



# SFP28 Short Wavelength C-temp Transceiver

APSP885B53CDL01



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## APSP885B53CDL01

ATOP's APSP885B53CDL01 short wavelength transceiver is a single-Channel , Pluggable , Fiber-Optic SFP28 for 25 Gigabit Ethernet and Infiniband EDR Applications. It is with the SFP+ 20-pin connector, Digital diagnostic functions are available via an I<sup>2</sup>C. It has built-in clock and data recovery (CDR). They are compliant to IEEE802.3by, SFF-8472 Rev 12.2 and SFF-8402 , and compatible with SFF-8432 and applicable portions of SFF-8431 Rev4.1.This module incorporates ATOP Technologies proven circuit and VCSEL technology to provide reliable longlife, high performance, and consistent service .

### Product Features

- ✓ Duplex LC connector
- ✓ Hot-pluggable SFP28 footprint
- ✓ 850nm VCSEL laser
- ✓ RoHS compliant and Lead Free
- ✓ 100m over MMF (50/125 um OM4)
- ✓ 70m over MMF (50/125um OM3)
- ✓ Metal enclosure for lower EMI
- ✓ Power dissipation <1W (0~70°C)
- ✓ Commercial operating temperature optional

### Applications

- ✓ 25GBASE-SR Ethernet
- ✓ CPRI Option 10



## Product Selection

| Part Number     | Operating Case temperature | DDMI |
|-----------------|----------------------------|------|
| APSP885B53CDL01 | Commercial(0~70°C)         | Yes  |

## Regulatory Compliance

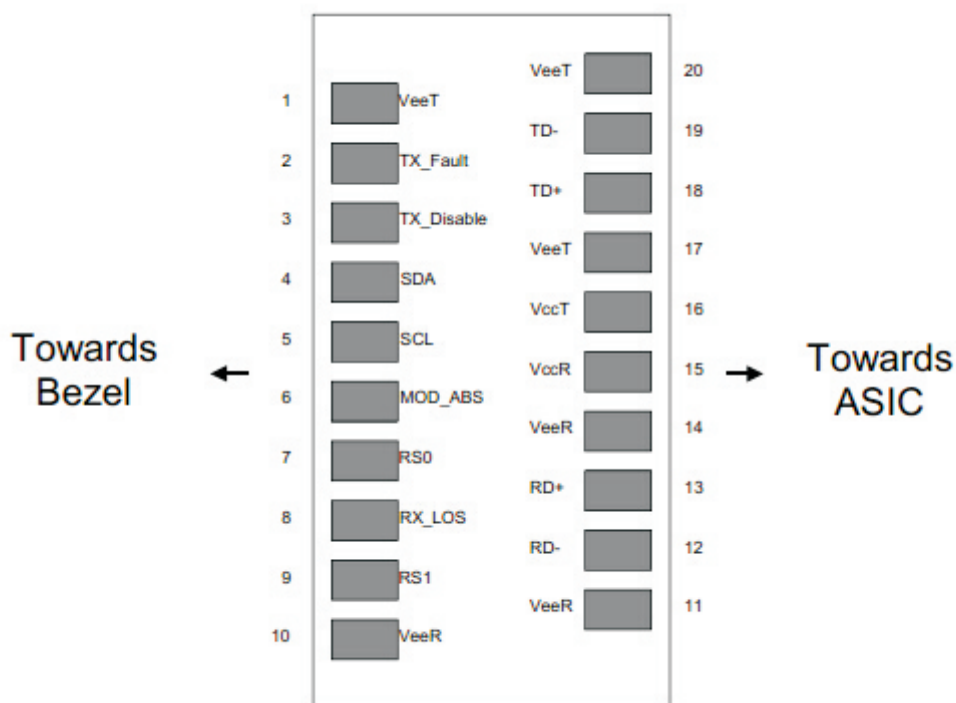
- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with EN 61000-4-2
- Immunity compatible with EN 61000-4-3
- EMI compatible with FCC Part 15 Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 IEC 60950, IEC60825-1,2
- RoHS 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. LVTTTL-O   | 2    |
| 3   | TX Disable | Transmitter Disable. Laser output disabled on high or open. LVTTTL-I          | 3    |
| 4   | SDA        | 2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-I/O | 2    |
| 5   | SCL        | 2-Wire Serial Interface Data Line (Same as MOD-DEF2 in INF-8074i). LVTTTL-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 . LVTTTL-I            | 4    |
| 8   | LOS        | Loss of Signal indication. Logic 0 indicates normal operation. LVTTTL-O       | 5    |
| 9   | RS1        | Rate Select 1, optionally controls SFP+ module transmitter. LVTTTL-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    |

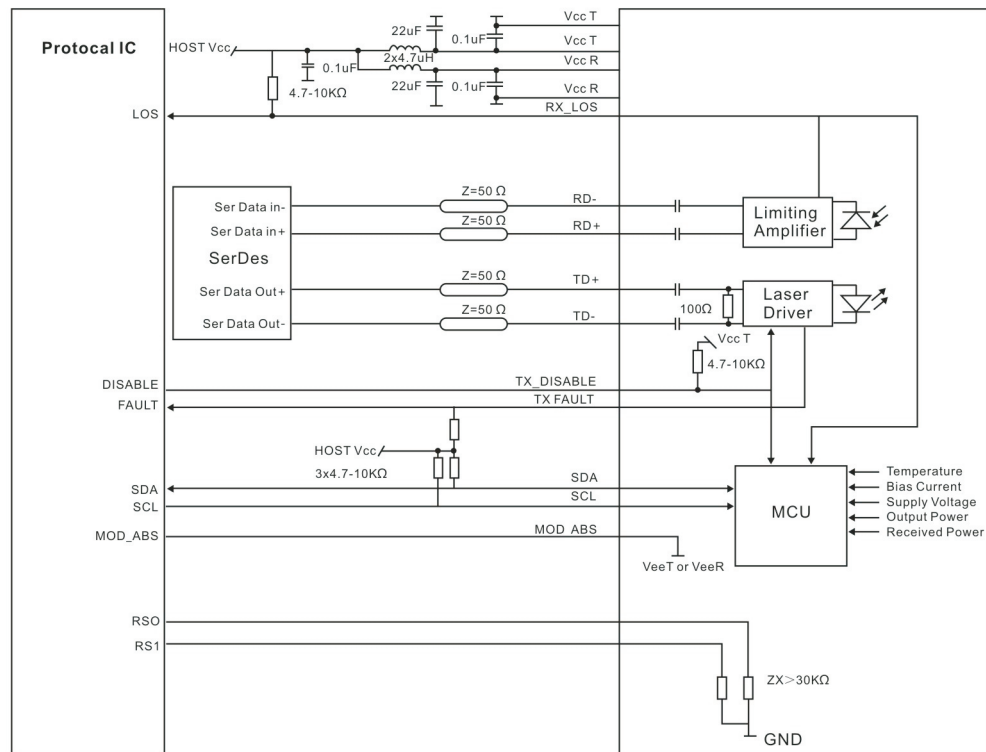
## Note

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  | 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    |      |       | 300  | mA   | Commercial |
| Case Operating Temperature  | TC     | 0    |       | +70  | °C   | Commercial |
| Data Rate(Gigabit Ethernet) | BR     |      | 25.78 |      | Gbps |            |
| 50/125 um OM4 MMF           | Lmax   |      |       | 100  | m    |            |

## Electrical Characteristics

| Parameter                      | Symbol   | Min       | Typ | Max      | Unit     | Ref. |
|--------------------------------|----------|-----------|-----|----------|----------|------|
| <b>Transmitter</b>             |          |           |     |          |          |      |
| Input differential impedance   | Rin      | 80        | 100 | 120      | $\Omega$ | 1    |
| Differential data input swing  | Vin, pp  | 150       |     | 980      | 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        |      |
| <b>Receiver</b>                |          |           |     |          |          |      |
| Single ended data output swing | Vout, pp | 185       |     | 425      | mV       | 2    |
| LOS-High                       |          | Vcc – 0.8 |     | Vcc      | V        |      |
| LOS-Low                        |          | Vee       |     | Vee+0.8  | V        |      |

Notes:

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

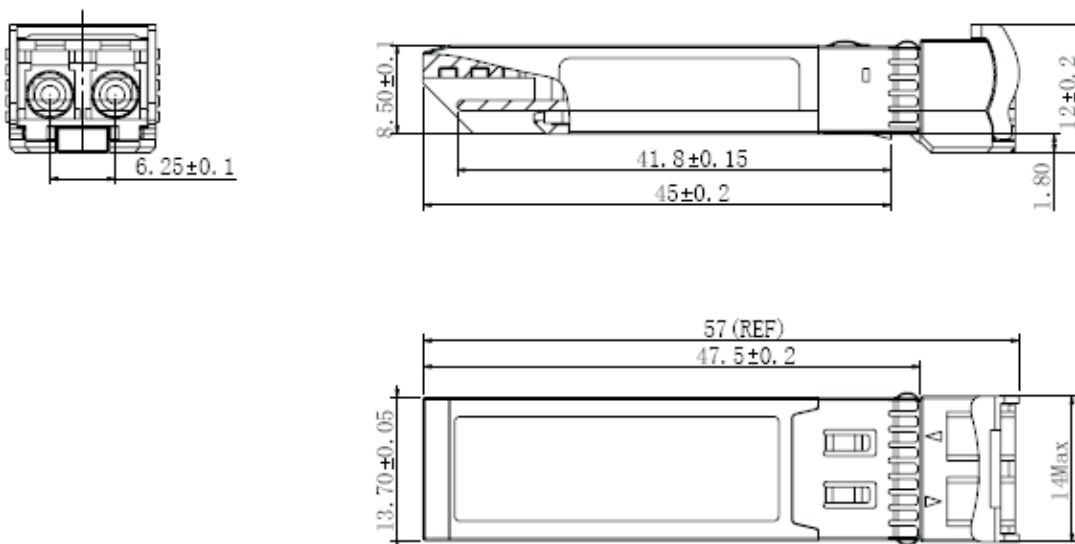
## Optical Characteristics

| Parameter                          | Symbol          | Min  | Typ | Max   | Unit | Ref. |
|------------------------------------|-----------------|------|-----|-------|------|------|
| <b>Transmitter</b>                 |                 |      |     |       |      |      |
| Output Opt. Power                  | PO              | -8.4 |     | +2.4  | dBm  |      |
| Optical Wavelength                 | $\lambda$       | 840  | 850 | 860   | nm   |      |
| Spectral Width (RMS)@25Gb/s        | $\Delta\lambda$ |      |     | 0.6   | nm   |      |
| Optical Extinction Ratio           | ER              | 2    |     |       | dB   |      |
| <b>Receiver</b>                    |                 |      |     |       |      |      |
| Receiver Sensitivity               | SENS1           |      |     | -10.3 | dBm  | 1    |
| Stressed Receiver Sensitivity(OMA) | Pmin            |      |     | -5.2  | dBm  |      |
| Receiver Overload                  |                 | 3    |     |       | dBm  |      |
| Optical Center Wavelength          | $\lambda_C$     | 840  |     | 860   | nm   |      |
| LOS De-Assert                      | LOSD            |      |     | -13   | dBm  |      |
| LOS Assert                         | LOSA            | -30  |     |       | dBm  |      |
| LOS Hysteresis                     |                 | 0.5  |     | 5     | dB   |      |

Notes: Measured with data rate at 25.78Gb/s, BER less than  $5E-5$  with PRBS  $2^{31}-1$ .

## Mechanical Specifications

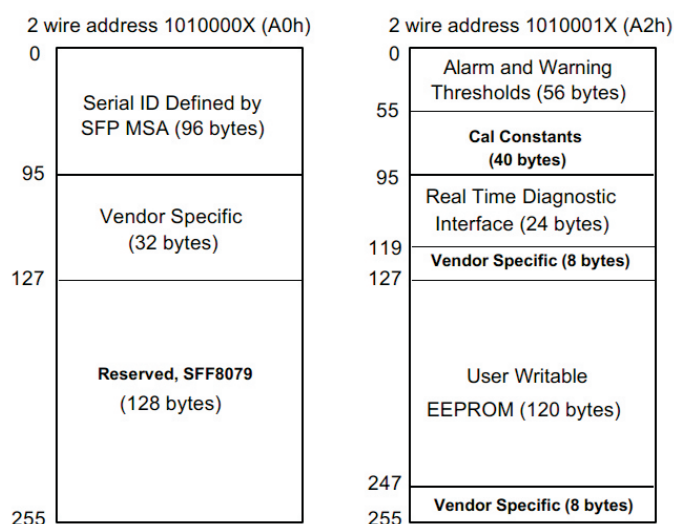
- ATOP's Small Form Factor Pluggable (SFP28) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA) , dimensions are in mm.



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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 (C)  | ±3°C     | Internal    |
| Voltage      | 2.97 to 3.63V   | ±3%      | Internal    |
| Bias Current | 0 to 80mA       | ±10%     | Internal    |
| TX Power     | -8.4 to +2.4dBm | ±3dB     | Internal    |
| RX Power     | -11 to 3dBm     | ±3dB     | Internal    |

## Revision History

| Revision   | Initiated     | Reviewed      | Approved  | DCN                                | Release Date  |
|------------|---------------|---------------|-----------|------------------------------------|---------------|
| Version1.0 | Chuck.chen    | Sunbin        | DingZheng | New Released.                      | Jul. 19, 2017 |
| Version2.0 | Chuck.chen    | Tang.Zhiqiang | DingZheng | Change Power dissipation           | Apr. 9, 2018  |
| Version2.1 | Li Tao        | Tang.Zhiqiang | DingZheng | Add CPRI Option 10                 | Jan. 15, 2019 |
| Version2.2 | Tang.Zhiqiang | Li Tao        | DingZheng | Update the new template            | Dec 19, 2019  |
| Version2.3 | Tang Rong     | Li Tao        | DingZheng | Update Recommend Circuit Schematic | June 30, 2020 |





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