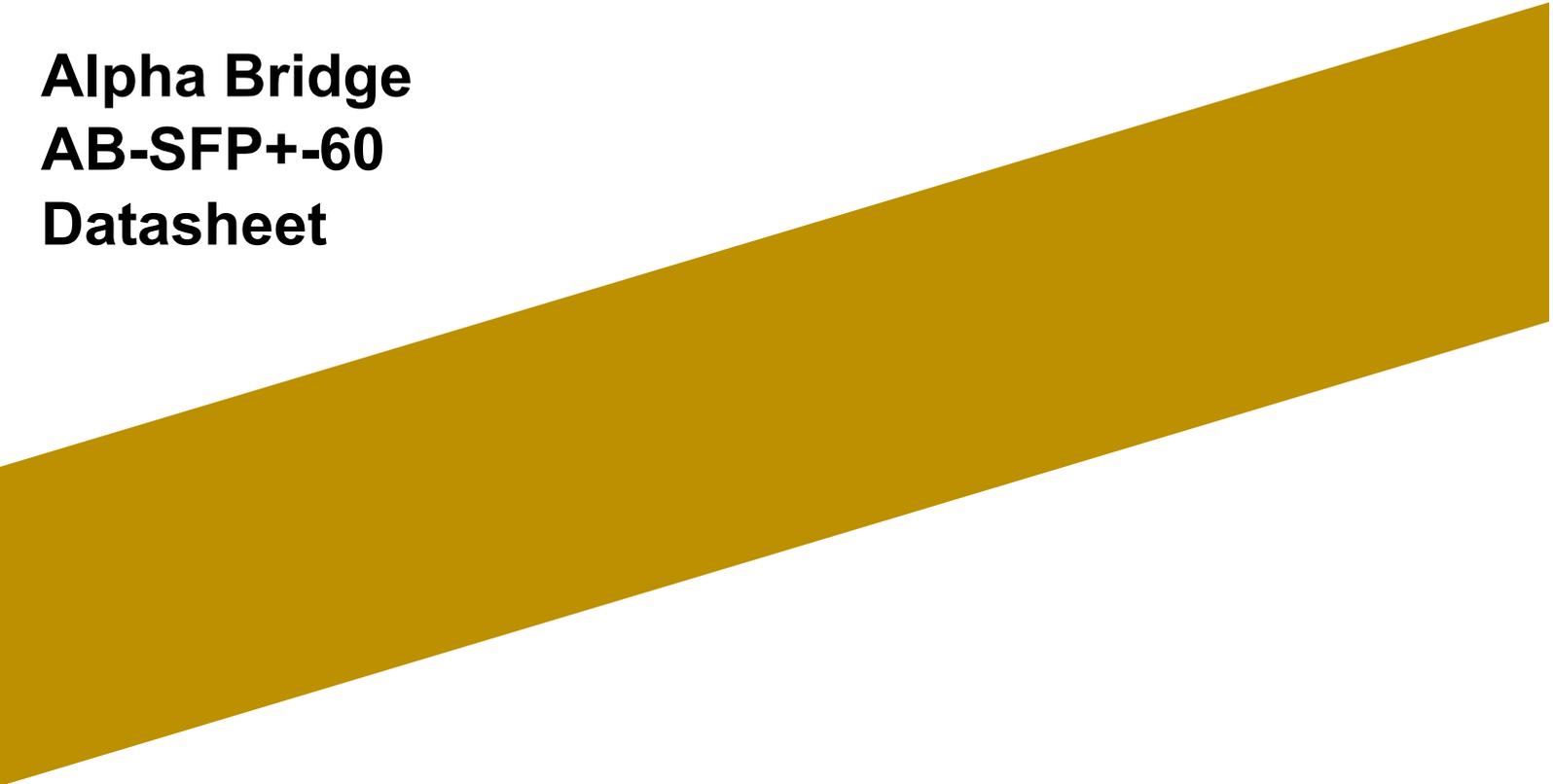


**Alpha Bridge  
AB-SFP+-60  
Datasheet**





### Features

- Compliant with SFF-8431 and IEEE802.3ae
- Data rate selectable ≤4.25Gbps or 9.95Gbps to 11.3Gbps bit rates
- Cooled EML transmitter and APD receiver
- link length up to 60km
- Low Power Dissipation 1.4W Typical (Maximum:2W)
- Single 3.3V power supply
- Diagnostic Performance Monitoring of module temperature, supply Voltages, laser bias current, transmit optical power, receive optical power
- RoHS compliant and lead-free

### Applications

- 10G Ethernet
- 10G Fiber Channel (with/without FEC)

### Description

SFP+ZR Transceiver is designed for 8.5G/10G Fiber-Channel and 10GBE applications. The transceiver consists of two sections: The transmitter section incorporates a cold EML laser. The receiver section consists of an APD photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. SFP+ZR Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power, and transceiver supply voltage.

### Absolute Maximum Ratings

| Parameter           | Symbol | Min  | Max | Unit |
|---------------------|--------|------|-----|------|
| Supply Voltage      | Vcc    | -0.5 | 3.8 | V    |
| Storage Temperature | Tst    | -40  | 85  | °C   |
| Relative Humidity   | Rh     | 0    | 85  | %    |

### Operating Conditions

| Parameter                    | Symbol | Min  | Typical | Max  | Unit |
|------------------------------|--------|------|---------|------|------|
| Supply Voltage               | Vcc    | 3.13 | 3.3     | 3.47 | V    |
| Supply current [1]           | Icc    |      | 420     | 610  | mA   |
| Operating Case Temperature   | Tca    | -5   | -       | 70   | °C   |
| Module Power Dissipation [2] | Pm     | -    | 1.4     | 2    | W    |

#### Notes:

- Supply current is shared between VCCTX and VCCR. Typical Supply current test at 25°C , Max Supply current test at 60~70°C
- In-rush is defined as current level above steady state current requirements

### Transmitter Specifications – Optical

| Parameter                         | Symbol      | Min  | Typical | Max  | Unit |
|-----------------------------------|-------------|------|---------|------|------|
| Center Wavelength                 | c           | 1528 |         | 1565 | nm   |
| Optical Average Power             | Po          | 0    | -       | 4    | dBm  |
| Side Mode Suppression Ratio       | SMSR        | 30   | -       | -    | dB   |
| Optical Transmit Power (disabled) | PTX_DISABLE | -    | -       | -30  | dBm  |
| Extinction Ratio                  | ER          | 9    |         | -    | dB   |

|                               |    |  |  |      |       |
|-------------------------------|----|--|--|------|-------|
| RIN210MA                      |    |  |  | -128 | dB/Hz |
| Optical Return Loss Tolerance |    |  |  | 21   | dB    |
| Dispersion penalty(1600ps/nm) | DP |  |  | 2    | dB    |

**Transmitter Specifications – Electrical**

| Parameter                    | Symbol  | Min | Typical | Max      | Unit |
|------------------------------|---------|-----|---------|----------|------|
| Data Rate                    | Mra     | -   | 10.3    | 11.3     | Gbps |
| Input differential impedance | Rim     | -   | 100     | -        | Ω    |
| Differential data Input      | VtxDIFF | 120 | -       | 850      | mV   |
| Transmit Disable Voltage     | VD      | 2   | -       | Vcc3+0.3 | V    |
| Transmit Enable Voltage      | Ven     | 0   | -       | 0.8      | V    |
| Transmit Disable Assert Time | Vn      | -   | -       | 100      | us   |

**Receiver Specifications – Optical**

| Parameter                  | Symbol      | Min  | Typical | Max  | Unit |
|----------------------------|-------------|------|---------|------|------|
| Input Operating Wavelength | λ           | 1110 | -       | 1650 | nm   |
| Receiver sensitivity [1]   |             | -    | -       | -24  | dBm  |
| Maximum Input Power        | RX-overload | -    | -       | -8   | dBm  |
| Loss of Signal Asserted    |             | -34  | -       | -    | dBm  |
| LOS De-Asserted            |             | -    | -       | -24  | dBm  |

Notes: Measured with conformance test signal for BER = 10<sup>-12</sup>. PRBS31, Data Rate=10.3Gbps.

**Receiver Specifications – Electrical**

| Parameter                 | Symbol   | Min | Typical | Max       | Unit |
|---------------------------|----------|-----|---------|-----------|------|
| Data Rate                 | Mra      | -   | 10.3    | 11.3      | Gbps |
| Differential Output Swing | Vout P-P | 350 | -       | 850       | mV   |
| Rise/Fall Time            | Tr / Tf  | 24  | -       | -         | ps   |
| Loss of Signal –Asserted  | VOH      | 2   | -       | Vcc3+0.3- | V    |
| Loss of Signal –Negated   | VOL      | 0   | -       | 0.4       | V    |

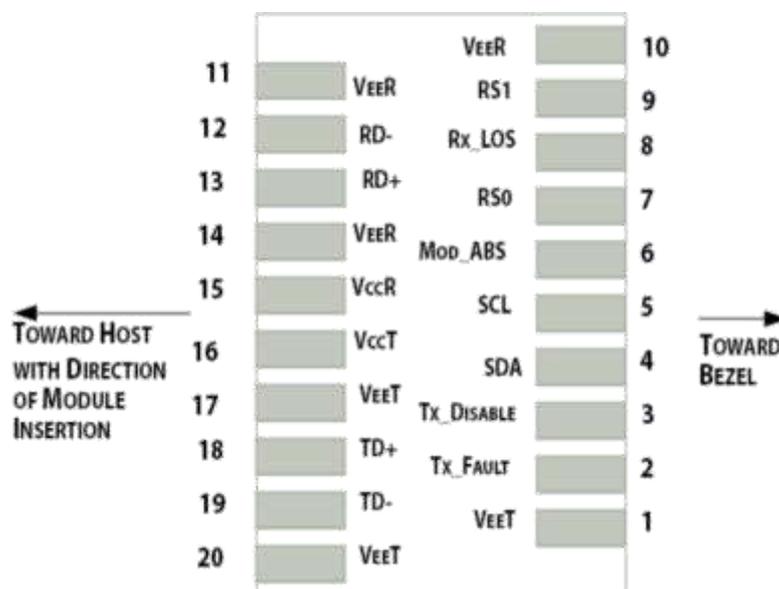


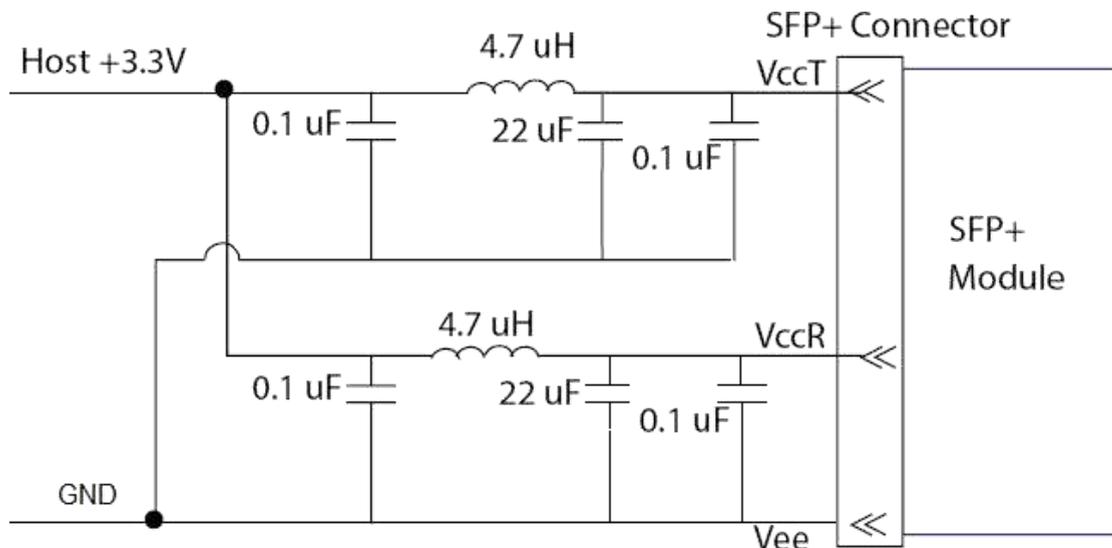
Figure1. Electrical Pin-out Details

**Pin Descriptions**

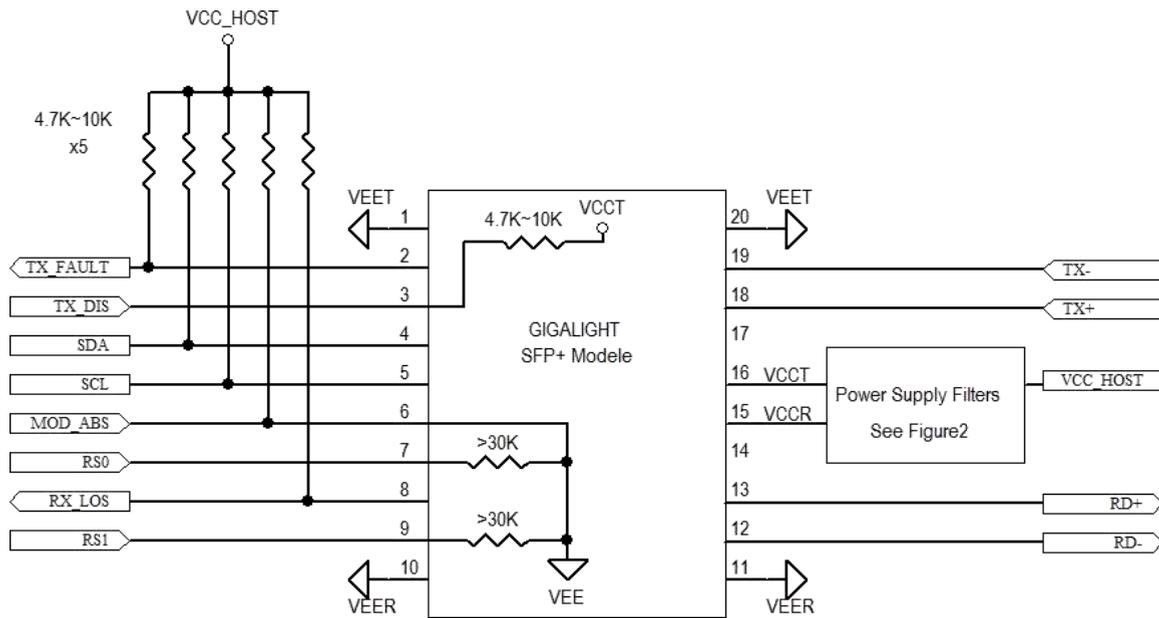
| Pin | Symbol       | Name/Description   |
|-----|--------------|--|
| 1   | VEET [1]     | Transmitter Ground   |
| 2   | Tx_FAULT [2] | Transmitter Fault  |
| 3   | Tx_DIS       | Transmitter Disable. Laser output disabled on high or open   |
| 4   | SDA [2]      | 2-wire Serial Interface Data Line  |
| 5   | SCL [2]      | 2-wire Serial Interface Clock Line   |
| 6   | MOD_ABS [4]  | Module Absent. Grounded within the module  |
| 7   | RS0 [5]      | RS0 for Rate Select: Open or Low = Module supports ≤4.25Gbps<br>High = Module supports 9.95 Gb/s to 10.3125 Gb/s |
| 8   | RX_LOS [2]   | Loss of Signal indication. Logic 0 indicates normal operation  |
| 9   | RS1 [5]      | No connection required   |
| 10  | VEER [1]     | Receiver Ground  |
| 11  | VEER [1]     | Receiver Ground  |
| 12  | RD-          | Receiver Inverted DATA out. AC Coupled   |
| 13  | RD+          | Receiver DATA out. AC Coupled  |
| 14  | VEER [1]     | Receiver Ground  |
| 15  | VCCR         | Receiver Power Supply  |
| 16  | VCCT         | Transmitter Power Supply   |
| 17  | VEET [1]     | Transmitter Ground   |
| 18  | TD+          | Transmitter DATA in. AC Coupled  |
| 19  | TD-          | Transmitter Inverted DATA in. AC Coupled   |
| 20  | VEET [1]     | Transmitter Ground   |

**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 4.7 kΩ to 10 kΩ 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

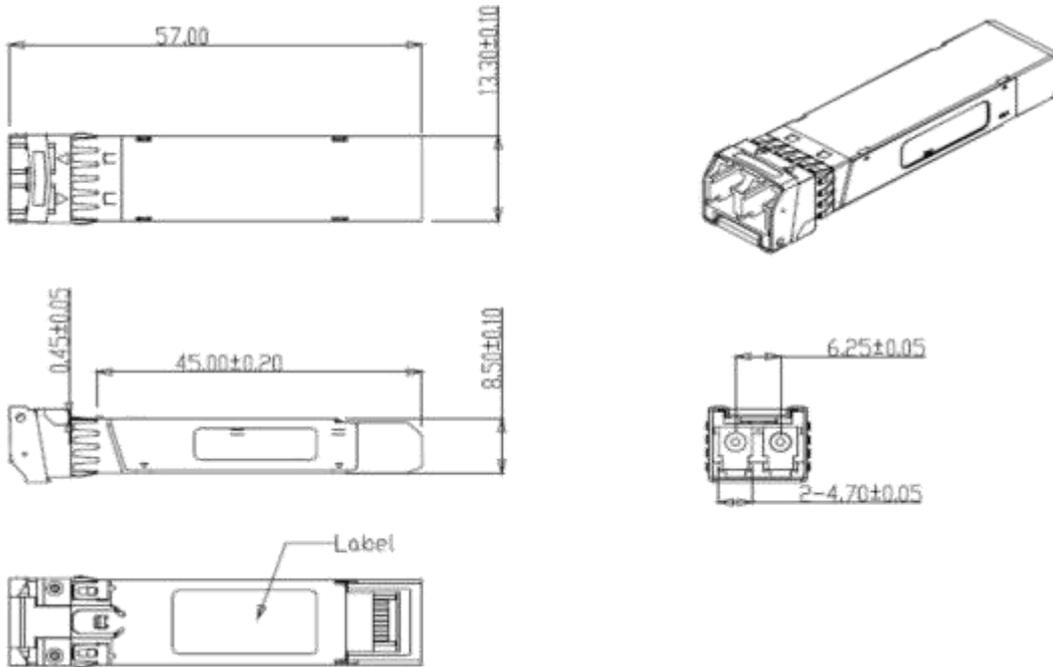


**Figure2. Host Board Power Supply Filters Circuit**



**Figure3. Host-Module Interface**

**Mechanical Specifications**



**Ordering information**

| Part Number   | Product Description                       |
|---------------|---|
| AB-SFP+-60    | 10Gbps 1550nm 60km LC SFP+, 0°C ~ +70°C   |
| AB-SFP+-60- I | 10Gbps 1550nm 60km LC SFP+, -40°C ~ +85°C |

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