QSFP56-DD-DR4+

400G QSFP56-DD DR4+ 1310nm SMF 2km Transceiver

Product Features

- Supports 425Gbps
- Single 3.3V Power Supply
- Power dissipation < 10W
- Up to 2km over SMF
- RoHS compliant
- QSFP-DD MSA Compliant
- 8x53.125Gbps (PAM4) electrical interface
- MPO-12 connector
- PIN and TIA array on the receiver side
- I2C interface with integrated Digital Diagnostic
- Monitoring
- Safety Certification: TUV/UL/FDA*1
- Case operating temperature:
  - Commercial: 0 ~ 70°C

Product Applications

- 400G Ethernet
- 4 x 100G-FR1
- Infiniband interconnects

I. Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min.	Typ.	Max.	Units
Storage Temperature	Ts	-40		+85	℃
Supply Voltage	Vcc	-0.5		3.6	V
Relative Humidity (non-condensing)	RH	5		95	%
Control Input Voltage	VI	-0.3		Vcc+0.5	V

II. Operating Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Operating Case Temperature	TOPR	0		70	ºC	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Instantaneous peak current at hot plug	ICC_IP			4000	mA	
Sustained peak current at hot plug	ICC_SP			3300	mA	
Maximum Power Dissipation	PD			10	W	
Maximum Power Dissipation, Low Power Mode	PDLP			1.5	W	
Signaling Rate per Lane	SRL		53.125		GBd	PAM4
Two Wire Serial Interface Clock Rate				400	kHz	
Power Supply Noise Tolerance (10Hz - 10MHz)				66	mV	
Rx Differential Data Output Load			100		Ohm	
Operating Distance		2		2000	m	

III. Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Wavelength	λC	1304.5	1311	1317.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power, each lane	AOPL	-3.1		4	dBm	1
Outer Optical Modulation Amplitude (OMAouter), each lane	TOMA			4.2	dBm	
Outer Optical Modulation Amplitude (OMAouter), each lane: • for TDECQ <1.4dB • for 1.4≤TDECQ≤3.4dB	TOMA	-0.1 -1.5+ TDECQ			dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ			3.4	dB	
Transmitter eye closure for PAM4(TECQ)	TECQ			3.4	dB	
| TDECQ - TECQ |				2.5	dB	
Over/under-shoot				22	%	
Transmitter power excursion				2	dBm	
Average Launch Power of OFF Transmitter, each lane	TOFF			-15	dBm	
Extinction Ratio, each lane	ER	3.5			dB	
RIN15.6OMA	RIN			-136	dB/Hz	
Optical Return Loss Tolerance	ORL			17.1	dB	
Transmitter Reflectance	TR			-26	dB	
Transmitter Transition Time	Tt			17	ps	

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	λC	1304.5	1311	1317.5	nm	
Damage Threshold, each lane	AOPD	5		-	dBm	
Average Receive Power, each lane	AOPR	-7.1		4	dBm	1
Receive Power (OMAouter), each lane	OMAR			4.2	dBm	
Receiver Reflectance	RR			-26	dB	
Receiver Sensitivity (OMAouter), each lane: • for TDECQ <1.4dB • for 1.4≤TDECQ≤3.4dB	SOMA			-4.5 -5.9+ TECQ	dBm	
Stressed Receiver Sensitivity (OMAouter), each lane	SRS			-2.5	dBm	2
Conditions of stressed receiver sensitivity test:						
Stressed eye closure for PAM4 (SECQ)			3.4		dB	

Notes:

1. Average receive power, (min) is informative and not the principal indicator of signal strength.
2. Measured with conformance test signal at TP3 for the BER = 2.4×10^{-4}.

IV. Electrical Characteristics: High Speed Signals

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				900	mV	
Near-end Eye height, differential		70			mV	
Far-end Eye height, differential		30			mV	
Far end pre-cursor 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	
Low Speed Signals						
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	
InitMode, ResetL and ModSelL	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.