

## PRE-QSFP56DD-DR4+

QSFP-DD, DR4+, 1310nm, 400G, 2km, SMF, MPO-12, DDM



### Product Features:

- Parallel 4 Optical Lanes
- Optical Data Rate 106.25Gbps (PAM4) per optical lane
- Up to 2km reach on Single Mode Fiber (SMF) with FEC
- 8 x 53.125Gb/s Electrical Interface (400GAUI-8)
- Maximum power consumption 12W
- MPO-12 Connector
- Digital Diagnostic Monitoring



### Applications:

- 400G Ethernet
- Supports 1x400G or 4x100G breakout mode
- Datacenter Enterprise Networking

### Compliance:

- QSFP-DD MSA
- IEEE 802.3bs
- RoHS
- MIL-STD-883 (ESD)

### General Product Description:

The PRE-QSFP56DD-DR4+ optical transceiver supports 400 Gigabit Ethernet applications up to 2km on single mode fiber with FEC enabled at the host platform on both ends of the link. The QSFP-DD module offers 4 independent transmit and receive optical lanes, each capable of 100Gb/s operation for a total data rate of 400Gb/s.

The PRE-QSFP56DD-DR4+ can work in 400G native operation or in 4x100G breakout mode connecting to single lambda 100G QSFP28-DR or QSFP28-FR optical transceivers.

The PRE-QSFP56DD-DR4+ is MSA, ROHS and DDM compliant and designed to meet external operating conditions including temperature, humidity, and EMI interference.

### Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Operating Case Temperature	$T_{OP}$	0	-	70	degC	
Power consumption	$P_W$	-	-	12	W	
Power Supply Current	$I_{CC}$	-	-	3.64	A	
Power Supply Voltage	$V_{CC}$	3.135	3.3	3.465	V	
Electrical Data Rate, per Lane	-	26.5625 $\pm$ 100 ppm			GBd	PAM4
Pre-FEC Bit Error Ratio	$BER_{Pre-FEC}$	-	-	$2.4 \times 10^{-4}$	-	
Post-FEC Bit Error Ratio	$BER_{Post-FEC}$	-	-	$1 \times 10^{-12}$	-	1
Transmission Length	TL	0.002	-	2	km	2

#### Notes:

1. FEC provided by host system
2. FEC required on host system to support maximum transmission distance.

Precision Optical Transceivers, Inc.

[PrecisionOT.com](http://PrecisionOT.com)

[sales@PrecisionOT.com](mailto:sales@PrecisionOT.com)

Tel. +1 585-500-4090

## Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
<b>Transmitter</b>						
Center Wavelength	$\lambda_c$	1304.5	1310	1317.5	nm	
Data Rate, per Lane	-	53.125 $\pm$ 100 ppm			GBd	PAM4
Side-Mode Suppression Ratio	SMSR	30	-	-	dB	
Average Launch Power, per Lane	$P_{TX\_AVG}$	-2.4	-	4	dBm	1
Outer Optical Modulation Amplitude (OMA <sub>outer</sub> ), per Lane	$P_{TX\_OMA}$	-0.2	-	4.2	dBm	2
Launch Power in OMA <sub>outer</sub> minus TDECQ, per Lane	-	-1.6	-	-	dBm	
Transmitter and Dispersion Eye Closure for PAM4, per Lane	TDECQ	-	-	3.4	dB	
Extinction Ratio	ER	3.5	-	-	dB	
RIN <sub>17.1</sub> OMA	RIN	-	-	-136	dB/Hz	
Optical Return Loss Tolerance	TOL	-	-	17.1	dB	
Transmitter Reflectance	$T_R$	-	-	-26	dB	
Average Launch Power of OFF Transmitter, per lane	$P_{OFF}$	-	-	-15	dBm	
<b>Receiver</b>						
Center Wavelength	$\lambda_c$	1304.5		1317.5	nm	
Data Rate, per lane	-	53.125 $\pm$ 100 ppm			GBd	PAM4
Damage Threshold, per lane	TH <sub>d</sub>	5.5			dBm	3
Average Receive power, per lane	$P_{RX\_AVG}$	-6.4		4.5	dBm	4
Receive Power (OMA <sub>outer</sub> ), per lane	$P_{RX\_OMA}$			4.7	dBm	
Receiver Sensitivity (OMA <sub>outer</sub> ), per lane	SEN			Eq. (1)	dBm	5
Stressed Receiver Sensitivity (OMA), per lane	SRS			-2.5	dBm	6
Receiver Reflectance	$R_R$			-26	dB	
<b>Stressed Receiver Sensitivity Test Conditions: (Note 7)</b>						
Stressed eye closure for PAM4 (SECQ), per lane under test			3.4		dB	
OMA <sub>outer</sub> of each Aggressor Lane			4.7		dBm	

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.
2. Even if the TDECQ < 1.4 dB, the OMA<sub>outer</sub> (min) must exceed the minimum value specified here.
3. The receiver shall be able to tolerate, without damage, continuous exposure to an optical input signal having this average power level.
4. Average receive power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
5. Receiver sensitivity (OMA<sub>outer</sub>), each lane (max) is informative and is defined for a transmitter with SECQ of up to 3.4 dB. It should meet Equation (1), which is illustrated in Figure 1.

$$\text{Receiver Sensitivity per lane} = \max(-4.5, \text{SECQ} - 5.9) \text{ dBm} \quad (1)$$

Where SECQ is that of the transmitter used to measure the receiver sensitivity

6. Measured with conformance test signal at receiver input for the BER of  $2.4 \times 10^{-4}$
7. These test conditions are for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

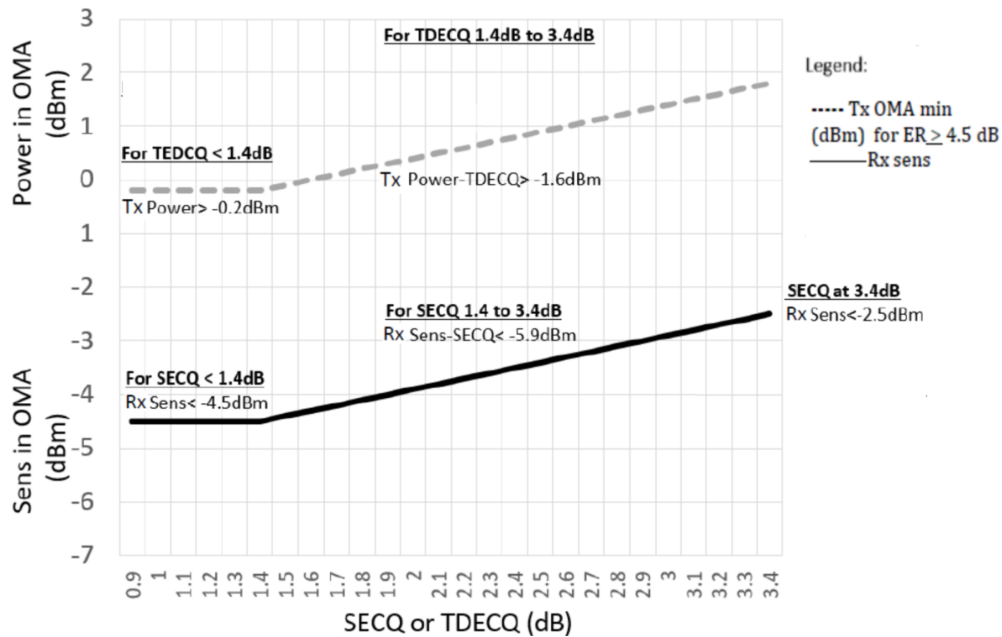


Figure 1 Receiver Sensitivity Mask for 400G-DR4+

Product Ordering Information

Part Number	Description
PRE-QSFP56DD-DR4+	QSFP-DD, DR4+, 1310nm, 400G, 2km, SMF, MPO-12, DDM