

## Features

- ◆ Supports 103Gbps and 112Gbps aggregate bit rates
- ◆ Single 3.3V Power Supply and Power dissipation < 9W
- ◆ Up to 40km transmission on SMF
- ◆ Hot-Pluggable CFP2 Footprint Duplex LC Connector Interface
- ◆ Class 1 FDA and IEC60825-1 Laser Safety Compliant
- ◆ RoHS6 Compliant
- ◆ Operating Case Temperature Standard: 0°C~+70°C
- ◆ Compliant with CFP2 MSA Specification
- ◆ MDIO interface with integrated Digital Diagnostic Monitoring
- ◆ 4 x 28G electrical interface



## Applications

- ◆ 100GBASE-ER4 Ethernet
- ◆ OTU4 4L1-9C1F

## Ordering Information

Part No.	Data Rate	Fiber	Distance* (Note2)	Interface	Temp.	DDMI
SNR-CFP2-100G-ER4-40 <sup>*(Note1)</sup>	112Gbps	SMF	40km	LC	Standard	Yes

Note1: Standard version

Note2: 40 km with 9/125µm SMF

\*The product image only for reference purpose

**Regulatory Compliance**<sup>\*note3</sup>

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

Note3: The above certificate number updated to June 2014, because some certificate will be updated every year, such as FDA and ROHS.

**Absolute Maximum Ratings**<sup>\*note4</sup>

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T <sub>s</sub>	-40	+85	°C
Case Temperature	T <sub>c</sub>	-5	+75	°C
Supply Voltage	V <sub>cc</sub>	-0.5	3.6	V
Relative Humidity(Non-condensing)	RH	5	95	%

Note4: Exceeding any one of these values may destroy the device immediately.

**Recommended Operating Conditions**

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T <sub>c</sub> SNR-CFP2-100G-ER4-	0		+70	°C
Operating Relative Humidity	RH	5		85	%
Power Supply Voltage	V <sub>cc</sub>	3.2	3.3	3.4	V
Power Consumption	P			9	W

**Performance Specifications -Electrical**

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
<b>Transmitter</b>						
Input Amplitude (Differential)	V <sub>in</sub>			1050	mVpp	AC coupled inputs <sup>*(Note7)</sup>
Input Impedance (Differential)	Z <sub>in</sub>	80	100	120	ohms	R <sub>in</sub> > 100 kohms @ DC
<b>Receiver</b>						
Output Amplitude (Differential)	V <sub>out</sub>	360		770	mVpp	AC coupled outputs <sup>*(Note7)</sup>
Output Impedance (Differential)	Z <sub>out</sub>	80	100	120	ohms	
Output Rise/Fall Time	t <sub>r</sub> /t <sub>f</sub>	24			ps	20%~80%

## Optical and Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Signaling Speed per Lane	BR <sub>AVE</sub>		27.95		Gbps
Data Rate Variation		-20		+20	ppm
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm
Total Average Output Power*(Note5)	P <sub>o</sub>			8.9	dBm
Average Launch Power per Lane	P <sub>each</sub>	-2.7		2.9	dBm
Maximum channel power difference				3.6	dB
Side Mode Suppression Ratio	SMSR	30			dB
Launch power of OFF Transmitter per lane				-30	dBm
Optical Return Loss Tolerance				20	dB
Extinction Ratio*(Note6)	ER	8			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}*(Note6)		G.959.1 Compliant			
TX Disable Assert Time	t <sub>off</sub>			100	us
<b>Receiver</b>					
Signaling Speed per Lane	BR <sub>AVE</sub>		27.95		Gbps
Data Rate Variation		-20		+20	ppm
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm

# SNR-CFP2-100G-ER4-40

18 dB Power Budget 100G SMF CFP2 Transceivers

Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm
Average Receive Power per Lane	Rpow	-20.7		4.5	dBm
Equivalent Receive Sensitivity per Lane <sup>*(Note8)</sup>	Pmin			-23.2	dBm
Damage threshold	Rdam	5.5			dBm
Maximum channel power difference				4.5	dB
Maximum Mean total input power				10.5	dBm
Maximum optical path penalty				2.5	dB
Optical Return Loss	ORL			-26	dB
LOS Assert	LOSA	-35		-26	dBm
LOS De-Assert	LOSD			-25	dBm
LOS Hysteresis		0.5			dB

## 100GBASE-ER4 Operation

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Signaling Speed per Lane	BR <sub>AVE</sub>		25.78		Gbps
Data Rate Variation		-100		+100	ppm
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm
Total Average Output Power <sup>*(Note5)</sup>	P <sub>o</sub>			8.9	dBm
Average Launch Power per Lane <sup>*(Note5)</sup>	P <sub>each</sub>	-2.9		2.9	dBm
Difference in launch power between any two lanes(OMA)				3.6	dB
Side Mode Suppression Ratio	SMSR	30			dB
Average launch power of OFF transmitter per lane				-30	dBm
Optical Return Loss Tolerance				20	dB
Transmitter reflectance				-12	dB
Extinction Ratio <sup>*(Note11)</sup>	ER	8			dB
Transmitter eye mask definition <sup>*(Note11)</sup>		IEEE802.3ba-2010 Compliant			
TX Disable Assert Time	t <sub>off</sub>			100	us
<b>Receiver</b>					
Signaling Speed per Lane	BR <sub>AVE</sub>		25.78		Gbps
Data Rate Variation		-100		+100	ppm
Lane_0 Center Wavelength	$\lambda_{C0}$	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	$\lambda_{C1}$	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	$\lambda_{C2}$	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	$\lambda_{C3}$	1308.09	1309.14	1310.19	nm

Average Receive Power per Lane	Rpow	-20.9		4.5	dBm
Difference in receive power between any two lanes(OMA)				4.5	dB
Receive Sensitivity in OMA per Lane*(Note8)	Pmin			-21.4	dBm
Stressed Sensitivity(OMA) per lane	SRS			-17.9	dBm
Damage threshold per lane	Rdam	5.5			dBm
Optical Return Loss*(Note12)	ORL			-26	dB
LOS Assert	LOSA	-35		-26	dBm
LOS De-Assert	LOSD			-25	dBm
LOS Hysteresis*(Note10)		0.5			dB

Note5: Output is coupled into a 9/125µm single-mode fiber.

Note6: Filtered, measured with a PRBS 2<sup>31</sup>-1 test pattern @27.95Gbps

Note7: High speed I/O, internally AC coupled.

Note8: Minimum average optical power measured at BER less than 1E-12, with a 2<sup>31</sup>-1 PRBS.

Note9: Eye Pattern Mask

Note10: LOS Hysteresis

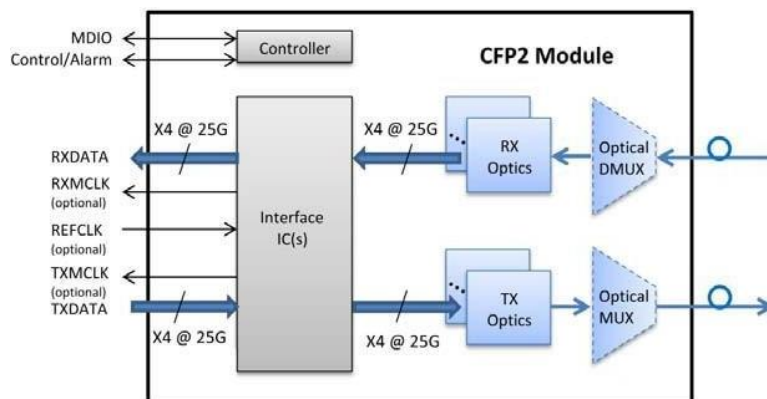
Note11: Filtered, measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78Gbps

Note12: Conditions of stressed receiver sensitivity test at 1.8 dB vertical eye closure penalty per lane, 0.2 UI stressed eye J2 Jitter per lane, 0.47UI stressed eye J9 Jitter per lane.

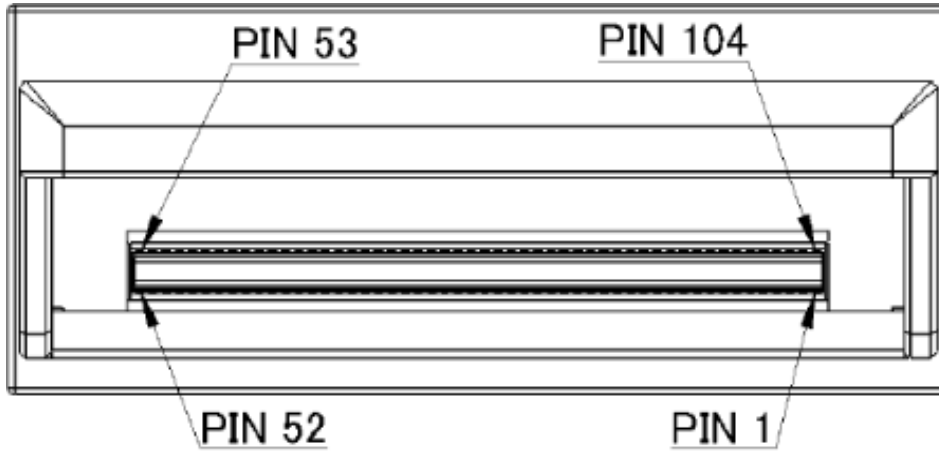
Note13: Eye Margin within 1000 waveforms.

Note14: Measured at BER less than 1E-16 without FEC, average optical power.

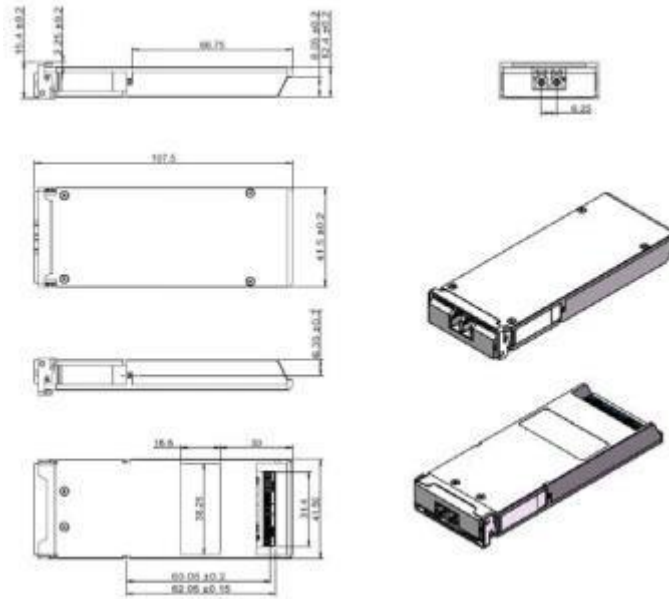
## Functional Description of Transceiver



## CFP2 Transceiver Electrical Pad Layout



## Mechanical Specifications



**CFP2**

## GUARANTEE:



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