

## AFBR-710FMZ

10G Fibre Channel, Multimode, 850 nm,  
SFP+ Optical Transceiver



## Data Sheet



### Description

The Avago AFBR-710FMZ transceiver is part of a family of SFP+ products. This transceiver utilizes Avago's 850 nm VCSEL and PIN Detector technology to provide a 10 Gb Fibre Channel design compliant with the ANSI 10G Fibre Channel specification. The AFBR-710FMZ transceiver is designed to enable 10 Gb Fibre Channel equipment designs with very high port density based on the new electrical and mechanical specification enhancements to the well known SFP specifications developed by the SFF Committee. These specifications are referred to as SFP+ to recognize these enhancements to previous SFP specifications used for lower speed products. Avago Technologies is an active participant in the SFF Committee specification development activities.

### Related Products

- AFBR-710SMZ is an SFP+ 10 Gigabit Ethernet 10GBASE-SR/SW transceiver with case temperature operated at 0-70 °C for use on multimode fiber cables. It is best suited for OM3 high bandwidth MMF link applications with link lengths up to 300 meters.
- AFBR-710DMZ SFP+ 10Gb/1Gb Gigabit Ethernet 10GBASE-SR transceiver for operation in 300m reach using OM3 MMF.
- AFCT-709SMZ (AFCT-709ASMZ) with case temperature 0-70 (0-85) °C SFP+ 10 Gigabit Ethernet 10GBASE-LR transceiver for operation in SMF link applications to 10 km
- AFCT-5016Z SFP+ Evaluation Board: The purpose of this SFP+ evaluation board is to provide the designer with a convenient means for evaluating SFP+ fiber optic transceivers.

### Features

- Avago 850 nm VCSEL source and Transmitter Optical Subassembly technology
- Avago PIN detector and Receiver Optical Subassembly technology
- Typical power dissipation 600 mW
- Full digital diagnostic management interface
- Avago SFP+ package design enables equipment EMI performance in high port density applications with margin to Class B limits

### Specifications

- Optical interface specifications per ANSI 10G Fibre Channel specification
- Link lengths at 10.51875 GBd:
  - 300 m with 50 µm OM3 MM fiber
  - 400 m with 50 µm OM4 MM fiber
- Electrical interface specifications per SFF Committee SFF 8431 Specifications for Enhanced 8.5 and 10 Gigabit Small Form Factor Pluggable Module "SFP+"
- Management interface specifications per SFF Committee SFF 8431 and SFF 8472 Diagnostic Monitoring Interface for Optical Transceivers
- Mechanical specifications per SFF Committee SFF 8432 Improved Pluggable Formfactor "IPF"
- LC Duplex optical connector interface conforming to ANSI TIA/EA 604-10 (FOCIS 10A)
- Compliant to Restriction on Hazardous Substances (RoHS) per EU and China requirements
- Class 1 Eye safe per requirements of IEC 60825-1 / CDRH

## Description, continued

### Installation

The AFBR-710FMZ transceiver package is compliant with the SFF 8432 Improved Pluggable Formfactor housing specification for the SFP+. It can be installed in any INF-8074 or SFF-8431/2 compliant Small Form Pluggable (SFP) port regardless of host equipment operating status. The AFBR-710FMZ is hot-pluggable, allowing the module to be installed while the host system is operating and on-line. Upon insertion, the transceiver housing makes initial contact with the host board SFP cage, mitigating potential damage due to Electro-Static Discharge (ESD).

### Digital Diagnostic Interface and Serial Identification

The two-wire interface protocol and signaling detail are based on SFF-8431. Conventional EEPROM memory, bytes 0-255 at memory address 0xA0, is organized in compliance with SFF-8431. New digital diagnostic information, bytes 0-255 at memory address 0xA2, is compliant to SFF-8472. The new diagnostic information provides the opportunity for Predictive Failure Identification, Compliance Prediction, Fault Isolation and Component Monitoring.

### Predictive Failure Identification

The AFBR-710FMZ predictive failure feature allows a host to identify potential link problems before system performance is impacted. Prior identification of link problems enables a host to service an application via "fail over" to a redundant link or replace a suspect device, maintaining system uptime in the process. For applications where ultra-high system uptime is required, a digital SFP provides a means to monitor two real-time laser metrics associated with observing laser degradation and predicting failure: average laser bias current (Tx\_Bias) and average laser optical power (Tx\_Power).

### Compliance Prediction

Compliance prediction is the ability to determine if an optical transceiver is operating within its operating and environmental requirements. AFBR-710FMZ devices provide real-time access to transceiver internal supply voltage and temperature, allowing a host to identify potential component compliance issues. Received optical power is also available to assess compliance of a cable plant and remote transmitter. When operating out of requirements, the link cannot guarantee error free transmission.

### Fault Isolation

The fault isolation feature allows a host to quickly pinpoint the location of a link failure, minimizing downtime. For optical links, the ability to identify a fault at a local device, remote device or cable plant is crucial to speeding service of an installation. AFBR-710FMZ real-time monitors of Tx\_Bias, Tx\_Power, Vcc, Temperature and Rx\_Power can be used to assess local transceiver current operating conditions. In addition, status flags TX\_DISABLE and Rx Loss of Signal (LOS) are mirrored in memory and available via the two-wire serial interface.

### Component Monitoring

Component evaluation is a more casual use of the AFBR-710AFMZ real-time monitors of Tx\_Bias, Tx\_Power, Vcc, Temperature and Rx\_Power. Potential uses are as debugging aids for system installation and design, and transceiver parametric evaluation for factory or field qualification. For example, temperature per module can be observed in high density applications to facilitate thermal evaluation of blades, PCI cards and systems.