

## DATA SHEET

### MODULETEK: GPON-OLT-CPP-C10

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

### GPON-OLT-CPP-C10 Overview

ModuleTek's GPON-OLT-CPP-C10 is a point-to-multipoint (P2MP) high quality EPON transceiver module, mainly used in home, Business or Curb (FTTX). It is designed for 2488 Mbps downstream and 1244 Mbps upstream duplex data link transmission, high-speed burst mode TDM receiver/transmitter is used. It is based on the ITU-T G.984.2 B+ class specification, and for two-way communication on a single fiber, with high bandwidth, high efficiency, large coverage, rich user interface and many other advantages, and integrates 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 Compliant
- 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 C++

## Ordering Information

Part Number	Description
GPON-OLT-CPP-C10	SFP GPON OLT Transceiver Class C++ 2488/1244Mbps with DOM
<b>For More Information:</b> ModuleTek Limited Web: <a href="http://www.moduletek.com">www.moduletek.com</a> Email: <a href="mailto:sales@moduletek.com">sales@moduletek.com</a>	

## General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR		2488/1244		Mb/s	1
Bit Error Rate	BER			$10^{-10}$		
Operating Temperature	T <sub>C</sub>	0		70	°C	2
Storage Temperature	T <sub>STO</sub>	-40		85	°C	3
Supply Current	I <sub>CC</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

$V_{CC}=3.14V$  to  $3.46V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Transmitter Type	1490nm DFB Laser with Isolator					1
Downstream Signaling Speed	$S_{TX}$		2488		Mb/s	
Output Optical Power	$P_{TX}$	4.5		10	dBm	2
Optical Center Wavelength	$\lambda_C$	1480		1500	nm	
Extinction Ratio	ER	8.2			dB	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Launch Power of OFF Transmitter	$P_{OUT\_OFF}$			-40	dBm	
Output Eye	Compliant with G.984. 2		Data Rate=2488Mb/s			

### Notes:

1. Continuous-mode
2. Class 1 Product

## Optical – Characteristics – Receiver

$V_{CC}=3.14V$  to  $3.46V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Receiver Type	1310nm APD/TIA burst-mode Receiver					
Signaling Speed	$S_{rx}$		1244		Mb/s	
Optical Center Wavelength	$\lambda_C$	1280	1310	1360	nm	
Average Rx Sensitivity @ 1244Mb/s	$R_{X\_SEN}$			-30	dBm	1
Burst Sensitivity Receiver Overload	$P_{MAX}$	-12			dBm	
Receiver Burst Mode Dynamic Range		15			dB	
LOS Assert	$LOS_A$	-45			dBm	
LOS De-Assert	$LOS_D$			-32	dBm	
LOS Hysteresis	$LOS_H$	0.5			dB	

### Notes:

1. @BER  $10^{-10}$  PRBS  $2^{23}-1$

## Electrical Characteristics

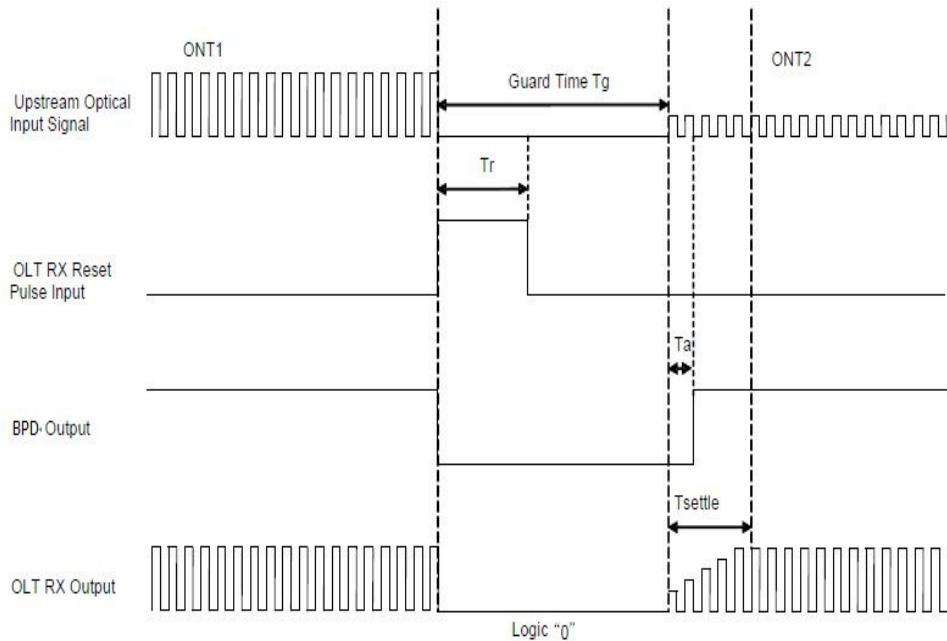
$V_{CC}=3.14V$  to  $3.46V$ ,  $T_C=0^{\circ}C$  to  $70^{\circ}C$

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	$R_{IN}$		100		$\Omega$	
Differential data input swing	$V_{IN\_PP}$	600		1600	mV	
Differential data output swing	$V_{OUT\_PP}$	400		1600	mV	
Input Signal Level (LVTTTL H)	V	2.0		$V_{CC}$	V	
Input Signal Level (LVTTTL L)	V	0		0.8	V	
Output Signal Level (LVTTTL H)	V	2.4		$V_{CC}$	V	
Output Signal Level (LVTTTL L)	V	0		0.4	V	

## Digital Diagnostic Functions

GPON-OLT-CPP-C10 supports the 2-wire serial communication protocol as defined in SFP MSA. Digital diagnostic information is accessible over the 2-wire interface at the address 0xA2. Digital diagnostics for GPON-OLT-CPP-C10 are internally calibrated by default. The internal micro control unit accesses the device operating parameters in real time, Such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage. The module implements the alarm function of the SFP MSA, alerts the user when a particular operating parameter exceeds the factory-set normal range.

## Timing Diagram

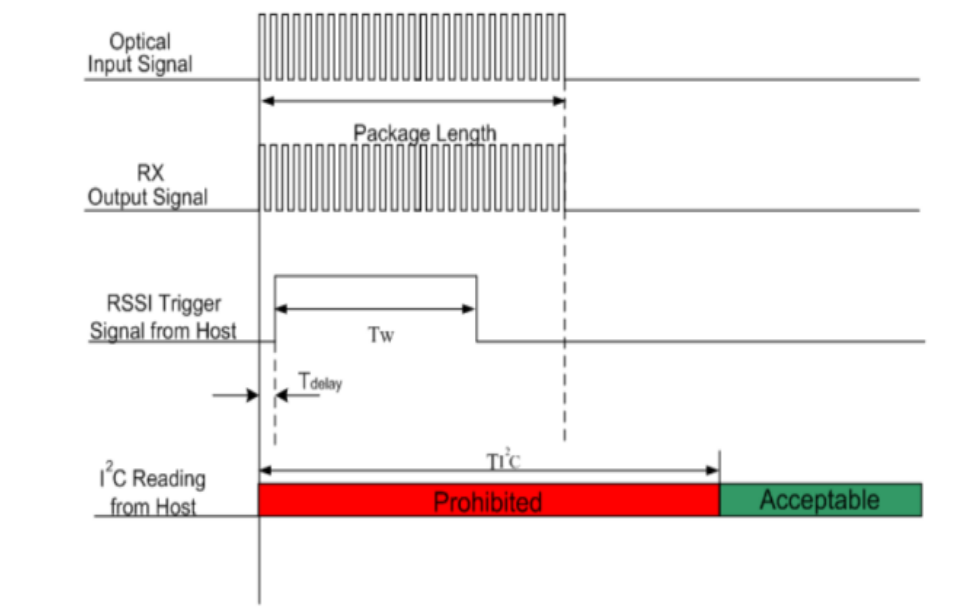


Time Parameter definition in GPON system

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
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:

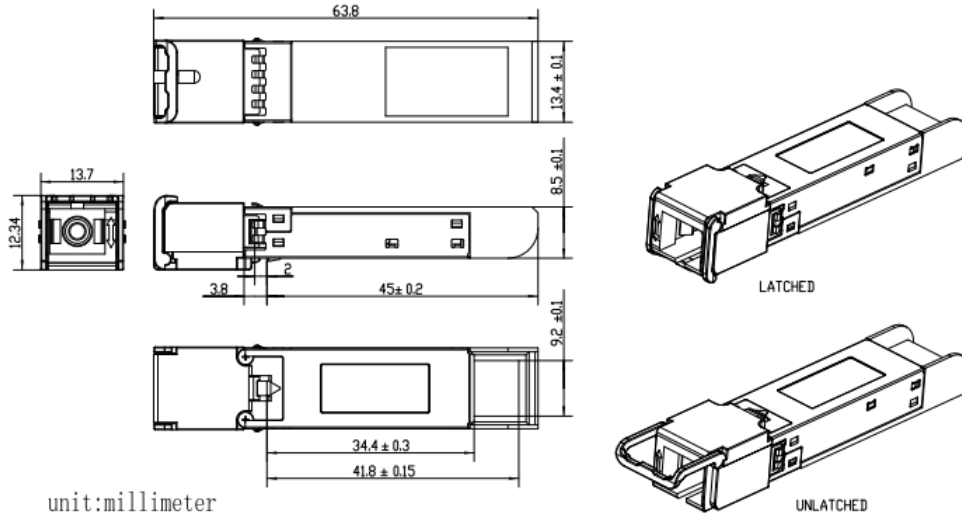
1. The RESET signal should occur in the GUARD BAND time slot and commence immediately at the end of the ONT signal.
2. The Rx BURST PACKET DETECT (BPD) asserts LOW when the RESET signal is applied; asserts HIGH when an incoming burst is detected and latches HIGH until the next RESET signal.



RSSI Timing Diagram

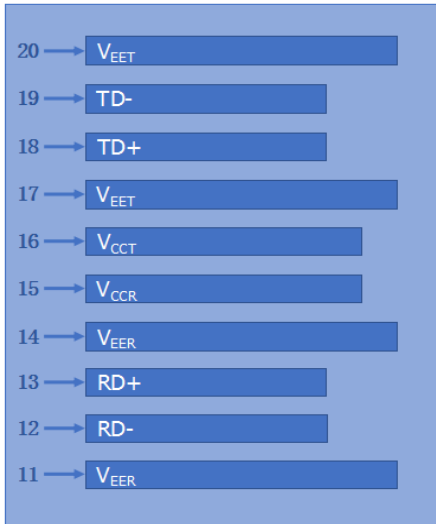
Parameter	Symbol	Min	Type	Max	Unit	Remarks
Trigger width	$T_w$	300			ns	
RSSI Trigger Delay	$T_{DELAY}$	30			ns	
I <sup>2</sup> C response time	$T_{I2C}$			500	us	

## Dimensions

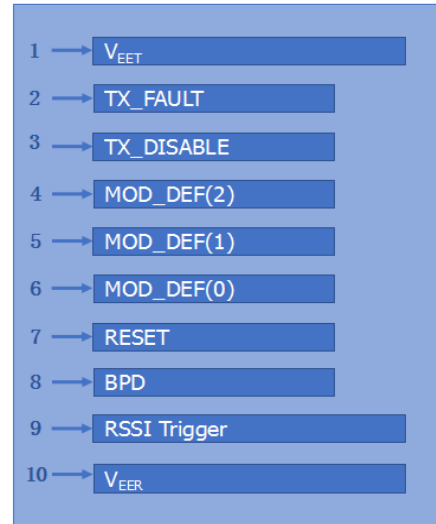
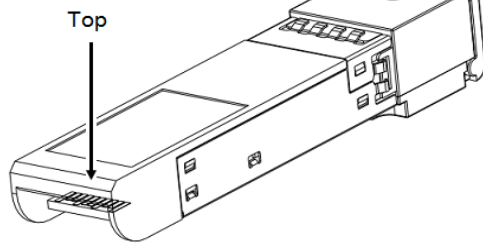


ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED  
UNIT: mm

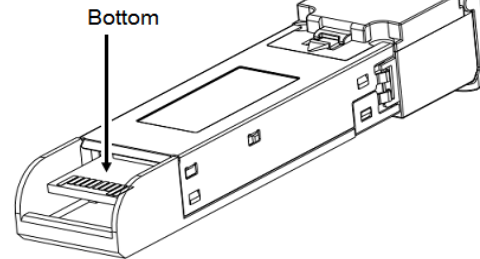
## Electrical Pad Layout



Top of Board



Bottom of Board





## Pin Assignment

PIN #	Symbol	Description	Remarks
1	V <sub>EET</sub>	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault	
3	TX_DISABLE	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 4.7kΩ-10kΩ 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