GPON ONU Optical Transceiver SFF Module

RTXM167-403

Features

- *Integrated Single fiber bi-directional optical subassembly*
- *1310nm DFB laser Burst-mode Transmitter and 1490nm APD Continuous receiver(with WDM)*
- *SFF 2x5 metallic package*
- *+3.3V single power supply*
- *Low power consumption*
- *-40 to 85°C operating ambient temperature*
- *LVPECL compatible data input/output interface*
- *LVTTL transmitter burst mode control*
- *Burst Disable:L-active*
- *LVTTL receiver signal-detected indication*
- *Class 1 Laser eye safety*
- *Excellent EMI and EMC characteristics*
- *Compliant with RoHS&WEEE*

Applications

- *Optical transceiver for Gigabit-capable Passive Optical Networks (GPON)*

ONU side

Standards

- ***ITU-T G.984.2 ClassB+***
- ***Small Form Factor Transceiver Multisource Agreement July 5,2000***

Description

The GPON ONU Transceiver is designed for Gigabit-capable Passive Optical Network（GPON）transmission. The module incorporates 1310nm burst-mode transmitter and 1490nm continuous-mode receiver.

The transmitter section uses a 1310nm DFB laser and an integrated BM laser driver which designed to perform very small burst enable/disable delay time. The laser driver also includes digital APC and temperature compensation circuit, which are used for keeping the launch optical power and extinction ratio constant over temperature and aging.

The receiver section uses an integrated 1490nm APD photodiode and preamplifier mounted together. It has the function that indicates receiver signal-detected status (active high).

An integrated WDM coupler can separate 1490nm input light and 1310nm output light.

The metallic package guarantees excellent EMI and EMC characteristics, which totally comply with international relevant standards.

Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Operating Temperature Range	T_c	^oC	-40	85
Storage Temperature Range	T_s	^oC	-40	85
Relative Humidity	RH	%	5	95
Power Supply Voltage	V_{cc}	V	0	4.6
Pin Input Voltage		V	GND	Vcc
Reciever Damage Threshold		dBm	+4	–
Lead Solder Temperature		^oC	–	260
Lead Solder Duration		S	–	10
Fiber Yield Strength		k_gf	–	0.5
Fiber Bend Radius		mm	30	–

Recommended Operating Conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Voltage	V_{cc}	V	3.13	3.3	3.47
Operating Temperature Range	T_{op}	^oC	-40	–	85

Specifications *(-40 °C <Top<85°C and 3.13V<Vcc<3.47V)*

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Electrical Characteristics						
Supply Current	I_{cc}	mA	–	–	300	
LVPECL Single Ended Data Input Swing		mV	100	–	800	1
LVPECL Single Ended Data Output Swing		mV	300	–	500	2
Differential Data input impedance		Ω	–	100	–	1
Signal Level(LVTTL H)		V	2.4	–	Vcc	
Signal Level(LVTTL L)		V	0	–	0.8	
Optical transmmiter Characteristics						
Data Rate		Mbps	–	1250	–	
Center Wavelength Range	λ_c	nm	1280	–	1350	
Spectral Width(@-20dB)	$\Delta\lambda$	nm	–	–	1	
Launch Optical Power	P_o	dBm	1	–	5	3
Off level light		dBm	–	–	-45	

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Extinction Ratio	EX	dB	10	–	–	4
Burst turn on/off time	Ton/Toff	ns	–	–	12	5
Rise/Fall time(20%~80%)	Tr/Tf	ps	–	–	260	6
$RIN_{15}OMA$		dB/Hz	–	–	-115	
Optical Return Loss Tolerance		dB	–	–	15	
Maximum reflectance		dB	–	–	-12	λ=1.31μm
Transmitter dispersion penalty	TDP	dB	–	–	1.8	7
Eye Diagram	Compliant with ITU-T G.984.2					8
Optical receive Characteristics						
Data Rate		Mbps	–	2500	–	
Receiver Sensitivity	S	dBm	–	–	-29	9
Overload Input Optical Power	P_{in}	dBm	-8	–	–	9
Center Wavelength Range	λ_c	nm	1480	1490	1500	
Receiver reflectance		dB	–	–	-12	λ=1.49μm
SD(LVTTL) Optical Dessert		dBm	-44	–	–	
SD(LVTTL) Optical Assert		dBm	–	–	-30	
LOS Hysteresis		dB	0.5	–	6	

Note1: *DC coupled internally and terminated externally (see the recommended circuit below).*

Note2: *LVPECL output,AC coupled internally (see the recommended circuit below).*

Note3: *Coupled into 9/125 SMF*

Note4: *Measured with PRBS 2^{23}-1 test pattern @1.25Gbps.*

Note5: *see Figure 1.*

Note6: *Measured with the Bessel-Thompson filter ON.*

Note7: *Transmit on 20km SMF.*

Note8: *See Figure 2.*

Note9: *Measured with PRBS 2^{23}-1 test pattern @1.25Gbps with Tx on,ER=10dB,BER=10E-12.*

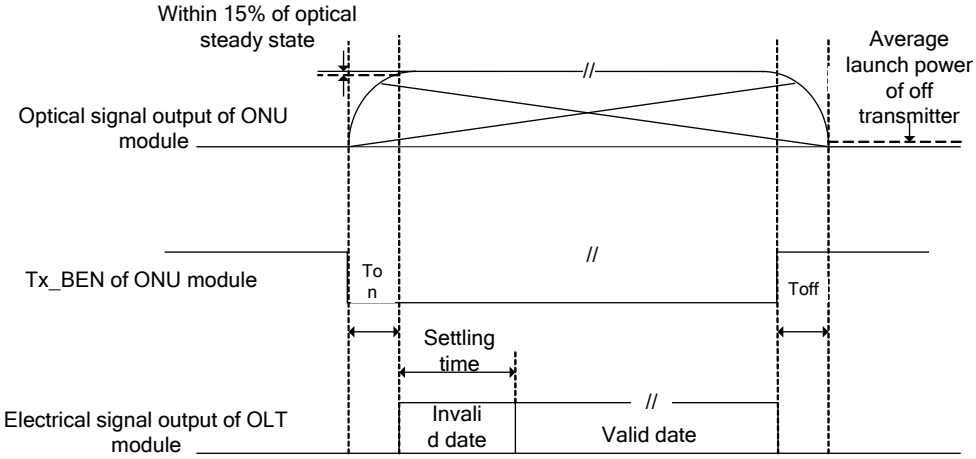


Figure1 Burst_mode Reciever Dynamic range in GPON system

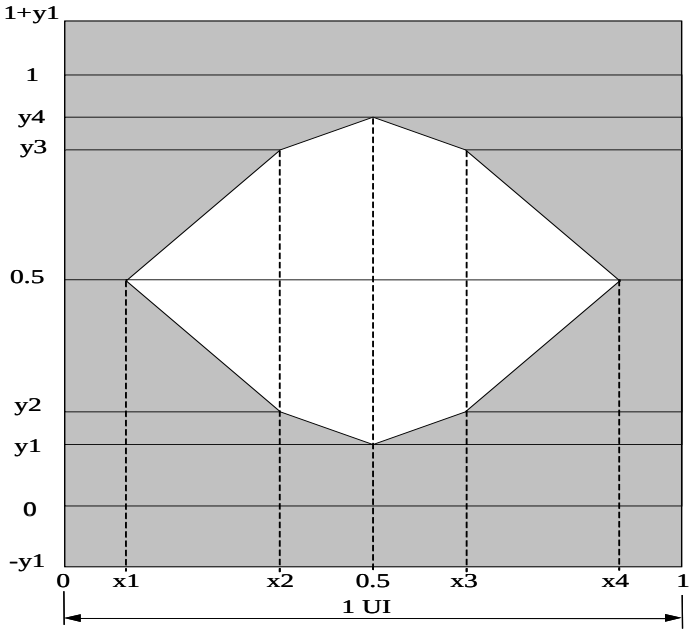


Figure2 Mask of diagram

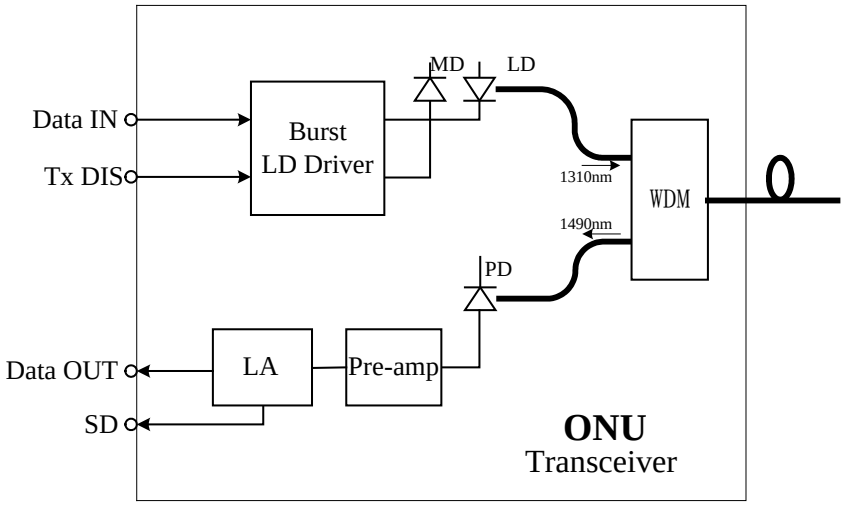
	155.52 Mbit/s	622.08 Mbit/s	1244.16 Mbit/s	2488.32 Mbit/s
x1/x4	0.10/0.90	0.20/0.80	0.22/0.78	For further study
x2/x3	0.35/0.65	0.40/0.60	0.40/0.60	For further study
y1/y4	0.13/0.87	0.15/0.85	0.17/0.83	For further study
y2/y3	0.20/0.80	0.20/0.80	0.20/0.80	For further study

Pin Description

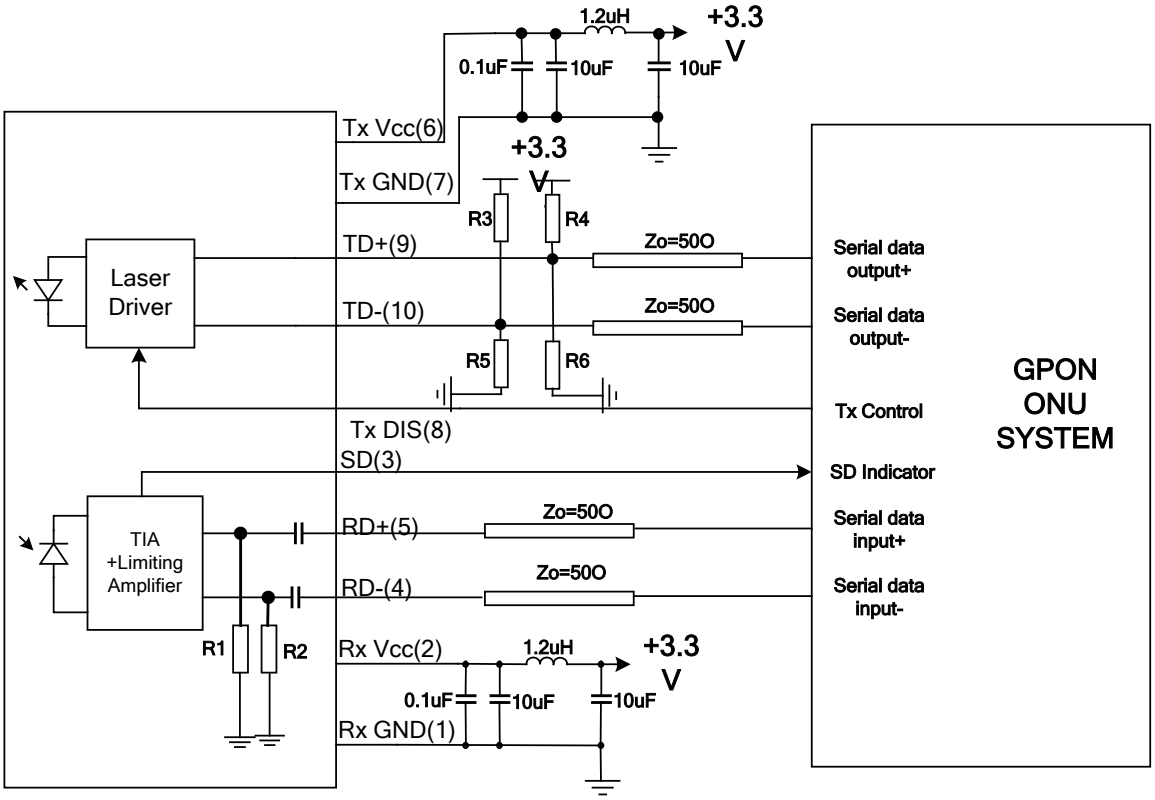
Pin	Name	Descirption	Pin	Name	Descirption
1	Rx GND	Receiver ground	6	Tx VCC	Transmitter power supply
2	Rx VCC	Receiver power supply	7	Tx GND	Transmitter ground

3	SD	LVTTL Signal detect	8	Tx DIS	LVTTL Transmitter burst mode control, “L”: Tx ON
4	RD_-	Receiver data output. (AC coupled internally)	9	TD_+	LVPECL Data input+ (DC coupled and external termination needed)
5	RD_+	Receiver data output+ (AC coupled internally)	10	TD_-	LVPECL Data input. (DC coupled and external termination needed)

Block Diagram

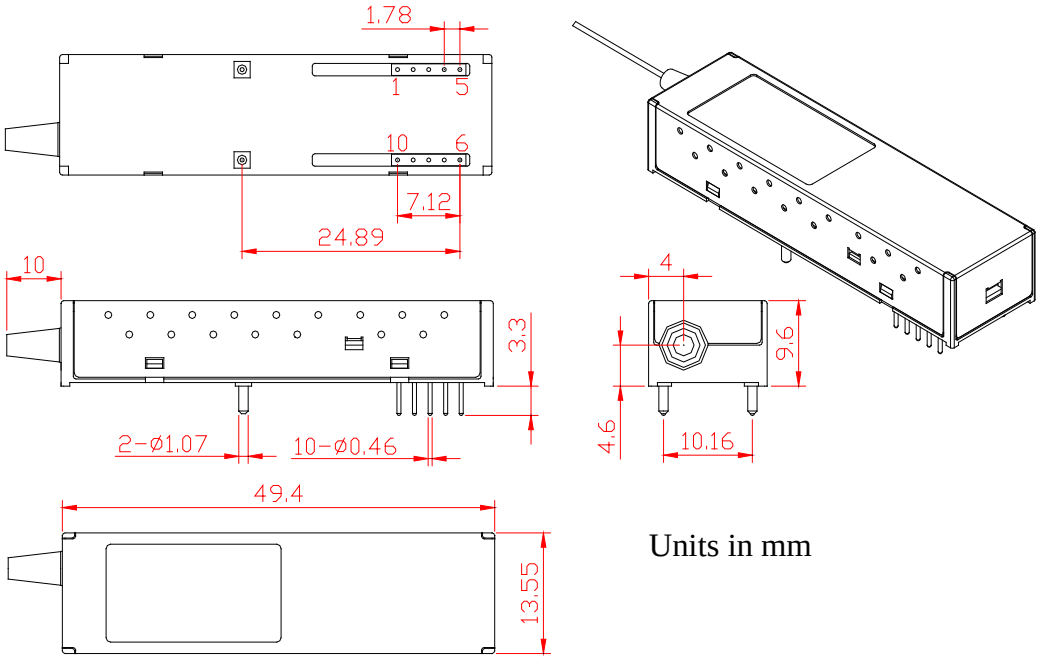


Typical Application Circuit



R1=R2=180O R3=R4=130O R5=R6=82O

Package Outline



Units in mm

Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1 (>1.5kV) – Human Body Model
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	Class 2(>4.0kV)
Electromagnetic Interference (EMI)	CISPR22 ITE Class B EN55022 Class B	Compliant with standards
Immunity	IEC61000-4-3 Class 2 EN55024	Typically show no measurable effect from a 3V/m field swept from 80 to 1000MHz applied to the transceiver without a chassis enclosure.
Eye Safety	FDA 21 CFR 1040.10 and 1040.11 UL TUV EN 60825-1	Compliant with Class 1 laser product

Ordering Information

Part No.	Specification								Application Code
	Package	Datarate	Laser	Optical Power	Detector	Sensitivity	Temp	BM control logic	
RTXM167-403	SFF 2×5	1.25Gb/s	1310nm DFB	1~ 5dBm	APD	-29dBm	-40~85°C	Tx DIS	CLASS B+

Note1: *SC/PC , SC/APC or other type of connector is optional by customer.*

Note2: *The length of pigtail is normal 540±40mm (the length of connector is not included) ,but can be customed for specific requirement.*

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