10G GPON ONU SFP+ Optical Transceiver

APXGU25ASHCDSN2

Product Features

- ✓ 1270nm 2.488G burst-mode transmitter with DFB laser
- ✓ 1577nm 9.953G continuous-mode receiver with APD-TIA
- ✓ Compliant ITU-T G.987.2 XGPON N2 Class Power budget
- ✓ SFP+ MSA SFF-8431 Compliant
- ✓ Single +3.3V power supply
- ✓ Operation case temperature:0-70°C
- ✓ Digital diagnostic interface compliant with SFF-8472

Applications

- ✓ 10G Passive Optical Networks (ONU)N1 or N2 Class application

General

ATOP's APXGU25ASHCDSN2 Small Form Factor Pluggable (SFP+) transceivers are compatible with the Small Form Factor Multi-Sourcing Agreement (MSA). The transceivers are single fiber bi-directional data links with asymmetric 2.488Gbps upstream and 9.953Gbps downstream. They are RoHS compliant and lead-free.

Regulatory Compliance

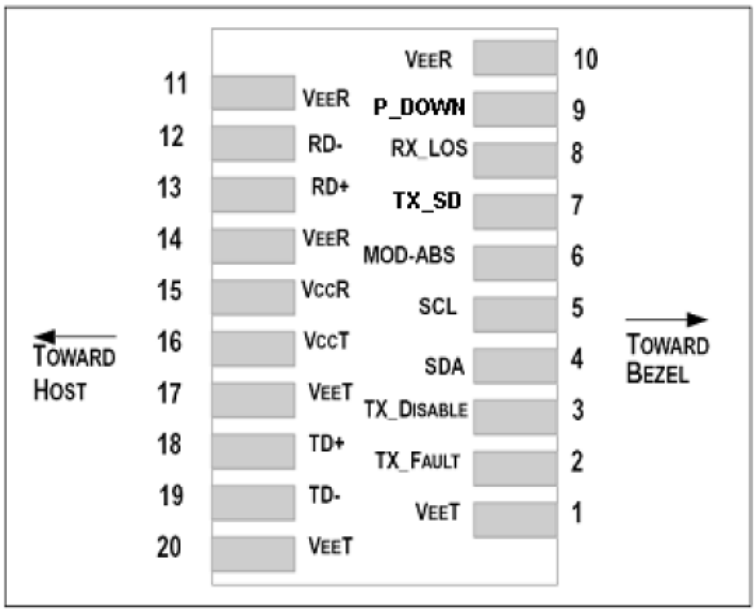
- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Single SC Receptacle: compatible with IEC 61000-4-2
- Immunity compatible with IEC 61000-4-3
- EMI compatible with FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2
- RoHS compliant with 2002/95/EC 4.1&4.2 2005/747/EC

Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	VeeT	Transmitter Ground.	1
2	TX Fault	Transmitter Fault Indication.	2
3	TX_Burst	Transmitter Burst Mode Control.	3
4	SDA	Module Definition 2.	
5	SCL	Module Definition 1.	
6	MOD-ABS	Module Definition 0.	
7	TX_SD	Transmitter State Indication.	4
8	RX_LOS	Loss of Signal.	5
9	P_Down	Power down.	6
10	VeeR	Receiver Ground.	1
11	VeeR	Receiver Ground.	1
12	RD-	Receiver inverted Data Output.	
13	RD+	Receiver Non-inverted Data Output.	
14	VeeR	Receiver Ground.	1
15	VCCR	Receiver Power.	1
16	VCCT	Transmitter Power.	
17	VeeT	Transmitter Ground.	
18	TD+	Transmitter Non-inverted Data Input.	
19	TD-	Transmitter inverted Data Input.	
20	VeeT	Transmitter Ground.	1

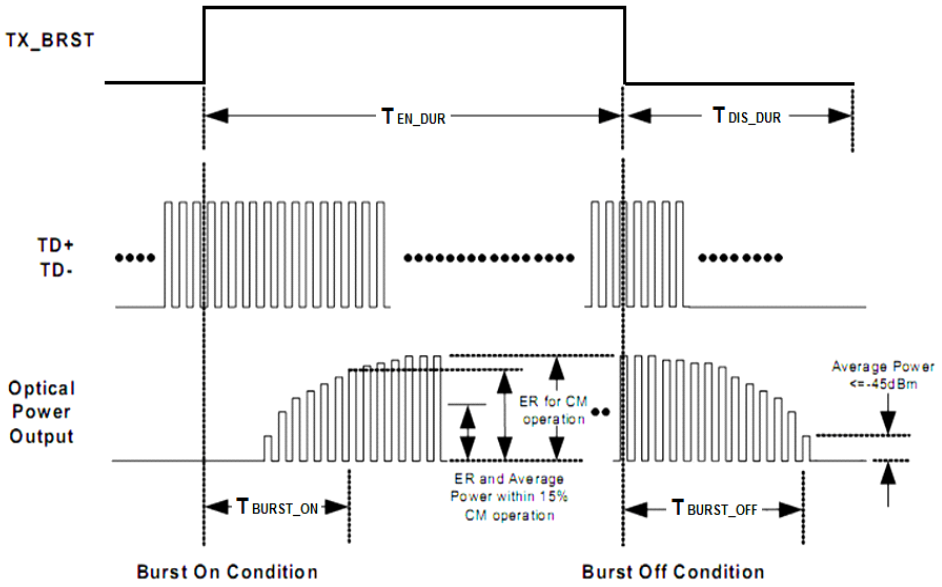
Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Shall pulled up with 4.7K-10K ohm to a VccT in the module.
3. High level Enable optical signal output.
4. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V.
5. TX_SD is the indicator of TX signal. High indicates laser on, low indicates laser off.
6. P_Down is a controller PIN for saving power consumption. If not use this feature, main board connection should be NC. Power saving of Tx side, On/off time less than 1ms, high active.

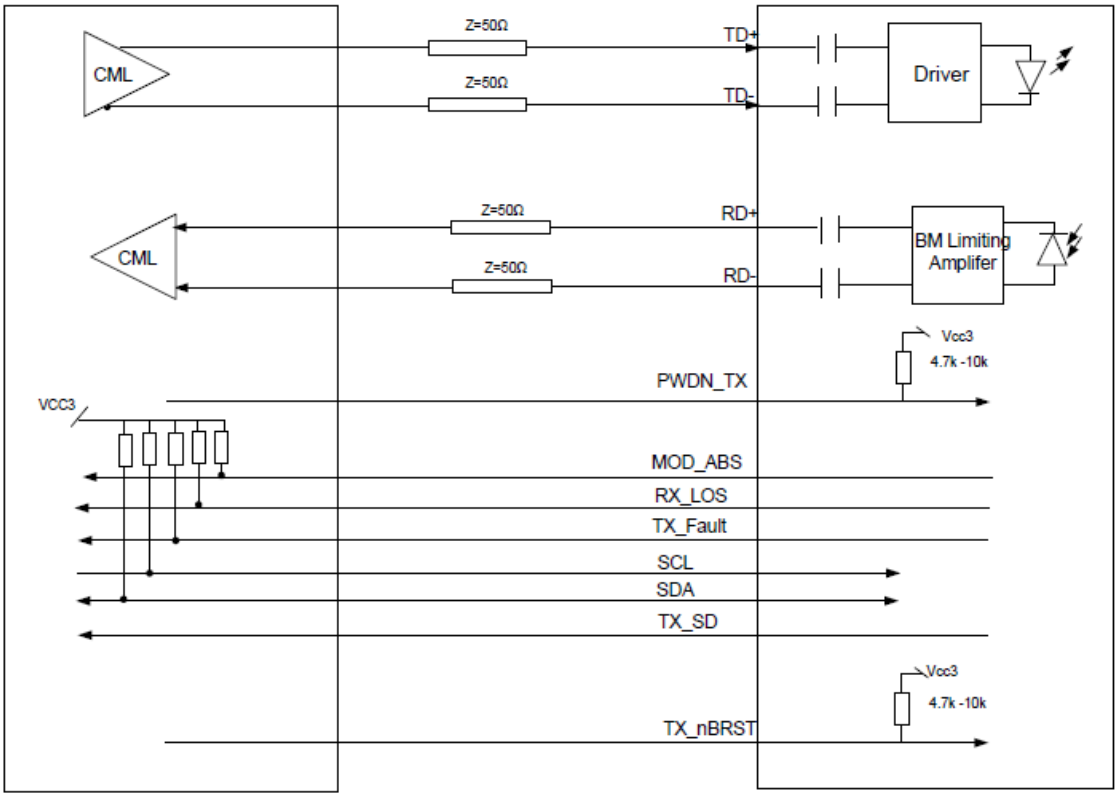


Pin assignment

Burst Mode Sequence



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	0		85	%	

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	
Data Rate(TX)			2.488		Gbps	
Data Rate(RX)			9.953		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	200	-	1600	mV	
TX Burst-High	-	Vcc – 1.3	-	Vcc	V	
TX Burst-Low	-	Vee	-	Vee+ 0.8	V	
TX Fault-High	-	Vcc-0.5	-	Vcc	V	
TX Fault-Low	-	Vee	-	Vee+0.5	V	
Tx_SD High	-	Vcc-0.5	-	Vcc	V	
Tx_SD Low	-	Vee	-	Vee+0.5	V	
Receiver						
Single ended data output swing	Vout, pp	400	-	1000	mV	1，2
Output Differential Impedance	Rout		100		Ω	
LOS-High	-	Vcc – 0.5	-	Vcc	V	
LOS-Low	-	Vee	-	Vee+0.5	V	
Rx_LOS Assert time	T_LOSA			100	us	
Rx_LOS De-Assert time	T_LOSD			100	us	
Time to Initialize	T_initial			300	ms	

Notes:

1. AC coupled.
2. Into 100 ohm differential termination.

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

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Optical Wavelength	λ	1260	1270	1280	nm	
Spectral Width(-20dB)	Δλ	-	-	1	nm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	

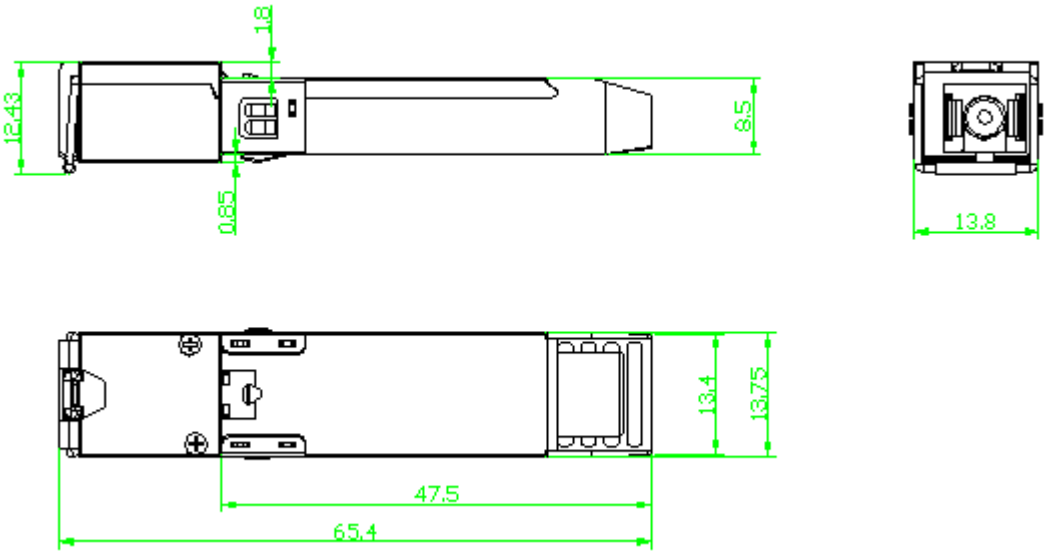
Optical Rise/Fall Time	tr/tf	-	-	140	ps	2, 3
Burst Turn On/Off Time	T_{on}/T_{off}			12	ns	
Output Opt. Power	P_O	2	-	7	dBm	1
Optical Extinction Ratio	ER	8.2	-	-	dB	
Transmitter Reflectance				-10	dB	
Optical Return Loss Tolerance				15	dB	
Optical Output Power with Tx OFF	Poff			-45	dBm	
Optical Eye Mask	Compliant With ITU-T G.987.2					2
Receiver						
Optical Center Wavelength	λ_C	1575	1577	1580	nm	
RX Sensitivity @2.488Gb/s	SENS	-	-	-28	dBm	4
Receiver Overload	-	-8	-	-	dBm	4
Signal Detect-Assert	SDA	-	-	-29	dBm	
Signal Detect-Deassert	SDD	-40	-	-	dBm	
SD-Hysteresis	SD_H	0.5	-	6	dB	
Receiver Reflectance				-12	dB	
WDM Filter Isolation	ISO(1550)	38			dB	
	ISO(1650)	35			dB	

Notes:

1. Class 1 Laser Safety，the optical power is coupled into 9/125um SMF
2. Measured with PRBS2^{23}-1 test pattern @2.488Gbit/s.
3. Measured with the Bessel-Thompson filter off, 20-80%.
4. Measured with a PRBS 2^{23}-1 test pattern @9.953Gbit/s and ER=6dB, BER =10^{-3}.

Mechanical Specifications

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



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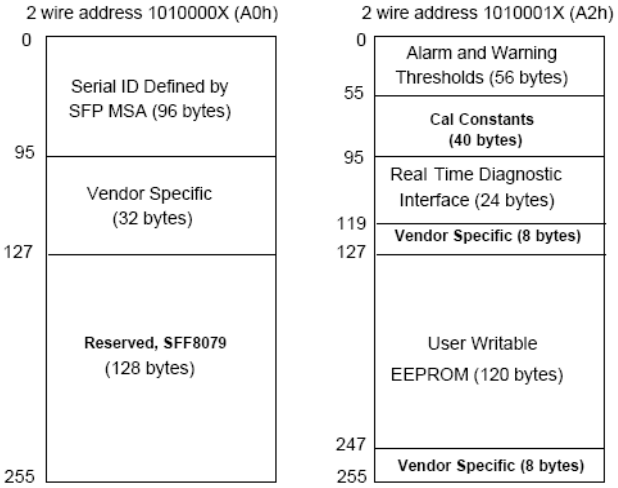
EEPROM Information

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 (C)	±3°C	Internal
Voltage	2.97 to 3.63V	±3%	Internal
Bias Current	0 to 100mA	±10%	Internal
TX Power	+2 to +7dBm	±3dB	Internal

RX Power	-28 to -8dBm	±3dB	Internal

Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
V1.0	yangpeiyun	Dinzheng		New Released.	DEC 21, 2016

For More Information

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