



GPON OLT Class C+ SFP Transceiver

APGPL43ASLxDSC+

■ 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 C+ 20Km

■ Product Selection

Part Number	Operating temperature	DDMI
APGPL43ASLCDSC+	Commercial	Yes
APGPL43ASLIDSC+	Industrial	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



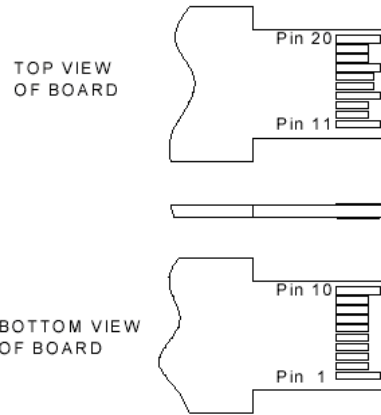
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with RoHS 2 (2011/65/EU)

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

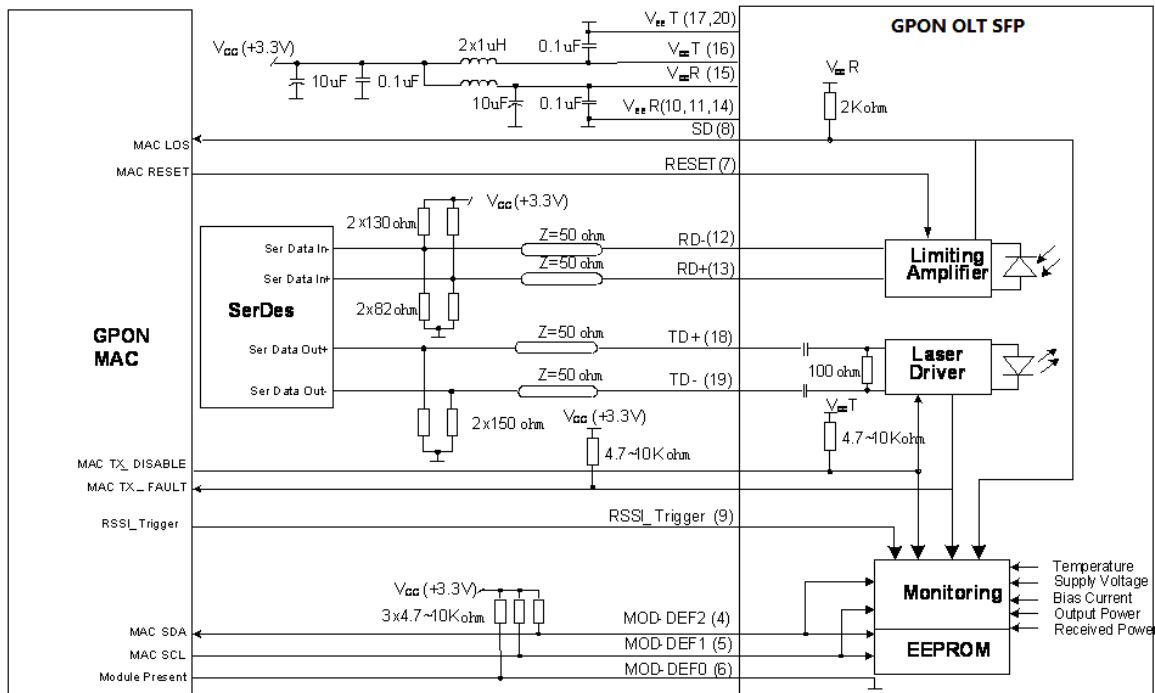
Notes:

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			500	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)

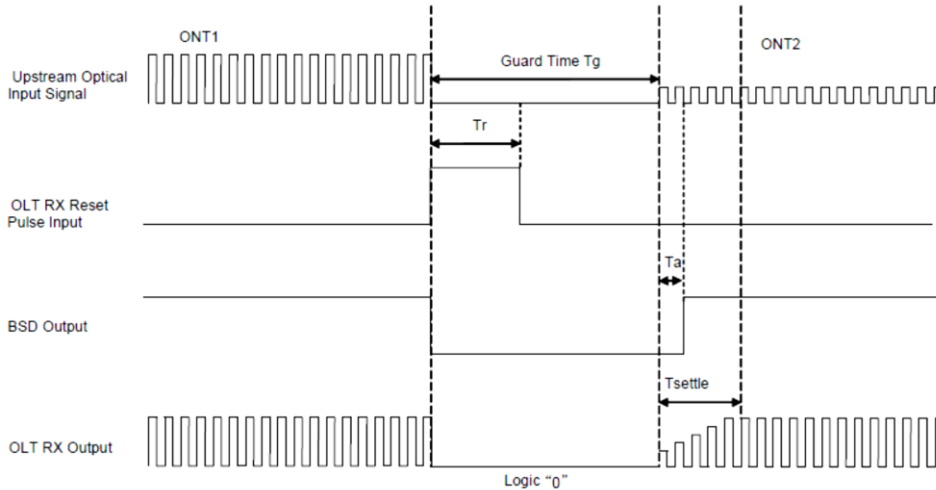
Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Input differential impedance	Rin	-	100	-	Ω	1
Single ended data input swing	Vin, pp	250	-	1200	mV	
TX Disable-High	-	Vcc-1.3	-	Vcc+0.3	V	
TX Disable-Low	-	Vee	-	Vee+0.8	V	
TX Fault-High	-	2.0	-	Vcc+0.3	V	
TX Fault-Low	-	0	-	0.8	V	
Receiver						
Data Output Voltage – Low (-Vcc)		-1.81		-1.62	V	
Data Output Voltage – High (-Vcc)		-1.02		-0.88	V	
Data Output Single ended Swing		200		1000	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.

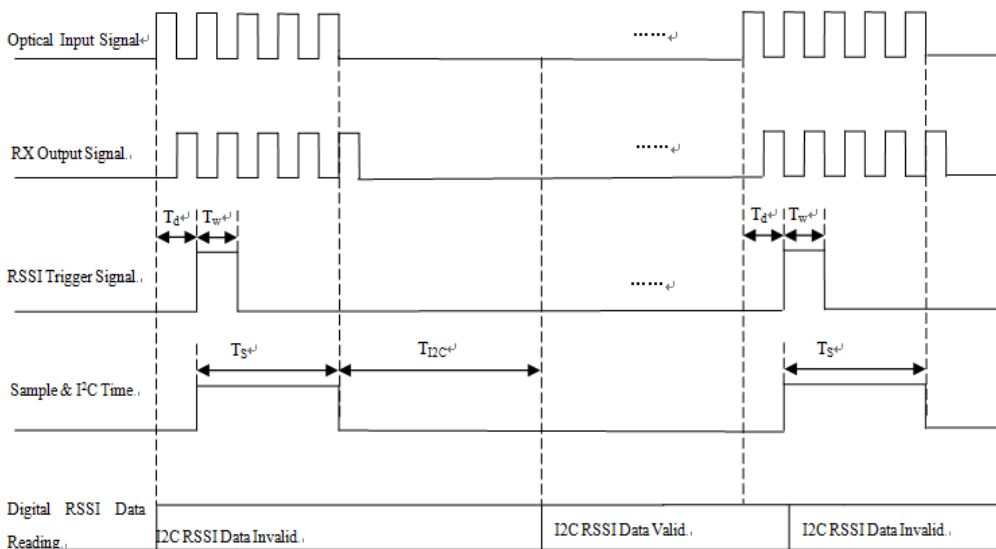
2. LVPECL output, DC coupled.
3. Refer to the Reset signal falling edge.

Burst Receiver Timing Sequence



Parameter	Symbol	Min	Typ	Max	Unit
Guard Time	T_g	4			Byte
Reset Width	T_r	12.8			ns
SD De-Assert Time	T_a			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	P _{OUT_BOL}	+4		+7	dBm	1
	P _{OUT_EOL}	+3		+7	dBm	
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	SEN_BOL	-	-	-31	dBm	5
	SEN_EOL			-30	dBm	
Receiver Overload	Rol	-12	-	-	dBm	
Dynamic Range		15			dB	

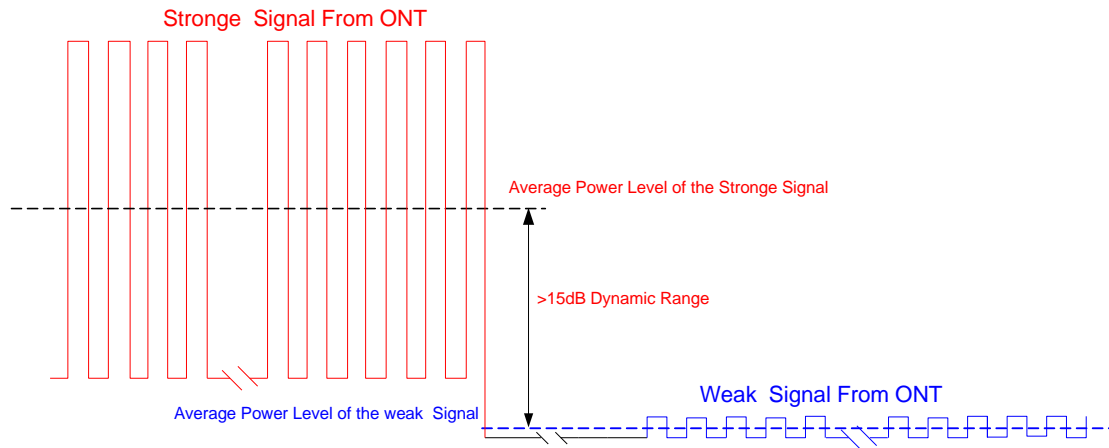


Optical Center Wavelength	λC	1260	1310	1360	nm	
SD Assert	SDA	-	-	-31	dBm	
SD De-Assert	SDD	-45	-	-	dBm	

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 $\leq 1 \times 10^{-10}$.

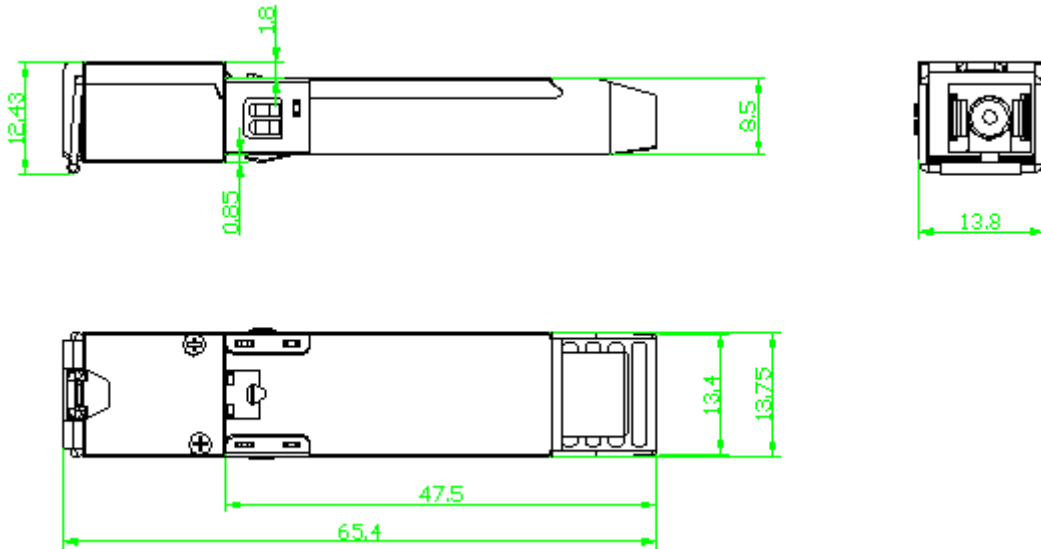
■ **Burst Mode Receiver Dynamic Range**



Burst Mode Receiver Dynamic Range in GPON System

■ **Mechanical Specifications**

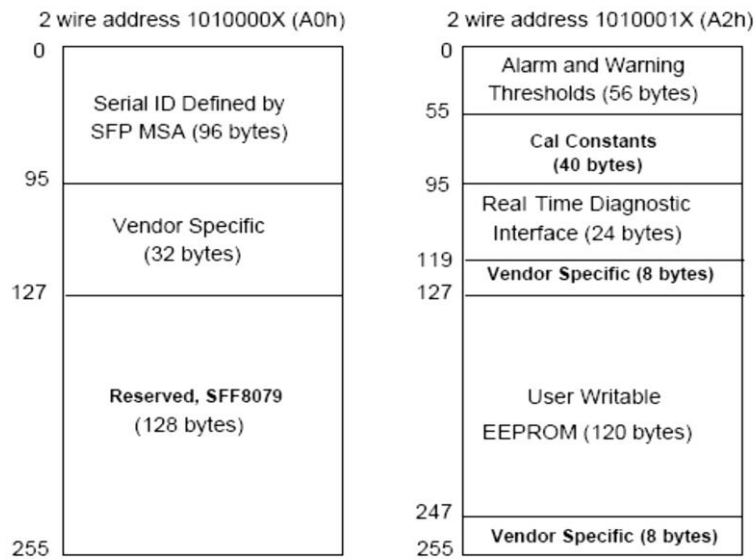
ATOP's Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA), dimensions are in mm.



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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
	-40 to +85°C	±3°C	Internal
Voltage	3.13 to 3.47V	±3%	Internal



Bias Current	0 to 100mA	±10%	Internal
TX Power	+3 to +7dBm	±3dB	Internal
RX Power	-31 to -12dBm	±3dB	Internal

Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
Version1.0	huangzhengyin	sunbin	dingzheng	New Released.	Jul 31 , 2017

■ For More Information

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