

AFBR-57H5MZ-AO

Broadcom® AFBR-57H5MZ Compatible TAA 64GBase-SW Fibre Channel SFP56 (MMF, 850nm, 100m, LC, DOM)

Features

- Supports 16GFC, 32GFC, and 64GFC Data Rates
- VCSEL Laser and PIN Receiver
- Up to 100m Transmission on Multi-Mode Fiber
- Power Dissipation of 1.5W
- LC Connector
- Single 3.3V Power Supply
- Operating Temperature: 0 to 70 Celsius
- Hot-Pluggable
- RoHS Compliant and Lead-Free



Applications

- 64GBase Fibre Channel
- Access and Enterprise

Product Description

This Broadcom® AFBR-57H5MZ compatible SFP56 transceiver provides 64GBase-SW Fibre Channel throughput up to 100m over multi-mode fiber (MMF) using a wavelength of 850nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent Broadcom® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. It is built to meet or exceed the specifications of Broadcom®, as well as to comply with MSA (Multi-Source Agreement) standards to ensure seamless network integration. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

AddOn's transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products."



Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	-0.3		4	V	
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Signaling Rate	64GFC		28.9		GBd	
	32GFC		28.05		GBd	
	16GFC		14.025		GBd	
Transmission Distance	64GFC			70 (OM3) 100 (OM4/OM5)	m	
	32GFC			20 (OM2) 70 (OM3) 100 (OM4)	m	
	16GFC			35 (OM2) 100 (OM3) 125 (OM4)	m	
Bit Error Rate	64GFC	10^{-10}	1.31×10^{-4}			1
	32GFC		10^{-12}			2
Coupled Fiber			Multi-Mode Fiber			3

Notes:

1. PRBS31Q for 64GFC.
2. PRBS31 for 32GFC/13GFC.
3. 50/125µm MMF.

64G Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	Vcc	3.135	3.3	3.465	V	
Module Supply Current	Icc		400		mA	
Transmitter						
Differential Input Voltage Tolerance		900			mV	
Differential Termination Resistance Mismatch				10	%	
Differential Return Loss SDD11	SDD11, SDD22 (dB)	$\begin{cases} -9.5+0.368 \cdot f & 0.01 < f < 8\text{GHz} \\ -4.75+7.4 \cdot \log_{10}(f/14.025\text{GHz}) & 8 < f \leq 21\text{GHz} \end{cases}$			dB	
Differential-Mode to Common-Mode Conversion SCD11	SDC22, SCD11 (dB) <	$\begin{cases} -22 + 20 \cdot f/25.78 \text{ GHz} & 0.01 < f < 12.89\text{GHz} \\ -15 + 6 \cdot f/25.78 \text{ GHz} & 12.89 < f < 21 \text{ GHz} \end{cases}$			dB	
Input Equalization				10	dB	
Receiver						
Differential Voltage (Pk-Pk)				900	mV	
Differential Voltage With Transmitter Disabled (Pk-Pk)				35	mV	
Common-Mode Noise (RMS)				17.5	mV	
Differential Termination Resistance Mismatch				10	%	1
Differential Return Loss SDD22	SDD11, SDD22 (dB)	$\begin{cases} -9.5+0.368 \cdot f & 0.01 < f < 8\text{GHz} \\ -4.75+7.4 \cdot \log_{10}(f/14.025\text{GHz}) & 8 < f \leq 21\text{GHz} \end{cases}$			dB	
Common-Mode to Differential-Mode Conversion SDC22	SDC22, SCD11 (dB) <	$\begin{cases} -22 + 20 \cdot f/25.78 \text{ GHz} & 0.01 < f < 12.89\text{GHz} \\ -15 + 6 \cdot f/25.78 \text{ GHz} & 12.89 < f < 21 \text{ GHz} \end{cases}$			dB	
Source Transition Time (20-80%)		9.5			ps	
Eye Width at 10 ⁻⁵ Probability EW5		0.265			UI	
Eye Height at 10 ⁻⁵ Probability EH5		70			mV	
Vertical Eye Closure (VEC)				12	dB	
Output Emphasis				5	dB	
Low-Speed Signals						
Tx_Fault, Rx_LOS Output Voltage	VOL	-0.3		0.4	V	2
Tx_Disable, RS0, RS1 Input Voltage	VIL	-0.3		0.8	V	
	VIH	2.0		Vcc+0.3	V	

Notes:

1. At 1MHz.
2. At 0.7mA.

32G Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	Vcc	3.135	3.3	3.465	V	
Module Supply Current	Icc		400		mA	
Transmitter						
Differential Termination Resistance Mismatch				10	%	
Differential Return Loss SDD11	SDD11, SDD22 (dB)	$\begin{cases} -11 & 0.05 < f < 4\text{GHz} \\ -6.0 + 9.2 \cdot \log_{10}(f/14.025\text{GHz}) & 4 < f \leq 28.05\text{GHz} \end{cases}$			dB	
Common-Mode to Differential-Mode Conversion SDC11	SDC11, SCD11 (dB) <	$\begin{cases} -22 + 14 \cdot f/28.05\text{GHz} & 0.05 < f < 14.025\text{GHz} \\ -18 + 6 \cdot f/28.05\text{GHz} & 14.025 < f < 28.05\text{GHz} \end{cases}$			dB	
Differential-Mode to Common-Mode Conversion SCD11	SDC11, SCD11 (dB) <	$\begin{cases} -22 + 14 \cdot f/28.05\text{GHz} & 0.05 < f < 14.025\text{GHz} \\ -18 + 6 \cdot f/28.05\text{GHz} & 14.025 < f < 28.05\text{GHz} \end{cases}$			dB	
Input Equalization				10	dB	
Receiver						
Differential Voltage (Pk-Pk)				900	mV	
Common-Mode Noise (RMS)				17.5	mV	
Differential Termination Resistance Mismatch				10	%	1
Differential Return Loss SDD22	SDD11, SDD22 (dB)	$\begin{cases} -11 & 0.05 < f < 4\text{GHz} \\ -6.0 + 9.2 \cdot \log_{10}(f/14.025\text{GHz}) & 4 < f \leq 28.05\text{GHz} \end{cases}$			dB	
Common-Mode to Differential-Mode Conversion SDC22	SDC11, SCD11 (dB) <	$\begin{cases} -22 + 14 \cdot f/28.05\text{GHz} & 0.05 < f < 14.025\text{GHz} \\ -18 + 6 \cdot f/28.05\text{GHz} & 14.025 < f < 28.05\text{GHz} \end{cases}$			dB	
Differential-Mode to Common-Mode Conversion SCD22	SDC11, SCD11 (dB) <	$\begin{cases} -22 + 14 \cdot f/28.05\text{GHz} & 0.05 < f < 14.025\text{GHz} \\ -18 + 6 \cdot f/28.05\text{GHz} & 14.025 < f < 28.05\text{GHz} \end{cases}$			dB	
Common-Mode Return Loss SCC22				-2	dB	
Source Transition Time (20-80%)		9.5			ps	
Vertical Eye Closure				4	dB	
Eye Width at 10 ⁻⁶ Probability EW6		0.65			UI	
Eye Height at 10 ⁻⁶ Probability EH6		250			mV	
Output Emphasis				5	dB	
Low-Speed Signals						
Tx_Fault, Rx_LOS Output Voltage	VOL	-0.3		0.4	V	2
Tx_Disable, RS0, RS1 Input Voltage	VIL	-0.3		0.8	V	
	VIH	2.0		Vcc+0.3	V	

Notes:

1. At 1MHz.
2. At 0.7mA.

16G Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	Vcc	3.135	3.3	3.465	V	
Module Supply Current	Icc		400		mA	
Transmitter						
Common-Mode Voltage (RMS)				30	mV	
Common-Mode Voltage (Spectral Peak) (RMS)				20	mV	
Input Equalization				10	dB	
Receiver						
Output Emphasis				5	dB	
Low-Speed Signals						
Tx_Fault, Rx_LOS Output Voltage	VOL	-0.3		0.4	V	1
Tx_Disable, RS0, RS1 Input Voltage	VIL	-0.3		0.8	V	
	VIH	2.0		Vcc+0.3	V	

Notes:

1. At 0.7mA.

64GFC Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength		840	850	860	nm	
RMS Spectral Width				0.6	nm	
TDECQ				5.5	dB	
TDECQ-10log10(Ceq)				5.5	dB	
OMA _{outer}		-4.5		3	dBm	
OMA _{outer} Extinction Ratio		3			dB	
Launched Power in OMA _{outer} Minus TDECQ		-5.9			dBm	
Average Launch Power		-7.5		4	dBm	
RIN ₁₂ OMA				-128	dB/Hz	
Transition Time (20-80%)				34	ps	
Encircled Flux		≥86% at 19μm, ≤30% at 4.5μm				
Receiver						
Damage Threshold		5			dBm	
Average Receive Power		-9.4		4	dBm	1
Receiver Power (OMA _{outer})				3	dBm	
Return Loss of Receiver		12			dB	
Receiver Sensitivity (OMA _{outer})				-7	dBm	
Stressed Receiver Sensitivity (OMA _{outer})				-2.4	dBm	
LOS De-Assert				-14	dBm	
LOS Assert		-30		-17	dBm	

Notes:

1. The receiver should be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level. The receiver does not have to operate correctly at this received power.

32GFC Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength		840	850	860	nm	
RMS Spectral Width				0.570	nm	
Average Launch Power		0.240 (-6.2)		1.585 (2)	mW (dBm)	
Optical Modulation Amplitude		0.476 (-3.2)			mW (dBm)	
Vertical Eye Closure Penalty (VECPq)				3.13	dB	
RIN ₁₂ OMA				-129	dB/Hz	
Encircled Flux		≥86% at 19μm, ≤30% at 4.5μm				
Receiver						
Average Receive Power				1.585 (2)	mW (dBm)	
Unstressed Receiver Sensitivity (OMA)				0.095 (-10.2)	mW (dBm)	
Return Loss of Receiver		12			dB	
Rx Jitter Tracking Test (OMA)		0.295(-5.3)			mW(dBm)	
Rx Jitter Tracking Test, Jitter Frequency, and Pk-Pk Amplitude		(500,1)(100,5)			(kHz,UI)	
Receiver Electrical 3dB Upper Cutoff Frequency				32	GHz	
Stressed Receiver Sensitivity (OMA)				0.263 (-5.8)	mW (dBm)	
LOS De-Assert				-14	dBm	
LOS Assert		-30		-17	dBm	

16GFC Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength		840	850	860	nm	
RMS Spectral Width				0.59	nm	
Average Launch Power		-7.8		0	dBm	1
Optical Modulation Amplitude		0.331 (-4.8)			mW (dBm)	
Vertical Eye Closure Penalty (VECPq)				2.56	dB	
RIN ₁₂ OMA				-128	dB/Hz	
Encircled Flux		≥86% at 19μm, ≤30% at 4.5μm				
Receiver						
Average Received Power				0	dBm	
Unstressed Receiver Sensitivity (OMA)				0.089 (-10.5)	mW (dBm)	
Return Loss of Receiver		12			dB	
Rx Jitter Tracking Test (OMA)		0.214(-6.7)			mW(dBm)	
Rx Jitter Tracking Test, Jitter Frequency, and Pk-Pk Amplitude		(840,1)(168,5)			(kHz,UI)	
Receiver Electrical 3dB Upper Cutoff Frequency				18	GHz	
Stressed Receiver Sensitivity (OMA)				0.17 (-7.7)	mW (dBm)	
LOS De-Assert				-14	dBm	
LOS Assert		-30		-17	dBm	

Notes:

1. Maximum average launch power shall be the less of the value listed here or the Class 1 laser safety limits (CDRH and EN 60825).

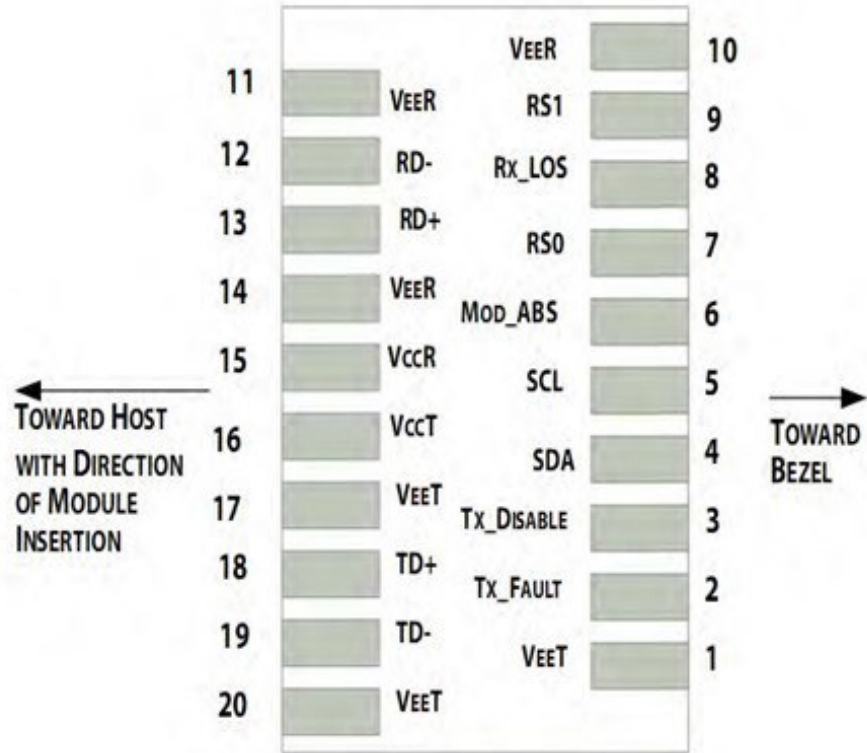
Pin Descriptions

Pin	Symbol	Name/Description	Notes
1	VeeT	Transmitter Ground (Common with Receiver Ground).	1
2	Tx_Fault	Transmitter Fault.	
3	Tx_Disable	Transmitter Disable. Logic 1 disables laser output.	
4	SDA	2-Wire Serial Interface Data Line.	
5	SCL	2-Wire Serial Interface Clock Line.	
6	MOD_ABS	Module Absent. Grounded within the module.	2
7	RS0	Rate Selection 0. Rx Signaling Rate.	3
8	Rx_LOS	Loss of Signal Indication. "Logic 1" indicates loss of signal.	
9	RS1	Rate Selection 1. Tx Signaling Rate.	3
10	VeeR	Receiver Ground (Common with Transmitter Ground).	1
11	VeeR	Receiver Ground (Common with Transmitter Ground).	1
12	RD-	Inverse Receiver Data Out. AC Coupled.	
13	RD+	Received 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 Data In. AC Coupled.	
19	TD-	Inverse Transmitter Data In. AC Coupled.	
20	VeeT	Transmitter Ground (Common with Receiver Ground).	1

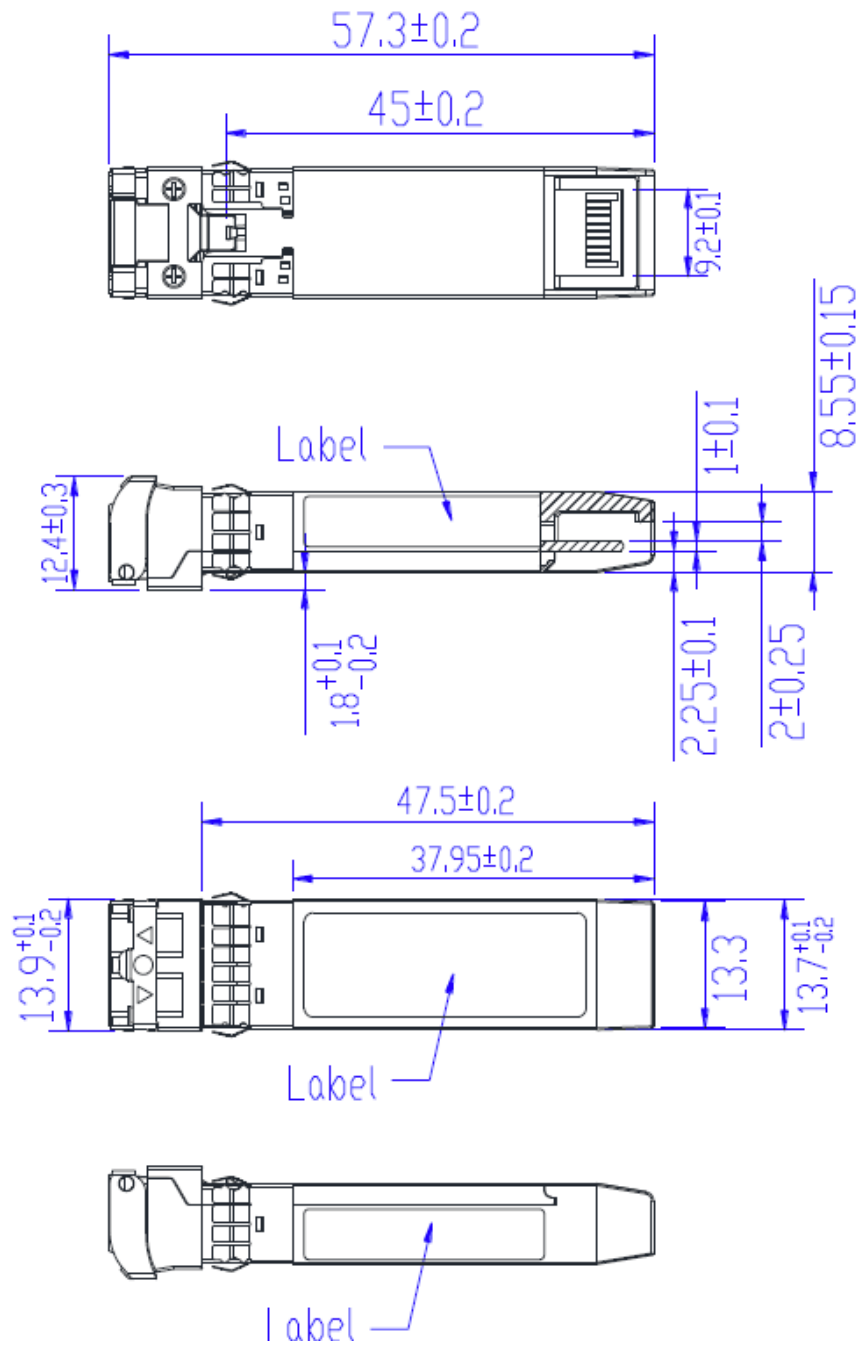
Notes:

1. The circuit ground is internally isolated from the chassis ground.
2. MOD_ABS is pulled low in the module to indicate that the module is plugged in.
3. The signal is internally pulled down per SFF-8431 Rev. 4.1.

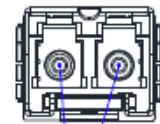
Electrical Pin-Out Details



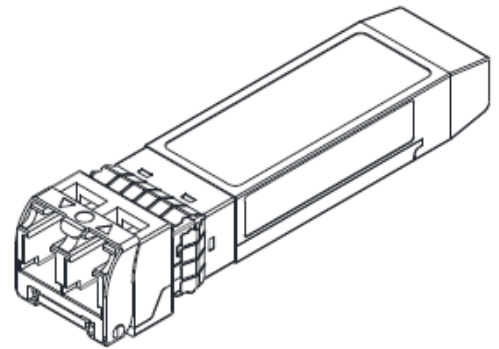
Mechanical Specifications



Units in mm



LC connector



About AddOn Networks

In 1999, AddOn Networks entered the market with a single product. Our founders fulfilled a severe shortage for compatible, cost-effective optical transceivers that compete at the same performance levels as leading OEM manufacturers. Adhering to the idea of redefining service and product quality not previously had in the fiber optic networking industry, AddOn invested resources in solution design, production, fulfillment, and global support.

Combining one of the most extensive and stringent testing processes in the industry, an exceptional free tech support center, and a consistent roll-out of innovative technologies, AddOn has continually set industry standards of quality and reliability throughout its history.

Reliability is the cornerstone of any optical fiber network and is ingrained in AddOn's DNA. It has played a key role in nurturing the long-term relationships developed over the years with customers. AddOn remains committed to exceeding industry standards with certifications ranging from NEBS Level 3 to ISO 9001:2015 with every new development while maintaining the signature reliability of its products.



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