

QSFP56-DD-LR4

400G, QSFP56-DD, LR4, SMF TRANSCEIVER

1271-1331nm, 10km REACH, DUPLEX LC CONNECTOR

Product Features

- Compliant with 100G Lambda MSA:
400GBASE-LR4-10 optical interface
- Compliant with IEEE 802.3bs standard:
400GAUI-8 electrical interface
- Compliant with QSFP-DD MSA HW with
duplex LC connector
- Compliant with QSFP-DD CMIS Rev 4.0
- Operating distance up to 10km
- Maximum power consumption 10 W
- Two wire serial Interface with digital diagnostic
monitoring
- Complies with EU Directive 2011/65/EU
(RoHS compliant)
- Class 1 Laser compliant
- Case operating temperature:
 - Commercial: 0 ~ 70°C



Product Applications

- 400G Ethernet
- Data Center
- Enterprise networking

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

II. Operating Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Operating Case Temperature	T _{OP}	0		70	°C	Commercial
Power Supply Voltage	V _{CC}	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	I _{CC_IP}			4000	mA	
Sustained peak current at hot plug	I _{CC_SP}			3300	mA	
Maximum Power Dissipation	P _D			10	W	
Maximum Power Dissipation, Low Power Mode	P _{DLP}			1.5	W	
Signaling Rate per Lane	SRL		53.125		Gbd	PAM4
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		10000	m	

III. Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Wavelength L0	λ_{C0}	1264.5	1271	1277.5	nm	
Wavelength L1	λ_{C1}	1284.5	1291	1297.5	nm	
Wavelength L2	λ_{C2}	1304.5	1311	1317.5	nm	
Wavelength L3	λ_{C3}	1324.5	1331	1337.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each lane	AOP _L	-2.7		5.1	dBm	1
Outer Optical Modulation Amplitude (OMA _{outer}), each lane	T _{OMA}			4.4	dBm	
Outer Optical Modulation Amplitude (OMA _{outer}) each lane: • for TDECQ < 1.4dB • for 1.4 ≤ TDECQ ≤ 3.4dB	T _{OMA}	0.3 - 1.1+TDECQ				
Difference in launch power between any two lanes (OMA _{outer})	DP			4	dB	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ			3.9	dB	
Transmitter eye closure for PAM4(TECQ)	TECQ			3.9	dB	
TDECQ - TECQ				2.5	dB	
Over/under-shoot				25	%	
Transmitter peak-to-peak power				5.2	dBm	
Avg. Launch Power of OFF Transmitter, each lane	T _{OFF}			-16	dBm	
Extinction Ratio, each lane	ER	3.5			dB	
Transmitter transition time				17	ps	
RIN _{15.6OMA}	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORL			15.6	dB	
Transmitter Reflectance	T _R			-26	dB	

Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength

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	6.1			dB	
Average Receive Power, each lane	AOPR	-9		5.1	dBm	1
Receive Power (OMA _{outer}), each lane	OMAR			4.4	dBm	
Difference in receive power between any two lanes (OMA _{outer})	DR			4.3	dB	
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity (OMA _{outer}) each lane: • for TDECQ < 1.4dB • for $1.4 \leq TDECQ \leq 3.4$ dB						
Stressed Receiver Sensitivity (OMA _{outer}), each lane	SRS			-4.3	dBm	
Conditions of stressed receiver sensitivity test:						
Stressed eye closure for PAM4 (SECQ)			3.9		dB	
OMA _{outer} of each aggressor lane			-0.4		dBm	

Notes:

1. Average receive power, each lane (min) is informative and not the principal indicator of signal strength.

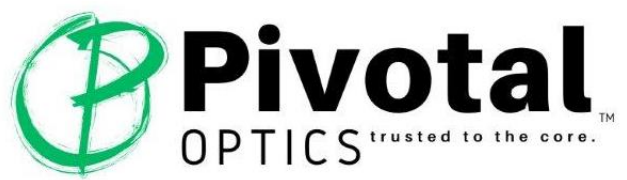
IV. Electrical Characteristics

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		2.5		
Differential Termination Mismatch				10		
Transition Time (min, 20% to 80%)		9.5				
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-0.7		Vcc+0.3	V	

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v. Ordering Information

Pivotal Part Number	Description
QSFP56-DD-LR4	QSFP56-DD, CMIS 4.0, 1310nm, LR4 SMF 10km, 400G DDM, C-Temp

Notes:

1. Please contact sales for specific OEM Platform part numbers to fit your network.

Warranty

<https://pivotaloptics.com/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.