



GPON OLT Class B+ SFP Transceiver

APGPL43BCDS20

■ Product Features

- ✓ Single fiber bi-directional data links
- ✓ 1490nm 2.488Gbps continuous-mode DFB laser transmitter
- ✓ 1310nm 1.244Gbps burst-mode APD-TIA receiver
- ✓ SC/UPC Connector
- ✓ Reset burst-mode receiver design
- ✓ Digital burst RSSI function
- ✓ RoHS compliant and Lead Free
- ✓ Metal enclosure for lower EMI
- ✓ Single +3.3V power supply
- ✓ Commercial and industrial operating temperature optional
- ✓ SFP MSA SFF-8074i Compliant
- ✓ Complies with ITU-T G.984.2 Amendment 1
- ✓ Complies with SFF-8472 Rev 9.5



■ Applications

- ✓ Gigabit-capable Passive Optical Networks Class B+ 20Km

■ Product Selection

Part Number	Operating temperature	DDMI
APGPL43BCDS20	Commercial	Yes

■ Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Single SC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3



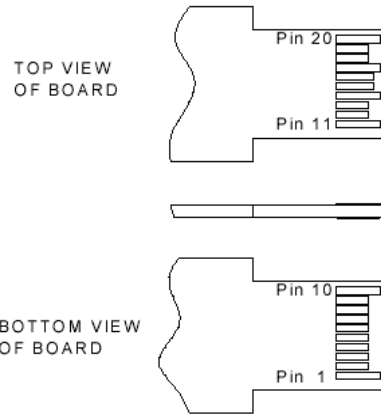
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with RoHS 2 (2011/65/EU)

Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	VEET	Transmitter Ground	1
2	TX Fault	Transmitter Fault Indication, High: abnormal; Low: normal	
3	TX Disable	Transmitter Disable, High: transmitter disable; Low: transmitter enable	2
4	MOD-DEF2	Module Definition 2, The data line of two wire serial interface	3
5	MOD-DEF1	Module Definition 1, The clock line of two wire serial interface	3
6	MOD-DEF0	Module Definition 0, Connected to Ground in the transceiver	3
7	Reset	Receiver Reset , High: reset the receiver	
8	SD	Signal Detect, High: signal detected; Low: loss of signal;	4
9	RSSI Trigger	RSSI Trigger for Transceiver A/D Conversion, LVTTTL High: enable RSSI A/D conversion	1
10	VEER	Receiver Ground	1
11	VEER	Receiver Ground	1
12	RD-	Inv. Receiver Data Out, LVPECL logic output, DC coupled	
13	RD+	Receiver Data Out, LVPECL logic output, DC coupled	
14	VEER	Received Ground	1
15	VCCR	Receiver Power	
16	VCCT	Transmitter Power	
17	VEET	Transmitter Ground	1
18	TD+	Transmit Data In, LVPECL logic input, AC coupled	
19	TD-	Inv. Transmit Data In, LVPECL logic input, AC coupled	
20	VEET	Transmitter Ground	1

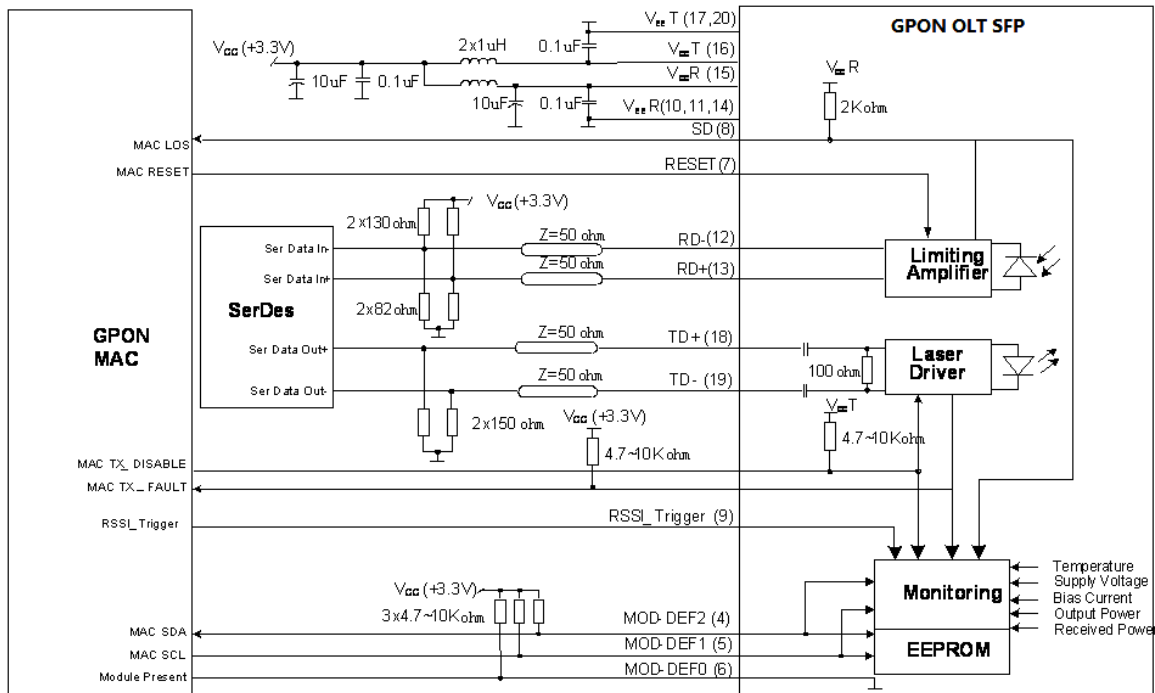
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TX Disable >2.0V or open, enabled on TX Disable <0.8V.
3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. MOD_DEF(0) pulls line low to indicate module is plugged in.
4. SD is open collector output. Should be pulled up with 4.7k – 10kohms on host board to a voltage between 2.0V and 3.6V.



Pin-out of Connector Block on Host Board

■ **Recommend Circuit Schematic**



■ **Absolute Maximum Ratings**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.5		+4.0	V	
Storage Temperature	TS	-40		+85	°C	
Operating Humidity	RH	5		95	%	



■ **Recommended Operating Conditions**

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Power Supply Voltage	Vcc	3.13	3.30	3.47	V	
Power Supply Current	Icc			450	mA	
Case Operating Temperature	Tc	0		+70	°C	commercial
	Tl	-40		+85		Industrial
Data Rate(TX)			2.488		Gbps	
Data Rate(RX)			1.244		Gbps	

■ **Electrical Characteristics (TOP=25°C, Vcc=3.3Volts)**

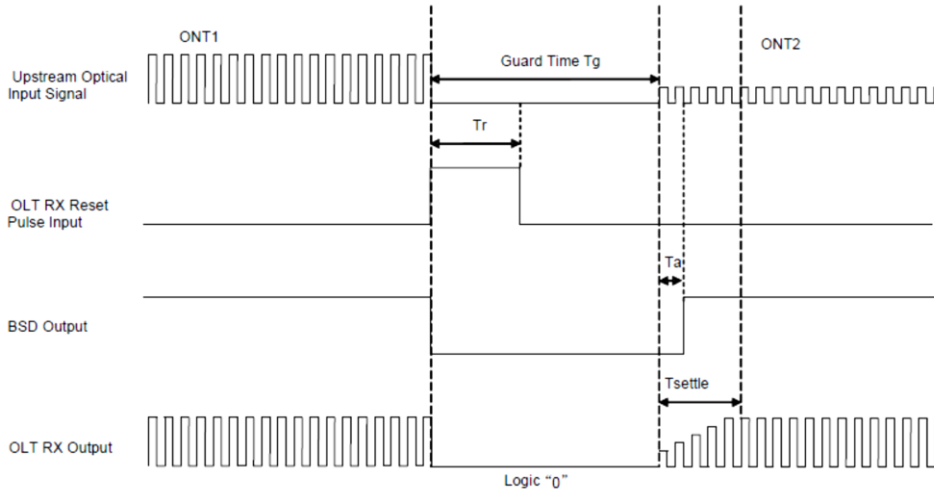
Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	1
Single ended data input swing	Vin, pp	250	-	1200	mV	
TX Disable-High	-	Vcc-1.3	-	Vcc+0.3	V	
TX Disable-Low	-	Vee	-	Vee+0.8	V	
TX Fault-High	-	2.0	-	Vcc+0.3	V	
TX Fault-Low	-	0	-	0.8	V	
Receiver						
Data Output Voltage – Low (-Vcc)		-1.81		-1.62	V	
Data Output Voltage – High (-Vcc)		-1.02		-0.88	V	
Data Output Differential Swing		400		2000	mV	2
Reset-Low		0		0.8	V	
Reset-High		2.0		Vcc+0.3	V	
Receiver Amplitude Recovery Time				32	bits	3
Signal Detect Voltage-Low		0		0.4	V	
Signal Detect Voltage-High		2.4		Vcc	V	

Notes:

1. AC coupled.

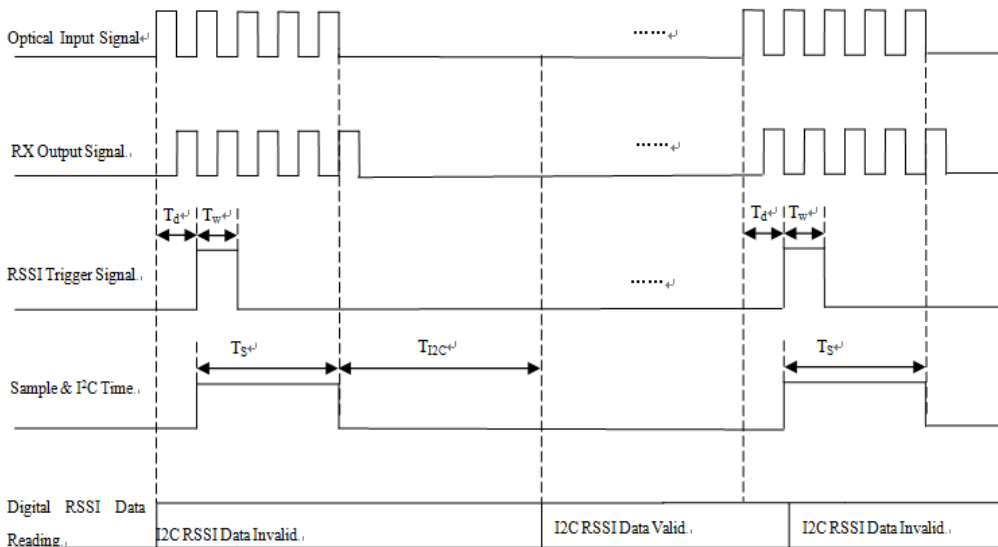
2. LVPECL output, DC coupled.
3. Refer to the Reset signal falling edge.

■ Burst Receiver Timing Sequence



Parameter	Symbol	Min	Typ	Max	Unit
Guard Time	Tg	4			Byte
Reset Width	Tr	12.8			ns
SD De-Assert Time	Ta			12.8	ns

■ Burst Receiver Timing Sequence



Timing Diagrams for Digital RSSI



Parameter	Symbol	Min	Typ	Max	Unit
Trigger delay	Td	25	-	-	ns
Trigger width	Tw	350	-	-	ns
Sample time	Ts	-	-	350	ns
I2C read time	TI2C	-	-	500	us
Receiver Power DDM (RSSI) Error	RXDDM			+/-3	dB

■ **Optical Characteristics (TOP=25°C, Vcc=3.3 Volts)**

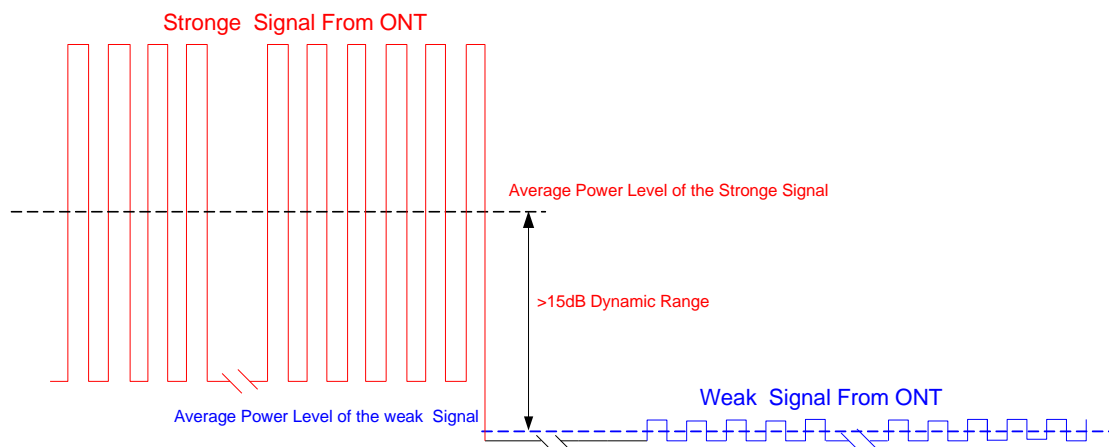
Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Output Opt. Power	PO	+2.5		+5	dBm	1
Optical Wavelength	λ	1480	1490	1500	nm	
Spectral Width (-20dB)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Optical Rise/Fall Time	tr/tf	-	-	160	ps	2
Total Generated Transmitter Jitter (peak to peak)	JTXp-p	-	-	0.07	UI	3
Total Generated Transmitter Jitter (rms)	JTXrms	-	-	0.007	UI	
Optical Extinction Ratio	ER	8.2	-	-	dB	
Transmitter and Dispersion Penalty	TDP			1	dB	4
Optical Waveform Diagram		ITU-T G.984.2				
Receiver						
RX Sensitivity @OC-48	SENS	-	-	-29	dBm	5
Receiver Overload	Rol	-8	-	-	dBm	
Dynamic Range		15			dB	
Optical Center Wavelength	λ_C	1260	1310	1360	nm	
SD Assert	SDA	-	-	-30	dBm	

SD De-Assert	SDD	-45	-	-	dBm	
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Notes:

1. Class 1 Laser Safety.
2. Unfiltered, 20-80%.
3. Measured with DJ-free data input signal .In actual application, output DJ will be the sum of input DJ and ΔDJ.
4. Transmit on 20km SMF.
5. Measured with PRBS 2²³-1+72CID@1244Mbps BER ≤1×10⁻¹⁰.

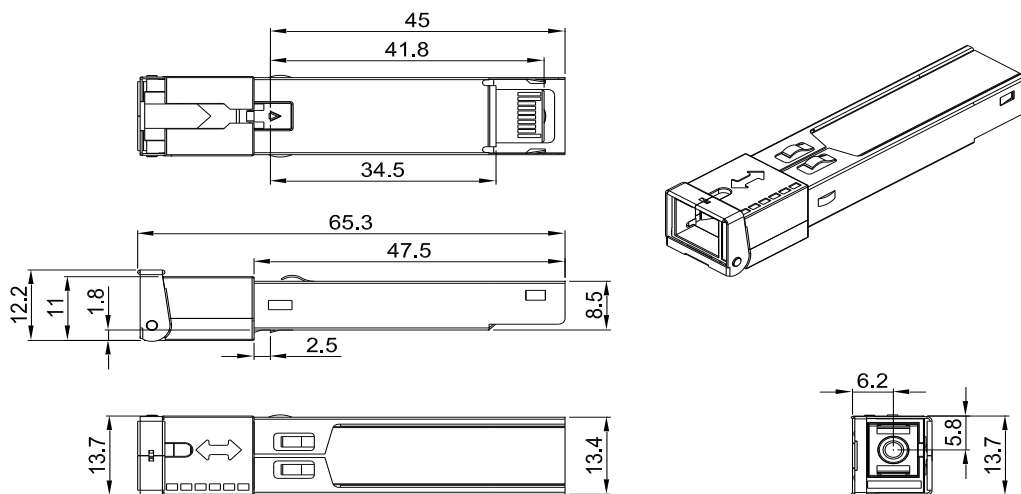
Burst Mode Receiver Dynamic Range



Burst Mode Receiver Dynamic Range in GPON System

Mechanical Specifications

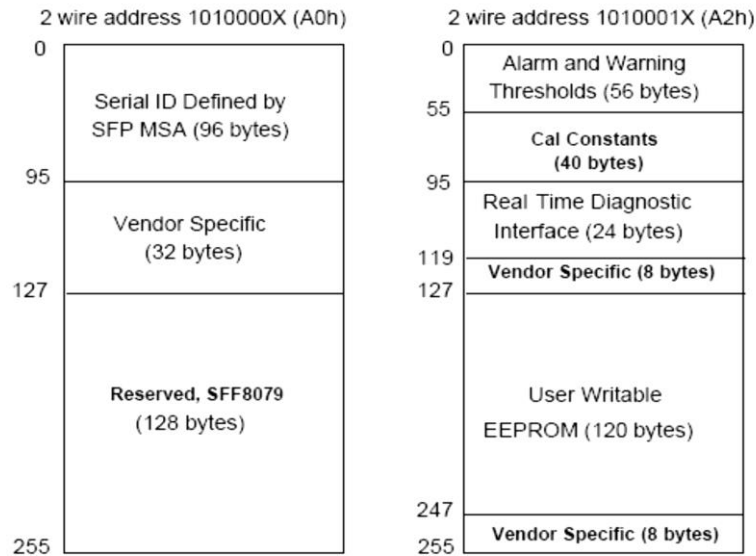
ATOP's Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA), dimensions are in mm.



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■ EEPROM Information

EEPROM memory map specific data field description is as below:



■ Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored. The following table defines the monitored parameter's accuracy.

Parameter	Range	Accuracy	Calibration
Temperature	0 to +70°C	±3°C	Internal
Voltage	3.13 to 3.47V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	+1.5 to +5dBm	±3dB	Internal
RX Power	-29 to -8dBm	±3dB	Internal

Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
Version1.0	yangpeiyun	sunbin	dingzheng	New Released.	May 2 , 2017

■ For More Information

ATOP Corporation

Tel: +86-755-86674946

Fax: +86-755-86296723

Email: sales@atoptechnology.com

Web: www.atoptechnology.com