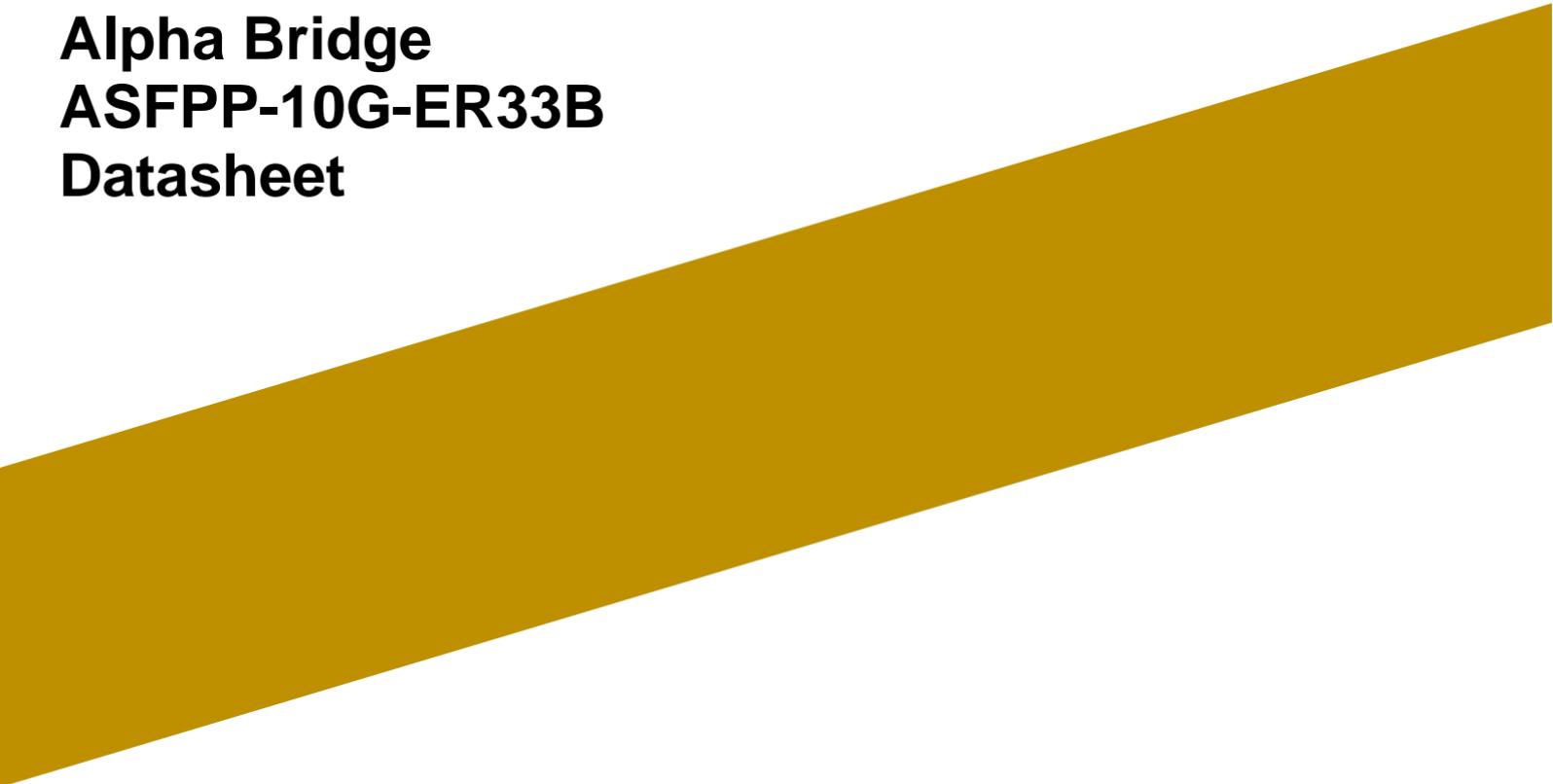


**Alpha Bridge**  
**ASFPP-10G-ER33B**  
**Datasheet**





## Features

- Support 9.95Gb/s to 10.3Gb/s data rates
- Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- Single 3.3V Supply
- Up to 40km on 9/125um SMF
- 1330nm DFB Laser transmitter, 1270nm receiver
- SFP+ MSA SFF-8431 Compliant
- Digital Diagnostic SFF-8472 Compliant
- RoHS compliant and Lead-Free
- Operating case temperature: 0°C ~70°C

## Applications

- 10GBASE-ER at 10.3125Gbps
- 10GBASE-EW at 9.953Gbps
- Other Optical Links

## Description

The SFP+ BWDM series single mode transceiver is a small form factor pluggable module for duplex optical data communications such as 10GBASE-ER/EW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability.

The SFP+ BWDM module is designed for single-mode fiber and operates at a nominal wavelength of 1330nm; The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector (IDP) mounted in an optical header and a limiting post-amplifier IC

## Absolute Maximum Ratings

| Parameters                 | Symbol | Min. | Max. | Units |
|----------------------------|--------|------|------|-------|
| Supply Voltage             | VCC    | -0.5 | 3.6  | V     |
| Storage Temperature        | Tc     | -40  | 85   | °C    |
| Operating Case Temperature | Tc     | 0    | 70   | °C    |
| Relative Humidity          | RH     | 0    | 85   | %     |

## Recommended Operating Conditions

| Parameter                  | Symbol | Min. | Typ. | Max. | Units |
|----------------------------|--------|------|------|------|-------|
| Supply Voltage             | VCC    | 3    | 3.3  | 3.6  | V     |
| Supply Current             | Icc    |      | 300  | 450  | mA    |
| Operating Case Temperature | TC     | 0    | 25   | 70   | °C    |
| Module Power Dissipation   | Pm     | -    | 1    | 1.5  | W     |

Notes:

1. Supply current is shared between VCCTX and VCCR X
2. In-rush is defined as current level above steady state current requirements.

## Diagnostics

| Parameters                            | Symbol    | Accuracy | Unit | Notes |
|---------------------------------------|-----------|----------|------|-------|
| Temperature monitor absolute error    | DMI_Temp  | ± 3      | °C   |       |
| Supply voltage monitor absolute error | DMI_VCC   | ±0.3     | V    |       |
| TX power                              | DMI_TX    | ± 3 dB   | dBm  |       |
| RX power                              | DMI_RX    | ± 3 dB   | dBm  |       |
| Bias Current monitor                  | DMI_Ibias | ± 10%    | mA   |       |

## Optical Characteristics

| Parameter                       | Symbol                    | Min. | Typ. | Max. | Units | Notes |
|---------------------------------|---------------------------|------|------|------|-------|-------|
| <b>Transmitter</b>              |                           |      |      |      |       |       |
| Optical Wavelength              | $\lambda_C$               | 1320 | 1330 | 1340 | nm    |       |
| Side Mode Suppression Ratio     | SMSR                      | 30   |      |      | dB    |       |
| Spectral Width (-20dB)          | $\Delta\lambda$           |      |      | 1    | nm    |       |
| Average Output Power            | Pop                       | 1    |      | 5    | dBm   | 1     |
| Extinction Ratio                | ER                        | 3.5  |      |      | dB    |       |
| Eye Mask                        | Compliant with IEEE 802.3 |      |      |      |       |       |
| Transmitter Dispersion Penalty  | TDP                       |      |      | 3.2  | dB    |       |
| Launch Power of OFF Transmitter | POUT_OFF                  |      |      | -30  | dBm   |       |
| Relative Intensity Noise        | RIN                       |      |      | -128 | dB/Hz |       |
| <b>Receiver</b>                 |                           |      |      |      |       |       |
| Center wavelength               | $\lambda_C$               | 1260 | 1270 | 1280 | nm    |       |
| Average Receiver Power          | PSENS                     |      |      | -15  | dBm   | 1,2   |
| Receiver Overload               | PMAX                      |      |      | 0.5  | dBm   |       |
| LOS Assert                      | LOSA                      | -30  |      |      | dBm   |       |
| LOS De-assert                   | LOSD                      |      |      | -15  | dBm   |       |
| LOS Hysteresis                  | LOSH                      | 0.5  |      |      | dB    |       |

Note:

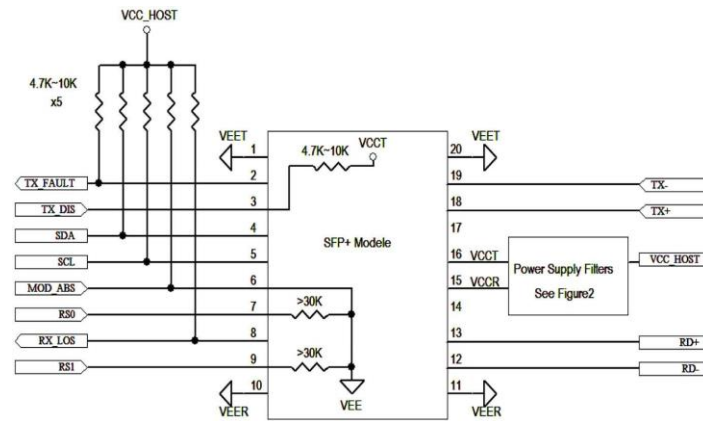
- Average Receiver Power (Min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant.
- Measured with a PRBS2<sup>31</sup>-1 test pattern @10.3125Gbps, BER $\leq$ 10<sup>-12</sup>

## Electrical Characteristics

| Parameter                      | Symbol     | Min. | Typ. | Max.    | Units    | Note |
|--------------------------------|------------|------|------|---------|----------|------|
| <b>Transmitter</b>             |            |      |      |         |          |      |
| Input differential impedance   | RIN        |      | 100  |         | $\Omega$ | 2    |
| Single-ended data input swing  | Vin_PP     | 150  |      | 1200    | mVpp     |      |
| Transmit Disable Voltage       | VD         | 2    |      | Vcc     | V        |      |
| Transmit Enable Voltage        | VEN        | VEE  |      | VEE+0.8 | V        | 3    |
| <b>Receiver</b>                |            |      |      |         |          |      |
| Output Differential impedance  | Rout       |      | 100  |         | $\Omega$ | 2    |
| Single-Ended Data Output Swing | VOUt_PP    | 300  |      | 700     | mV       | 4    |
| LOS Fault                      | VLOS fault | 2    |      | VCCHOST | V        | 5    |
| LOS Normal                     | VLOS norm  | VEE  |      | VEE+0.8 | V        | 5    |

Notes:

- Module power consumption never exceeds 1W..
- AC coupled.
- Or open circuit.
- Into 100-ohm differential termination.
- LOS is LVTTTL. Logic 0 indicates normal operation; logic1 indicates no signal detected.

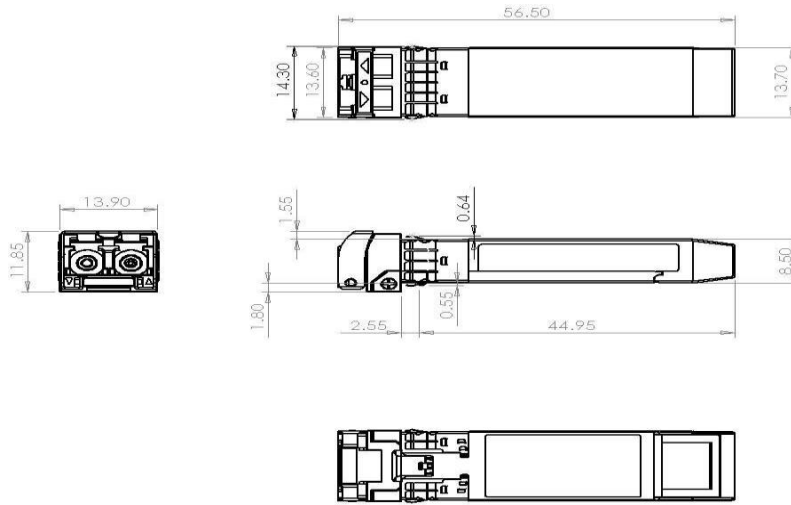


## Pin Descriptions

| Pin | Name       | Description   | Notes |
|-----|------------|---|-------|
| 1   | VEET       | Transmitter ground (common with receiver ground)              | 1     |
| 2   | TX_FAULT   | Transmitter Fault   | 2     |
| 3   | TX_DISABLE | Transmitter Disable. Laser output disabled on high or open    | 3     |
| 4   | SDA        | 2-wire Serial Interface Data Line                             | 4     |
| 5   | SCL        | 2-wire Serial Interface Clock Line                            | 4     |
| 6   | MOD_ABS    | Module Absent. Grounded within the module                     | 4     |
| 7   | RS0        | No connection required  |       |
| 8   | LOS        | Loss of Signal indication. Logic 0 indicates normal operation | 5     |
| 9   | RS1        | No connection required  | 1     |
| 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                        |       |
| 13  | RD+        | Receiver Non-inverted DATA out. AC coupled                    |       |
| 14  | VEER       | Receiver ground (common with transmitter ground)              | 1     |
| 15  | VCCR       | Receiver power supply   |       |
| 16  | VCCT       | Transmitter power supply                                      |       |
| 17  | VEET       | Transmitter ground (common with receiver ground)              | 1     |
| 18  | TD+        | Transmitter Non-Inverted DATA in. AC coupled                  |       |
| 19  | TD-        | Transmitter Inverted DATA in. AC coupled                      |       |
| 20  | VEET       | Transmitter ground (common with receiver ground)              | 1     |

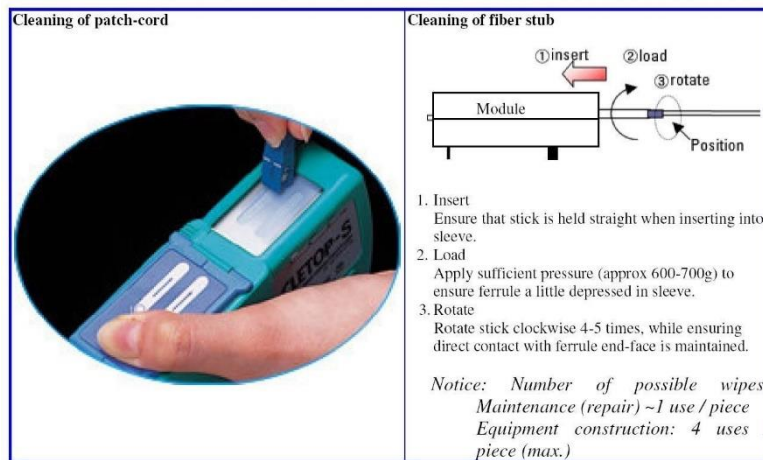
### Notes:

- Module circuit ground is isolated from module chassis ground within the module.
- should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
- TX Disable is an input contact with a 4.7k~10kΩ pullup to VccT inside the module.
- Mod\_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc\_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod\_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.
- RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.



### Optical Receptacle Cleaning Recommendations:

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patch-cord, the fiber end should be cleaned up by using Cletop® cleaning cassette



Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME

### Ordering Information

| Model Number      | Part Number    | Reach | Input/Output | TX/RX     | SignalDetect | Voltage | Temperature   |
|-------------------|----------------|-------|--------------|-----------|--------------|---------|---------------|
| ASFPP-10G-ER33B   | OPAK-W40-33-CF | 40 km | AC/AC        | 1330/1270 | TTL          | 3.3V    | 0°C to 70 °C  |
| ASFPP-10G-ER33B-I | OPAK-W40-33-CF | 40 km | AC/AC        | 1330/1270 | TTL          | 3.3V    | -40°C to 85 ° |

Note: All information contained in this document is subject to change without notice.

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