

## GPON ONU Triplexer Transceiver

*RTXM170-601-C45*

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### 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*
- *LVPECL 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*
- *0°C to 85°C operating case 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 9.5*
- *RoHS 6*

## Descriptions

RTXM170-601-C45 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.

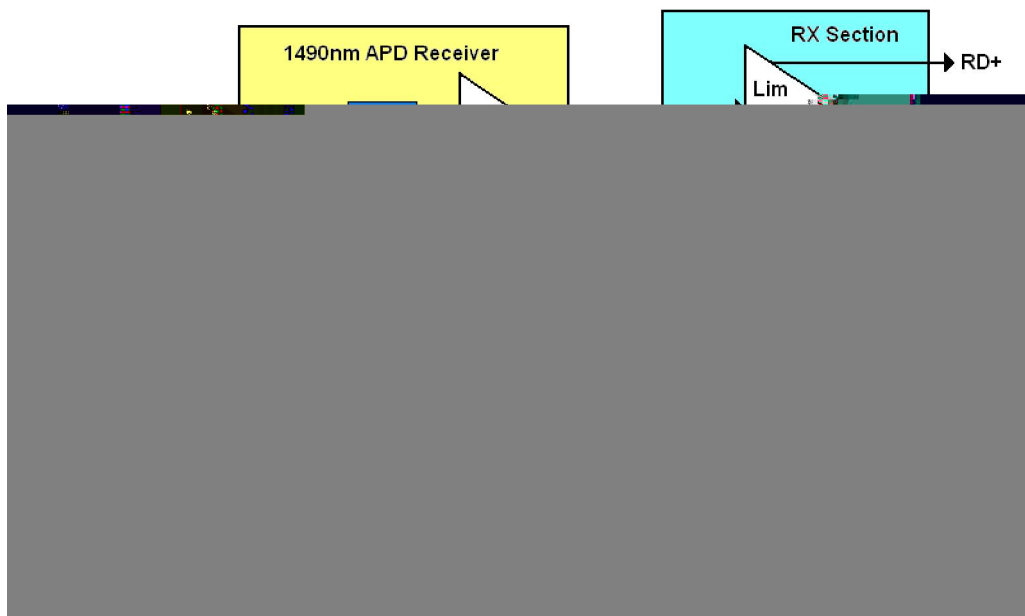
The Digital transmitter uses a 1310nm DFB laser diode and an integrated Burst Mode laser driver which designed to perform very small burst enable/disable delay time. The transmitter also incorporates an Automatic Power Control(APC) circuit and an Automatic Temperature Control(ATC) circuit to keep the launch optical power and extinction ratio over an operating case temperature of 0~ + 85°C.

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~ 1002Hz.

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

## Block diagram



**Figure 1** Transceiver Functional Diagram

# RTXM170-601-C45

## Optical and Electrical Characteristics (T<sub>0</sub> = 0°C to +85°C)

Parameter	Symbol	Unit	Min	Typ	Max	Note
<b>Digital Transmitter</b>						
Supply Voltage	V <sub>CC_T</sub>	V	3.13	3.3	3.47	-
Supply Current	I <sub>CC_T</sub>	mA	-	-	200	-
Bit Rate	-	Gbps	-	1.25	-	-
Operation Wavelength	λ	nm	1290	1310	1330	-
Spectral Width (@ -20dB)	Δλ	nm	-	-	1	-
SMSR	-	dB	30	-	-	-
Launch Optical Power	P <sub>O</sub>	dBm	0.5	-	5	1
Off Level Light	P <sub>OFF</sub>	dBm	-	-	-45	-
Extinction ratio	ER	dB	10	-	-	2
Burst turn on Time	T <sub>ON</sub>	ns	-	-	12.8	3
Burst turn off Time	T <sub>OFF</sub>	ns	-	-	12.8	3
Rise/Fall time	-	ps	-	-	260	1,4
TX SD Delay time	T <sub>TXSD_D</sub>	ns	-	-	1000	-
Tw_burst_en - Tw_tx_sd	-	ns	-	-	350	-
TX SD Assert Time	T <sub>TXSD_O</sub>	S	-	-	3	5
TX Data Input Differential Voltage	-	mv	200	-	1600	6
TX Burst Input Differential Voltage	-	mv	200	-	1600	-
Input Differential Impedance	Z <sub>i</sub>	-	90	100	110	-
Transmitter Dispersion Penalty	T <sub>DP</sub>	dB	-	-	1	7
Transmitter Eye Diagram Margin	-	-	8%	-	-	-
Transmitter Eye Diagram	Compliant with ITU-T G.984.2					8
<b>Digital Receiver</b>						
Supply Voltage	V <sub>CC_R</sub>	V	3.13	3.3	3.47	-
Supply Current	I <sub>CC_R</sub>	mA	-	-	120	-
Bit Rate	-	Gbps	-	2.5	-	-
Operation Wavelength	λ	nm	1480	1490	1500	-
Sensitivity	P <sub>Sen</sub>	dBm	-	-	-28	9
Overload Input Optical Power	P <sub>Over</sub>	dBm	-8	-	-	-
Damage Input Optical Power	P <sub>Dam</sub>	dBm	-	-	+5	-
Signal Detect Assert Level	P <sub>as</sub>	dBm	-	-	-31	10
Signal Detect De-assert Level	P <sub>das</sub>	dBm	-45	-	-	11
Signal Detect Hysteresis	P <sub>as</sub> - P <sub>das</sub>	dB	0.5	-	6	-
Signal Detect Assert Time	T <sub>Sda</sub>	us	-	-	10	-
Signal Detect De-assert Time	T <sub>Sdd</sub>	us	-	-	10	-
Signal Detect Assert Voltage	V <sub>Sda</sub>	V	2.4	-	3.3	-
Signal Detect De-Assert Voltage	V <sub>Sdd</sub>	V	0	-	0.4	-

# RTXM170-601-C45

Output Differential Voltage	-	mv	300	-	1200	12
Output Differential Impedance	$Z_0$		90	100	110	-
<b>Analog Receiver</b>						
Supply Voltage	$V_{DD}$	V	+10.8	+12	+13.2	-
Supply Current	$I_{DD}$	mA	-	130	180	-
Operation Wavelength	$\rho$	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	13
RF output level	$L_O$	dBmV	17	20	23	14
RF offset Adjust Range	$L_A$	dBmV	10		20	14
CNR	CNR	dB	46	-	-	15
C/CSO	CSO	dBc	56	-	-	16
C/CTB	CTB	dBc	56	-	-	16
RF Output Return Loss	$RL_O$	dB	14	-	-	17
Output Impedance	$Z_0$		-	75	-	-
<b>IIC Interface</b>						
IIC Clock Frequency	$F_{IIC}$	KHz	-	400	-	-
IIC Clock Stretching	-	us	-	-	500	-
Data Hold Time	-	ns	120	-	-	-
IIC Bus Release	-	-	9 Clock Signal			-

*Note 1:*

*Note 2:*

*Note 3:*

*Note 4:*

*Note 5:*

*Note 6:*

*Note 7:*

*Note 8:*

*Note 9:*

*Note 10:*

*Note 11:*

*Note 12:*

*Note 13:*

*Note 14:*

## 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	
RTXM170-601 -C45	1×20 SFF	TX: 1.25Gb/S RX1: 2.5 Gb/s RX2: 45~1002MHz	1310nm DFB	+0.5~ +5dBm	1490nm APD-TIA	< -28dBm	1550nm PIN	-8~ +2dBm	3 PIN	0~ 85°C	20Km DDM	GPON ONU Triplexer

Note 1 :

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Note 2 :

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