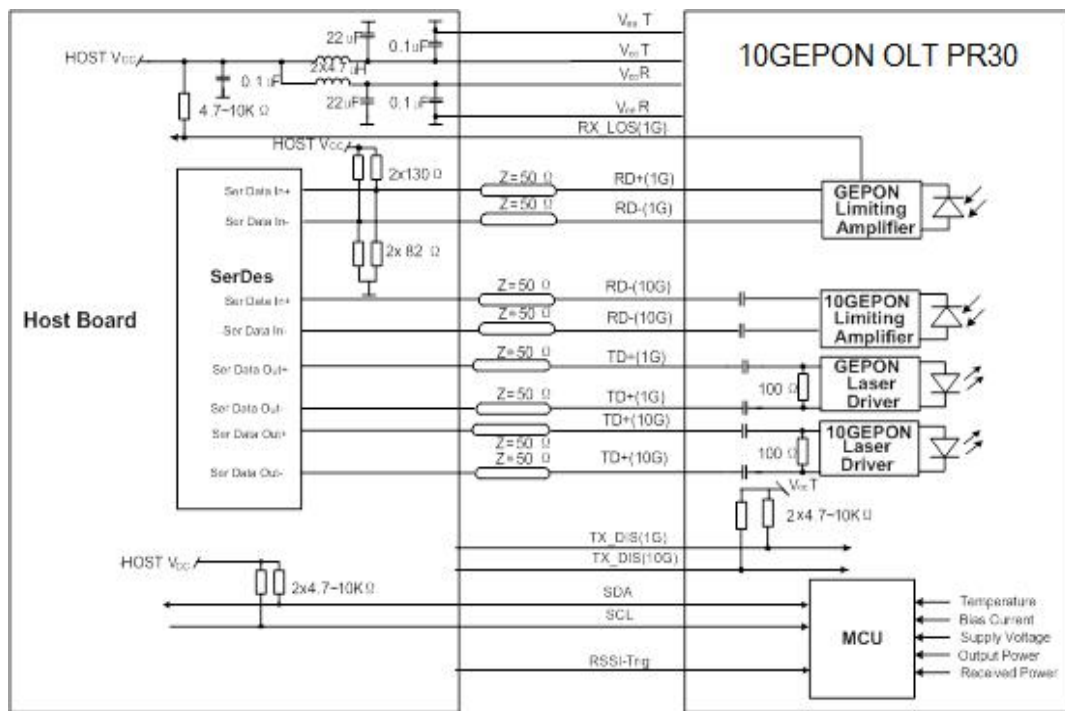


Figure 6 Recommended Interface Circuit



**ORDER INFORMATION**

Part Number	Product Description
PES96-BC5423-20	10GEPON OLT PR30, Tx 1577nm/1490nm&10.3125G/1.25G, Rx 1270nm/1310nm&10.3125G/1.25G, SFP+ form-factor, SC/UPC receptacle connector, 0~70°C

**REMARK**

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Contact Information**

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