Product Specification

850Gb/s 2xVR4 OSFP 850nm 50m
Optical Transceiver

P/N: 800G-OSFP-2VR4

Features

- Hot Pluggable OSFP form factor
- Operating data rate 850Gbps
- Single +3.3V power supply
- Dual MPO-12 APC connector
- Max power dissipation <16W
- Maximum link length of 30m on OM3
- Maximum link length of 50m on OM4
- 850nm VCSEL laser
- PIN receivers
- Built-in digital diagnostic function
- Commercial temperature range 0°C to 70°C

Compliance

- Compliant with OSFP MSA
- Compliant with CMIS 5.1
- RoHS

Applications

- 800G Ethernet
- Cloud Services
- Data Center Interconnect
- Data center Enterprise networking
- Switches with OSFP ports

Description

The 800G-OSFP-2VR4 is an eight-channel, parallel, pluggable fiber-optic transceiver designed for 800 Gigabit Ethernet applications. This high-performance module is optimized for short-range data communication and interconnect applications, delivering exceptional speed and reliability. It integrates eight data lanes in each direction, operating at 8x53.125 GBd, enabling a total throughput of 800 Gbps. The module supports transmission distances of up to 30 meters over OM3 multimode fiber (MMF) and 50 meters over OM4 MMF, utilizing a nominal wavelength of 850 nm.

The OSFP-800G-2VR4 is engineered for multimode fiber systems, ensuring optimal performance and compatibility. It features dual MTP/MPO-12 connectors for efficient optical coupling and minimal signal loss. Rigorous production testing guarantees superior out-of-the-box installation, performance, and durability. Additionally, the module includes digital diagnostics monitoring (DDM) via the I2C interface, as specified by the OSFP MSA, providing real-time access to critical operating parameters such as temperature, voltage, and optical power levels.

With its hot-swappable design, the OSFP-800G-2VR4 is ideal for a wide range of applications, including data centers, high-performance computing (HPC) networks, and enterprise core and distribution layer deployments. Its advanced features and robust performance make it a reliable solution for next-generation 800G Ethernet systems.

Product performance Specifications

1、Basic Product Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Absolute Maximum Ratings					
Storage Temperature	T_S	-40	-	+85	°C
Supply Voltage	V_{CC}	-0.5	-	4	V
Relative Humidity	RH	5	-	85	%
Operational Specifications					
Operating Case Temperature	T_C	0	-	70	°C
Power Supply Voltage	V_{CC}	3.135	3.3	3.465	V
Power Supply Current	Icc			2730	mA
Power Consumption	P_{DISS}	-	-	16	W
Data Rate	DR	-	850	-	Gbps
Pre-FEC Bit Error Ratio			$2.4x10^{-4}$		
Transmission Distance(OM3)	-	0.5	-	30	m
Transmission Distance(OM4)	-	0.5	-	50	m

2、Product Optical and Electrical Characteristics

Parameter		Symbol	Min	Typ.	Max	Unit	Note
Pre FEC Bit Error Ratio					2.40E-04		
Post FEC Bit Error Ratio					1.00E-12		
Transceiver							
Data rate per lane		DR	-100ppm	53.125	+100ppm	GBd	
Modulation format				PAM4			
Center Wavelength		λ_C	840	850	863	nm	1
RMS spectral width		σ			0.6	nm	
Average Launch power, each lane		AOPL	-1		4	dBm	
Optical Power OMA, each Lane，max		TOMA		3.5		dBm	
OMA_{outer},each lane min	max (TECQ, TDECQ)<1.8 dB		max [-2.6 , max(TECQ,TECQ) -4.4]			dBm	
	1.8<max (TECQ, TDECQ)<4.4 dB						
Transmitter and dispersion eye closure (TDECQ), each lane		TDECQ			4.4	dB	
Transmitter eye closure for PAM4 (TECQ), each lane		TECQ			4.4	dB	
Extinction ratio		ER	2.5		3.5	dB	
Transmitter power excursion, each lane					2.3	dBm	
Optical Return Loss Tolerance		ORLT			14	dB	
Optical Power for TX DISABLE		TOFF			-30	dBm	
Encircled fluxb			≥86% at 19 um ≤30% at 4.5 um				2
Differential pk-pk Input Voltage tolerance			750			mV	
Differential Termination Mismatch					10	%	
Eye height			10			mV	
Common-mode to differential-mode return loss			IEEE802.3ck Equation (120G -1)			dB	
Vertical eye closure					12	dB	
Effective return loss			7.3			dB	
Transition Time			10			ps	
Receiver							
Data rate per lane		BR		53.125			Gbd
Modulation format				PAM4			

Center Wavelength		λ	842	850	863	nm	
Damage threshold		AOPD	5			dBm	
Average receive power, each lane		AOPR	-6.3		4	dBm	
Receive power, each lane (OMAouter)		OMA-R			3.5	dBm	
Receiver reflectance		RR			-20	dB	
Receiver sensitivity, each lane		SOMA	RS = max (-4.6 , TECQ -6.4)			dBm	3
Stressed receiver sensitivity, each lane		SRS			-2	dBm	
Rx LOS	Assert		-15			dBm	
	De-assert				-7.5	dBm	
	Hysteresis		0.5		5	dB	
Differential data output swing			300		900	mVpp	
Differential termination mismatch					10	%	
Eye height			15			mV	
Vertical eye closure					12	dB	
Common-mode to differential-mode return loss			IEEE802.3ck Equation (120G-1)				
Effective return loss			8.5			dB	
Transition time			8.5			ps	

Note1: Defined according to the performance of the laser used.

Note2: Measured into type A1a.2 or type A1a.3, or A1a.4, 50μs fiber, in accordance with IEC 61280-1-4.

Note3: Receiver sensitivity is informative and is defined for a transmitter with a value of TECQ. Measured with conformance test signal at TP3 for BER = 2.4E-4 Pre-FEC.

Recommended Host Board Power Supply Circuit

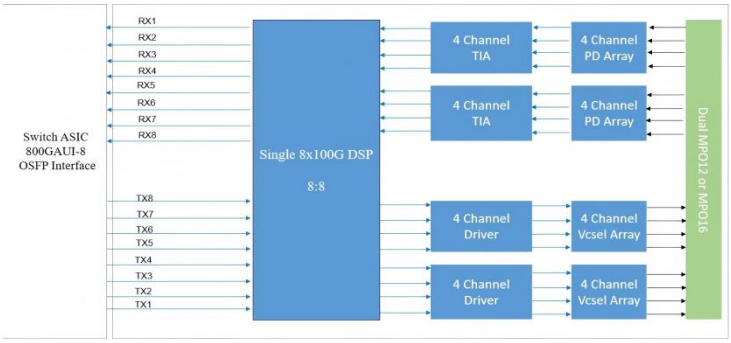


Figure 1: Module Block Diagram

Recommended Interface Circuit

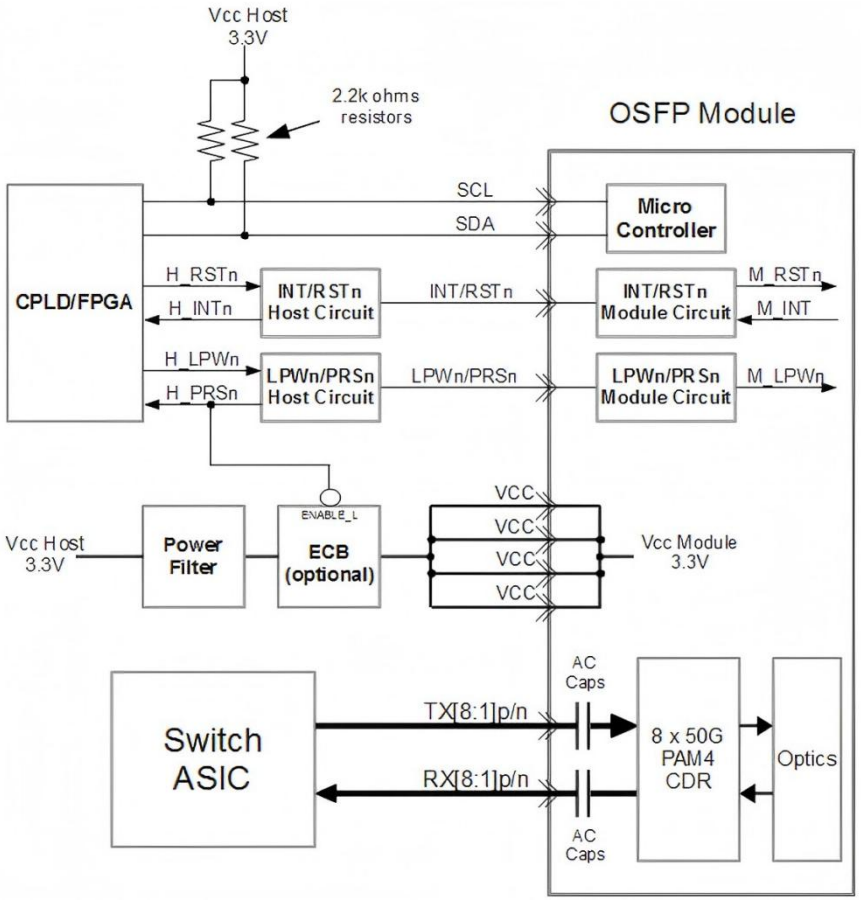


Figure2: Recommended Interface Circuit

Optical Interface

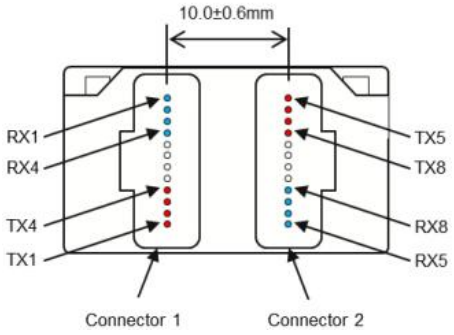


Figure3: Optical Lane Sequence

Pin-out Definition

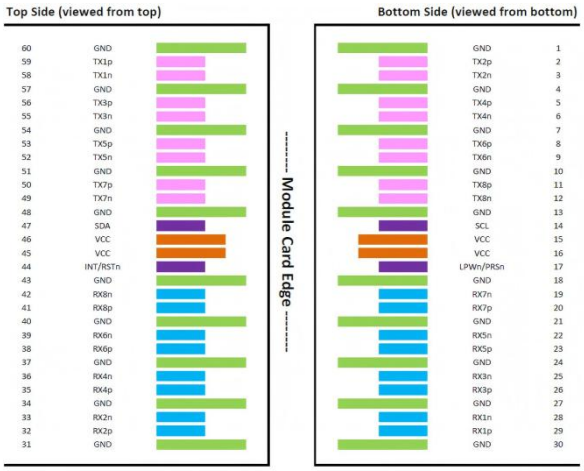


Figure4: Pin view

Pin Function Definitions

Pin	Logic	Symbol	Description	Note
1		GND	Ground	
2	CML-I	TX2p	Transmitter Data Non-Inverted	
3	CML-I	TX2n	Transmitter Data Inverted	
4		GND	Ground	
5	CML-I	TX4p	Transmitter Data Non-Inverted	
6	CML-I	TX4n	Transmitter Data Inverted	
7		GND	Ground	
8	CML-I	TX6p	Transmitter Data Non-Inverted	

9	CML-I	TX6n	Transmitter Data Inverted	
10		GND	Ground	
11	CML-I	TX8p	Transmitter Data Non-Inverted	
12	CML-I	TX8n	Transmitter Data Inverted	
13		GND	Ground	
14	LVCMOS-I/O	SCL	2-wire Serial interface clock	1
15		VCC	+3.3V Power	
16		VCC	+3.3V Power	
17	Multi-Level	LPWn/PRSn	Low-Power Mode / Module Present	2
18		GND	Ground	
19	CML-O	RX7n	Receiver Data Inverted	
20	CML-O	RX7p	Receiver Data Non-Inverted	
21		GND	Ground	
22	CML-O	RX5n	Receiver Data Inverted	
23	CML-O	RX5p	Receiver Data Non-Inverted	
24		GND	Ground	
25	CML-O	RX3n	Receiver Data Inverted	
26	CML-O	RX3p	Receiver Data Non-Inverted	
27		GND	Ground	
28	CML-O	RX1n	Receiver Data Inverted	
29	CML-O	RX1p	Receiver Data Non-Inverted	
30		GND	Ground	
31		GND	Ground	
32	CML-O	RX2p	Receiver Data Non-Inverted	
33	CML-O	RX2n	Receiver Data Inverted	
34		GND	Ground	
35	CML-O	RX4p	Receiver Data Non-Inverted	
36	CML-O	RX4n	Receiver Data Inverted	
37		GND	Ground	
38	CML-O	RX6p	Receiver Data Non-Inverted	
39	CML-O	RX6n	Receiver Data Inverted	
40		GND	Ground	
41	CML-O	RX8p	Receiver Data Non-Inverted	
42	CML-O	RX8n	Receiver Data Inverted	
43		GND	Ground	
44	Multi-Level	INT/RSTn	Module Interrupt / Module Reset	2
45		VCC	+3.3V Power	
46		VCC	+3.3V Power	

47	LVCMOS-I/O	SDA	2-wire Serial interface data	1
48		GND	Ground	
49	CML-I	TX7n	Transmitter Data Inverted	
50	CML-I	TX7p	Transmitter Data Non-Inverted	
51		GND	Ground	
52	CML-I	TX5n	Transmitter Data Inverted	
53	CML-I	TX5p	Transmitter Data Non-Inverted	
54		GND	Ground	
55	CML-I	TX3n	Transmitter Data Inverted	
56	CML-I	TX3p	Transmitter Data Non-Inverted	
57		GND	Ground	
58	CML-I	TX1n	Transmitter Data Inverted	
59	CML-I	TX1p	Transmitter Data Non-Inverted	
60		GND	Ground	

Note1: Open-Drain with pull up resistor on Host.

Note2: See pin description for required circuit.

Monitoring Specification

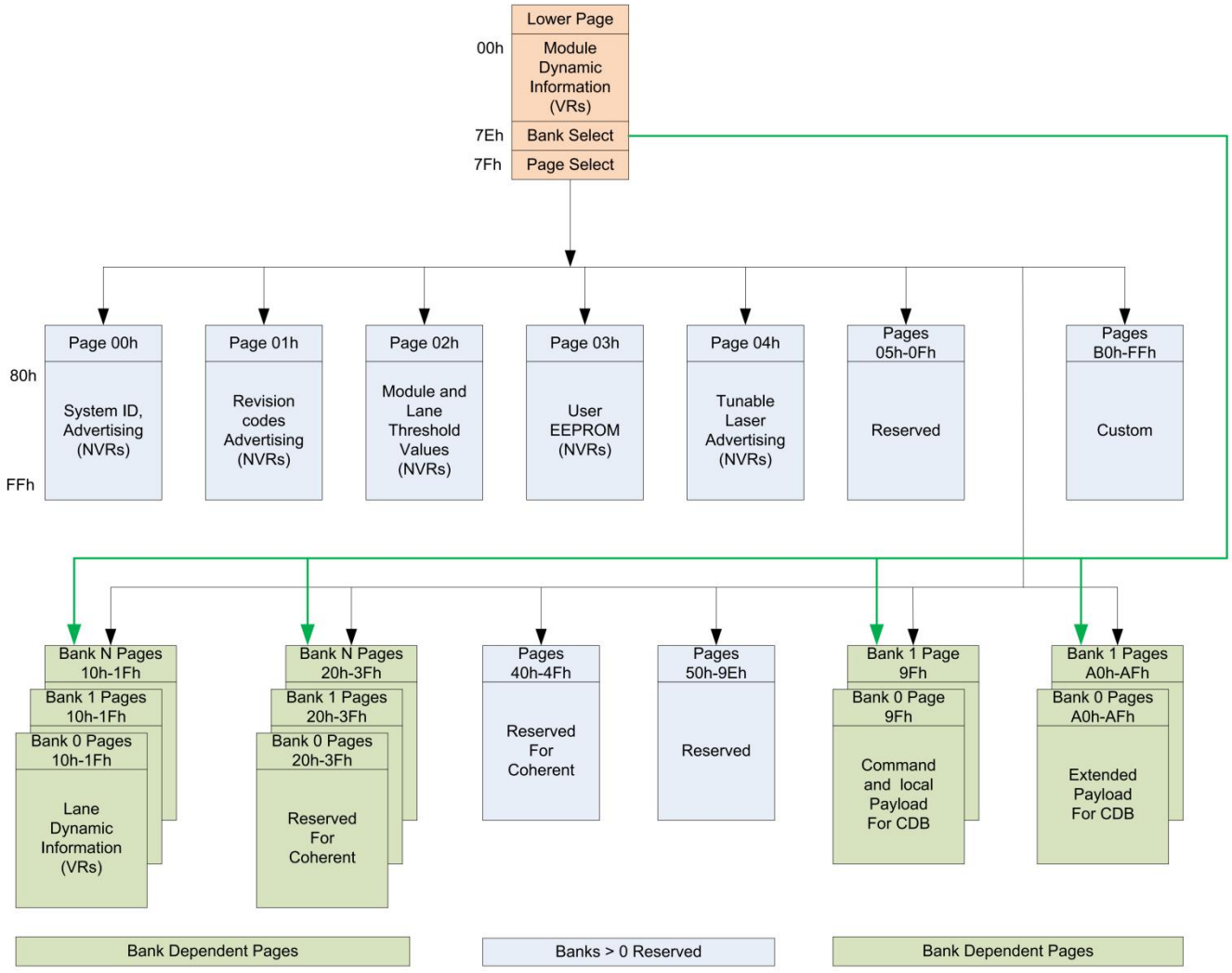


Figure5: Memory map

Memory map Table

Byte	Unit	Name	Description
Lower Page 00h			
0	1	Identifier	Identifier - Type of Serial Module - See SFF-8024.
1	1	Revision Compliance	Identifier – CMIS revision; the upper nibble is the whole number part and the lower nibble is the decimal part. Example: 01h indicates version 0.1, 21h indicates version 2.1.
2-3	2	ID and Status Area	Flat mem indication, CLEI present indicator, Maximum TWI speed,

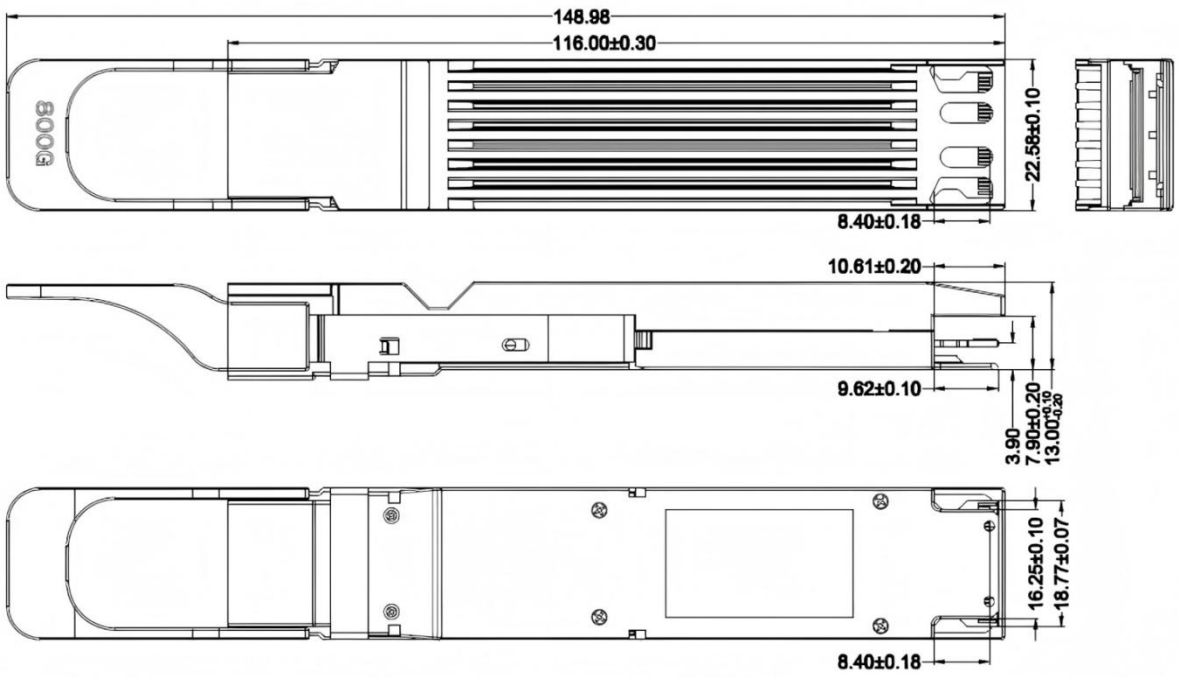
			Current state of Module, Current state of the Interrupt signal.
4-7	4	Lane Flag Summary	Flag summary of all lane flags on pages 10h-1Fh.
8-13	6	Module-Level Flags	All flags that are not lane or data path specific.
14-25	12	Module-Level Monitors	Monitors that are not lane or data path specific.
26-30	5	Module Global Controls	Controls applicable to the module as a whole
31-36	6	Module-Level Flag Masks	Masking bits for the Module-Level flags
37-38	2	CDB Status Area	Status of most recent CDB command
39-40	2	Module Firmware Version	Module Firmware Version.
41-63	23	Reserved Area	Reserved for future standardization
64-82	19	Custom Area	Vendor or module type specific use
83-84	2	Inactive Firmware Version	Version Number of Inactive Firmware. Values of 00h indicates module supports only a single image.
85-117	33	Application Advertising	Combinations of host and media interfaces that are supported by module data path(s)
118-125	8	Password Entry and Change	Password Entry and Change
126	1	Bank Select Byte	Bank address of currently visible Page
127	1	Page Select Byte	Page address of currently visible Page
Upper Page 00h			
128	1	Identifier	Identifier - Type of Serial Module - See SFF-8024.
129-144	16	Vendor name	Vendor name (ASCII)
145-147	2	Vendor OUI	Vendor IEEE company ID
148-163	16	Vendor PN	Part number provided by vendor (ASCII)
164-165	8	Vendor rev	Revision level for part number provided by vendor (ASCII)
166-181	10	Vendor SN	Vendor Serial Number (ASCII)
182-183	2	Date code year	ASCII code, two low order digits of year (00=2000)
184-185	2	Date code month	ASCII code digits of month (01=Jan through 12=Dec)
186-187	2	Date code day of month	ASCII code day of month (01-31)
188-189	2	Lot code	ASCII code, custom lot code, may be blank
190-199	10	CLEI code	Common Language Equipment Identification code
200-201	2	Module power characteristics	Module power characteristics
202	1	Cable assembly length	Cable assembly length
203	1	Media Connector Type	Media Connector Type
204	1	5 GHz attenuation	Passive copper cable attenuation at 5 GHz in 1 dB increments
205	1	7 GHz attenuation	Passive copper cable attenuation at 7 GHz in 1 dB increments
206	1	12.9 GHz attenuation	Passive copper cable attenuation at 12.9 GHz in 1 dB increments
207	1	25.8 GHz attenuation	Passive copper cable attenuation at 25.8 GHz in 1 dB increments
208-209	2	Reserved	Reserved
210-211	2	Cable Assembly Lane Information	Cable Assembly Lane Information

212	1	Media Interface Technology	Media Interface Technology
213-220	8	Reserved	Reserved
221	1	Custom	Custom
222	1	Checksum	Includes bytes 128-221
223-255	33	Custom Info NV	Custom Info NV
Page 01h (Optional)			
128	1	Inactive Module firmware major revision	Numeric representation of inactive module firmware major revision
129	1	Inactive Module firmware minor revision	Inactive Module firmware minor revision
130	1	Module hardware major revision	Module hardware major revision
131	1	Module hardware minor revision	Module hardware minor revision
132	1	Length (SMF)	Bits7-6 Length multiplier(SMF),Bits 5-0 Base Length (SMF)
133	1	Length (OM5)	Link length supported for OM5 fiber, units of 2 m (2 to 510 m)
134	1	Length (OM4)	Link length supported for OM4 fiber, units of 2 m (2 to 510 m)
135	1	Length (OM3)	Link length supported for EBW 50/125 μm fiber (OM3), units of 2m (2 to 510 m)
136	1	Length (OM2)	Link length supported for 50/125 μm fiber (OM2), units of 1m (1 to 255 m)
137	1	Reserved	Reserved
138-139	2	Nominal Wavelength	Nominal Wavelength
140-141	2	Wavelength Tolerance	Wavelength Tolerance
142-144	3	Implemented Memory Pages and Durations advertising	Implemented Memory Pages and Durations advertising
145-154	10	Module Characteristics advertising	Module Characteristics advertising
155-156	2	Implemented Controls advertising	Implemented Controls advertising
157-158	2	Implemented Flags advertising	Implemented Flags advertising
159-160	2	Implemented Monitors advertising	Implemented Monitors advertising
161-162	2	Implemented Signal Integrity Controls advertising	Implemented Signal Integrity Controls advertising
163-166	4	CDB support advertising	CDB support advertising
167-168	2	Additional Durations advertising	Additional Durations advertising
169-175	7	Reserved	Reserved
176-190	15	Module Media Lane advertising	Coded 1 if the Application is allowed to begin on a given media lane. Bits 0-7 correspond to Host Lanes 1-8. In multi-lane Applications each instance of an Application shall use contiguous media lane numbers. If multiple instances of a single Application are allowed each starting point is identified. If multiple instances are advertised,

			all instance must be supported concurrently.
191-222	32	Custom	Custom
223-250	28	Extended Module Host-Media Interface Advertising options	Extended Module Host-Media Interface Advertising options
251-254	4	Reserved	Reserved
255	1	Checksum	Checksum
Page 02h (Optional)			
128-129	2	Temperature monitor high alarm	Thresholds for internally measured temperature monitor: signed 2's complement in 1/256 degree Celsius increments
130-131	2	Temperature monitor low alarm	
132-133	2	Temperature monitor high warning	
134-135	2	Temperature monitor low warning	
136-137	2	Supply 3.3-volt monitor high alarm	Thresholds for internally measured 3.3 volt input supply voltage: in 100 µV increments
138-139	2	Supply 3.3-volt monitor low alarm	
140-141	2	Supply 3.3-volt monitor high warning	
142-143	2	Supply 3.3-volt monitor low warning	
144-145	2	Aux 1 monitor high alarm	Thresholds for TEC Current or Reserved monitor TEC Current: signed 2's complement in 100/32767% increments of maximum TEC current +32767 is max TEC current (100%) – Max Heating -32767 is min TEC current (100%) – Max Cooling
146-147	2	Aux 1 monitor low alarm	
148-149	2	Aux 1 monitor high warning	
150-151	2	Aux 1 monitor low warning	
152-153	2	Aux 2 monitor high alarm	Thresholds for TEC Current or Laser Temperature monitor TEC Current: signed 2's complement in 100/32767%increments of maximum TEC current +32767 is max TEC current (100%) – Max Heating -32767 is min TEC current (100%) – Max Cooling Laser Temperature: signed 2's complement in 1/256 degree Celsius increments
154-155	2	Aux 2 monitor low alarm	
156-157	2	Aux 2 monitor high warning	
158-159	2	Aux 2 monitor low warning	
160-161	2	Aux 3 monitor high alarm	Thresholds for Laser Temperature or additional supply voltage monitorLaser Temperature: signed 2's complement in 1/256 degree Celsius increments NOTE: Laser Temp can be below 0 if uncooled or in Tx Disable.Additional supply voltage monitor: in 100 µV increments
162-163	2	Aux 3 monitor low alarm	
164-165	2	Aux 3 monitor high warning	
166-167	2	Aux 3 monitor low warning	
168-169	2	Custom monitor high alarm	Custom monitor: signed or unsigned 16 bit value
170-171	2	Custom monitor low alarm	
172-173	2	Custom monitor high warning	
174-175	2	Custom monitor low warning	

176-177	2	Tx optical power high alarm	Threshold for Tx optical power monitor: unsigned integer in 0.1 uW increments, yielding a total measurement range of 0 to 6.5535 mW (~-40 to +8.2 dBm)See section 8.8.3 for monitor details including accuracy
178-179	2	Tx optical power low alarm	
180-181	2	Tx optical power high warning	
182-183	2	Tx optical power low warning	
184-185	2	Tx bias current high alarm	Threshold for Tx bias monitor: unsigned integer in 2 uA increments, times the multiplier from Table 8-33. See section 8.8.3 for monitor details including accuracy
186-187	2	Tx bias current low alarm	
188-189	2	Tx bias current high warning	
190-191	2	Tx bias current low warning	
192-193	2	Rx optical power high alarm	Threshold for Rx optical power monitor: unsigned integer in 0.1 uW increments, yielding a total measurement range of 0 to 6.5535 mW (~-40 to +8.2 dBm) See section 8.8.3 for accuracy.
194-195	2	Rx bias current low alarm	
196-197	2	Rx bias current high warning	
198-199	2	Rx bias current low warning	
200-229	30	Reserved	Reserved
230-254	25	Custom	Custom
255	1	Checksum	Covers bytes 128-254

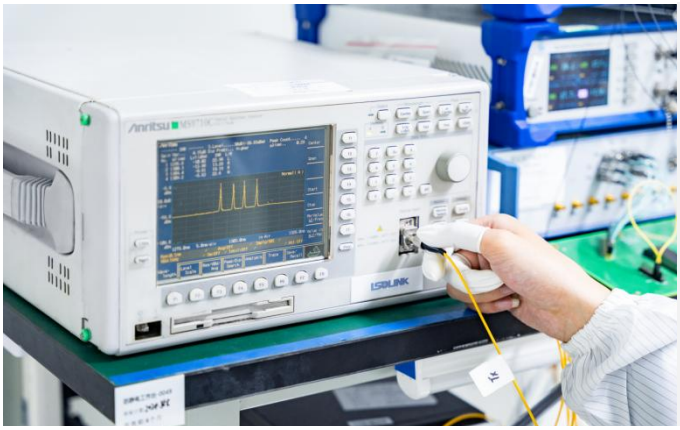
Mechanical Dimension



Test Center

1、Performance Testing

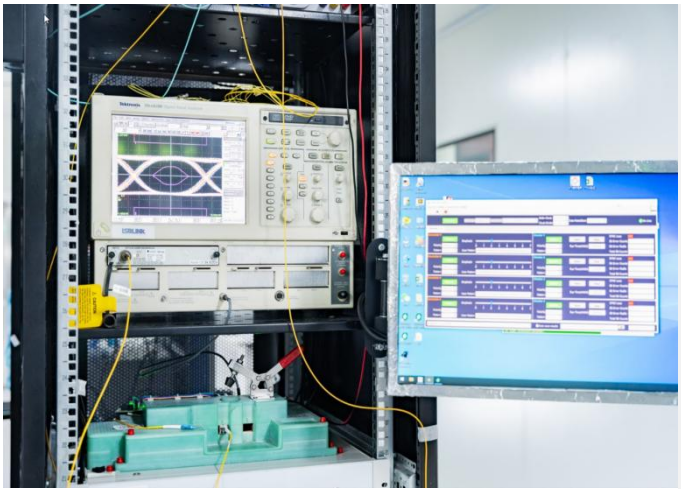
Every fiber optic transceiver is thoroughly tested by the LSOLINK Assurance Program, which is equipped with the world's most advanced analytical equipment to ensure that our transceivers meet the industry's international public protocol standards while still functioning flawlessly in your facility.



Optical Spectrum Inspection

Using the industry's leading optical spectrum analyser to check in real time that the parameters of the optical transceiver's laser comply with industry standards.

- **Peak:** Peak wavelength and peak level
- **2nd Peak:** Side-mode wavelength and level
- **Mean WI:** Center wavelength
- **Total Power:** Total power of spectrum
- **SMSR:** Side-Mode Suppression Ratio



Optical Signal Quality Inspection

Using highly efficient sampling oscilloscopes and BERT testers, equipped with an automated test platform to accurately test the signal quality of the transceiver, test records are kept for up to 5 years to ensure the traceability of each transceiver.

- **Eye Mask Margin(NRZ)**
- **TDECQ(PAM4):**transmitter dispersion eye closure
- **OMA:** Optical modulation amplitude
- **BER:** Bit error rate
- **ER:** Extinction Ratio

Flow Pressure Test

Using multi-protocol network traffic analyser with various brands of switches to test the transceiver's ability to transmit at full speed.

- **Bandwidth:** Actual transceiver bandwidth on the port
- **Packet Loss**
- **Packet Errors:**CRC Errors/PCS Errors/Symbol Errors
- **LinkDown Counts**
- **latency**

Aboveis part of our test bed network equipment. For more information, Please click download for optical transceiver performance test report.

2、Quality Control

We adopt advanced quality management solutions. Each transceiver is self-inspected, including:20x microscope inspection, 200x microscope inspection, and QC process inspection.

visual inspection

Microscopic inspection: 20X

Microscopic inspection: 200X

Reliability Verification

Optical endface inspection

OQC Inspection

Order Information

Part Number	Description
400G-OSFP-VR4	400GBASE-VR4 OSFP PAM4 850nm 50m DOM MTP/MPO-12 APC MMF Transceiver Module，Flat Top
400G-OSFP-SR4	400GBASE-SR4 OSFP PAM4 850nm 100m DOM MTP/MPO-12 APC MMF Optical Transceiver Module
400G-OSFP-DR4	400GBASE-DR4 OSFP PAM4 1310nm 500m DOM MTP/MPO-12 APC SMF Optical Transceiver Module
800G-OSFP-2VR4	800GBASE-2xVR4 OSFP PAM4 850nm 50m DOM Dual MTP/MPO-12 APC MMF Optical Transceiver Module
800G-OSFP-2SR4	800GBASE-2xSR4 OSFP PAM4 850nm 100m DOM Dual MTP/MPO-12 APC MMF Optical Transceiver Module
800G-OSFP-2DR4	800GBASE-2xDR4 OSFP PAM4 1310nm 500m DOM Dual MTP/MPO-12 APC SMF Optical Transceiver Module
800G-OSFP-2FR4	800GBASE-2xFR4 OSFP PAM4 1310nm 2km DOM Dual Duplex LC SMF Optical Transceiver Module
800G-OSFP-2DR4+	800GBASE-2xDR4+ OSFP PAM4 1310nm 2km DOM Dual MTP/MPO-12 APC SMF Optical Transceiver Module

Further Information

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Web | www.lsolink.com

Email | For Sales@lsolink.com

Disclaimer

1. We are committed to continuous product improvement and feature upgrades, and the contents con t ained in this manual are subject to change without notice.

2. Nothing herein should be construed as constituting an additional warranty.

3. LSOLINK assumes no responsibility for the use or reliability of equipment or software not provided by LSOLINK.