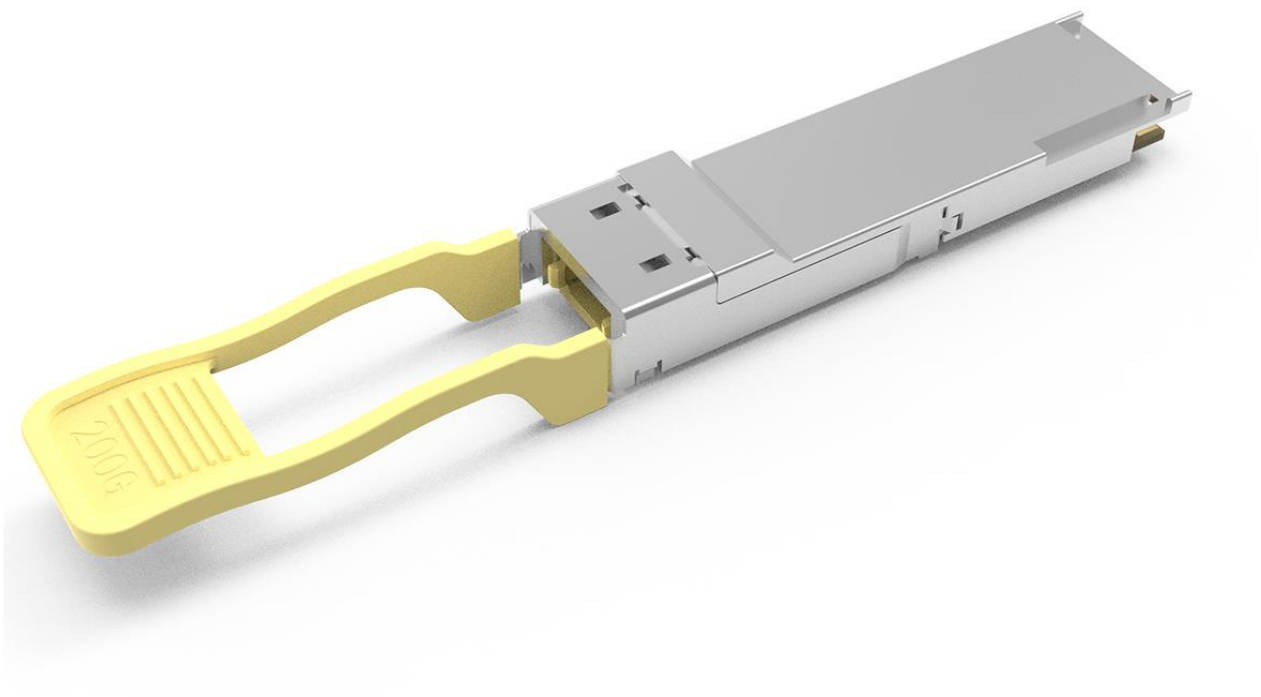
Product Datasheet

200G QSFP56 SR4 Transceiver



Application

- Data center & Networking Equipment
- Servers/Storage Devices
- High Performance Computing (HPC)
- Switches/Routers
- Telecom Central Offices (CO)
- Test and Measurement Equipment

Standards Compliance

- IEEE 802.3bs, IEEE 802.3cd
- SFF 8679
- CMIS4.0 or SFF8636

Features

- Data rate up to 212.5Gbps (4x PAM4 53Gbps);
- Reach up to 70m on MMF(OM3);
- Reach up to 100m on MMF(OM4);
- 850nm VCSEL laser and PIN receiver;
- High speed I/O electrical interface (200GAUI-4);
- I2C interface with integrated Digital Diagnostic monitoring;
- Single MPO-12 receptacle;
- Single +3.3V power supply;
- Power consumption <5 W;
- Operating case temperature: 0 to +70°C;
- Compliant to RoHS-10

1.0 Product Specification

1.1 Absolute Maximum Ratings (TC=25℃, unless otherwise noted)

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operational sections of the data sheet. Exposure to absolute maximum ratings will cause permanent damage and/or adversely affect device reliability.

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Storage Temperature	TS	-40	-	+85	℃	
Maximum Supply Voltage	Vcc	-0.5	-	4.0	V	
Operating Relative Humidity	RH	15	-	+85	%	

1.2 General Specifications

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	Tc	0	-	70	ºC	
Power Supply Voltage	Vcc	3.13	3.3	3.47	V	
Power Supply Current	Icc	-	-	1.5	A	
Maximum Power Dissipation	P_D	-	-	5	W	
Lane Baud Rate	BR_{LANE}		26.5625		GBd	
Transmission Distance	TD		-	70	m	Over MMF OM3
Transmission Distance	TD		-	100	m	Over MMF OM4

1.3 PIN Descriptions

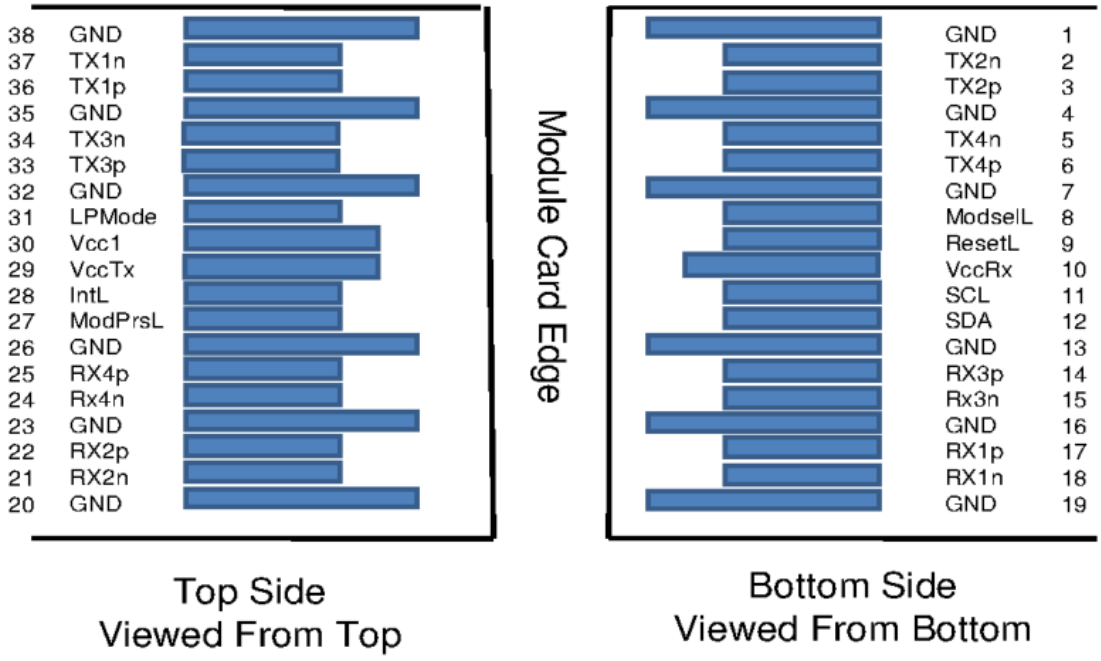


Figure 1 – Pin Definitions

Pin	Symbol	Name/Description	Ref.
1	GND	Ground	1
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	1
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	1
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	Vcc Rx	+3.3 V Power supply receiver	
11	SCL	2-wire serial interface clock	
12	SDA	2-wire serial interface data	
13	GND	Ground	1
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	1
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	

Pin	Symbol	Name/Description	Ref.
19	GND	Ground	1
20	GND	Ground	1
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	1
24	Rx4n	Receiver Inverted Data Output	
25	Rx4p	Receiver Non-Inverted Data Output	
26	GND	Ground	1
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	Vcc Tx	+3.3 V Power supply transmitter	
30	Vcc1	+3.3 V Power Supply	
31	LPMode	Low Power Mode	
32	GND	Ground	1
33	Tx3p	Transmitter Non-Inverted Data Input	
34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	1
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	1

Notes:[1] Circuit ground is internally isolated from chassis ground.

1.4 Electrical Characteristics

Parameter	Symbol	Min	Typical	Max	Units	Notes
Receiver electrical output characteristics at TP4						
Signaling rate per lane			26.5625		GBd	
AC common-mode output voltage(RMS)			-	17.5	mV	
Differential peak-to-peak output voltage				900	mV	
Near-end ESMW (Eye symmetry mask width)			0.265		UI	
Near-end Eye height, differential		70			mV	
Far-end ESMW (Eye symmetry mask width)			0.2		UI	
Far-end Eye height, differential		30			mV	

Far-end pre-cursor ISI ratio		-4.5		2.5	%	
Differential termination mismatch				10	%	
Transition time (min, 20% to 80%)		9.5			ps	
DC common mode voltage		-350		2850	mV	
Transmitter electrical input characteristics at TP1						
Signaling rate, per lane			26.5625		GBd	
Differential pk-pk input voltage tolerance		900			mV	
Differential termination mismatch				10	%	
Module stressed input test		Per Section 120E.3.4.1, IEEE802.3bs				
Single-ended voltage tolerance range		-0.4		3.3	V	
Common-mode voltage		-300		2800	mV	

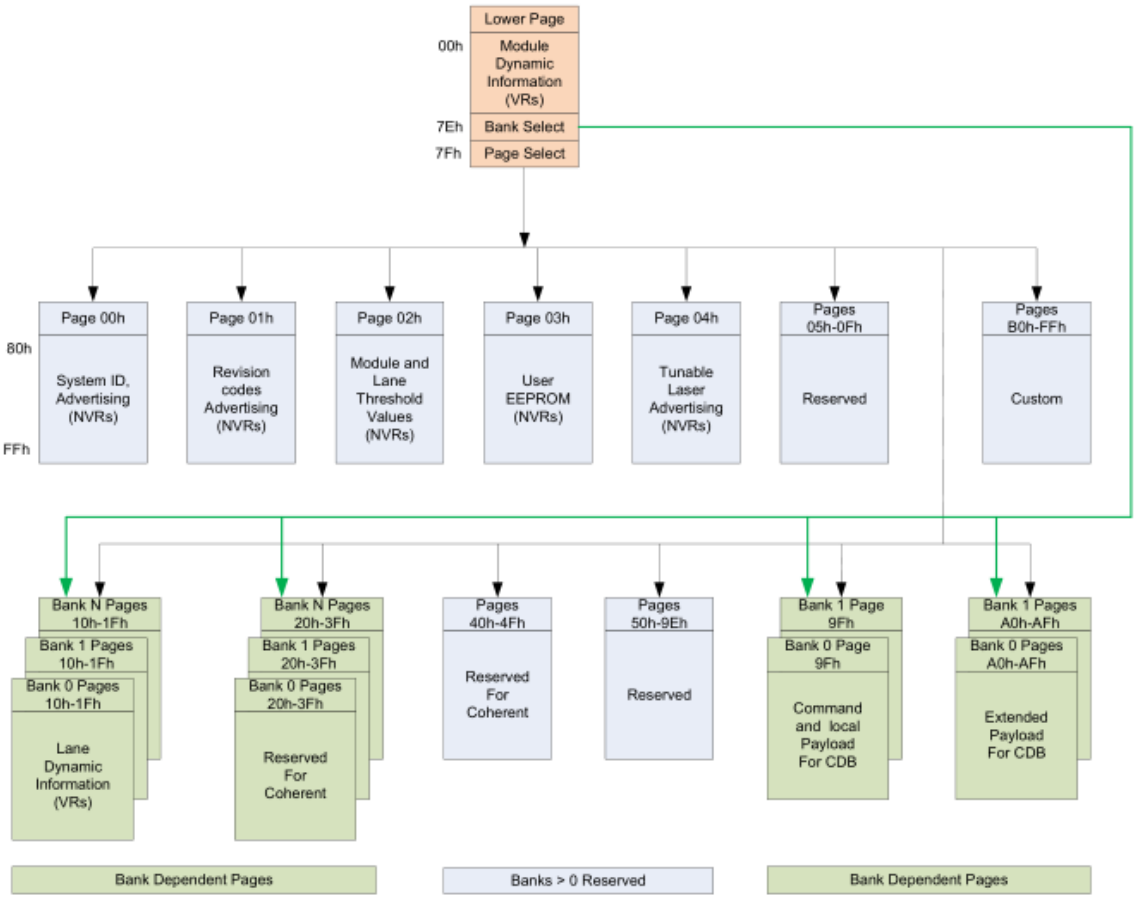
1.5 Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Units	Notes
Transmitter						
Center Wavelength	λc	840	850	860	nm	
RMS Spectral width	Δλ			0.6	nm	
Average Launch Power, each lane		-6.2	-	4	dBm	
Optical Modulation Amplitude	OMA	-4.2	-	3	dBm	
Launch power in OMA minus TDECQ		-5.6	-	-	dBm	
Average Output Power (Laser Turn off)		-	-	-30	dBm	
Extinction Ratio	ER	3	-	-	dB	
Transmitter and dispersion eye closure (TDECQ), each lane	TDECQ	-	-	4.5	dB	
TDECQ – 10log $_{10}$ (C_{eq}), each lane				4.5	dB	
Optical Return Loss Tolerance	ORLT	-	-	12	dB	
RIN_{12} OMA				-128	dB/Hz	
Encircled flux at 4.5μm				30	%	
Encircled flux at 19μm		86			%	
Receiver						
Center Wavelength	λc	840	850	860	nm	
Damage threshold		5	-	-	dBm	
Average receive power, each lane		-8.4		4	dBm	
Receive power, each lane (OMAouter)			-	3	dBm	1

Parameter	Symbol	Min	Typical	Max	Units	Notes
Receiver sensitivity (OMAouter), each lane	Rx_sen			-6.5	dBm	1
LOS Assert	LOS_A	-20	-	-	dBm	
LOS De-Assert	LOS_D	-	-	-9	dBm	
LOS Hysteresis	LOS_H	0.5	-	5	dB	

Notes: [1] Measured at TP3 for BER 2.4E-4 Pre-FEC

1.6 Module Memory Map



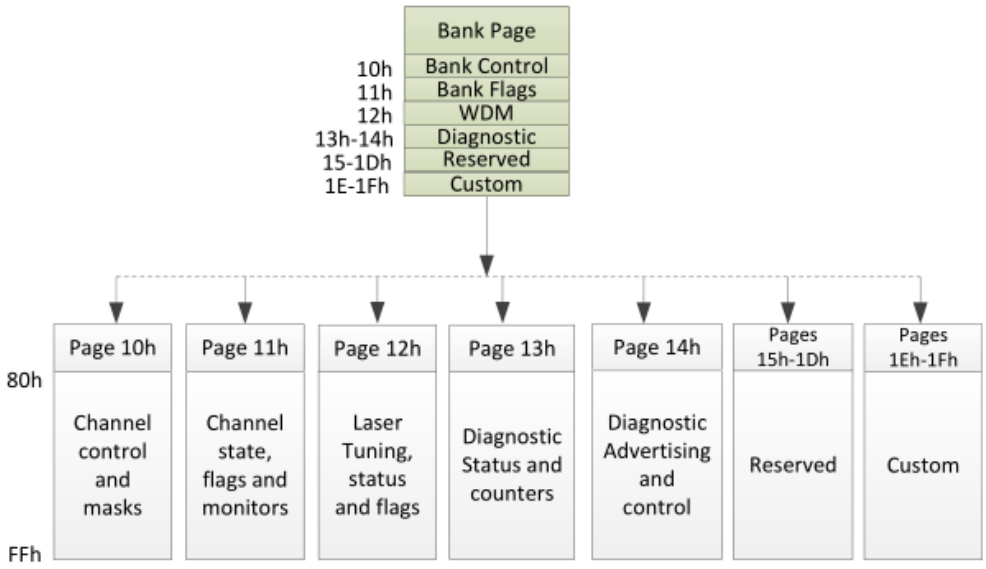


Figure 2 –Memory Map

1.7 Digital Diagnostic Specification

Parameter	Symbol	Accuracy	Units	Notes
Transceiver Case Temperature	DMI_TEMP	±5	℃	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	±3%	V	Full operating range
Channel Bias current monitor	DMI_IBIAS	±3%	mA	Per channel
Channel RX power monitor absolute error	DMI_RX	±3	dB	Per channel
Channel TX power monitor absolute error	DMI_TX	±3	dB	Per channel

1.8 Optical Interface Lanes And Assignment

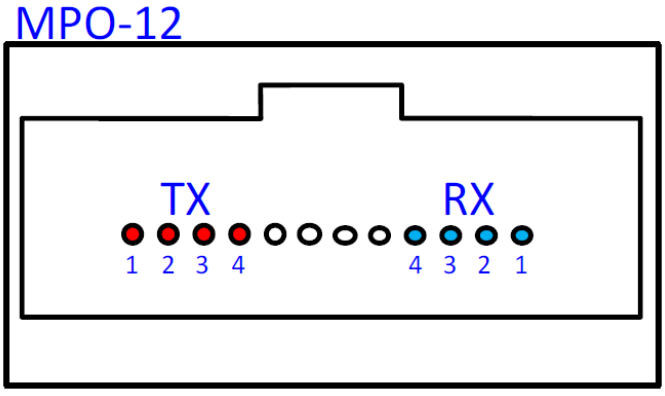


Figure 3 –Optical lanes Assignment

MPO receptacle with 8-degree angled end-face or 0-degree angled end-face for customers to

choose

1.9 Mechanical Specifications

Unit: mm

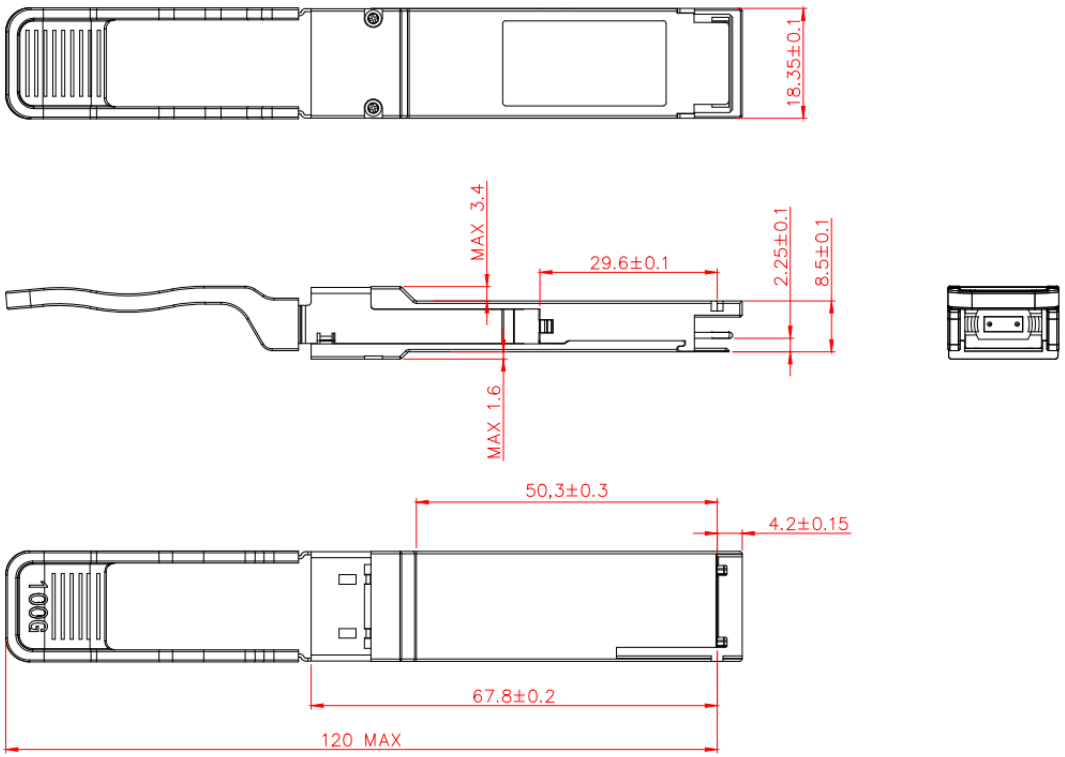


Figure 4 – QSFP56 Mechanical Specifications

2.0 Product Information

Data Rate	Factor		Optical	Wavelength	Reach
200G	QSFP56	SR4	MPO	850nm	100m

ESD Safety Cautions

This transceiver is specified as ESD threshold 1KV for high speed data pins and 2KV for all others electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Important Notice

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3.0 Revision Record

Rev.	Comments	Author	Date
A01	Initial Release	Koko Sun	10/01/2023