

QSFP56-DD-FR4

400G QSFP56-DD FR4 1271-1331nm SMF 2km Transceiver

Product Features

- Compliant with 400G-FR4 Technical
- Specification rev 2.0 (100G Lambda MSA)
- Compliant with QSFP-DD MSA HW with duplex LC connector
- Compliant with IEEE 802.3bs standard: 400GAUI-8 electrical interface
- Compliant with QSFP-DD CMIS Rev 4.0
- Maximum power consumption 10 W
- Operating Distance up to 2km
- Two wire serial Interface with digital diagnostic monitoring
- Complies with EU Directive 2011/65/EU (RoHS compliant), and Class 1 Laser
- Case operating temperature:
 - Commercial: 0 ~ 70°C



Product Applications

- 400G Ethernet
- Data Center

I. Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min.	Typ.	Max.	Units
Storage Temperature	Ts	-40		+85	°C
Supply Voltage	Vcc	-0.5		3.6	V
Relative Humidity (non-condensing)	RH	5		95	%
Data Input Voltage Differential	IVDIP-VDINI			1	V
Control Input Voltage	VI	-0.3		Vcc+0.5	V
Control Output Voltage	IO	-20		20	mA

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400G, QSFP56-DD, FR4, SMF TRANSCEIVER
1271-1331nm, 2km REACH, DUPLEX LC CONNECTOR

II. Operating Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Case Operating Temperature	TC	0		+70	°C	Commercial
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	Icc_IP			4800	mA	
Sustained peak current at hot plug	Icc_SP			3960	mA	
Max Power Dissipation	PD			10	W	
Maximum Power Dissipation, Low Power Mode	PDLP			1.5	W	
Signalling Rate per Lane	SRL		53.125		Gbd	
Two Wire Serial Interface Clock Rate				400	kHz	
Module power supply noise tolerance 10 Hz - 10 MHz (ptp)				66	mVpp	
Rx Differential Data Output Load			100		Ohm	
Operating Distance		2		2000	m	

III. Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Wavelength L0	$\lambda C0$	1264.5	1271	1277.5	nm	
Wavelength L1	$\lambda C1$	1284.5	1291	1297.5	nm	
Wavelength L2	$\lambda C2$	1304.5	1311	1317.5	nm	
Wavelength L3	$\lambda C3$	1324.5	1331	1337.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each lane	AOPL	-3.3		3.5	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}), each lane	TOMA	-0.3		3.7	dBm	2
Difference in launch power between any two lanes (OMA _{outer})	DP			4	dB	
Launch Power in OMA _{outer} minus TDECQ for ER ≥ 4.5 dB, each lane	TOMA-TDECQ	-1.7			dBm	
Launch Power in OMA _{outer} minus TDECQ for ER < 4.5 dB, each lane	TOMA-TDECQ	-1.6			dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ			3.4	dB	
TDECQ – $10 \cdot \log_{10}(C_{eq})$, each lane				3.4	dB	
Average Launch Power of OFF Transmitter, each lane	TOFF			-20	dBm	
Extinction Ratio, each lane	ER	3.5			dB	
Transmitter transition time	TT			17	ps	
RIN _{17.1OMA}	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORL			17.1	dB	
Transmitter Reflectance	TR			-26	dB	

Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength.
2. Even if the TDECQ < 1.4 dB for an extinction ratio of ≥ 4.5 dB or TDECQ < 1.3 dB for an extinction ratio of < 4.5 dB, the OMA_{outer} (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.

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Parameter	Symbol	Min	Typical	Max	Unit	Notes
Receiver						
Wavelength L0	$\lambda C0$	1264.5	1271	1277.5	nm	
Wavelength L1	$\lambda C1$	1284.5	1291	1297.5	nm	
Wavelength L2	$\lambda C2$	1304.5	1311	1317.5	nm	
Wavelength L3	$\lambda C3$	1324.5	1331	1337.5	nm	
Damage Threshold, each lane	AOPD	4.5			dBm	
Average Receive Power, each lane	AOPR	-7.3		3.5	dBm	1
Receive Power (OMA _{outer}), each lane	OMAR			3.7	dBm	
Difference in receive power between any two lanes (OMA _{outer})	DR			4.1	dB	
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity (OMA _{outer}), each lane	SOMA			Max (-4.6, SECQ-6)		2
Stressed Receiver Sensitivity (OMA _{outer}), each lane	SRS			-2.6		3
Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4 (SECQ)			3.4			
SECQ – $10 \cdot \log_{10}(C_{eq})$, lane under test (max)				3.4		
OMA _{outer} of each aggressor lane			1.5			

Notes:

1. Average receive power, each lane (min) is informative and not the principal indicator of signal strength.
2. Receiver sensitivity (OMA_{outer}), each lane (max) is informative and is defined for a transmitter with a value of SECQ up to 3.4 dB.
3. Measured with conformance test signal at TP3 for the BER = 2.4×10^{-4}

IV. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Differential pk-pk input Voltage tolerance		900			mV	
Differential termination mismatch				10	%	
Single-ended voltage tolerance range		-0.4		3.3	V	
DC common mode Voltage		-350		2850	mV	
Receiver						
AC common-mode output Voltage (RMS)				17.5	mV	
Differential output Voltage	Zout			900	mV	
Near-end Eye height, differential		70				
Far-end Eye height, differential		30				
Far end pre-cursor ISI ratio		-4.5				
Differential Termination Mismatch				10		
Transition Time (min, 20% to 80%)		9.5		3.3		
DC common mode Voltage		-350		2850		
Low Speed Signal						
Module output SCL and SDA	VOL	0		0.4	V	
Module Input SCL and SDA	VIL	-0.3		Vcc*0.3	V	
	VIH	Vcc*0.7		Vcc+0.5	V	
LPMoDe, ResetL, ModSelL and ePPS	VIL	-0.3		0.8	V	
	VIH	2		Vcc+0.3	V	
IntL	VOL	0		0.4	V	
	VOH	Vcc-0.5		Vcc+0.3	V	

Warranty

All transceivers feature a limited lifetime warranty.

Disclaimer

External physical characteristics are subject to variation. This may include, but is not limited to, external case designs, pull tab colors and/or shapes, removal latch styles or colors, and label sizes and placement. These variations do not affect the function or characteristics of the transceivers.