

400G SR4 100M OSFP

Product Features

- Hot-plug OSFP form factor
- OSFP 4x100Gb/s modulation
- Up to 106.25Gbps data rate per channel
- MPO-12 connector receptacle with APC end-face
- Maximum link length of 60m on OM3 MMF or 100m on OM4/OM5 MMF
- Uncooled 850nm VCSEL array
- PIN photo detector array
- Low power dissipation <8W
- Commercial case temperature range of 0°C to 70°C
- Single 3.3V power supply
- I2C management interface and compatible with CMIS5.0
- Compliant with IEEE802.3ck
- RoHS-6 compliant (lead-free)

Applications

- OSFP MSA
- 400G Ethernet

Description

This product is a parallel 400Gb/s Octal Small Form-factor Pluggable (OSFP) optical module. The OSFP full-duplex optical module offers 4 independent transmit and receive channels, each capable of 106.25Gb/s operation for an aggregate data rate of 400Gb/s on 60 meters of OM3 multi-mode fiber or 100 meters of OM4/OM5 multi-mode fiber. An optical fiber cable with two MTP/MPO-12 APC connectors can be plugged into the OSFP SR4 module receptacle. Electrical connection is achieved through an OSFP MSA-compliant edge type connector. The product is designed with form factor, optical/electrical connection and digital diagnostic interface according to the OSFP Multi-Source Agreement (MSA). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference.

Ordering Information

Table 1. Ordering Information

Part Number	Transmitter	Output Power(dBm)	Receiver	Receiver Power(dBm)	Reach(m)	Temp(°C)	DDM	RoHS
OSFP-400G-SR4	VCSEL	-4.6~4.0	PIN	-4.4(OMA)	100	0~70	Available	Compliant

Absolute Maximum Ratings

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Storage Temperature	Ts	-40	-	85	°C	1
Relative Humidity	Rh	5	-	85	%	-
Supply Voltage	Vcc	-0.5	-	4.0	V	-

Notes:

1. No condensation

Recommended Operating Conditions

Table 3. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Case Temperature	Tc	0	-	60	°C	-
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	-
Power Supply Current	Icc	-	-	2.42	A	-

Transmitter Optical Characteristics

Table 4. Transmitter Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
PAM4 Signaling rate, each lane	-	-	53.125	-	GBd	PAM4
Lane Wavelengths(range)	λ_0	840	850	860	nm	-
Average launch power, each lane	Pa	-4.6	-	4	dBm	1
Outer Optical Modulation Amplitude, each lane	OMA _{outer}	-2.6	-	-	dBm	-

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter and dispersion penalty eye closure for PAM4 (TDECQ), each lane	TDECQ	-	-	4.4	dB	-
Average launch power of OFF transmitter, each lane	Poff	-	-	-30	dBm	-
Extinction ratio	ER	2.5	-	-	dB	-
Relative Intensity Noise	RIN	-	-	-132	dB/Hz	-
Optical return loss tolerance				12	dB	
Transmitter transition time	-	-	-	17	ps	

Notes

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.

Receiver Optical Characteristics

Table 5. Receiver Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
PAM4 Signaling rate, each lane	-	-	53.125	-	GBd	PAM4
Lane wavelengths	λ_0	840	850	860	nm	-
Damage threshold, each lane	-	5	-	-	dBm	1
Average receive power, each lane	-	-6.3	-	4	dBm	2
Receive power (OMA _{outer})	-	-	-	3.5	dBm	-
Receiver reflectance				-12	dBm	
Receiver sensitivity (OMA _{outer})				-4.4	dBm	5/6
Stressed receiver sensitivity (OMA _{outer})	-	-	-	-2.0	dBm	3

Notes:

1. For BER = 2.4E-4 Pre-FEC, use the compliance test signal of TP3 for measurement.

Electrical Characteristics

Table 6 Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Module Supply Current	I _{cc}	-	-	5	A	-
Power Dissipation	PD	-	-	16	W	-
Transmitter						
Signaling data (each lane)	-	53.125± 100 ppm			GBd	PAM4
Input Differential Impedance	Z _{in}	90	100	110	Ω	-
Differential termination mismatchal	-	-	-	10	%	-
Single-ended voltage tolerance range	-	-0.4	-	3.3	V	-
Receiver						
Signaling rate (each lane)		53.125 ± 100 ppm			GBd	PAM4
Output Differential Impedance	Z _{out}	90	100	110	Ω	-
Differential termination mismatch	-	-	-	10	%	-
Error Bit Rate	BER	-	-	2.4E-4		1

Notes:

1 PRBS31Q@53.125Gbd PAM4

Pin Description

Table 7. Pin Description of OSFP

Pin#	Logic	Symbol	Description	Plug Sequence	Notes
1	1	GND	Ground	-	-
2	CML-I	TX2p	Transmitter Data Non-Inverted	3	-
3	CML-I	TX2n	Transmitter Data Inverted	3	-
4	1	GND	Ground	-	-
5	CML-I	TX4p	Transmitter Data Non-Inverted	3	-
6	CML-I	TX4n	Transmitter Data Inverted	3	-
7	1	GND	Ground	-	-
8	CML-I	TX6p	Transmitter Data Non-Inverted	3	-
9	CML-I	TX6n	Transmitter Data Inverted	3	-
10	1	GND	Ground	-	-
11	CML-I	TX8p	Transmitter Data Non-Inverted	3	-
12	CML-I	TX8n	Transmitter Data Inverted	3	-
13	1	GND	Ground	-	-
14	LVC MOS-I/O	SCL	2-wire Serial interface clock	3	Open-Drain with pull up resistor on Host
15	Power from Host	VCC	+3.3V Power	-	-
16	Power from Host	VCC	+3.3V Power	-	-
17	Multi-Level	LPWn/PRSn	Low-Power Mode / Module Present	3	See pin description for required circuit
18	1	GND	Ground		-
19	CML-O	RX7n	Receiver Data Inverted	3	-

20	CML-O	RX7p	Receiver Data Non-Inverted	3	-
21	1	GND	Ground	-	-
22	CML-O	RX5n	Receiver Data Inverted	3	-
23	CML-O	RX5p	Receiver Data Non-Inverted	3	-
Pin#	Logic	Symbol	Description	Plug Sequence	Notes
24	1	GND	Ground	-	-
25	CML-O	RX3n	Receiver Data Inverted	3	-
26	CML-O	RX3p	Receiver Data Non-Inverted	3	-
27	1	GND	Ground	-	-
28	CML-O	RX1n	Receiver Data Inverted	3	-
29	CML-O	RX1p	Receiver Data Non-Inverted	3	-
30	1	GND	Ground	-	-
31	1	GND	Ground	-	-
32	CML-O	RX2p	Receiver Data Non-Inverted	3	-
33	CML-O	RX2n	Receiver Data Inverted	3	-
34	1	GND	Ground	-	-
35	CML-O	RX4p	Receiver Data Non-Inverted	3	-
36	CML-O	RX4n	Receiver Data Inverted	3	-
37	1	GND	Ground	-	-
38	CML-O	RX6p	Receiver Data Non-Inverted	3	-
39	CML-O	RX6n	Receiver Data Inverted	3	-
40	1	GND	Ground	-	-
41	CML-O	RX8p	Receiver Data Non-Inverted	3	-
42	CML-O	RX8n	Receiver Data Inverted	3	-
43	1	GND	Ground	-	-

44	Multi-Level	INT/RSTn	Module Interrupt / Module Reset	3	See pin description for required circuit
45	Power from Host	VCC	+3.3V Power	-	-
46	Power from Host	VCC	+3.3V Power	-	-
47	LVC MOS-I/O	SDA	2-wire Serial interface data	3	Open-Drain with pull up resistor on Host
Pin#	Logic	Symbol	Description	Plug Sequence	Notes
48	1	GND	Ground	-	-
49	CML-I	TX7n	Transmitter Data Inverted	3	-
50	CML-I	TX7p	Transmitter Data Non-Inverted	3	-
51	1	GND	Ground	-	-
52	CML-I	TX5n	Transmitter Data Inverted	3	-
53	CML-I	TX5p	Transmitter Data Non-Inverted	3	-
54	1	GND	Ground	-	-
55	CML-I	TX3n	Transmitter Data Inverted	3	-
56	CML-I	TX3p	Transmitter Data Non-Inverted	3	-
57	1	GND	Ground	-	-
58	CML-I	TX1n	Transmitter Data Inverted	3	-
59	CML-I	TX1p	Transmitter Data Non-Inverted	3	-
60	1	GND	Ground	-	-

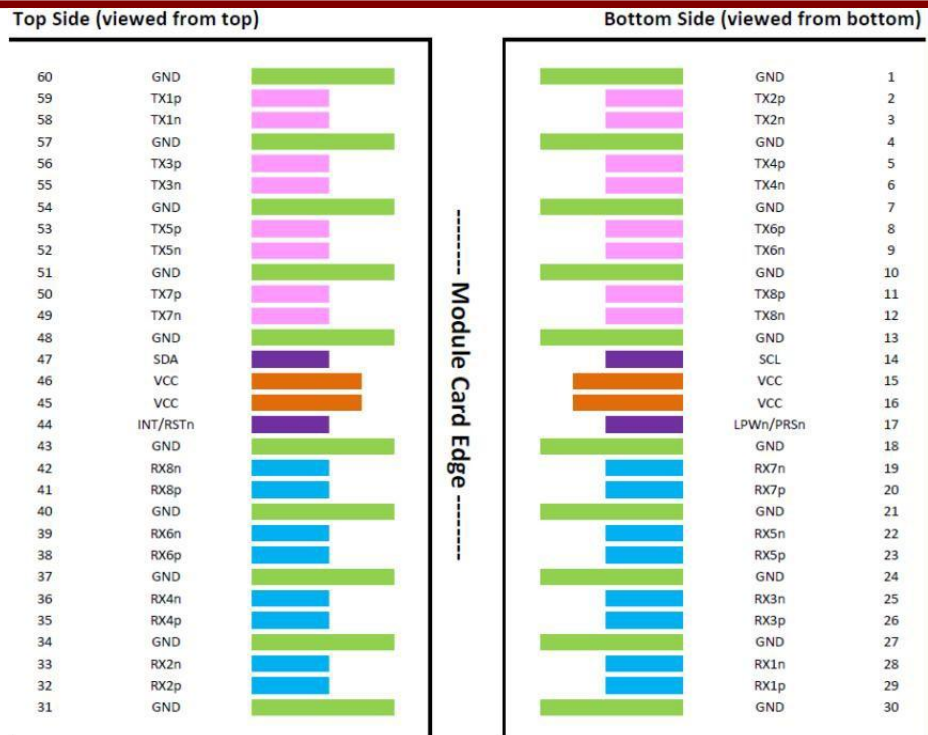


Figure1. Pin View

Monitoring Specification

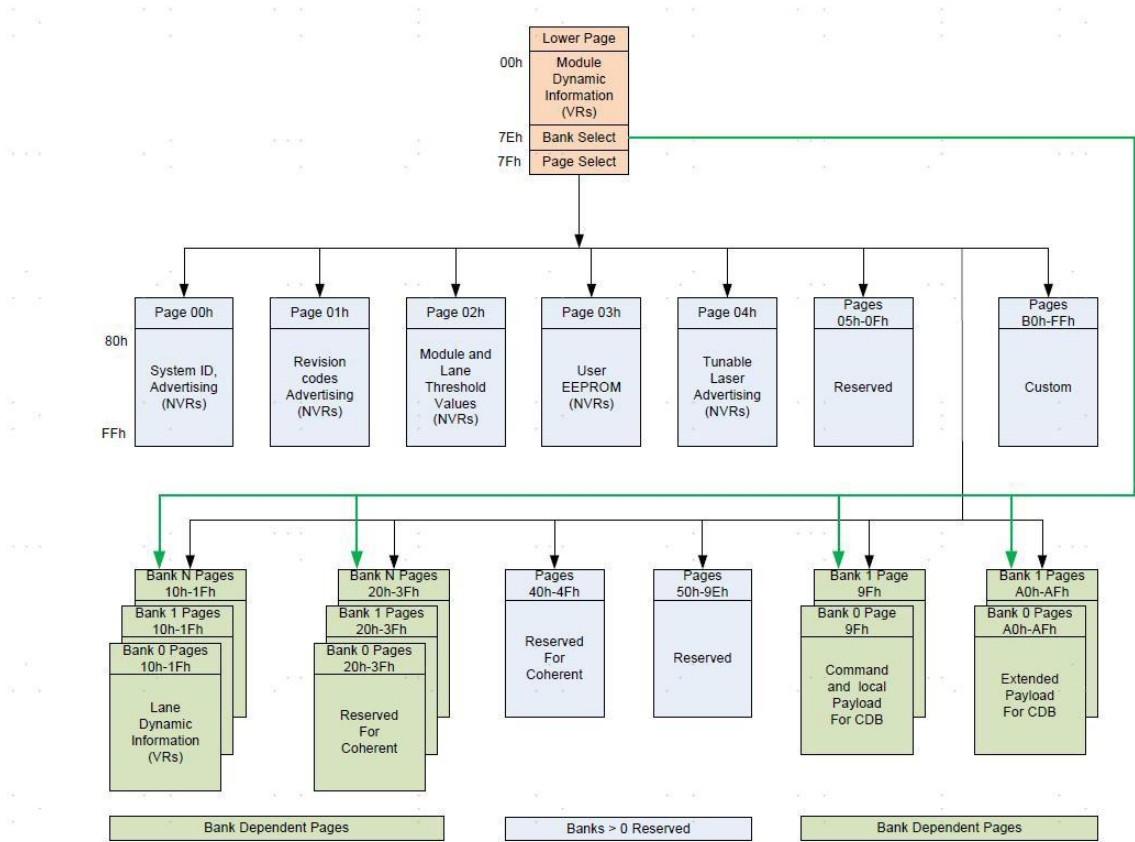


Figure2.Memory Map

Mechanical specifications

