OSFP-400GB-SR8-AO

MSA and TAA 400GBase-SR8 OSFP-IHS Transceiver (MMF, 850nm, MPO-16, 100m, CMIS 4.0)

Features

- Compliant with OSFP MSA Specifications
- Power Dissipation: 10W
- Single 3.3V Power Supply
- MPO-16 Connector APC
- Independent 8 Channels to Support Break-Out
- 8x26.5625GBd PAM4 Electrical Interface
- PIN and TIA Array on the Receiver Side
- VCSEL Transmitter
- RoHS Compliant and Lead-Free
- Operating Temperature: 0 to 70 Celsius

Applications

- 400GBase Ethernet
- Access and Enterprise

Product Description

This MSA compliant OSFP-IHS Transceiver provides 400GBase-SR8 throughput up to 100m over multi-mode fiber (MMF) using a wavelength of 850nm via an MPO-16 connector. 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. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. 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.")

TAA COMPLIANT

Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	-0.5	3.3	3.6	V	
Storage Temperature		Tstg	-40		85	°C	
Operating Case Temperature		Tc	0		70	°C	
Relative Humidity (Non-Condensing)		RH	5		85	%	
Receiver Differential Data Output Load					100	Ω	
Data Rate Per Lane		DR		26.5625 ± 100ppm		GBd	
Modulation Format				PAM4			
Fiber Length	**OM3**				70	m	
	OM4				100	m	

Electrical Characteristics

Parameter	Symbol / Test Point	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Power Supply Noise				25	mVp-p	1
Power Consumption				10	W	
Power Supply Total Current			0.1		mA	
AC Coupling Internal Capacitor			0.1		µF	
Input Specifications						
Differential Pk-Pk Input Voltage Tolerance	TP1a	900			mV	2
Differential Input Return Loss	TP1	Equation (83E-5)			dB	3
Common- to Differential-Mode Conversion Return Loss	TP1	Equation (83E-6)				3
Differential Termination Mismatch	TP1			10	%	
Single-Ended Voltage Tolerance Range	TP1a	-0.4		3.3	V	
DC Common-Mode Output Voltage	TP1	-350		2850	mV	4
Module Stressed Input Test	TP1a					5
Eye Width			0.22		UI	
Applied Pk-Pk Sinusoidal Jitter			Table 120E-6			6
Eye Height			32		mV	
Output Specifications						
AC Common-Mode Output Voltage (RMS)	TP4			17.5	mV	
Differential Pk-Pk Output Voltage	TP4			900	mV	
Near-End Eye Symmetry Mask Width	TP4	0.265			UI	
Near-End Differential Eye Height	TP4	70			mV	
Differential Output Return Loss	TP4	Equation (83E-2)				3

Common- to Differential-Mode Conversion Return Loss	TP4	Equation (83E-3)				3
Differential Termination Mismatch	TP4			10	%	
Transition Time (20-80%)	TP4	9.5			ps	
DC Common-Mode Voltage	TP4	-350		2850	mV	4
SCL and SDA Pin						
SCL and SDA	VOL	0		0.4	V	
	VOH	Vcc-0.5		Vcc+0.3	V	
SCL and SDA	VIL	-0.3		Vcc*0.3	V	
	VIH	Vcc*0.7		Vcc +0.5	V	

Notes:

1. Power Supply Noise is defined as the peak-to-peak noise amplitude over the frequency range at the host supply side of the recommended power supply filter with the module and recommended filter in place. Voltage levels including peak-to-peak noise are limited to the recommended operating range of the associated power supply.
2. With the exception to 120E.3.1.2 that the pattern is PRBS31Q or scrambled idle.
3. Refers to IEEE 802.3-2018.
4. DC common-mode voltage is generated by the host. Specification includes the effects of offset voltage.
5. Meets BER specified in 120E.1.1 of IEEE 802.3-2018.
6. Table 120E-6 refers to IEEE 802.3-2018.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter @TP2 Test Point						
Center Wavelength	λ	840		868	nm	
RMS Spectral Width	ΔλRMS			0.6	nm	1
Average Launch Power Per Lane	Pavg	-6.5		4	dBm	
Outer Optical Modulation Amplitude (OMA_{outer}) Per Lane	POMA	-4.5		3	dBm	2
Launch Power in OMA_{outer} Minus TDECQ	OMA-TDECQ	-5.9			dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ) Per Lane	TDECQ			4.5	dB	
TDECQ-$10\log_{10}(C_{eq})$ Per Lane	TDECQ – $10\log_{10}(C_{eq})$			4.5	dB	3
Average Launch Power of Off Transmitter Per Lane	Poff			-30	dBm	
Extinction Ratio Per Lane	ER	3			dB	
$RIN_{12}OMA$	$RIN_{12}OMA$			-128	dB/Hz	
Optical Return Loss Tolerance	ORL			12	dB	
Encircled Flux	EF		≥86% at 19μm ≤30% at 4.5μm			4

Receiver @TP3 Test Point						
Damage Threshold		5			dBm	5
Average Receiver Power Per Lane	OMA_{outer}	-8.4		4	dBm	6
Receiver Power Per Lane OMA_{outer}				3	dBm	
Receiver Reflectance				-12	dB	
Stressed Receiver Sensitivity (OMA_{outer}) Per Lane				-3.4	dBm	7
LOS Assert	LOSA	-17			dBm	
LOS De-Assert	LOSD			-11	dBm	
Receiver Sensitivity (OMA_{outer}) Per Lane			Max. (6.5, SECQ-7.9)		dBm	8
Stressed Eye Closure for PAM4 (SECQ) Per Lane Under Test			4.5		dB	
SECQ-$10log_{10}(C_{eq})$ Per Lane Under Test				405	dB	3
OMA_{outer} of Each Aggressor Lane			3		dBm	9
Conditions of Stressed Receiver Sensitivity Test						10

Notes:

1. RMS spectral width is the standard deviation of the spectrum.
2. Even if the TDECQ < 1.4dB, the OMA (minimum) must exceed this value.
3. C_{eq} is a coefficient defined in 121.8.5.3, which accounts for the reference equalizer noise enhancement.
4. If measured into Type A1a.2 or A1a.3, or A1a.5, 50µm fiber, in accordance with IEC61280-1-4.
5. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level on one lane. The receiver does not have to operate correctly at this input power.
6. Average receiver power, per lane (minimum), is informative and not the principle indicator of signal strength. A received power below this value cannot be complaint; however, a value above this does not ensure compliance.
7. Measured with conformance test signal at TP3 (see 138.8.10) for the BER specified in 138.1.1.
8. Receiver sensitivity is informative and is defined for a transmitter with a value of SECQ up to 4.5dB with BER<$2.4x10^{-4}$ without FEC in PRBS 2^{31}-1.
9. Only applies to 100GBase-SR2, 200GBase-SR4, and 400GBase-SR8.
10. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Pin Descriptions

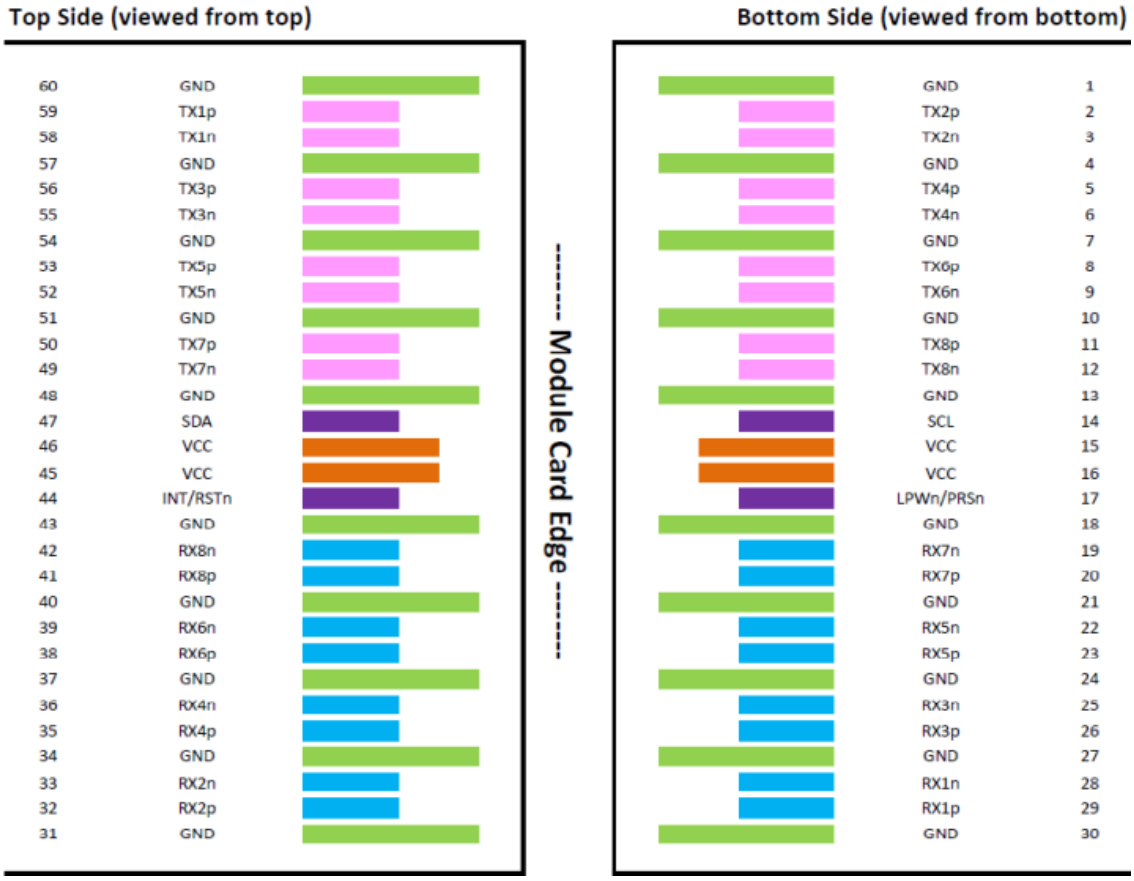
Pin	Logic	Symbol	Name/Description	Plug Sequence	Notes
1		GND	Module Ground.	1	1
2	CML-I	Tx2+	Transmitter Non-Inverted Data.	3	
3	CML-I	Tx2-	Transmitter Inverted Data.	3	
4		GND	Module Ground.	1	1
5	CML-I	Tx4+	Transmitter Non-Inverted Data.	3	
6	CML-I	Tx4-	Transmitter Inverted Data.	3	
7		GND	Module Ground.	1	1
8	CML-I	Tx6+	Transmitter Non-Inverted Data.	3	
9	CML-I	Tx6-	Transmitter Inverted Data.	3	
10		GND	Module Ground.	1	1
11	CML-I	Tx8+	Transmitter Non-Inverted Data.	3	
12	CML-I	Tx8-	Transmitter Inverted Data.	3	
13		GND	Module Ground.	1	1
14	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock.	3	2
15		Vcc	+3.3V Power Supply.	2	
16		Vcc	+3.3V Power Supply.	2	
17	Multi-Level	LPWn/PRSn	Low-Power Mode/Module Present.	3	
18		GND	Module Ground.	1	1
19	CML-O	Rx7-	Receiver Inverted Data.	3	
20	CML-O	Rx7+	Receiver Non-Inverted Data.	3	
21		GND	Module Ground.	1	1
22	CML-O	Rx5-	Receiver Inverted Data.	3	
23	CML-O	Rx5+	Receiver Non-Inverted Data.	3	
24		GND	Module Ground.	1	1
25	CML-O	Rx3-	Receiver Inverted Data.	3	
26	CML-O	Rx3+	Receiver Non-Inverted Data.	3	
27		GND	Module Ground.	1	1
28	CML-O	Rx1-	Receiver Inverted Data.	3	
29	CML-O	Rx1+	Receiver Non-Inverted Data.	3	
30		GND	Module Ground.	1	1
31		GND	Module Ground.	1	1
32	CML-O	Rx2+	Receiver Non-Inverted Data.	3	
33	CML-O	Rx2-	Receiver Inverted Data.	3	
34		GND	Module Ground.	1	1
35	CML-O	Rx4+	Receiver Non-Inverted Data.	3	
36	CML-O	Rx4-	Receiver Inverted Data.	3	
37		GND	Module Ground.	1	1

38	CML-O	Rx6+	Receiver Non-Inverted Data.	3	
39	CML-O	Rx6-	Receiver Inverted Data.	3	
40		GND	Module Ground.	1	1
41	CML-O	Rx8+	Receiver Non-Inverted Data.	3	
42	CML-O	Rx8-	Receiver Inverted Data.	3	
43		GND	Module Ground.	1	1
44	Multi-Level	INT/RSTn	Module Input/Module Reset.	3	
45		Vcc	+3.3V Power Supply.	2	
46		Vcc	+3.3V Power Supply.	2	
47	LVCMOS-I/O	SCL	2-Wire Serial Interface Data.	3	2
48		GND	Module Ground.	1	1
49	CML-I	Tx7-	Transmitter Inverted Data.	3	
50	CML-I	Tx7+	Transmitter Non-Inverted Data.	3	
51		GND	Module Ground.	1	1
52	CML-I	Tx5-	Transmitter Inverted Data.	3	
53	CML-I	Tx5+	Transmitter Non-Inverted Data.	3	
54		GND	Module Ground.	1	1
55	CML-I	Tx3-	Transmitter Inverted Data.	3	
56	CML-I	Tx3+	Transmitter Non-Inverted Data.	3	
57		GND	Module Ground.	1	1
58	CML-I	Tx1-	Transmitter Inverted Data.	3	
59	CML-I	Tx1+	Transmitter Non-Inverted Data.	3	
60		GND	Module Ground.	1	1

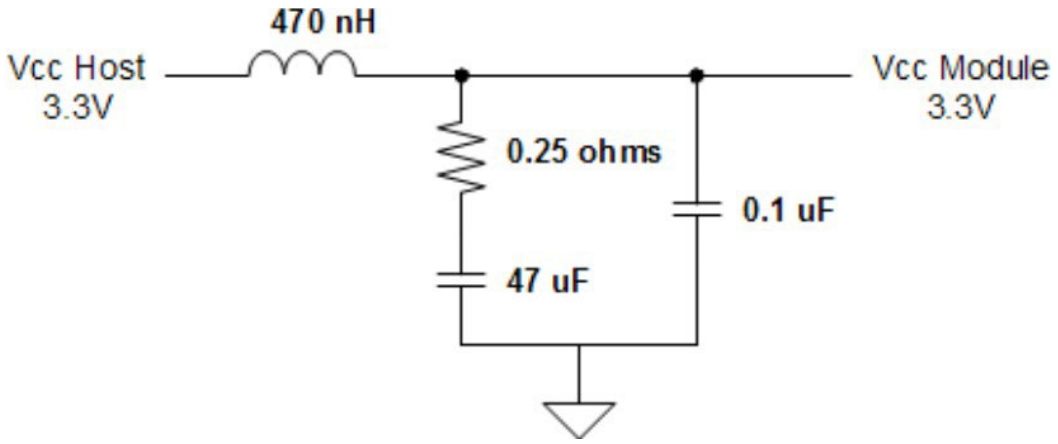
Notes:

1. OSFP uses common ground (GND) for all signals and supply (power). All are common within the OSFP module, and all module voltages are referenced to this potential unless otherwise noted.
2. Open-drain with pull-up resistor on the host.

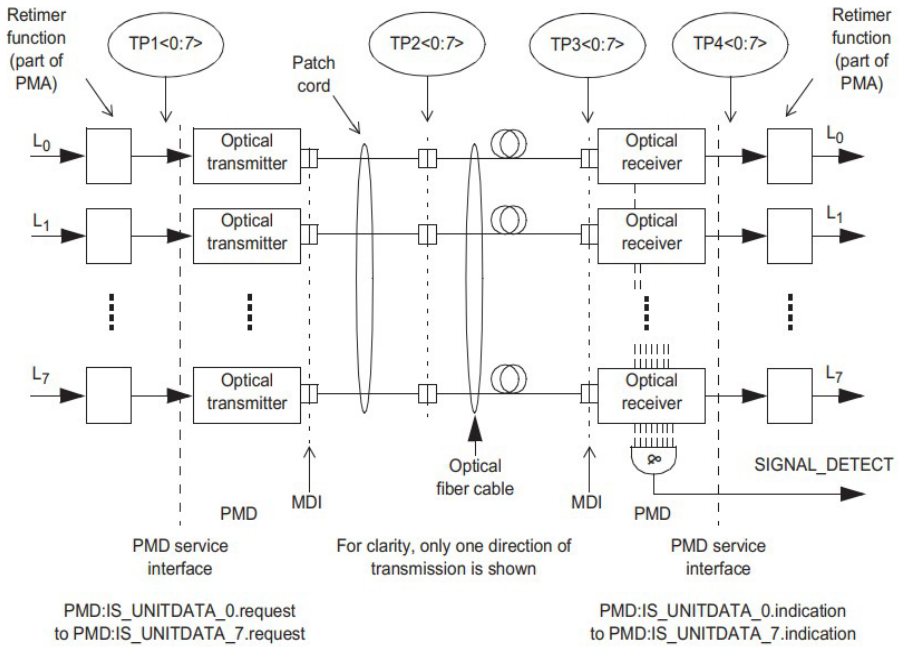
Electrical Pad Layout



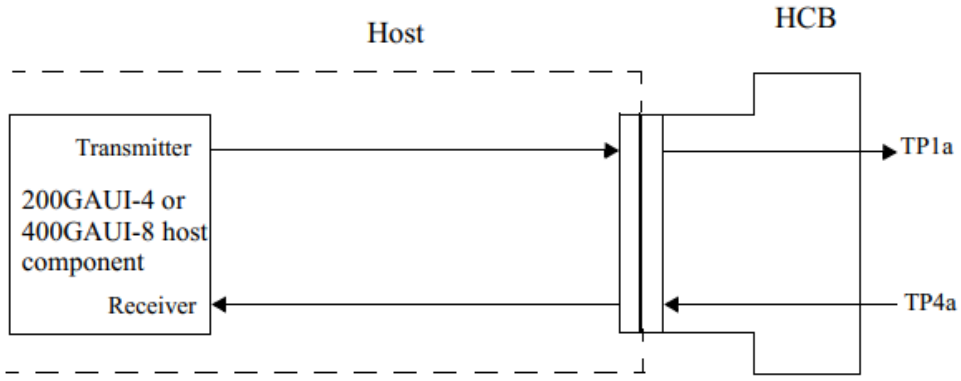
Recommended Host Board Power Supply Filter



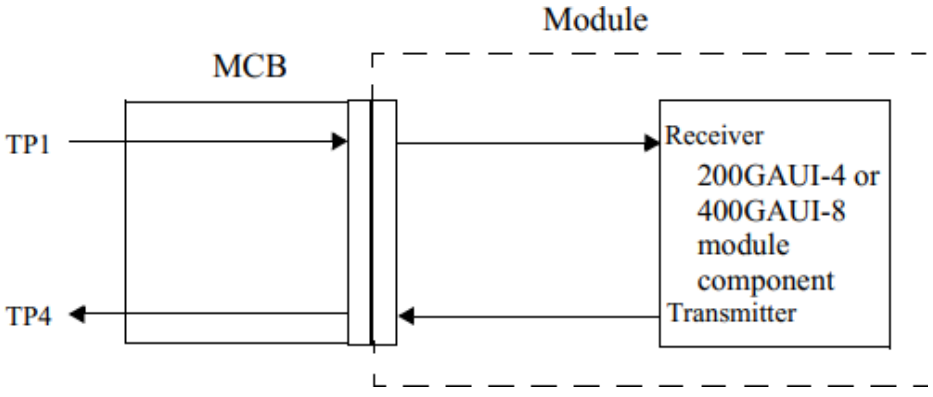
IEEE 802.3cm Block Diagram for 400GBASE-SR8 Transmit/Receive Paths



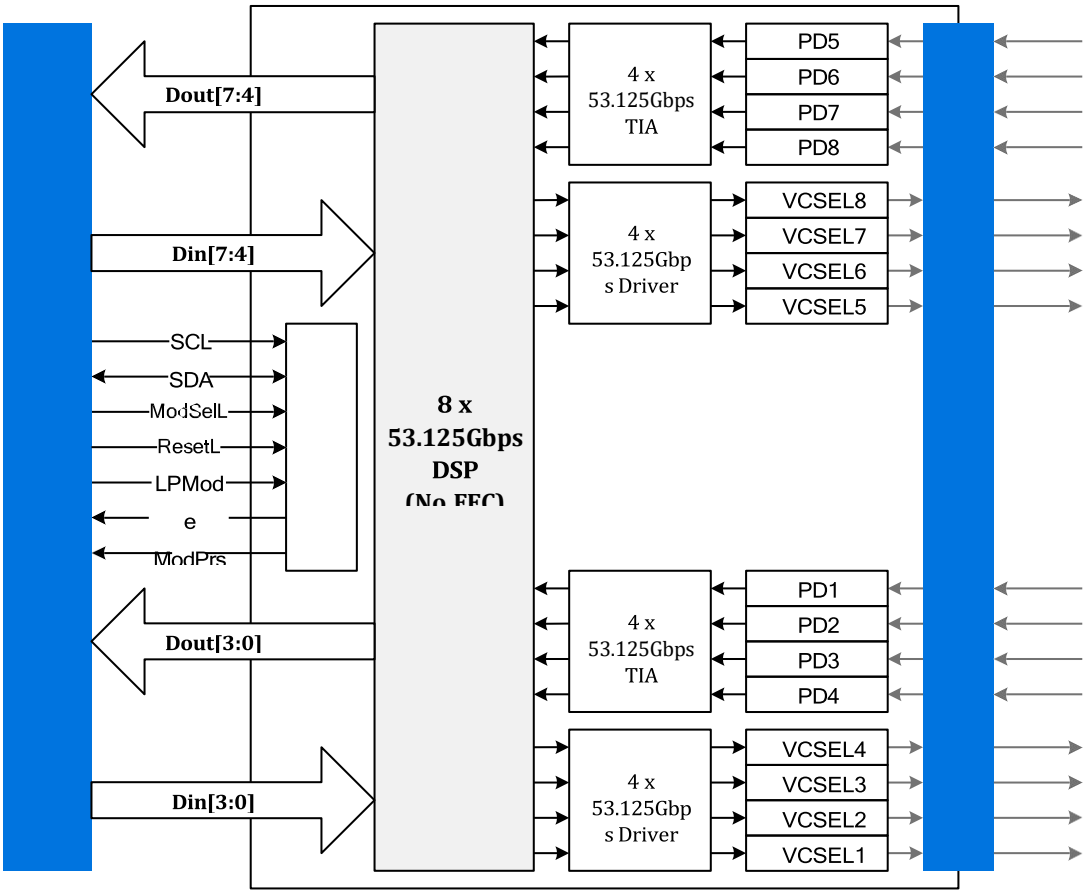
IEEE 802.3bs 400GAUI-4 Compliance Points (TP1a, TP4a)



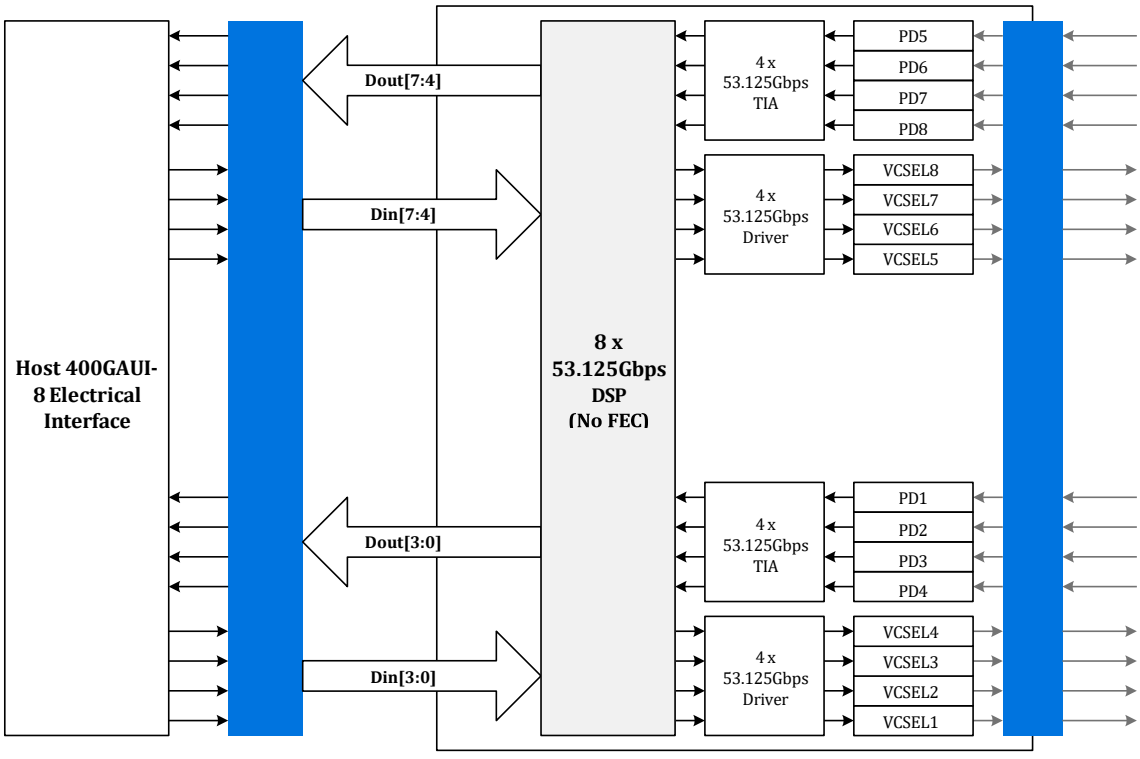
IEEE 802.3bs 400GAUI-8 C2M Compliance Points (TP1, TP4)



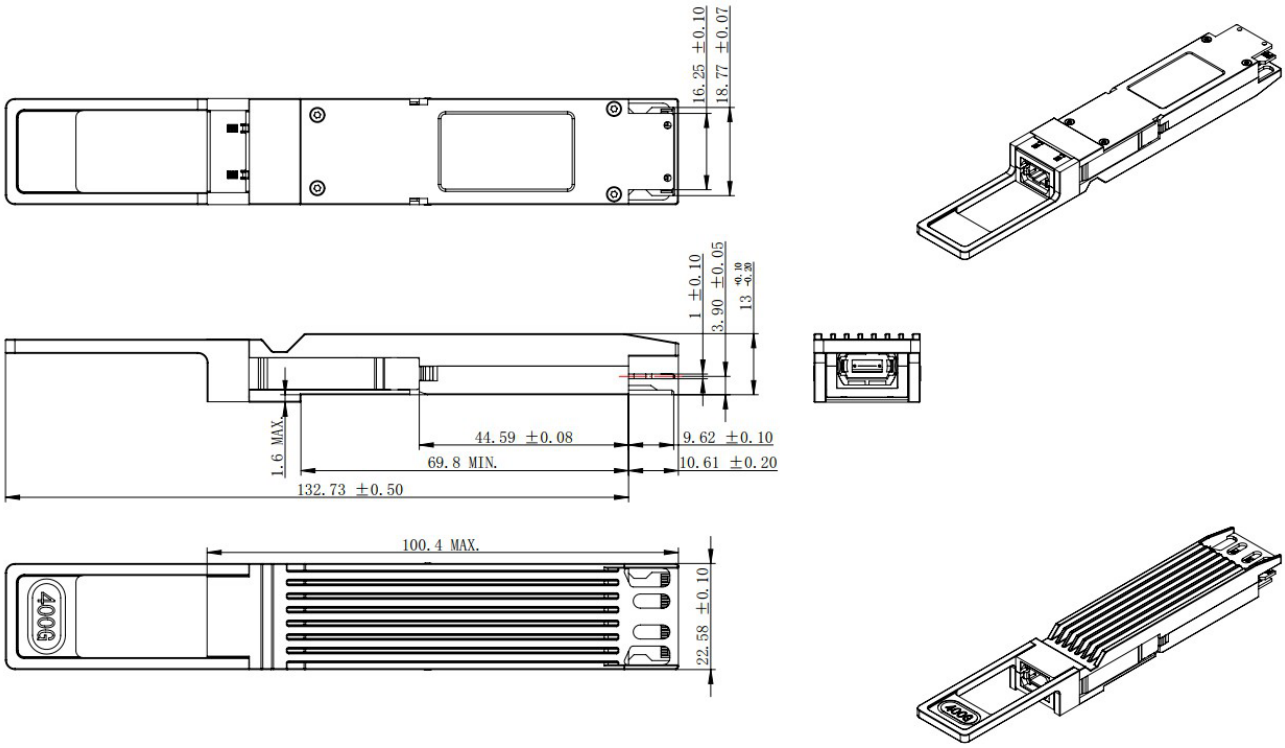
Transceiver Block Diagram



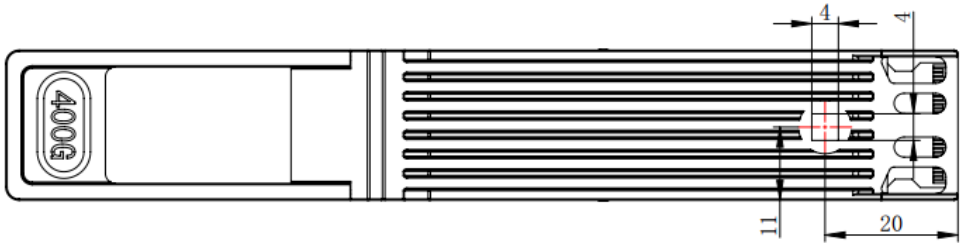
Application Reference Diagram



Mechanical Specifications



Case Temperature Measurement Point (All Dimensions in mm)



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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