

## DATA SHEET

### MODULETEK – GPON-OLT-BP-C10

#### SFP GPON OLT Transceiver Class B+ 2488/1244Mbps with DOM

#### GPON-OLT-BP-C10 Overview

ModuleTek's GPON-OLT-BP-C10 is a point to multi point (P2MP) Fiber to the Home, Business or Curb(FTTX) GPON transceiver with high quality. It is designed for 2488Mbps downstream and 1244Mbps upstream duplex data links that employ high-speed burst mode TDM receivers/transmitters. It is based on the ITU-T G.984.2 Class B+ specifications for bidirectional communications over a single fiber and incorporates a high performance 1310nm burst-mode APD/TIA receiver and 1490nm continuous-mode DFB transmitter with internal optical isolator.

#### Product Features

- Single fiber bi-directional data links with 2488Mbps Tx and 1244Mbps Rx
- 1310nm APD/TIA burst-mode Receiver
- 1490nm continuous-mode DFB Laser with Isolator
- ITU-T G.984.2 Complaint
- SFF-8472 Compliant
- Low Power Consumption
- Hot-pluggable SFP footprint
- Simplex SC connector
- Single power supply 3.3V
- RoHS Compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C.

#### Applications

- Access Networks
- Fiber to the Home, Curb, Office (FTTX)
- Point to Multi Point Service (P2MP)
- FSAN Class B+

#### Ordering Information

Part Number	Description
GPON-OLT-BP-C10	SFP GPON OLT Transceiver Class B+ 2488/1244Mbps with DOM

#### For More Information:

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### General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR		2488/1244		Mb/s	1
Bit Error Rate	BER			10 <sup>-10</sup>		
Operating Temperature	T <sub>OP</sub>	0		70	°C	2
Storage Temperature	T <sub>STO</sub>	- 40		85	°C	3
Supply Current	I <sub>S</sub>		200	300	mA	4
Input Voltage	V <sub>CC</sub>	3.14	3.3	3.46	V	
Maximum Voltage	V <sub>MAX</sub>	- 0.5		4	V	4

#### Notes:

1. Downstream/Upstream
2. Case temperature
3. Ambient temperature
4. For electrical power interface

### Optical Characteristics – Transmitter

V<sub>CC</sub>=3.14V to 3.46V, T<sub>C</sub>=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks	
Transmitter Type		1490nm DFB Laser with Isolator					1
Downstream Signaling Speed	S <sub>TX</sub>		2488		Mb/s		
Output Optical Power	P <sub>TX</sub>	1.5		5	dBm	2	
Optical Output with TX OFF				- 40	dBm		
Optical Center Wavelength	λ <sub>C</sub>	1480		1500	nm		
Extinction Ratio	ER	8.2			dB		
Spectral Width (- 20dB)	Δλ			1	nm		
Side Mode Suppression Ratio	SMSR	30			dB		
Output Eye		Compliant with G.984. 2				Data Rate=2488Mb/s	

#### Notes:

1. Continuous-mode
2. Class 1 Product

### Optical Characteristics – Receiver

V<sub>CC</sub>=3.14V to 3.46V, T<sub>C</sub>=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks	
Receiver Type		1310nm APD/TIA burst-mode Receiver					
Signaling Speed	S <sub>RX</sub>		1244		Mb/s		
Optical Center Wavelength	λ <sub>C</sub>	1280	1310	1360	nm		
Average Rx Sensitivity @1244Mb/s	R <sub>X_SEN</sub>			- 28	dBm	1	
Burst Sensitivity Receiver Overload	P <sub>MAX</sub>	- 8			dBm		

Receiver Burst Mode Dynamic Range		15		dB
LOS Assert	LOS_A	- 45		dBm
LOS De-Assert	LOS_D		- 30	dBm
LOS Hysteresis	LOS_H	0.5		dB

### Notes:

1. @BER 10<sup>-10</sup> PRBS 2<sup>23</sup>-1

### Electrical Characteristics

V<sub>CC</sub>=3.14V to 3.46V, T<sub>C</sub>=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R <sub>IN</sub>		100		Ω	
Differential data input swing	V <sub>IN_PP</sub>	200		1600	mV	
Differential data output swing	V <sub>OUT_PP</sub>	400		1600	mV	
Input Signal Level (LVTTTL H)	V	2.0		V <sub>CC</sub>	V	
Input Signal Level (LVTTTL L)	V	0		0.8		
Output Signal Level (LVTTTL H)	V	2.4		V <sub>CC</sub>	V	
Output Signal Level (LVTTTL L)	V	0		0.4	V	

### Digital Diagnostic Functions

GPON-OLT-BP-C10 support the 2-wire serial communication protocol as defined in the SFP MSA. Digital diagnostic information is accessible over the 2-wire interface at the address 0xA2. Digital diagnostics for GPON-OLT-BP-C10 are internally calibrated by default. A micro controller unit inside the transceiver gathers the monitoring information and reports the status of transceiver.

**Transceiver Temperature**, internally measured, represented as a 16 bit signed twos complement value in increments of 1/256 degrees Celsius, Temperature accuracy is better than ±3 degrees Celsius over specified operating temperature and voltage.

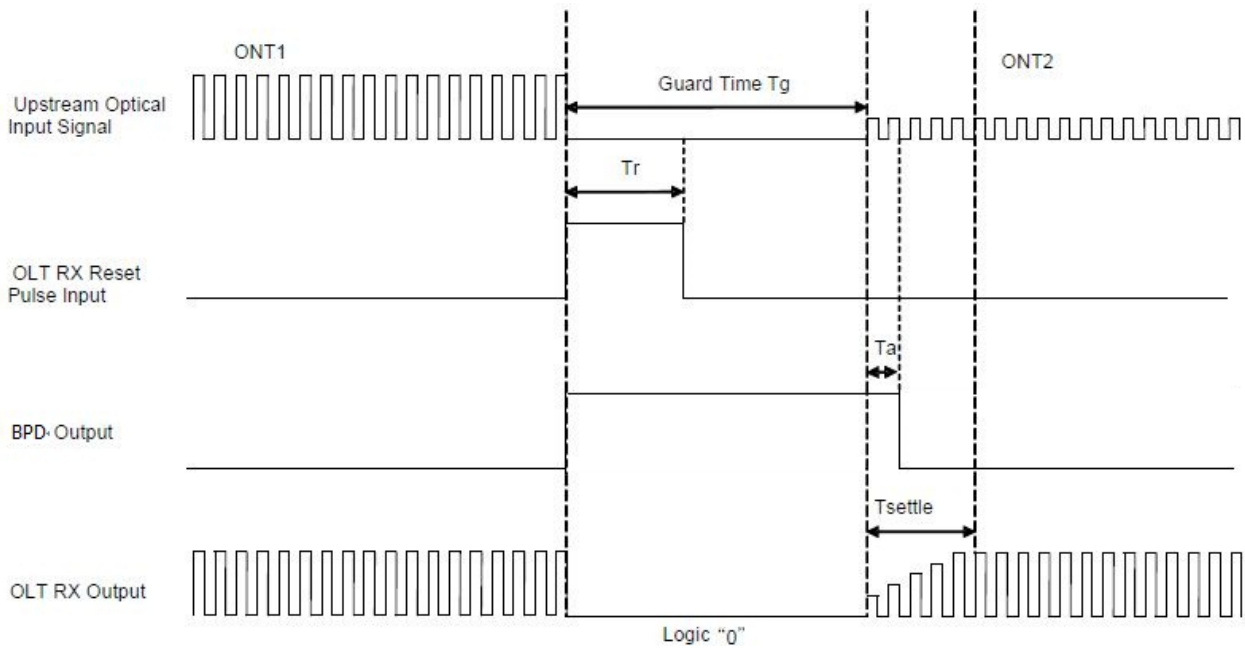
**Transceiver Supply Power**, internally measured, represented as a 16 bit unsigned integer with the voltage defined as the full 16 bit value (0 – 65535) with LSB equal to 100 μVolt, yielding a total range of 0 to +6.55 Volts.

**Transceiver TX bias current**, internally measured, represented as a 16 bit unsigned integer with the current defined as the full 16 bit value (0 – 65535) with LSB equal to 2 μA, yielding a total range of 0 to 131mA. Accuracy is better than ±10% over specified operating temperature and voltage.

**Transceiver TX output power**, internally measured, represented as a 16 bit unsigned integer with the power defined as the full 16 bit value (0 – 65535) with LSB equal to 0.1 μW. Data is assumed to be based on measurement of laser monitor photodiode current. Accuracy is better than ±3dB over specified temperature and voltage. Data is not valid when the transmitter is disabled.

**Transceiver RX received optical power**, internally measured, represented as a 16 bit unsigned integer with the power defined as the full 16 bit 35 value (0 – 65535) with LSB equal to 0.1 μW. Accuracy is better than ±3dB over specified temperature and voltage.

## Timing Diagram

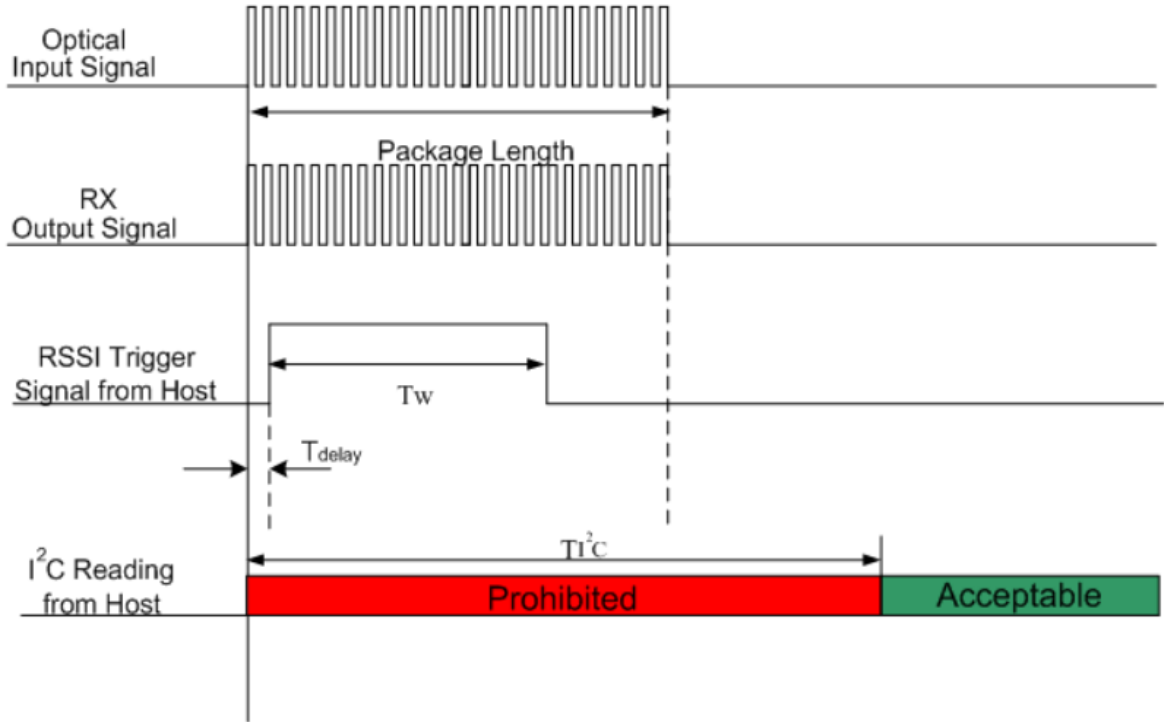


### Time Parameter definition in GPON system

Parameter	Symbol	Min	Typical	Max	Unit	Note
Guard Time	$T_g$	4			byte	
Reset Pulse Width	$T_r$	16			bit	1
Burst Signal Detect Assert	$T_a$			10	ns	2
Burst Mode Receiver Setting Time	$T_{settle}$			44	bit	

#### Notes:

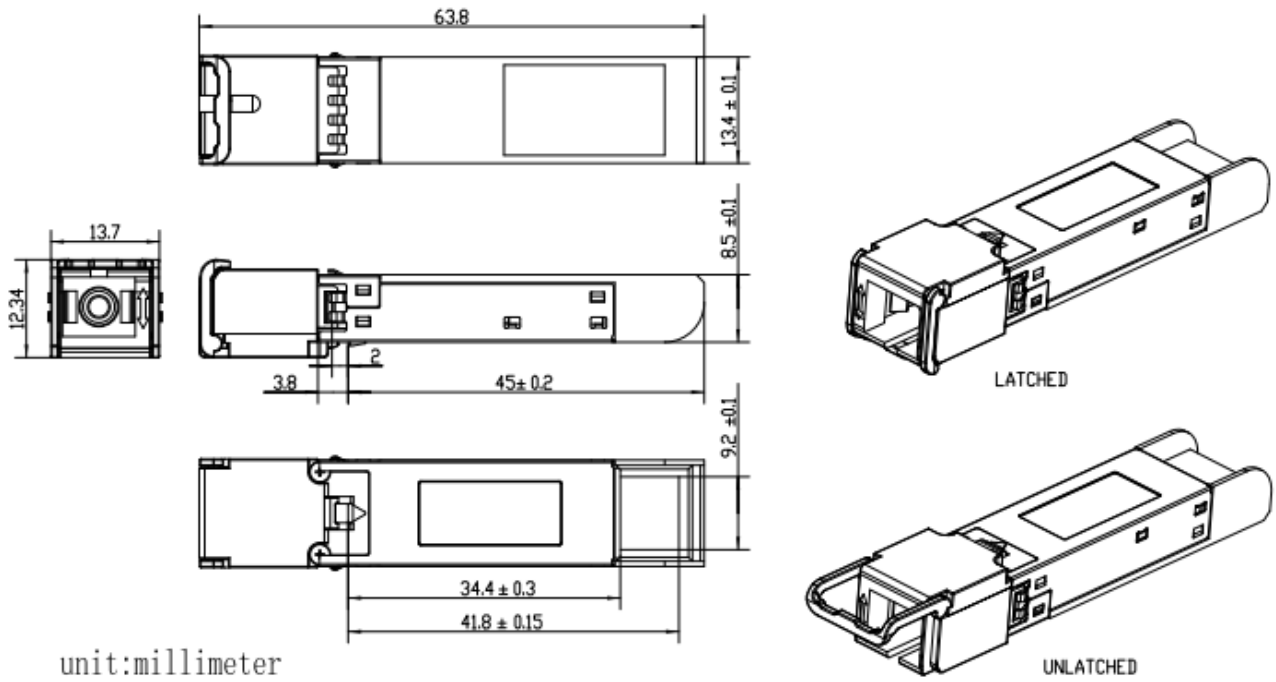
1. The RESET signal should occur in the GUARD BAND time slot and commence immediately at the end of the ONT signal.
2. The Rx BURST PACKET DETECT (BPD) asserts LOW when the RESET signal is applied; asserts HIGH when an incoming burst is detected and latches HIGH until the next RESET signal.



**RSSI Timing Diagram**

Parameter	Symbol	Min	Type	Max	Unit	Remarks
Trigger width	T <sub>w</sub>	300			ns	
RSSI Trigger Delay	T <sub>DELAY</sub>	30			ns	
I <sup>2</sup> C response time	T <sub>I<sup>2</sup>C</sub>			500	us	

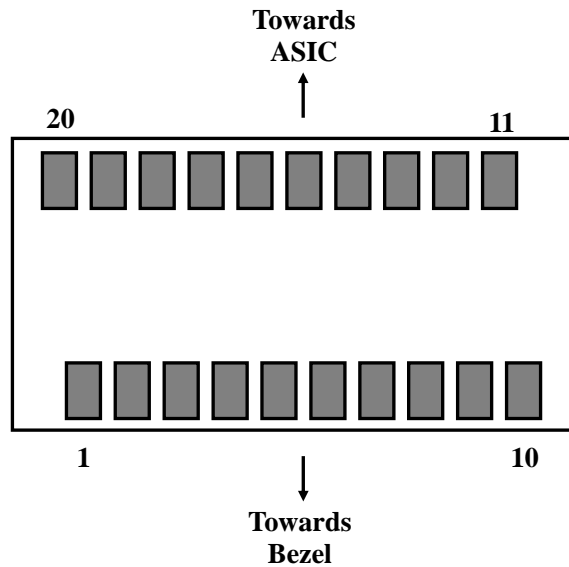
## Dimensions

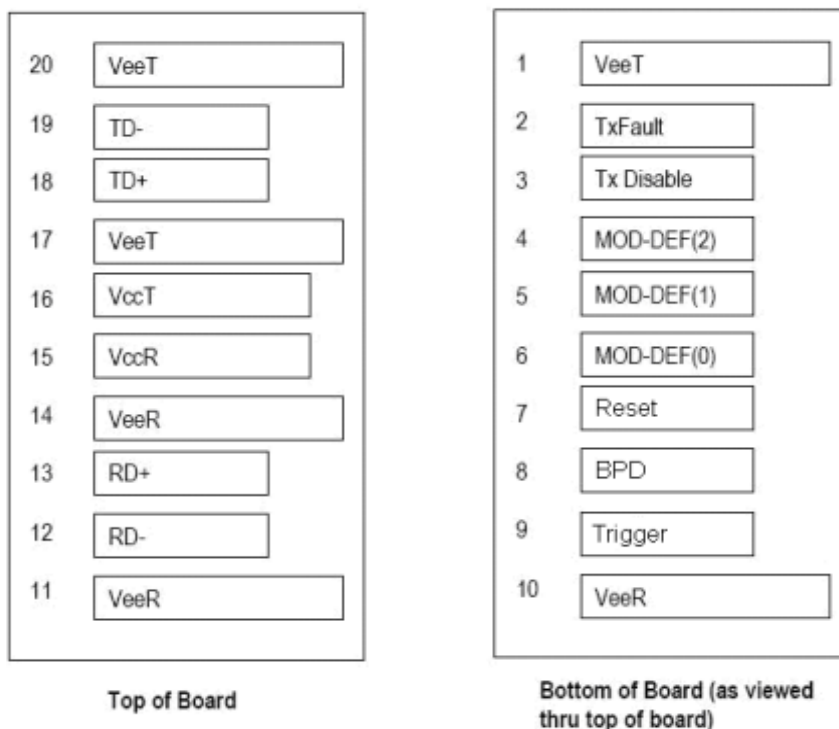


ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED

UNIT: mm

## Electrical Pad Layout





### Pin Assignment

PIN #	Symbol	Description	Remarks
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
2	T <sub>FAULT</sub>	Transmitter Fault.	
3	T <sub>DIS</sub>	Transmitter Disable. Laser output disabled on high or open	2
4	MOD_DEF (2)	Module Definition 2. Data line for serial ID	3
5	MOD_DEF (1)	Module Definition 1. Clock line for serial ID	3
6	MOD_DEF (0)	Module Definition 0. Grounded within the module	3
7	RESET	Receiver Reset	4
8	BPD	Burst Packet Detect	5
9	RSSI Trigger	RSSI Trigger Signal From Host	6
10	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
11	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
12	RD-	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	
14	V <sub>EER</sub>	Receiver ground (common with transmitter ground)	1
15	V <sub>CCR</sub>	Receiver power supply	
16	V <sub>CCT</sub>	Transmitter power supply	
17	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	

19	TD-	Transmitter Inverted DATA in. AC coupled	
20	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1

### Notes:

1. Circuit ground is isolated from chassis ground
2. Disabled: T<sub>DIS</sub>>2V or open, Enabled: T<sub>DIS</sub><0.8V
3. Should Be pulled up with 4.7k – 10k ohm on host board to a voltage between 2V and 3.6V
4. Reset is a LVTTTL input which is used to clear receiver status before receiving the next burst packet
5. BPD is a LVTTTL output. High Level indicates that burst packet is detected by the receiver
6. RSSI Trigger is a LVTTTL input from host for starting ADC of digital RSSI circuit to sample the analog RSSI signal

### References

1. ITU-T G.984.2
2. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 2000.
3. SFF-8472