

GPON Triplexer Optical Module

Product Features

- Support ITU-T G.984.2/G.984.5 GPON Networks with video application
- Single fiber triple directional data links with 1.244Gbps Tx, 2.488Gbps Rx and 1G bandwidth analog video Rx
- Up to 20Km reach
- 1310nm burst-mode transmitter with DFB laser
- 1490nm continuous-mode receiver with APD-TIA
- 1555nm analog video receiver with ACG operation of 47M~1003MHz bandwidth
- 2-wire interface for integrated digital diagnostic Monitoring
- 2x2 inch TRIPLEXER package with SC/APC pigtail optical interface
- Support RX_SD, TX_SD PIN definitions
- RF_out in PIN interface
- +3.3V and +12V power supply
- Operating case temperature: 0~70°C for commercial or -40~85°C for industrial
- RoHS6 compliance



Operating Condition

Parameter	Unit	Min.	Typical	Max.
Storage Temperature	°C	-40		85
Operating Case Temp for C-temp	°C	0		70
Operating Case Temp for I-temp	°C	-40		85
3.3V Power Supply Voltage	V	3.15	3.3	3.45
3.3V Supply Current	mA			350
12V Power Supply Voltage	V	11.4	12	13.2
12V Supply Current for Video	mA			200
Analog Video Bandwidth	MHz	47		1003
Bit Rate for Digital Tx	MHz		1244.16	
Bit Rate for Digital Rx	MHz		2488.32	
Soldering Temperature (10s)	°C			260
HBM ESD Sensitivity	V	1000		

Characteristics

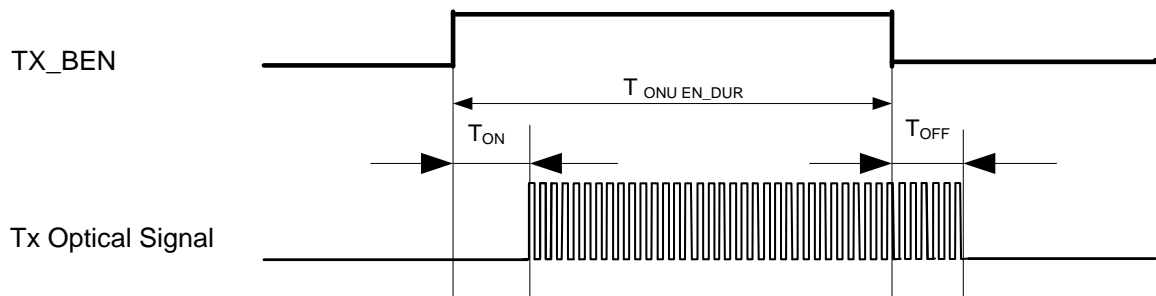
All performance is specified at whole working temperature and conditions

Parameter	Unit	Min.	Typical	Max.
Digital Transmitter				
TX Central Wavelength	nm	1290	1310	1330
Spectral Width (-20dB)	nm			1
Side Mode Suppression Ratio (SMSR)	dB	30		
Mean Launched Power	dBm	0.5		5
Mean Launched Power (TX Off)	dBm			-45
Extinction Ratio	dB	10		
Optical Return Loss Tolerance	dB	-15		
Transmitter and dispersion Penalty	dB			1
Transmitter Mask (PRBS2 ²³ -1 @ 1.244Gbps)	Compliant With ITU-T G984.2			
Digital Receiver				
Receive Wavelength	nm	1480	1490	1500
Sensitivity (PRBS2 ²³ -1 @ 2.488G, ER=8.2dB, BER<10 ⁻¹⁰)	dBm			-28
Overload (PRBS2 ²³ -1 @ 2.488G, ER=8.2dB, BER<10 ⁻¹⁰)	dBm	-8		
Signal Detected Assert Level	dBm			-29
Signal Detected De-assert Level	dBm	-45		
SD Hysteresis	dB	0.5		6
Video Channel Plans				
Frequency Range (Bandwidth)	MHz	47		1003
Receiver Wavelength		1550	1555	1560
Responsivity	A/W	0.8		
Analog Channels (OMI = 4.3%/channel)			40	
Digital Channels (OMI = 2.15%/channel)			63	
Total OMI			22.75%	
Channel Bandwidth	MHz		4	
Channel Spacing	MHz		6	
Video PD Monitor Accuracy (input -10~-2dBm)	dB			1
Received Average Optical Power	dBm	-8		2
RF Channel Output Power (at 450 MHz)	dBmV	18		23

RF Total	dBuV	94		100
RF Tilt (47M~1003M)	dB	2		7
S22 Output Return Loss (75Ω)	dB	14		
Distortions CSO	dBc			-55
Distortions CTB	dBc			-55
Carrier to Noise Ratio (CNR at OMI=3.5% at -5dBm)	dB	46		
Digital Channel Plans				
Digital Channels (OMI = 2.8%/channel)			135	
Total OMI			23%	
Received Average Optical Power	dBm	-9		2
RF Channel Output Power (at 450 MHz)	dBmV	13		18
RF total output	dBuV	93		99
RF Tilt (47M~1003M)	dB	2		7
S22 Output Return Loss (75Ω)	dB	14		
Distortions CSO	dBc			-48
Distortions CTB	dBc			-48
Carrier to Noise Ratio (CNR at OMI=2.8%, -9dBm)	dB	40		
Electrical Interface Characteristics				
Data Input Swing Differential/TX	mV	200	-	2000
Data Output Swing Differential/RX	mV	400		1600
Date Differential Impedance	Ω	90	100	110
LVTTL Output High	V	2.4		Vcc
LVTTL Output Low	V	0		0.4
LVTTL Input High	V	2.0		Vcc+0.3
LVTTL Input Low	V	0		0.8
Timing Characteristics				
Turn On Time at Burst mode (T _{ON})	ns			12.8
Turn Off Time at Burst mode (T _{OFF})	ns			12.8
TX-SD Assert Time (T _{TXSD_ON})	ns			100
TX-SD De-assert Time (T _{TXSD_OFF})	ns			100
RX-SD Assert Time (T _{LOSA})	us			100
RX-SD De-assert Time (T _{LOSD})	us			100
Isolation and Crosstalk				
1555nm external to 1490nm Rx Isolation	dB	32		
1490nm external to 1555nm Rx Isolation	dB	32		
1310nm external to 1555nm Rx	dB	40		

Isolation				
1310nm external to 1490nm data Isolation	dB	30		
1310nm Tx to 1490nm Rx Optical Crosstalk	dB			47
1310nm Tx to 1555nm Rx Optical Crosstalk	dB			47

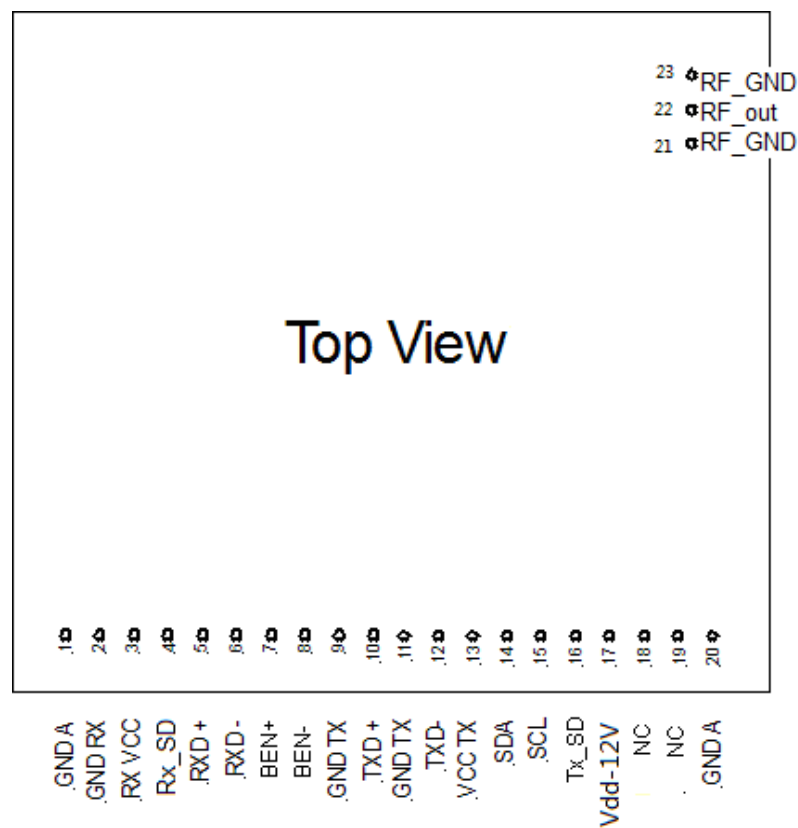
Burst Mode Transmitter Timing (transmitter on when TX_Burst high)



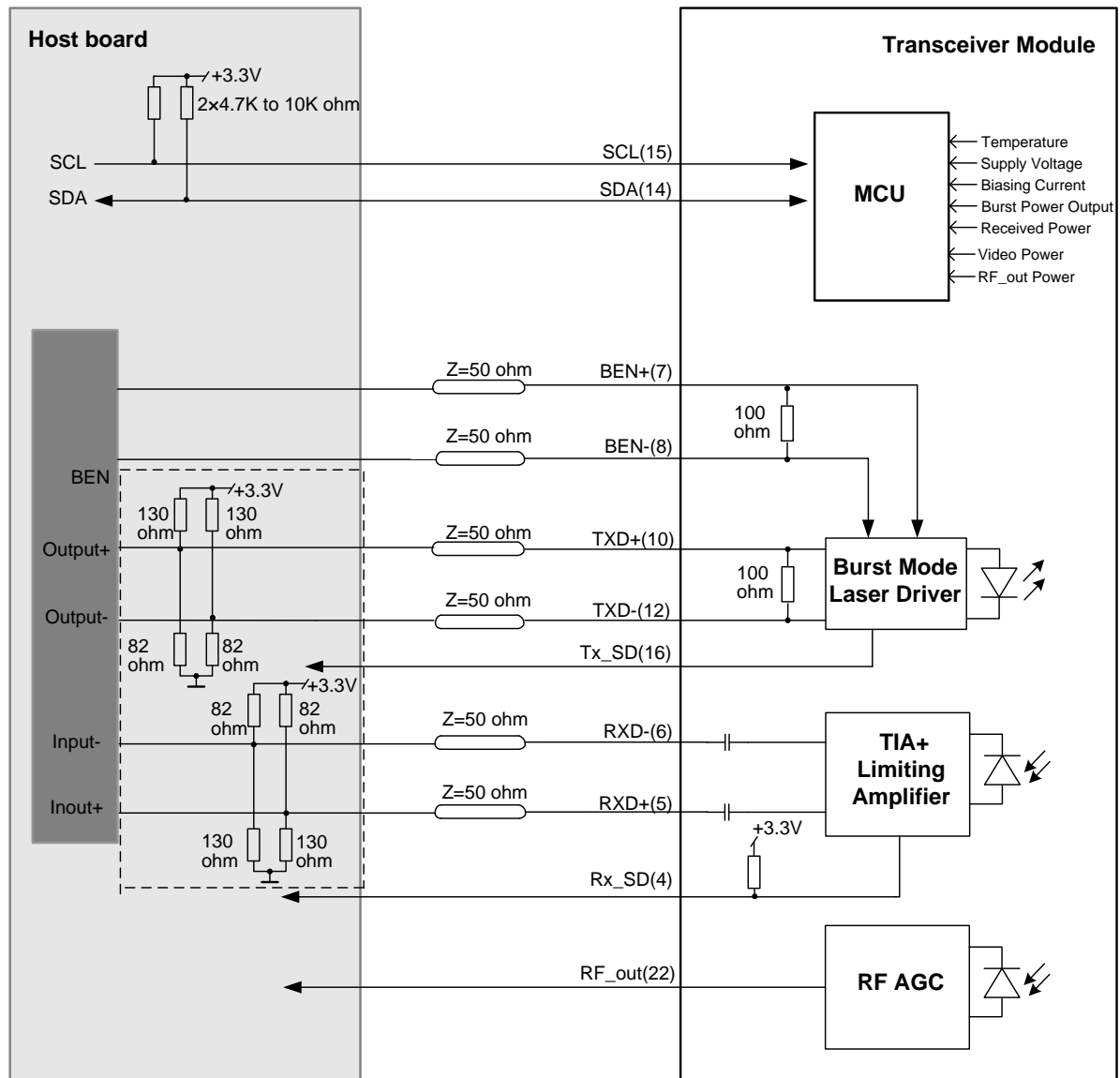
PIN Definition

Pin No.	Symbol	Level / Logic	Description
1	GND_A		Common Ground
2	GND_Rx		Digital Rx ground
3	Vcc_Rx		Digital Rx Vcc
4	RX_SD	LVTTTL-O	1490nm Rx Signal Detect Indication, active high when received signal
5	RXD+	CML-O	Receiver Non-Inverted Data Output, AC-Coupled
6	RXD-	CML-O	Receiver Inverted Data Output, AC-Coupled
7	BEN+	LVPECL-I	Burst Non-Inverted Enable Input, AC-Coupled
8	BEN-	LVPECL-I	Burst Inverted Enable Input, AC-Coupled
9	GND_Tx		Digital Tx ground
10	TXD+	LVPECL-I	Transmitter Non-Inverted Data Input, DC-Coupled, 100Ω differential termination
11	GND_Tx		
12	TXD-	LVPECL-I	Transmitter Inverted Data Input, DC-Coupled, 100Ω differential termination
13	Vcc_Tx		Digital Tx Vcc

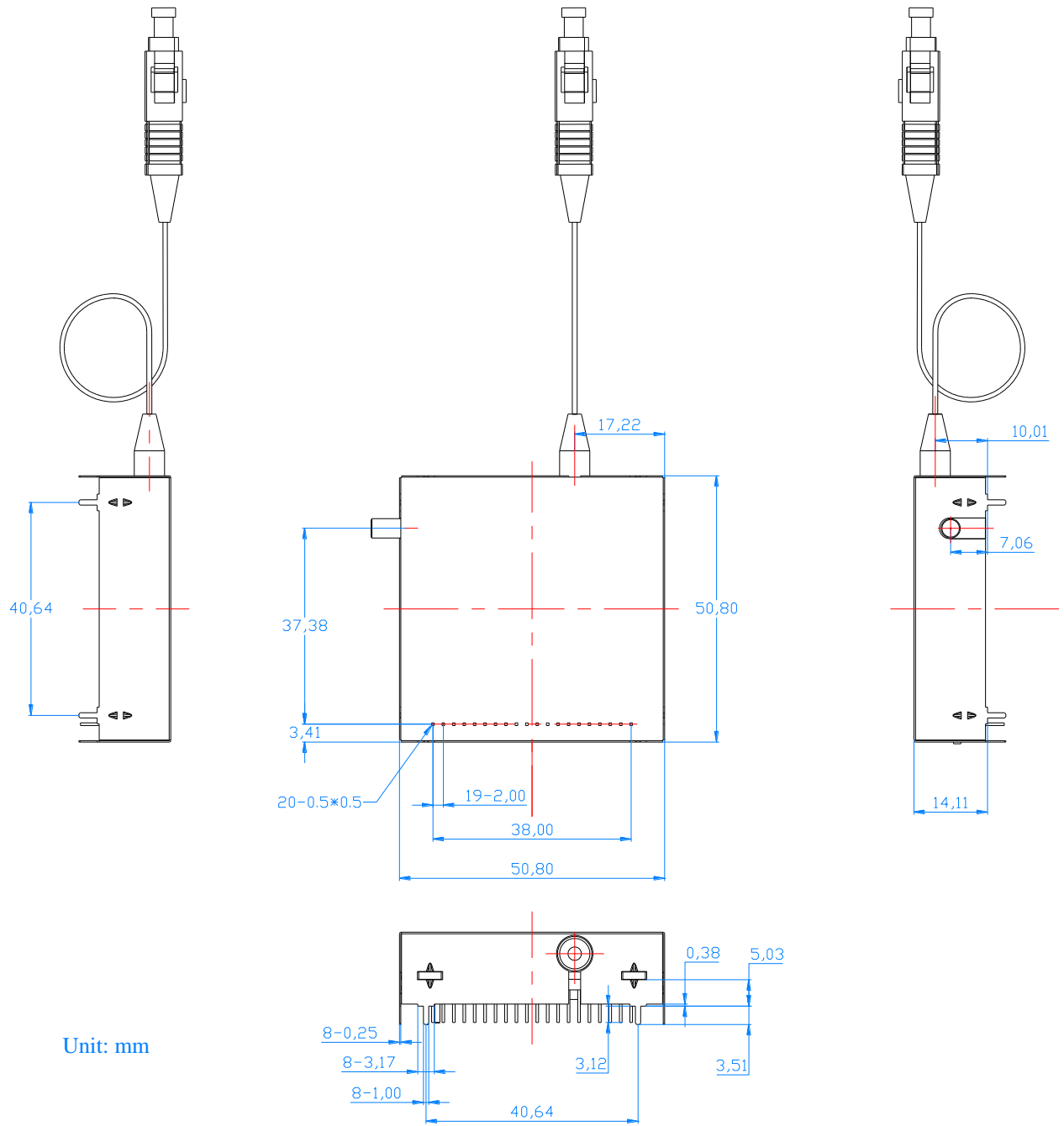
14	SDA	LVTTL-I/O	2-Wire Serial Interface Data Line
15	SCL	LVTTL-I	2-Wire Serial Interface Clock
16	TX_SD	LVTTL/O	transmitter on Indication, Active high when transmitter on
17	Vdd_+12V		Video Rx 12V Vdd
18	NC		Not connected
19	NC		Not connected
20	GND_A		Common ground
21	RF_GND		RF ground
22	RF_OUT		RF output signal
23	RF_GND		RF ground



Typical Interface Circuit

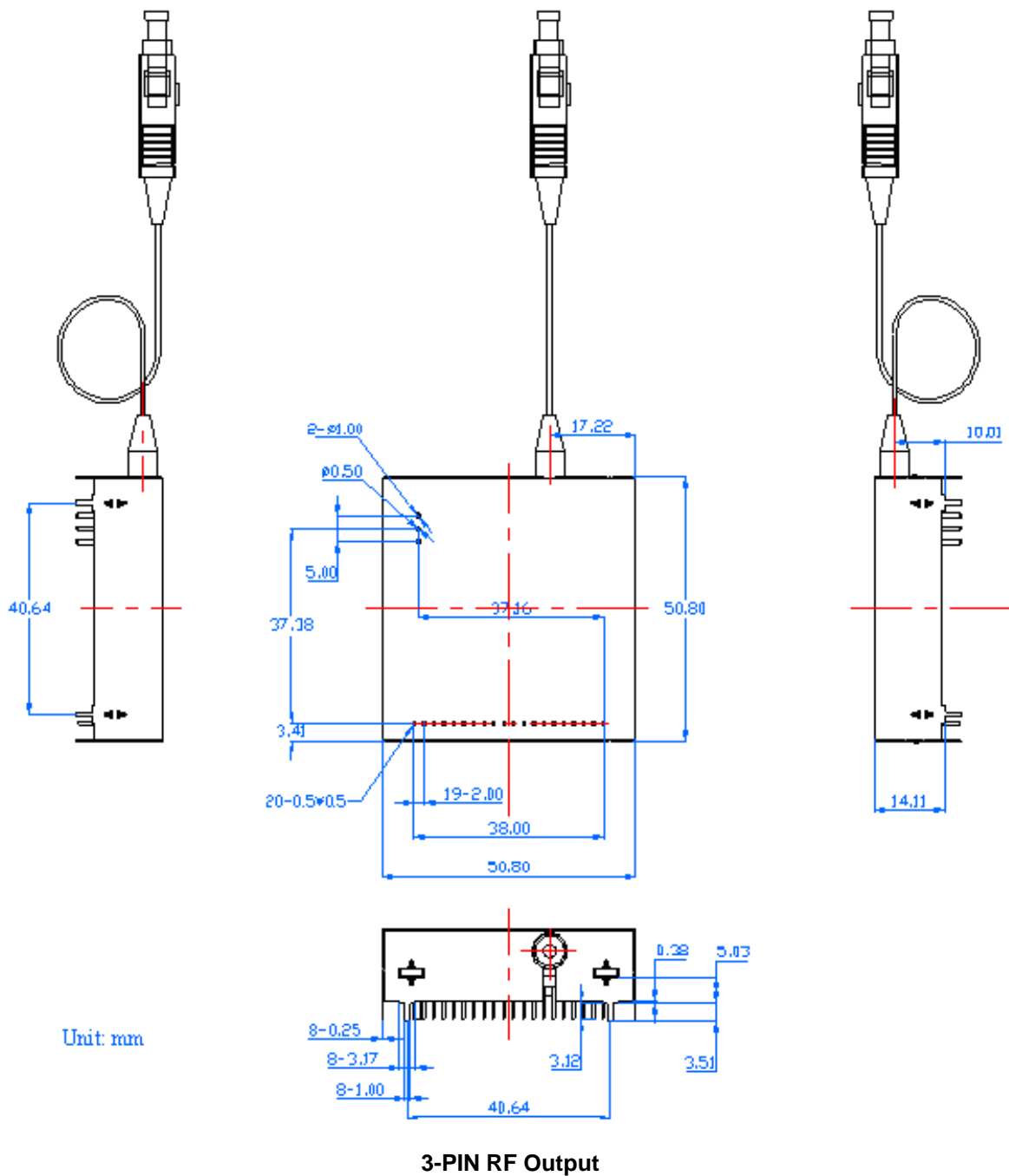


Mechanical Diagram

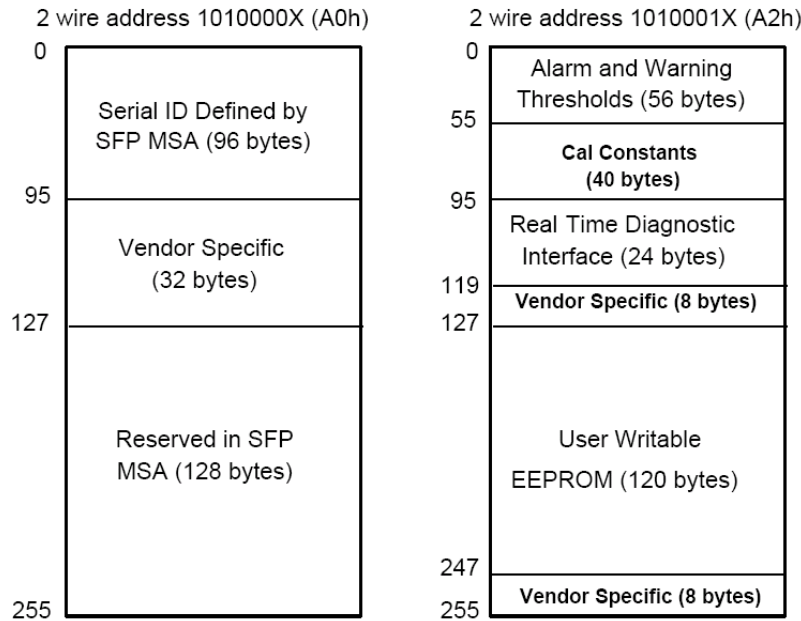


Unit: mm

SMB RF Output



EEPROM Memory Map



A2 Address	Type	Name of Field	Description
92	FLASH	RF_OFFSET	R/W. RF AGC control (0.1dB / LSB), 8bit signed integer, password protected,
93-94	FLASH		reserved
95	FLASH	Checksum	Checksum of A2[0..94]
96-97	RAM	Temperature	Case temperature monitoring value (1/256°C / LSB)
98-99	RAM	Voltage	+3.3V Voltage monitoring value (0.1mV / LSB)
100-101	RAM	Bias Current	Bias Current monitoring value (2uA / LSB)
102-103	RAM	1310nm_power	1310nm Transmitter power monitoring value (0.1uW / LSB)
104-105	RAM	1490nm_power	1490nm Receiver power monitoring value (0.1uW / LSB)
106-107	RAM	1550nm_power	1555nm Video power monitoring value (0.1uW / LSB)
108-109	RAM	RF_out_power	RF_output power monitoring value (0.1dBuV / LSB)
110	RAM	status/control	bit7: TSSI status, high indicate the Rouge ONU has occurred once bit6: soft_TX_disable, high disable the transmitter output bit5: RF_SD, high when video signal detected

			<p>bit4: AGC_en, high active in default, low disable the AGC loop</p> <p>bit3: RF_en, high active in default, low disable the RF output</p> <p>bit2: TX_fault status, high indicate the Tx fault</p> <p>bit1: RX_SD status, high indicate the 1490nm signal detected</p> <p>bit0: Data-Ready</p>
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Ordering Information

Ordering P/Ns	Description
T3420345A-CPA	GPON Triplexer, 1.244Gbps Tx 1310nm, 2.488Gbps Rx 1490nm, 1G Bandwidth Video Rx 1555nm, TX_BEN signal high active transmitter on, 2*2 inch form-factor, SC/APC pigtail connector, RF_out in PIN interface, 0~70°C Commercial temperature; ITU-T G.984.2 or G.984.5;
T3420345A-IPA	GPON Triplexer, 1.244Gbps Tx 1310nm, 2.488Gbps Rx 1490nm, 1G Bandwidth Video Rx 1555nm, TX_BEN signal high active transmitter on, 2*2 inch form-factor, SC/APC pigtail connector, RF_out in PIN interface, -40~85°C Industrial temperature; ITU-T G.984.2 or G.984.5;
T3420345A-CPB	GPON Triplexer, 1.244Gbps Tx 1310nm, 2.488Gbps Rx 1490nm, 870M Bandwidth Video Rx 1555nm, TX_BEN signal high active transmitter on, 2*2 inch form-factor, SC/APC pigtail connector, RF_out in PIN interface, 0~70°C Commercial temperature; ITU-T G.984.2 or G.984.5;
T3420345A-IPB	GPON Triplexer, 1.244Gbps Tx 1310nm, 2.488Gbps Rx 1490nm, 870M Bandwidth Video Rx 1555nm, TX_BEN signal high active transmitter on, 2*2 inch form-factor, SC/APC pigtail connector, RF_out in PIN interface, -40~85°C Industrial temperature; ITU-T G.984.2 or G.984.5;