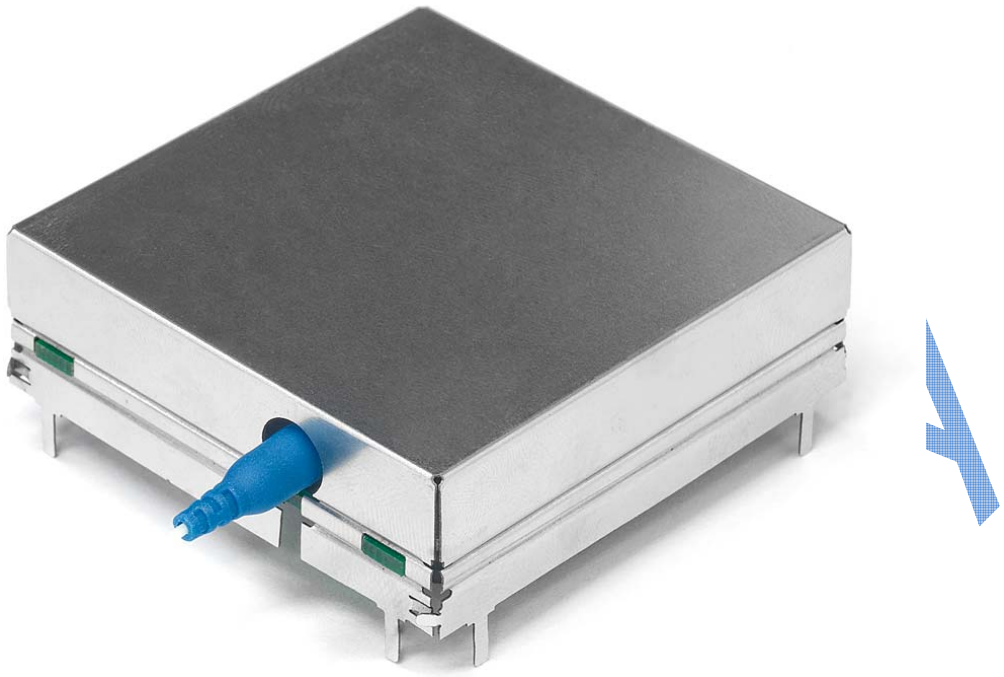

GPON ONU Triplexer Transceiver

RTXM170-611

Features

- *Single Fiber Triplexer*
- *1.25Gbps data upstream /2.5Gbps data downstream /45~1002MHz CATV analog signal downstream*
- *Burst mode transmission with 1310nm DFB laser*
- *Continuous mode digital receiver with 1490nm APD-TIA*
- *Analog CATV receiver with 1555nm InGaAs PIN detector*
- *+3.3V /+12V power supply*
- *CML compatible data input*
- *CML compatible data output*
- *CML transmitter burst-mode control*
- *LVTTL I2C DDM interface*
- *LVTTL TX_SD and RX_SD*
- *Soft Enable/Disable TX and Video*
- *Fully RoHS Compliant*
- *All metal housing for superior EMI performance*
- *Excellent ESD/TVS protection*
- *-40℃ to +85℃ operating temperature*
- *1×20 Pin and 2"×2" Package*
- *3PIN RF output connector*
- *Real time monitoring of:*
  - *Temperature*
  - *Supply voltage*
  - *Laser bias current*
  - *Transmitted optical power*
  - *Received optical power*
  - *Video Received optical power*
  - *RF Output level*

Applications

- ***GPON ONU Side***
- ***Voice / Data / Video FTTx***

Standards

- ***ITU-T G.984.2 Class B+***
- ***ITU-T G.984.5***
- ***SFF-8472 Rev 10.2***
- ***RoHS 6***

Descriptions

RTXM170-611 GPON ONU Triplexer Transceiver is designed for Gigabit-capable Passive Optical Network (GPON). The Triplexer comprise of a Burst Mode optical transmitter, a Continuous Mode optical receiver and an Analog CATV receiver.

The Digital transmitter uses a 1310nm DFB laser diode and an integrated Burst Mode laser driver which designed to perform very small burst enable/disable delay time. The transmitter also incorporates an Automatic Power Control(APC) circuit and an Automatic Temperature Control(ATC) circuit to keep the launch optical power and extinction ratio over an operating temperature of -40~+85℃.

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

The Analog CATV receiver uses a 1555nm PIN photodiode and a high performance RF amplifier. It contains an Automatic Gain Control(AGC) circuit to keep the output effective voltage level over an input optical power range of -8dBm~+2dBm and contains a Spectrum Balance Network(SBN) circuit to keep the output tilt over a wideband of 45MHz~1002MHz.

The Triplexer features a digital diagnostic and control function through a digital serial I2C interface.

Block Diagram

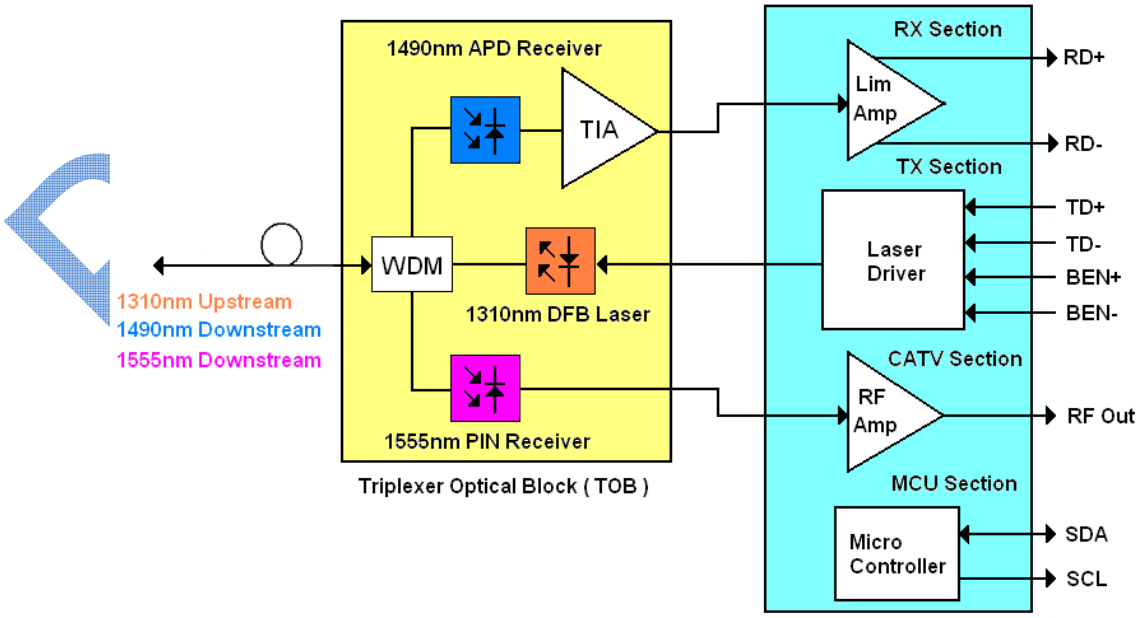

Figure 1 Transceiver Functional Diagram

Optical and Electrical Characteristics *(T_O =-40℃ to +85 ℃)*

Parameter	Symbol	Unit	Min	Typ	Max	Note
Digital Transmitter						
Supply Voltage	V_{CC_T}	V	3.15	3.3	3.45	-
Supply Current	I_{CC_T}	mA	-	-	200	-
Bit Rate	-	Gbps	-	1.25	-	-
Operation Wavelength	λ_p	nm	1290	1310	1330	
Spectral Width (@ -20dB)	$\Delta\lambda$	nm	-	-	1	-
SMSR	-	dB	30	-	-	-
Launch Optical Power	P_O	dBm	+0.5	-	5	1
Off Level Light	P_{OFF}	dBm	-	-	-40	-
Extinction ratio	ER	dB	10	-	-	2
Burst turn on Time	T_{ON}	ns	-	-	12.8	3
Burst turn off Time	T_{OFF}	ns	-	-	12.8	3
Rise/Fall time	-	ps	-	-	260	1,4
Input Differential Voltage	-	mv	200		1600	5
Input Differential Impedance	Z_i	Ω	90	100	110	-
Transmitter Dispersion Penalty	T_{DP}	dB	-	-	1	6
Transmitter Eye Diagram		Compliant with ITU-T G.984.2				7
Digital Receiver						
Supply Voltage	V_{CC_R}	V	3.15	3.3	3.45	-
Supply Current	I_{CC_R}	mA	-	-	120	-
Bit Rate	-	Gbps	-	2.5	-	-
Operation Wavelength	λ_p	nm	1480	1490	1500	-
Sensitivity	P_{Sen}	dBm	-	-	-28	8
Overload Input Optical Power	P_{Over}	dBm	-8	-	-	-
Damage Input Optical Power	P_{Dam}	dBm	-	-	+5	-
Signal Detect Assert Level	P_{as}	dBm	-	-	-31	9
Signal Detect De-assert Level	P_{das}	dBm	-45	-	-	10
Signal Detect Hysteresis	P_{as} - P_{das}	dB	0.5	-	6	-
Signal Detect Assert Time	T_{Sda}	us	-	-	10	-
Signal Detect De-assert Time	T_{Sdd}	us	-	-	10	-
Output Differential Voltage	-	mv	300	-	1600	11
Output Differential Impedance	Z_O	Ω	90	100	110	-
Analog Receiver						
Supply Voltage	V_{DD}	V	+11.7	+12	+13.2	-
Supply Current	I_{DD}	mA	-	130	190	-
Operation Wavelength	λ_p	nm	1550	1555	1560	-
Frequency Range	F_{op}	MHz	45	-	1002	-

Input Optical Power Dynamic Range	P_{in}	dBm	-8	-	+2	-
Damage Input Optical Power	P_{Dam}	dBm	-	-	+5	-
RF output tilt	L_T	dB	2	-	7	12
RF output level	L_O	dBmV	18	-	-	13
CNR	CNR	dB	46	-	-	14
C/CSO	CSO	dBc	56	-	-	15
C/CTB	CTB	dBc	56	-	-	15
Output Return Loss	L_O	dB	14	-	-	16
Output Impedance	Z_O	Ω	-	75	-	-

Note 1: *Coupled into 9/125um.*

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

Note 3: *Refer to Timing Parameter Definition in Burst Mode Sequence, See Figure 4.*

Note 4: *Measured with the Bessel-Thompson filter ON.*

Note 5: *DC coupled internally and terminated internally (see the recommended circuit below).*

Note 6: *Transmit on 20Km SMF.*

Note 7: *See Figure 5.*

Note 8: *Measured with PRBS 2^{23}-1 test pattern @ 2.5Gbps with TX on, ER=10dB, BER=10E-12.*

Note 9: *An increase in optical power above the level will cause the Signal Detect output to switch from a low state to a high state, Refer to Timing Parameter Definition of RX ALM Assert/Dessert time, see Figure 6.*

Note 10: *A decrease in optical power below the level will cause the Signal Detect output to switch from a high state to a low state, Refer to Timing Parameter Definition of RX ALM Assert/Dessert time, see Figure 7.*

Note 11: *AC coupled internally (see the recommended circuit below).*

Note 12: *Test from 45MHz to 1002MHz.*

Note 13: *Test at -8~+2dBm Optical Input Power，The 40 analog(NTSC) channels（OMI4.3%） and 63 digital(64 or 256QAM) channels(OMI2.15%). The equivalent value of the digital channels RF level is 6dB lower than the analog channels.*

Note 14: *Test at -8dBm Optical Input Power, The 40 analog(NTSC) channels（OMI4.3%）and 63 digital(64 or 256QAM) channels(OMI2.15%). The equivalent value of the digital channels RF level is 6dB lower than the analog channels.*

Note 15: *Test at +2dBm Optical Input Power, The 40 analog(NTSC) channels（OMI4.3%）and 63 digital(64 or 256QAM) channels(OMI2.15%). The equivalent value of the digital channels RF level is 6dB lower than the analog channels.*

Note 16: *Test from 45MHz to 1002MHz.*

Regulatory Compliance

Feature	Test Method	Performance
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2	LV4(Air discharge 15kV,Contact discharge 8kV) Performance criterion B
Electromagnetic Interference (EMI)	CISPR22 ITE Class B EN55022 Class B FCC Part15 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.
Laser Eye Safety	FDA 21 CFR 1040.10 And 1040.11 EN60950 TUV EN60825-1,2	Compliant with Class 1 laser product
RoHS	2002/95/EC 4.1&4.2	Compliant with standards

Ordering Information

Part No.	Specifications												Application
	Package	Data rate Bandwidth	Laser	Optical Power	Detector	Sensitivity	Video Detector	AGC Range	RFcon	Top	Reach	Other	
RTXM170-611	1×20 SFF	TX:1.25Gb/S RX1:2.5 Gb/s RX2:45~1002Mhz	1310nm DFB	+0.5~ +5dBm	1490nm APD-TIA	< -28 dBm	1555nm PIN	-8~ +2dBm	3PIN	-40~ 85 °C	20Km	DDM	GPON ONU Triplexer

Note 1: *The length of pigtail is normal 600mm±40mm (the length of connector is included)*

Note2 : *Min is ambient temperature; max is the module case temperature.*

Edition 2015-12-08
Published by Wuhan Telecommunication Devices Co.,Ltd.