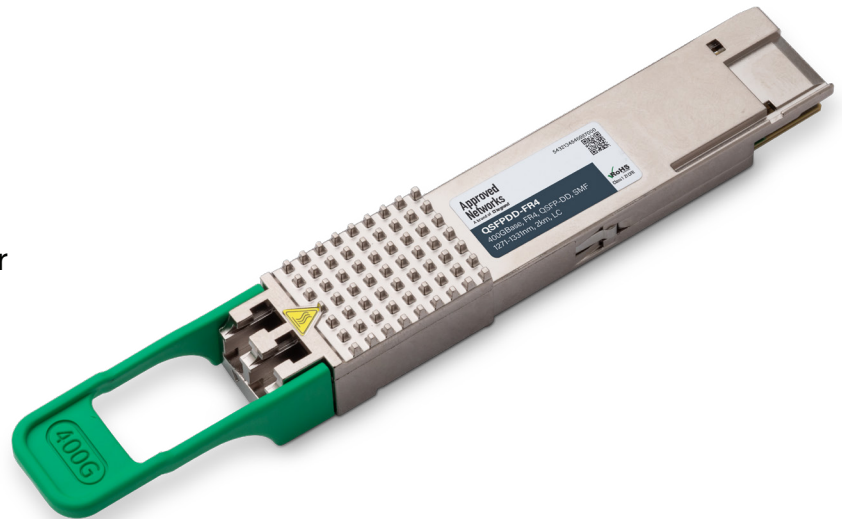


### Features:

- Compliant with 400G-FR4 Technical Specification rev 2.0 (100G Lambda MSA)
- Compliant with QSFP-DD MSA HW Rev 5.0; type 2 housing 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
- Case operating temperature 0°C to 70°C
- Two wire serial Interface with digital diagnostic monitoring
- Complies with EU Directive 2011/65/EU (RoHS compliant)
- Class 1 Laser



### 1. Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
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 Current	IO	-20	20	mA

### 2. Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	TOPR	0	-	70	°C	
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	
Maximum Power Dissipation	PD	-	-	10	W	

Maximum Power Dissipation, Low Power Mode	PDLP	-	-	1.5	W	
Signalling 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	-	2000	m	

### 3. Transmitter Optical Specifications

The following tables list the performance specifications for the various functional blocks of the integrated optical transceiver module.

Parameter	Symbol	Min.	Typ.	Max.	Unit
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 <sup>1</sup>	AOPL	-3.3	-	3.5	dBm
Outer Optical Modulation Amplitude (OMA <sub>outer</sub> ), each lane <sup>2</sup>	TOMA	-0.3	-	3.7	dBm
Difference in launch power between any two lanes (OMA <sub>outer</sub> )	DP	-	-	4	dB
Launch Power in OMA <sub>outer</sub> minus TDECQ for ER $\geq$ 4.5dB, each lane	TOMA-TDECQ	-1.7	-	-	dBm
Launch Power in OMA <sub>outer</sub> minus TDECQ for ER <4.5dB, each lane	TOMA-TDECQ	-1.6	-	-	dBm
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ	-	-	3.4	dB
TDECQ - 10*log <sub>10</sub> (Ceq), 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 <sub>17:1OMA</sub>	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<sub>outer</sub> (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.

**4. Receiver Optical Specifications**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Wavelength L0	λC0	1264.5	1271	1277.5	nm	
Wavelength L1	λC1	1284.5	1291	1297.5	nm	
Wavelength L2	λC2	1304.5	1311	1317.5	nm	
Wavelength L3	λC3	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 <sub>outer</sub> ), each lane	OMAR	-	-	3.7	dBm	
Difference in receive power between any two lanes (OMA <sub>outer</sub> )	DR	-	-	4.1	dB	
Receiver Reflectance	RR	-	-	-26	dB	
Receiver Sensitivity (OMA <sub>outer</sub> ), each lane	SOMA	-	-	Max (-4.6, SECQ-6)	dBm	2
Stressed Receiver Sensitivity (OMA <sub>outer</sub> ), each lane	SRS	-	-	-2.6	dBm	3
Conditions of stressed receiver sensitivity test						
Stressed eye closure for PAM4 (SECQ)	-	-	3.4	-	dB	
SECQ - 10*log <sub>10</sub> (C <sub>eq</sub> ), lane under test (max)	-	-	-	3.4	dB	
OMA <sub>outer</sub> of each aggressor lane	-	-	1.5	-	dBm	

**Notes:**

1. Average receive power, each lane (min) is informative and not the principal indicator of signal strength.
2. Receiver sensitivity (OMA<sub>outer</sub>), 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 = 2.4x10<sup>-4</sup>

## 5. Electrical Specification High Speed Signal

(compliant with IEEE 802.3bs 400GAUI-8)

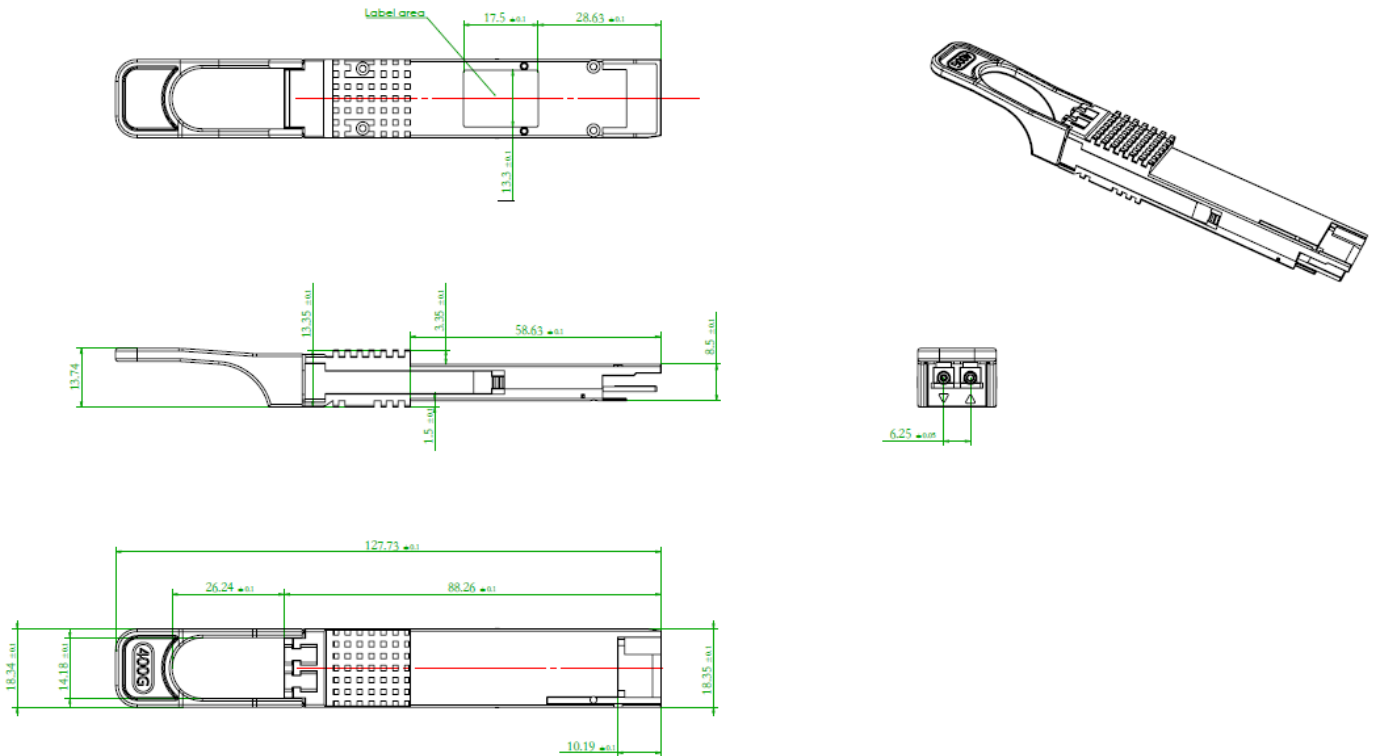
Parameter	Symbol	Min.	Typ.	Max.	Unit
<b>Receiver (Module Output)</b>					
AC common-mode output Voltage (RMS)		-	-	17.5	mV
Differential output Voltage		-	-	900	mV
Near-end Eye height, differential		70	-	-	mV
Far-end Eye height, differential		30	-	-	mV
Far end pre-cursor ISI ratio		-4.5	-	2.5	%
Differential Termination Mismatch		-	-	10	%
Transition Time (min, 20% to 80%)		9.5	-	-	ps
DC common mode Voltage		-350	-	2850	mV
<b>Transmitter (Module Input)</b>					
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

## 6. Electrical Specification Low Speed Signal

(compliant with QSFP-DD HW Rev 5.0)

Parameter	Symbol	Min.	Max.	Unit
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

## 7. Mechanical Diagram



**Note:** 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.

## 8. Ordering Information

OEM	Part Number	OEM	Part Number
Arista	QDD-400G-FR4-AN-A	Cisco	QDD-400G-FR4-S-A
Juniper	QDD-400G-FR4-JN-A	MSA	AN-QSFP400G-FR4
Juniper	QDD-400G-FR4-JN-C1	Nokia	3HE15272AA-C1
MSA Champion ONE	400GQSFPDDE-FR4-A		

## 9. Contact Information

Tel: 800.590.9535

Web: <http://www.approvednetworks.com>