



20km EPON ONU Optical Transceiver Transceiver SFF Module

RTXM169-406

Features

- *Integrated Single fiber bi-directional optical subassembly*
- *SC receptacle optical interface*
- *1310nm DFB laser Burst-mode Transmitter and 1490nm*
- *PIN/TIA Continuous receiver(with WDM)*
- *SFF 2x5 metallic package*
- *+3.3V single power supply*
- *Low power consumption*
- *0 to 70°C operating ambient temperature*
- *LVPECL compatible data input/output interface*
- *LVTTL transmitter burst mode control*
- *LVTTL receiver signal-detected indication*
- *Class 1 Laser eye safety*
- *RoHS compliant*

Application

- *Optical transceiver for Gigabit Ethernet Passive Optical Networks (EPON) ONU side*

Standard

- *IEEE802.3ah 1000BASE-PX20*
- *Small Form Factor Transceiver Multisource Agreement July 5,2000*

Absolute Maximum Ratings

Parameter	Symbol	Unit	Min	Max
Operating Temperature Range	Tc	°C	0	70
Storage Temperature Range	Ts	°C	-40	85
Relative Humidity	RH	%	5	95
Power Supply Voltage	Vcc	V	0	4.6
Pin Input Voltage		V	GND	Vcc
Receiver Damage Threshold		dBm	+4	–
Lead Solder Temperature		°C	–	260
Lead Solder Duration		S	–	10

Recommended operating conditions

Parameter	Symbol	Unit	Min	Typ	Max
Operating Voltage	Vcc	V	3.13	3.3	3.47
Operating Temperature Range	Top	°C	0	–	70
Operating Data Rate	Gbps		–	1.25±100ppm	–

Specifications (0°C < Top < 70°C and 3.13V < Vcc < 3.47V)

Parameter	Symbol	Unit	Min	Typ	Max	Notes
Electrical Characteristics						
Supply Current	Icc	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 transmitter Characteristics						
Data Rate		Mbps	–	1250	–	
Center Wavelength Range	λc	nm	1280	–	1350	

Spectral Width(@RMS)	$\Delta\lambda$	nm	-	-	1	
Launch Optical Power	Po	dBm	0	-	+4	3
Off level light		dBm	-	-	-45	

Extinction Ratio	EX	dB	10	-	-	4
Burst turn on/off time	Ton/Toff	ns	-	-	16	5
Rise/Fall time (20%~80%)	Tr/Tf	ps	-	-	260	6
RIN15OMA		dB/Hz	-	-	-113	
Optical Return Loss Tolerance		dB	-	-	15	
Maximum reflectance		dB	-	-	-12	$\lambda=1.31\mu\text{m}$
Transmitter dispersion penalty	TDP	dB	-	-	1.8	7
Eye Diagram	Compliant with IEEE Std 802.3ah					8

Optical receive Characteristics

Data Rate		Mbps	-	1250	-	
Receiver Sensitivity	S	dBm	-	-	-26.5	9
Overload Input Optical Power	Pin	dBm	-3	-	-	9
Center Wavelength Range	λ_c	nm	1480	1490	1500	
Receiver reflectance		dB	-	-	-12	$\lambda=1.49\mu\text{m}$
SD(LVTTL)	Optical Dessert	dBm	-40	-	-	
	Optical Assert		-	-	-27	
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 27-1 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 27-1 test pattern @1.25Gbps with Tx on, ER=10dB, BER=10E-12.

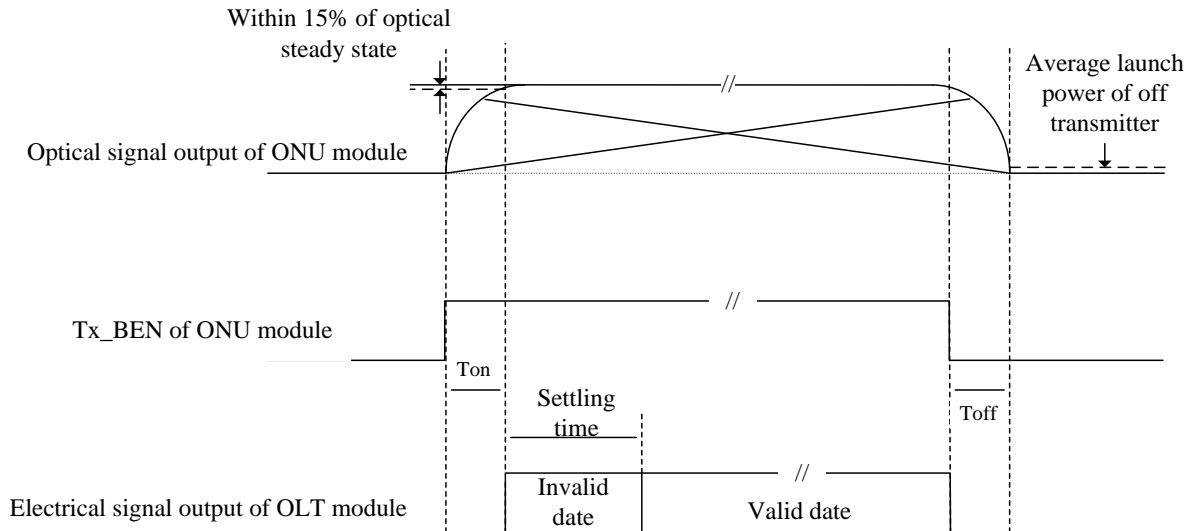
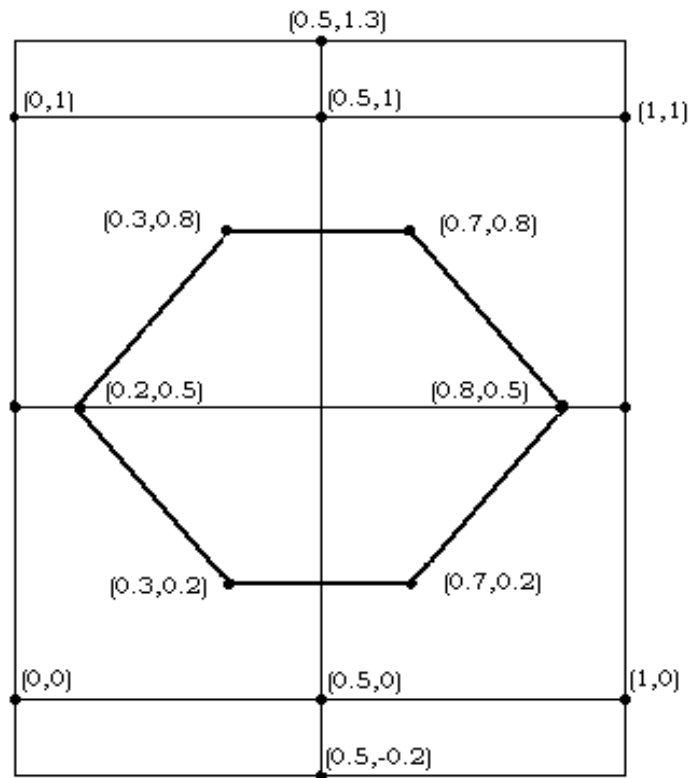


Figure1 Burst_mode Receiver Dynamic range in EPON system



Mask of diagram

Figure2 Mask of diagram

Pin Description(2×5)

Pin Name	Description	Pin Name	Description
1	Rx GND Receiver ground	6	Tx V _{CC} Transmitter power supply
2	Rx V _{CC} Receiver power supply	7	Tx GND Transmitter ground
3	SD LVTTTL Signal detect	8	Tx EN LVTTTL Transmitter burst mode control, "H": 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

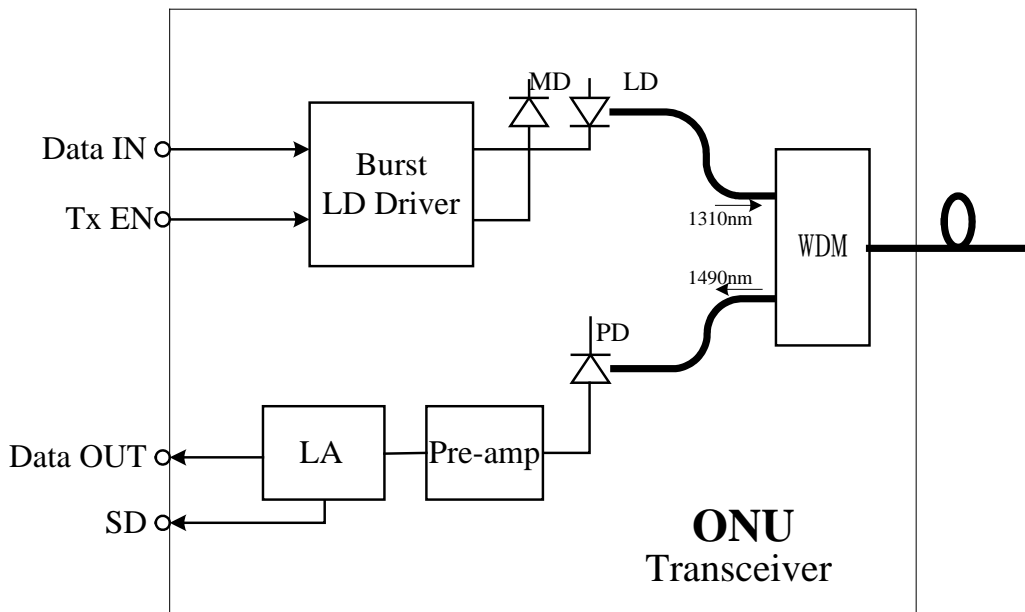


Figure3 Functional block diagram

Typical Application Circuit

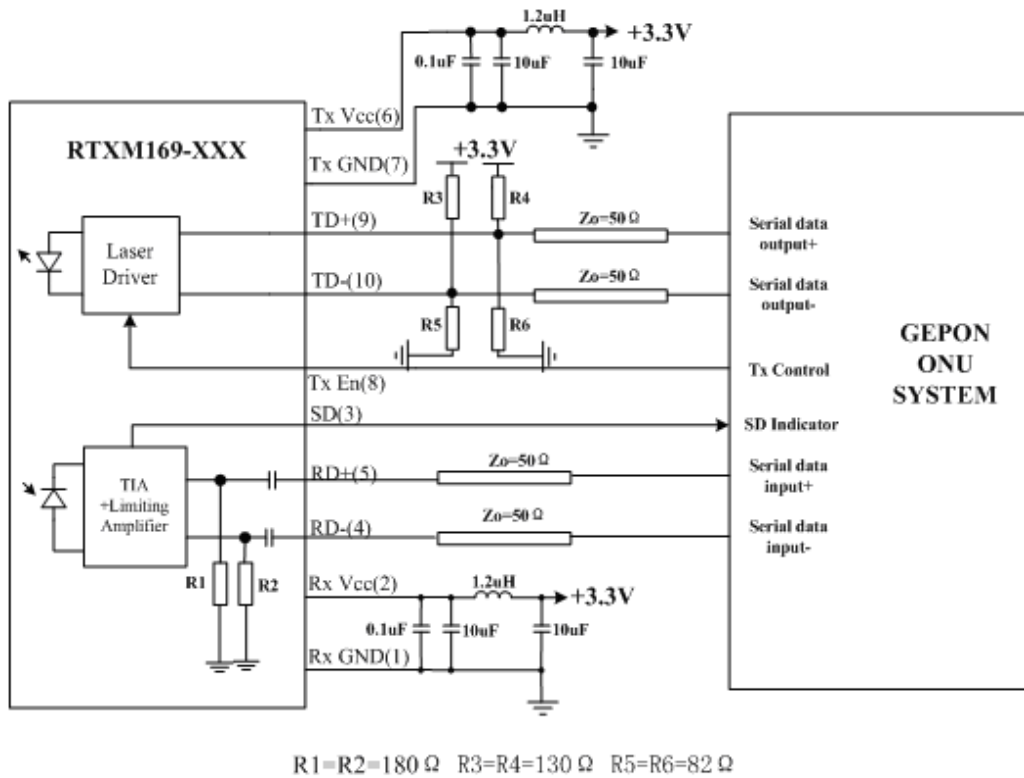


Figure4 Typical application circuit

Package Outline *(Units: mm)*

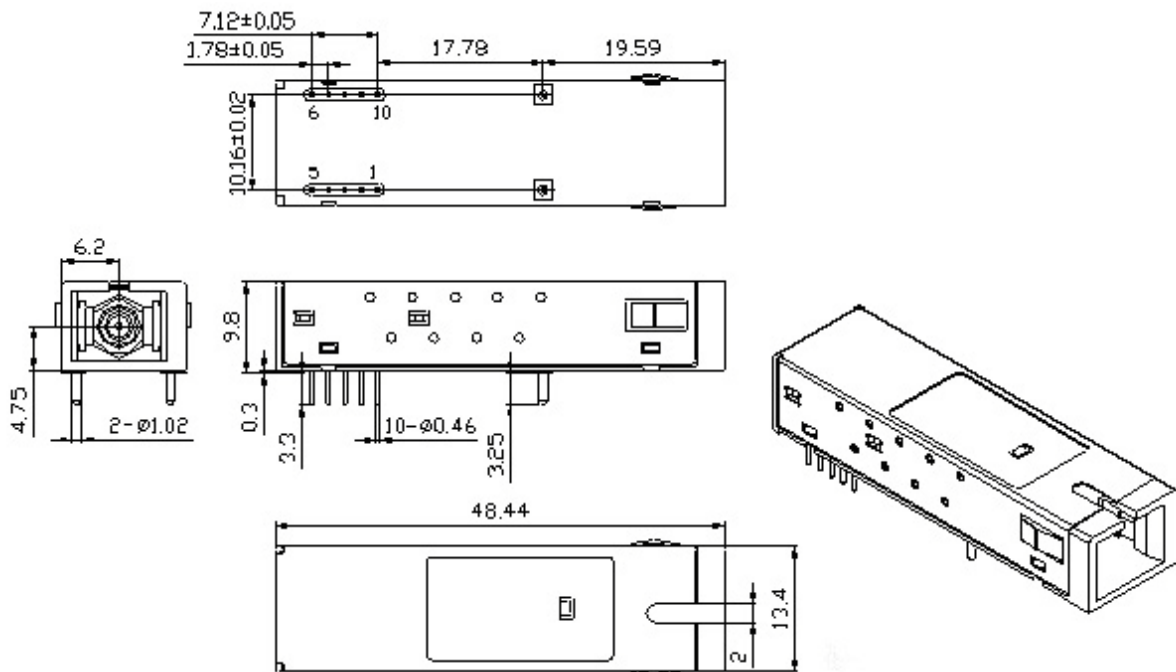


Figure5 Package outline

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.	Specifications									Application
	Pack	Rate	Tx	Pout	Rx	S	Top	Reach	others	
RTXM169-406	SFF 2x5	1.25G	1310nm DFB	0 ~ +4dBm	PIN < -26.5dBm	0~70°C	20km	Tx EN1	1000BASE-PX20	

Note1: The "LVTTTL transmitter burst mode control" is set as "Tx Enable at high level"

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