



SFPM-50GBASE-LR-OPC

MSA and TAA 50GBase-LR SFP56 Transceiver Multi-Rate 10/25/50G (SMF, 1310nm, 10km, LC, DOM)

Features

- SFF-8431 and SFF-8472 Compliance
- SFP56 package with duplex LC connector
- Up to 53Gb/s bi-directional data links
- Single-mode Fiber
- Cooled 1310 EML Transmitter
- PIN Receiver
- Build-in DSP
- Single +3.3V power supply
- Class 1 laser safety certified
- 2.5W maximum power consumption
- Operating Temperature: 0C to 70C
- RoHS Compliant



Applications:

- 50GBase Ethernet
- Access and Enterprise

Product Description

This MSA and TAA compliant SFP56 transceiver provides multi-rate 10/25/50GBase-LR throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. 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.

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

Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4
- ESD to the LC Receptacle: compatible with IEC 61000-4-3
- EMI/EMC compatible with FCC Part 15 Subpart B Rules, EN55022:2010
- Laser Eye Safety compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1,2
- RoHS compliant with EU RoHS 2.0 directive 2015/863/EU

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit
Maximum Supply Voltage	V _{cc}	-0.5		4.0	V
Storage Temperature	T _S	-40		85	°C
Operating Case Temperature	T _c	0	25	70	°C
Relative Humidity	RH	5		95	%
Data Rate		10.3125		53.125	Gbps

Electrical Characteristics (TOP=25°C, V_{cc}=3.3Volts)

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		V _{cc}	3.135	3.3	3.465	V	
Module Supply Current		I _{cc}			760	mA	
Power Dissipation		P _D			2500	mW	
Transmitter							
Differential data input swing		V _{in} , p-p			900	mVp-p	
Input differential impedance		Z _{in}	90	100	110	Ω	
TX_FAULT	Transmitter Fault	V _{OH}	2.0		V _{CCHOST}	V	
	Normal Operation	V _{OL}	0		0.8	V	
TX_DISABLE	Transmitter Disable	V _{IH}	2.0		V _{CCHOST}	V	
	Transmitter Enable	V _{IL}	0		0.8	V	
Receiver							
Differential data output swing		V _{out} , p-p			900	mVp-p	1
Output differential impedance		Z _o	90	100	110	Ω	
Data Output Rise Time, Fall Time		t _r , t _f	9.5			ps	2
RX_LOS	Loss of signal (LOS)	V _{OH}	2.0		V _{CCHOST}	V	3
	Normal Operation	V _{OL}	0		0.8	V	3

Notes:

1. Internally AC coupled, but requires an external 100Ω differential load termination.

2. 20 – 80 %.
3. LOS is an open collector output. Should be pulled up with 4.7kΩ on the host board.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Launch Optical Power (average@50G PAM4)	P _{av}	-4.5		+4.2	dBm	1
Launch Optical Power (OMA@50G PAM4)	P _o	-1.5		+4	dBm	1
Launch Optical Power (average@10G&25G NRZ)	P _{av}	-5		+2	dBm	1
Launch Optical Power (OMA@10G&25G NRZ)	P _o	-4		+2.2	dBm	1
TDECQ (50G PAM4)	TDECQ			3.2	dB	
Extinction Ratio	ER	3.5			dB	
Center Wavelength Range	λ _c	1304.5		1317.5	nm	
Spectral Width	Δλ			1	nm	2
Side Mode suppression Ratio	SMSR	35			dB	
Optical Return Loss Tolerance	ORLT			15.1	dB	
Pout @TX-Disable Asserted	P _{off}			-30	dBm	
Receiver						
50G Receiver Sensitivity (average)	R _{av}			-10.8	dBm	3
50G Receiver Sensitivity (OMA)	R _{oma}			-7.7	dBm	3
25G Receiver Sensitivity (average)	R _{av}			-12	dBm	4
25G Receiver Sensitivity (OMA)	R _{oma}			-11.3	dBm	4
10G Receiver Sensitivity (average)	R _{av}			-12	dBm	5
10G Receiver Sensitivity (OMA)	R _{oma}			-11.3	dBm	5
Receiver Overload	P _{av}	+4.2			dBm	
Optical Wavelength Range	λ _c	1260		1340	nm	
Receiver Reflectance				-26	dB	
LOS De-Assert	LOS _D			-12	dBm	
LOS Assert	LOS _A	-20			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
2. 20dB spectral width.
3. Measured with PRBS 2³¹-1 at 2.4×10⁻⁴ BER.
4. Measured with PRBS 2³¹-1 at 5×10⁻⁵ BER.

5. Measured with PRBS $2^{31}-1$ at 1×10^{-12} BER.

Multi-rate Functionality

Through the I2C interface, the data rate ranges can be set through byte 110 & byte 118 (in the 0xA2)

Bit 110.3 soft RS0	Bit 118.3 soft RS1	Data Rate
0	0	10.31Gbps
0	1	NA
1	0	25.78Gbps
1	1	53.12Gbps (default setting)

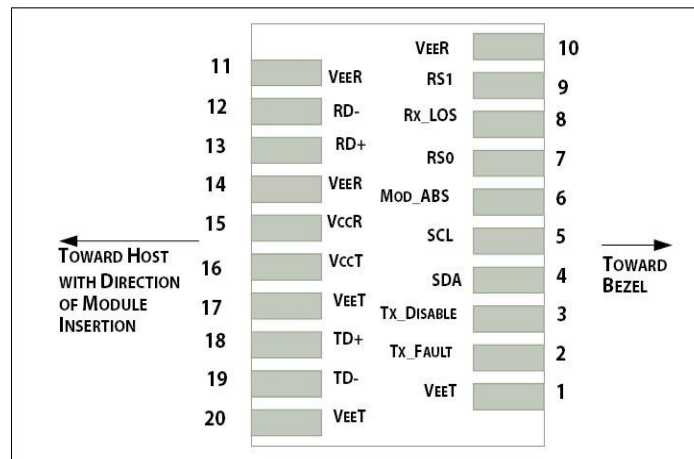
Note: Rate selection only supports software function but not hardware pin function

Pin Descriptions

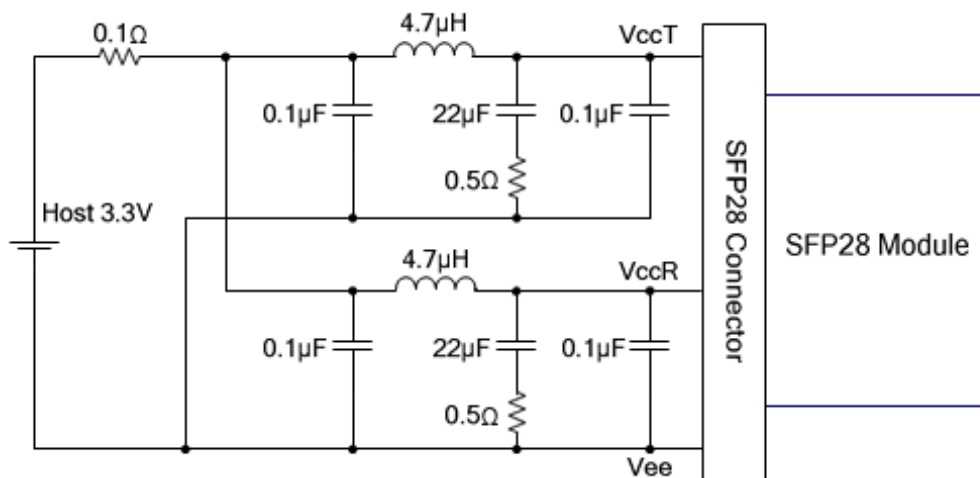
Pin	Symbol	Name/Descriptions	Notes
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault (LVTTL-O) - High indicates a fault condition	2
3	TX_Disable	Transmitter Disable (LVTTL-I) – High or open disables the transmitter	3
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	4
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	4
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module	5
7	RS0	NA	6
8	RX_LOS	Receiver Loss of Signal (LVTTL-O)	2
9	RS1	NA	6
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inverse Received Data out (CML-O)	
13	RD+	Received Data out (CML-O)	
14	VeeR	Receiver Ground	
15	VccR	Receiver Power - +3.3V	
16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Data In (CML-I)	
19	TD-	Inverse Transmitter Data In (CML-I)	
20	VeeT	Transmitter Ground	1

Notes:

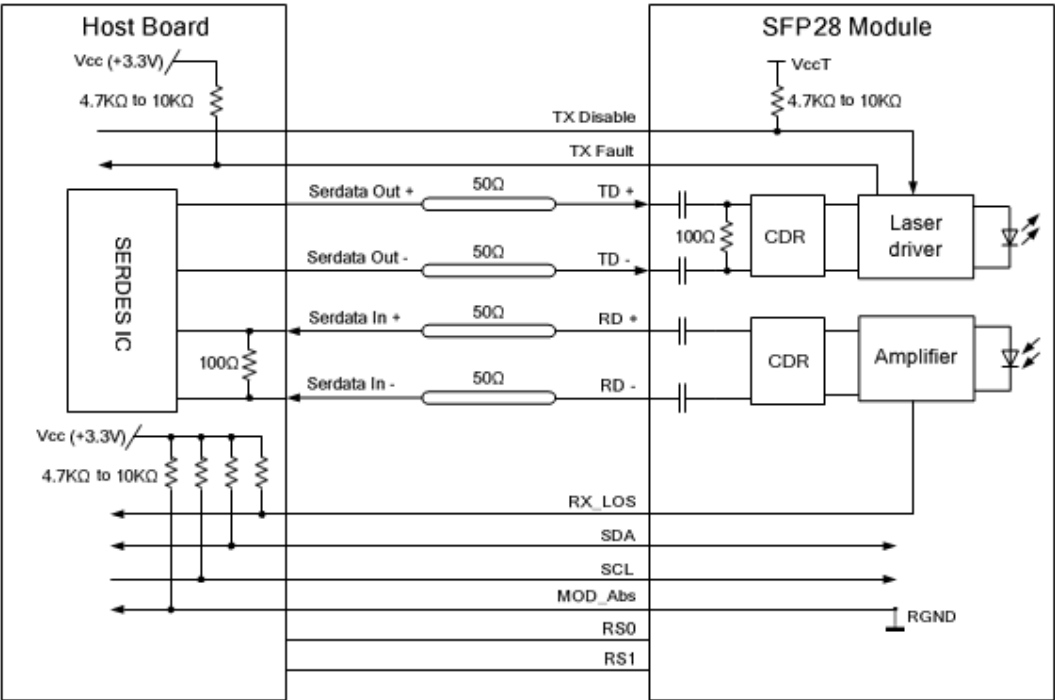
1. The module signal grounds are isolated from the module case.
2. This is an open collector/drain output that on the host board requires a 4.7K Ω to 10K Ω pull-up resistor to Vcc-Host.
3. This input is internally biased high with a 4.7K Ω to 10K Ω pull-up resistor to VccT.
4. Two-Wire Serial interface clock and data lines require an external pull-up resistor.
5. This is a ground return that on the host board requires a 4.7K Ω to 10K Ω pull-up resistor to Vcc-Host.
6. Rate select not available



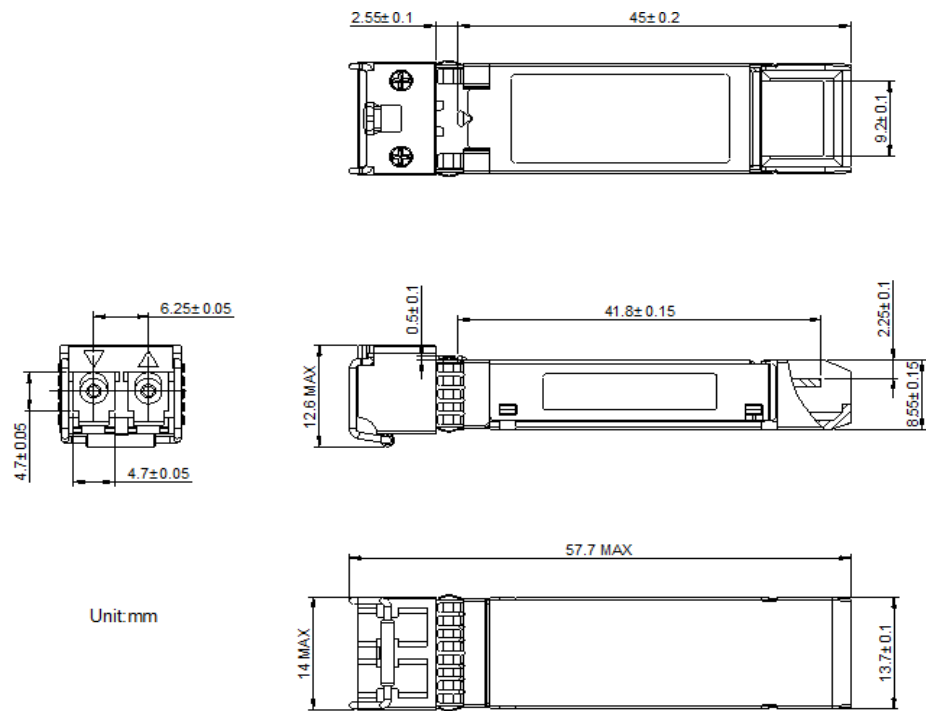
Host PCB SFP28 Pad Assignment Top View

Recommended Host Board Power Supply Filter Network

Recommended Application Interface Block Diagram



Mechanical Specifications



OptioConnect

Innovation for the Future of High-Speed Networking

Who We Are

OptioConnect is reshaping the landscape of communication and high-speed networking through intelligent technology. With a core focus on cutting edge technology, we deliver smarter fiber optic solutions for enterprise networks, data centers, and next-gen telecom infrastructures.

What We Do

At OptioConnect, we fuse advanced engineering with intelligent automation to drive the future of networking. Our AI-integrated solutions are designed to optimize performance and streamline operations with:

- Superior Performance
- Network and traffic optimization
- Intelligent energy management
- Seamless OEM compatibility
- Scalable cost-efficiency

Smarter Networks by Design

Innovation isn't just a goal—it's our process. We embed AI and machine learning across our R&D and product lines, enabling adaptive performance, automated tuning, and faster deployment cycles. The result? Networks that don't just work—they learn, evolve, and outperform.

Our Team

Our engineers, data scientists, and network architects bring decades of experience and a future-focused mindset. We provide hands-on support with intelligent insights that turn complex challenges into simple solutions.

Our Mission

To deliver AI-enhanced connectivity that reduces cost, increases speed, and maximizes efficiency—empowering our partners to operate at the forefront of a rapidly evolving digital world.

Let's Connect

Discover how OptioConnect's intelligent infrastructure solutions can power your network's next leap forward.

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