



10G EPON ONU SFP+ Optical Transceiver

APXEU25SYHCDS3

■ Product Features

- ✓ 1270nm 10.3125G burst-mode transmitter with DFB laser
- ✓ 1577nm 10.3125G continuous-mode receiver with APD-TIA
- ✓ Compliant IEEE 802.3av™-2009 10GBASE-PR30 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 BASE-PR-U3 application

■ General

ATOP's APXEU25SYHCDS3 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 symmetric 10.3125Gbps upstream and 10.3125Gbps 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

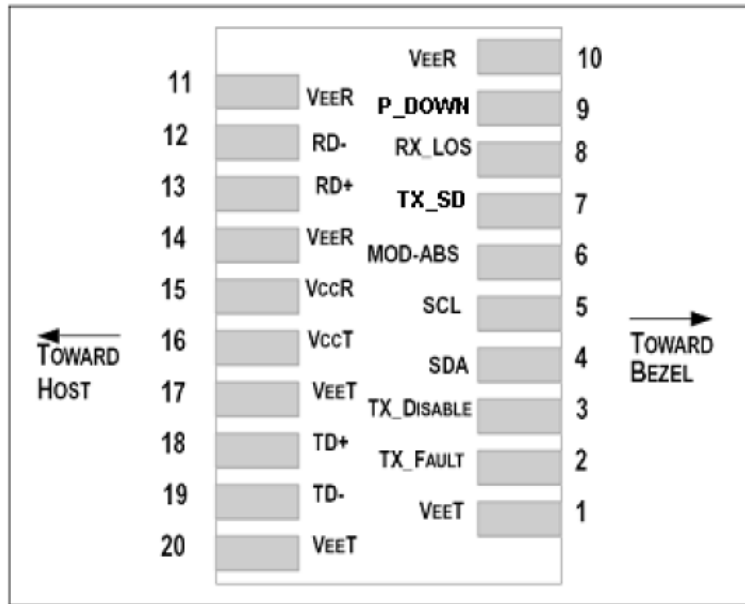


■ **Pin Descriptions**

| 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 |

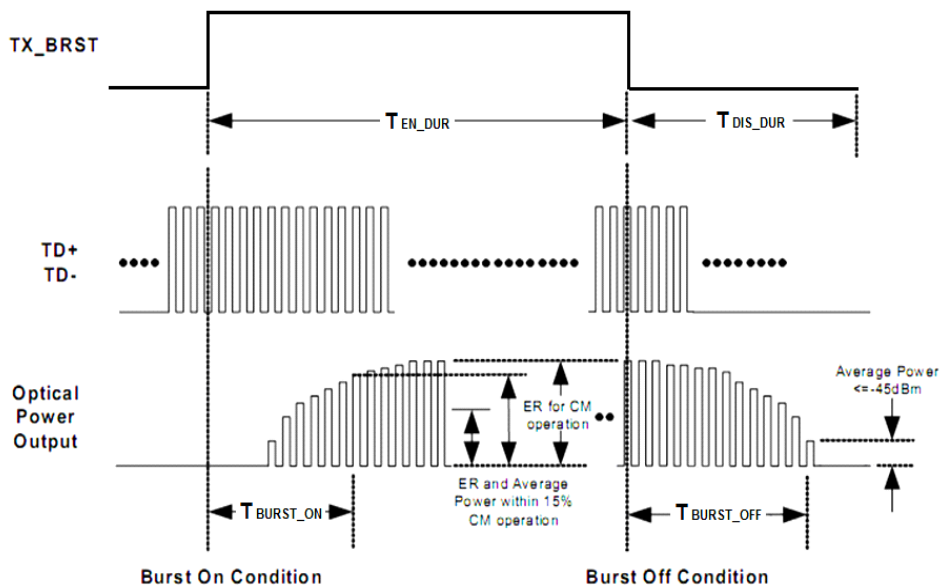
Notes:

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.

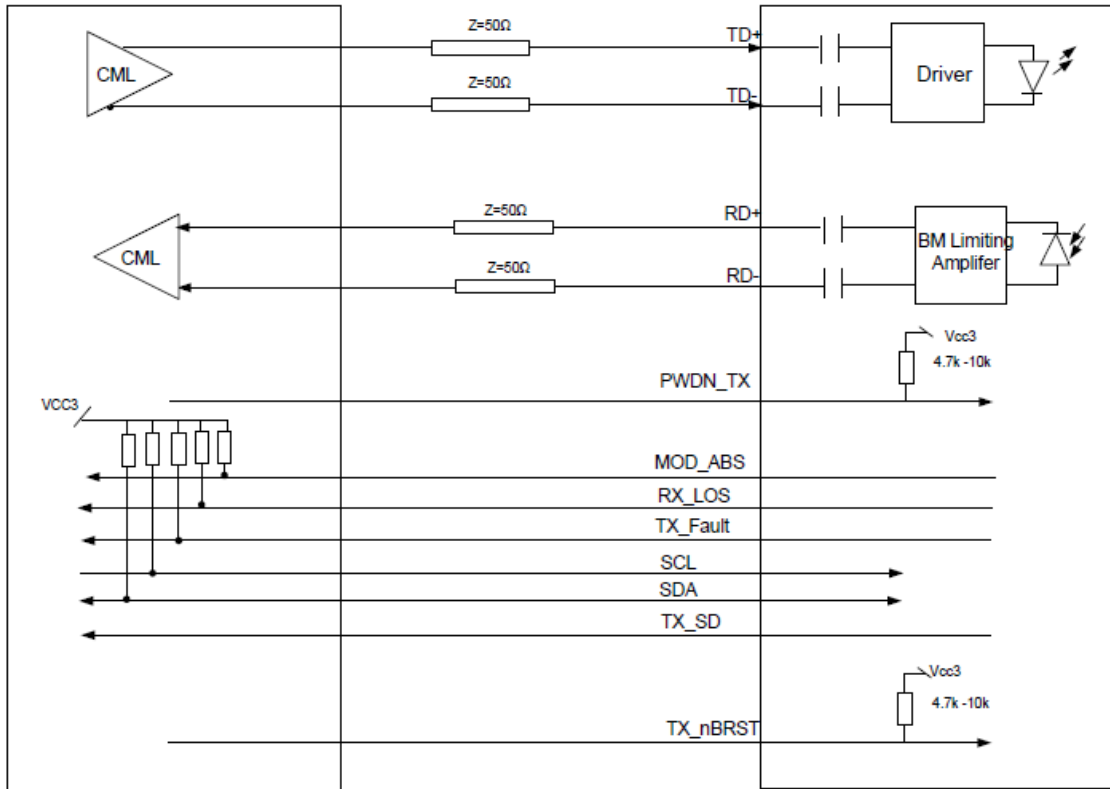


Pin assignment

■ **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 | | | 600 | mA | |
| Case Operating Temperature | Tc | 0 | | +70 | °C | |
| Data Rate(TX) | | | 10.3 | | Gbps | |
| Data Rate(RX) | | | 10.3 | | 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 | |



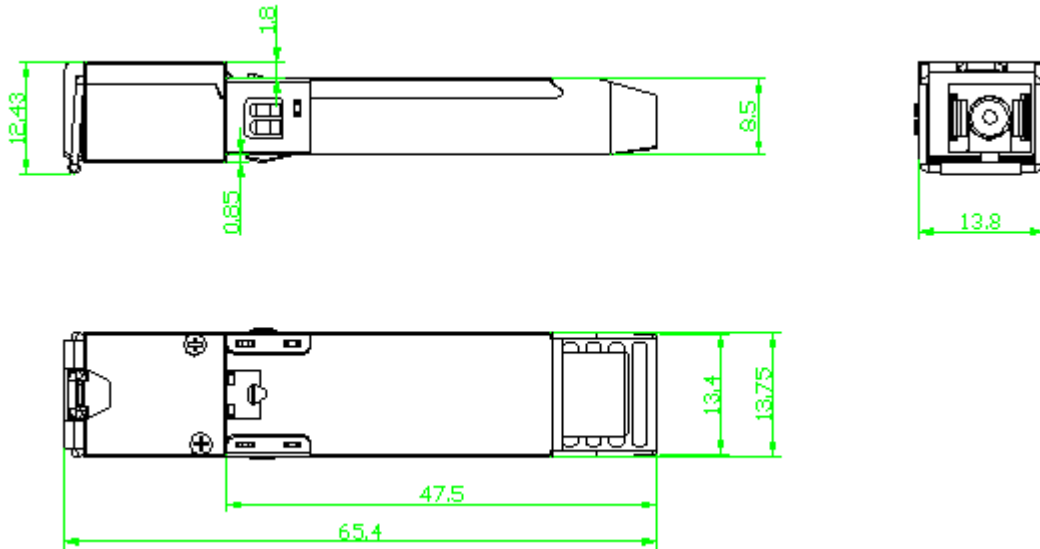
| | | | | | | |
|----------------------------------|---------------------------------------|------|------|-------|-----|------|
| Optical Rise/Fall Time | tr/tf | - | - | 65 | ps | 2, 3 |
| Burst Turn On/Off Time | T _{on} /T _{off} | | | 100 | ns | |
| Output Optical Power | P _o | 4 | - | 9 | dBm | 1 |
| Optical Extinction Ratio | ER | 6 | - | - | dB | |
| Transmitter Reflectance | | | | -10 | dB | |
| Optical Return Loss Tolerance | | | | 15 | dB | |
| Optical Output Power with Tx OFF | P _{off} | | | -45 | dBm | |
| Optical Eye Mask | Compliant With IEEE Std 802.3ah™-2004 | | | | | 2 |
| Receiver | | | | | | |
| Optical Center Wavelength | λ _c | 1575 | 1577 | 1580 | nm | |
| RX Sensitivity @2.488Gb/s | SENS | - | - | -28.5 | dBm | 4 |
| Receiver Overload | - | -8 | - | - | dBm | 4 |
| Signal Detect-Assert | SDA | - | - | -30 | dBm | |
| Signal Detect-Deassert | SDD | -44 | - | - | 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 PRBS²³¹-1 test pattern @10.3125Gbit/s.
3. Measured with the Bessel-Thompson filter off, 20-80%.
4. Measured with a PRBS ²³¹-1 test pattern @10.3125Gbit/s and ER=6dB, BER =10⁻³.

■ Mechanical Specifications

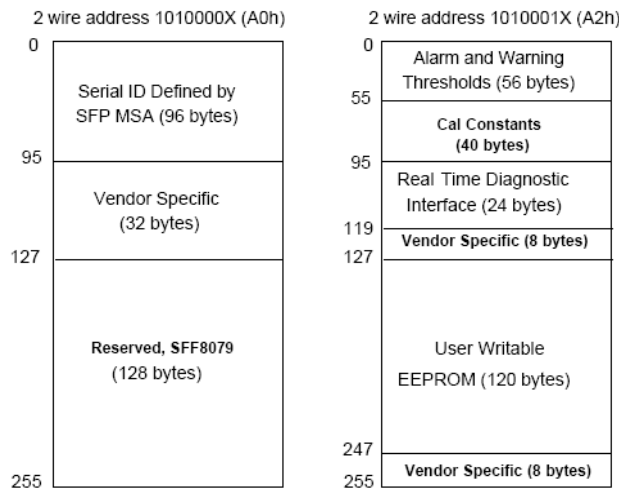
ATOP's Small Form Factor (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



APXEU25SYHCDSP3

■ **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 | +4 to +9dBm | ±3dB | Internal |



Connects fiber to your home

ATOP Corporation

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| | | | |
|----------|----------------|------|----------|
| RX Power | -28.5 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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