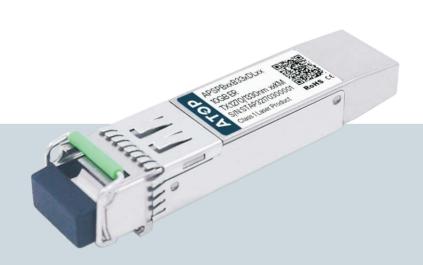


10.3Gb/s SFP+ BIDI Transceiver

APSPBxxB33CDL60





10.3Gb/s SFP+ BIDI Transceiver

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ATOP's APSPBxxB33CDL60 Small Form Factor Pluggable (SFP+) transceivers are compatible with SFF-8431, SFF-8432 and support 10GBASE Ethernet and 10G FibreChannel. It is designed for use in 10G-Gigabit multi-rate links up to 60km of G.652. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

Product Features

- ✓ Single LC connector
- ✓ Hot-pluggable SFP footprint
- √ Uncooled DFB laser
- √ RoHS compliant and Lead Free
- ✓ Distance up to 60km on 9/125um SMF
- ✓ Metal enclosure for lower EMI
- √ Power dissipation <1.5W
 </p>
- ✓ Commercial and industrial operating temperature optional
- ✓ SFP MSA SFF-8472 SFF-8431 SFF-8432 Compliant

Applications

- √ 10GBASE Ethernet
- √ 10G Fibre Channel



Product Selection

| Part Number | Wavelength | Operating Case temperature |
|-----------------|-------------------|----------------------------|
| APSPB23B33CDL60 | Tx-1270 / Rx-1330 | Commercial |
| APSPB32B33CDL60 | Tx-1330 / Rx-1270 | Commercial |



Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Single LC Receptacle: compatible with EN 61000-4-2
- Immunity compatible with EN 61000-4-3
- EMI compatible with FCC Part 15 Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 IEC 60950, IEC60825-1,2
- LoHS compliant with RoHS 2.0(2015/863/EU)-amending

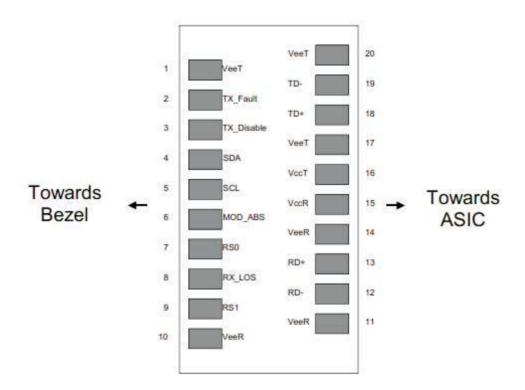
Pin Descriptions

| Pin | Symbol | Name | Ref. |
|-----|------------|--|------|
| 1 | VeeT | Transmitter Ground (Common with Receiver Ground) | 1 |
| 2 | TX Fault | Transmitter Fault. LVTTL-O | 2 |
| 3 | TX Disable | Transmitter Disable. Laser output disabled on high or open. LVTTL-I | 3 |
| 4 | SDA | 2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTL-I/O | 2 |
| 5 | SCL | 2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTL-I | 2 |
| 6 | Mod_ ABS | Module Absent, Connect to VeeT or VeeR in Module. | 2 |
| 7 | RS0 | Rate Select 0, optionally controls SFP+ module receiver LVTTL-I | 4 |
| 8 | LOS | Loss of Signal indication. Logic 0 indicates normal operation. LVTTL-O | 5 |
| 9 | RS1 | Rate Select 1, optionally controls SFP+ module transmitter. LVTTL-I | 4 |
| 10 | VeeR | Receiver Ground (Common with Transmitter Ground) | 1 |
| 11 | VeeR | Receiver Ground (Common with Transmitter Ground) | 1 |
| 12 | RD- | Receiver Inverted DATA out. AC Coupled. CML-O | |
| 13 | RD+ | Receiver Non-inverted DATA out. AC Coupled. CML-O | |
| 14 | VeeR | Receiver Ground (Common with Transmitter Ground) | 1 |
| 15 | VccR | Receiver Power Supply | 6 |
| 16 | VccT | Transmitter Power Supply | 6 |
| 17 | VeeT | Transmitter Ground (Common with Receiver Ground) | 1 |
| 18 | TD+ | Transmitter Non-Inverted DATA in. AC Coupled. CML- I | |
| 19 | TD- | Transmitter Inverted DATA in. AC Coupled. CML- I | |
| 20 | VeeT | Transmitter Ground (Common with Receiver Ground) | 1 |



Note

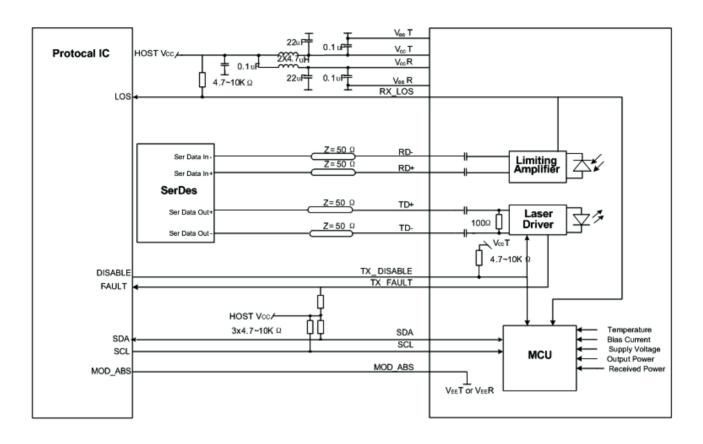
- 1. Circuit ground is internally isolated from chassis ground.
- 2. TX Fault is an open collector/drain output .Which should be pulled up with a 4.7K 10K Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc+0.3V.A high output indicates a transmitter fault caused by either the tx bias current or the tx output power exceeding the preset alarm thresholds. A low output indicates normal operation .In the low state, the output is pulled to <0.8V.
- 3. Laser output disabled on TX Disable > 2.0V or open, enabled on TX Disable < 0.8V.
- 4. Internally pulled down per SFF-8431 Rev4.1.
- 5. LOS is open collector output. Should be pulled up with 4.7k 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- 6. Internally connected



Pin-out of Connector Block on Host Board



Recommend Circuit Schematic



Absolute Maximum Ratings

| Parameter | Symbol | Min | Тур | 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 | Тур | Max | Unit | Ref. |
|----------------------------|--------|------|------|------|------|------------|
| Power Supply Voltage | Vcc | 3.13 | 3.30 | 3.47 | V | |
| Power Supply Current | lcc | | | 350 | mA | Commercial |
| Case Operating Temperature | Tc | 0 | | +70 | °C | Commercial |
| Data Rate | BR | | 10.3 | | Gbps | |
| 9/125um G.652 SMF | Lmax | | | 60 | km | |

Electrical Characteristics

| Parameter | Symbol | Min | Тур | Max | Unit | Ref. |
|--------------------------------|----------|-----------|-----|----------|------|------|
| Transmitter | | | | | | |
| Input differential impedance | Rin | 80 | 100 | 120 | Ω | 1 |
| Differential data input swing | Vin, pp | 120 | | 850 | mV | |
| TX Disable-High | | Vcc – 0.8 | | Vcc | V | |
| TX Disable-Low | | Vee | | Vee+ 0.8 | V | |
| TX Fault-High | | Vcc – 0.8 | | Vcc | V | |
| TX Fault-Low | | Vee | | Vee+ 0.8 | V | |
| Receiver | | | | | | |
| Differential data output swing | Vout, pp | 300 | | 850 | mV | 2 |
| Data output rise time | Tr | 28 | | | ps | 3 |
| Data output fall time | Tf | 28 | | | ps | 3 |
| LOS-High | | Vcc – 0.8 | | Vcc | V | |
| LOS-Low | | Vee | | Vee+0.8 | V | |

Notes:

- 1. AC coupled.
- 2. Into 100 ohm differential termination.
- 3. 20 80 %



Optical Characteristics

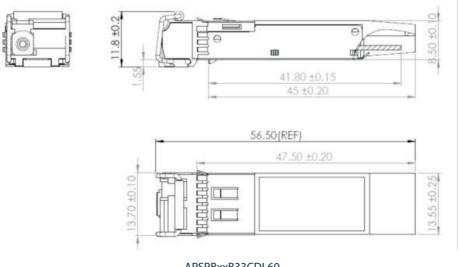
| Parameter | Symbol | Min | Тур | Max | Unit | Ref. |
|-----------------------------|--------|------|------|------|------|------|
| Transmitter | | | | | | |
| Output Opt. Power | РО | +1 | | +6 | dBm | |
| Optical Wavelength | ` | 1260 | 1270 | 1280 | nm | |
| Optical wavelength | λ | 1320 | 1330 | 1340 | nm | |
| Side-Mode Suppression Ratio | SMSR | 30 | | | dB | |
| Spectral Width(-20dB) | Δλ | | | 1 | nm | |
| Optical Extinction Ratio | ER | 4 | | | dB | |
| Receiver | | | | | | |
| RX Sensitivity @10.3Gb/s | SENS1 | | | -20 | dBm | 1,2 |
| Receiver Overload | | -7 | | | dBm | |
| 0 : 16 . W 1 | 16 | 1320 | 1330 | 1340 | nm | |
| Optical Center Wavelength | λС | 1260 | 1270 | 1280 | nm | |
| LOS De-Assert | LOSD | | | -22 | dBm | |
| LOS Assert | LOSA | -40 | | | dBm | |
| LOS Hysteresis | | 0.5 | | 5 | dB | |
| | | | | | | |

Notes:

- 1. Measured with conformance signals defined in FC-PI-2 Rev. 10.0 specifications.
- 2.Measured with PRBS 2 31-1 at 10 -12 BER.

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.

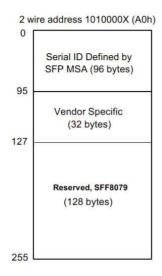


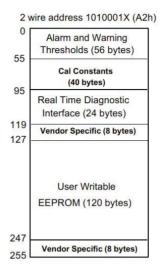
APSPBxxB33CDL60



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 | +1 to +6dBm | ±3dB | Internal |
| RX Power | -20 to -7dBm | ±3dB | Internal |

Revision History

| Revision | Initiated | Reviewed | Approved | DCN | Release Date |
|------------|--------------|------------|------------|----------------------------------|---------------|
| Version1.0 | Yangpeiyun | Sunbin | Ding zheng | New Released. | July 28, 2016 |
| Version1.1 | Tangzhiqiang | Yangpeiyun | Ding zheng | Update the new template. | Dec 19, 2019 |
| Version1.2 | Tangrong | Yangpeiyun | Dingzheng | Update the regulatory compliance | June 4, 2020 |



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