SNR-CFP4-100G-LR4-10 Series

Single-Mode OTU4 4I1-9D1F CFP4 Transceiver
Single-Mode 100GBASE-LR4 CFP4 Transceiver
RoHS6 Compliant

Features

- Supports 103Gbps and 112Gbps aggregate bit rates
- Single 3.3V Power Supply and Power dissipation < 6W
- Up to 10km transmission on SMF
- Hot-Pluggable CFP4 Footprint Duplex LC Connector Interface
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- RoHS6 Compliant
- Operating Case Temperature Standard: 0℃~+70℃
- Compliant with CFP4 MSA Specification
- MDIO interface with integrated Digital Diagnostic Monitoring
- No external reference clock

Applications

- 100GBASE-LR4 Ethernet
- OTU4 4I1-9D1F

Ordering Information

Part No.	Data Rate*note2	Distance*note1	Interface	Temp.	DDMI
SNR-CFP4-100G-LR4-10	103.125Gbps /111.81Gbps	10km	LC	Standard	Yes

Note1: 9/125μm SMF
Note2: Switching between 100GBASE-LR4 and OTU4 4I1-9D1F through MDIO.

*The product image only for reference purpose.

Regulatory Compliance*

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

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

Absolute Maximum Ratings*note3

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-40	+85	°C
Supply Voltage	Vcc	-0.5	3.6	V
Operating Relative Humidity	RH	5	85	%
ESD*note4			500	V

Note3: Exceeding any one of these values may destroy the device immediately.
Note4: Human body model.

Recommended Operating Conditions

Parameter	Symbol		Min.	Typical	Max.	Unit
Operating Case Temperature	T_C		0		70	°C
Power Supply Voltage	Vcc		3.2	3.3	3.4	V
Power Supply Noise	DC-1MHz			2		%
	1-10MHz			3		
Power Consumption	P	MAX			6	W
		Low Power Mode			1	

Time of Power-On sequence & Reset Sequence			TBD		sec
Modulation Format			NRZ, Mark Ratio 50%		

Performance Specifications - Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
Input Amplitude (Differential)	Vin	150		1000	mVpp	AC coupled inputs* (Note7)

Input Impedance (Differential)	Zin	85	100	115	ohms	Rin > 100 kohms @ DC
Receiver						
Output Amplitude (Differential)	Vout	360		900	mVpp	AC coupled outputs*(Note7)
Output Impedance (Differential)	Zout	85	100	115	ohms	
Output Rise/Fall Time	t_r/t_f	9.5			ps	20%~80%

1.2V MDIO Interface Specifications

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Input Voltage	V_{IH}	0.84		1.5	V	
	V_{IL}	-0.3		0.36	V	
Input Leak current	I_{IN}	-100		100	uA	
Output Voltage	V_{OH}	1.0		1.5	V	
	V_{OL}	-0.3		0.2	V	
Input Capacitance	C_I			10	pF	
Input MDC Clock	f_{MDC}	0.1		4	MHz	
MDC Clock Period	T_{MDC}	250		10000	ns	
MDIO Hold Time	T_{hold}	10			ns	
MDIO SetupTime	T_{setup}	10			ns	
Clock to output delay from the MMD	T_{dely}	0		300	ns	
GLB_ALM	$T_{glb\_alm\_ass}$			150	ms	
	$T_{glb\_alm\_dea}$			150	ms	
MDC High time	T_{high}			160	ns	
MDC Low time	T_{low}			160	ns	

Optical and Electrical Characteristics

OTU4 4I1-9D1F Operation

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter					
Signaling Speed per Lane	BR_{AVE}		27.95		Gbps
Data Rate Variation		-20		+20	ppm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm
Total Average Output Power*(Note5)	Po			8.9	dBm
Average Launch Power per Lane	Peach	-2.5		2.9	dBm
Maximum channel power difference				5	dB
Channel spacing			800		GHz
Maximum spectral excursion		-184		184	GHz

Side Mode Suppression Ratio	SMSR	30			dB
Optical Return Loss Tolerance				20	dB
Extinction Ratio*(Note6)	ER	7			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}*(Note6)		G.959.1 Compliant			
TX Disable Assert Time	t_off			100	us
Receiver					
Signaling Speed per Lane	BR_{AVE}		27.95		Gbps
Data Rate Variation		-20		+20	ppm
Damage threshold	Rdam	5.5			dBm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm
Average Receive Power per Lane	Rpow	-8.8		2.9	dBm
Equivalent Receive Sensitivity per Lane*(Note8)	Pmin			-10.3	dBm
Maximum channel power difference				5.5	dB
Maximum optical path penalty				1.5	dB
Optical Return Loss	ORL			-26	dB
LOS Assert	LOSA	-21.3			dBm
LOS De-Assert	LOSD			-11.3	dBm
LOS Hysteresis		0.5			dB

100GBASE-LR4 Operation

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter					
Signaling Speed per Lane	BR_{AVE}		25.78		Gbps
Data Rate Variation		-100		+100	ppm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm
Total Average Output Power*(Note5)	Po			10.5	dBm
Average Launch Power per Lane	Peach	-4.3		4.5	dBm
Difference in launch power between any two lanes				5	dB
Average launch power of OFF transmitter per lane				-30	dBm
Optical Return Loss Tolerance				20	dB
Transmitter reflectance				-12	dB
Extinction Ratio*(Note10)	ER	4			dB
Transmitter eye mask definition {X1,		IEEE 802.3 Clause 88 100Gbase-LR4			

X2, X3, Y1, Y2, Y3}*(Note10)		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}			
TX Disable Assert Time	t_off			100	us
Receiver					
Signaling Speed per Lane	BR_{AVE}		25.78		Gbps
Data Rate Variation		-100		+100	ppm
Damage threshold	Rdam	5.5			dBm
Lane_0 Center Wavelength	λ_{C0}	1294.53	1295.56	1296.59	nm
Lane_1 Center Wavelength	λ_{C1}	1299.02	1300.05	1301.09	nm
Lane_2 Center Wavelength	λ_{C2}	1303.54	1304.58	1305.63	nm
Lane_3 Center Wavelength	λ_{C3}	1308.09	1309.14	1310.19	nm
Average Receive Power per Lane	Rpow	-10.6		4.5	dBm
Receive Sensitivity in OMA per Lane*(Note12)	Pmin			-8.6	dBm
Stressed Sensitivity(OMA) per lane	SRS			-6.8	dBm
Optical Return Loss*(Note11)	ORL			-26	dB
LOS Assert	LOSA	-20.6			dBm
LOS De-Assert	LOSD			-10.6	dBm
LOS Hysteresis*(Note 9)		0.5			dB

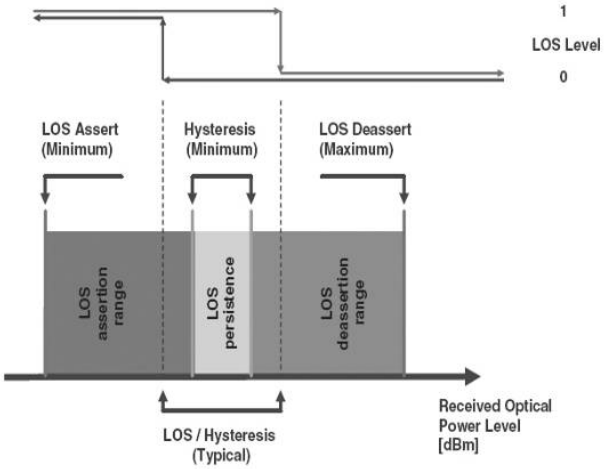
Note5: Output is coupled into a 9/125μm single-mode fiber.

Note6: Filtered, measured with a PRBS 2^{31}-1 test pattern @27.95Gbps

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

Note8: Minimum average optical power measured at BER less than 1E-5, with a 2^{31}-1 PRBS without FEC. The maximum bit error ratio for this application of 1E-12 is only after error correction has been applied.

Note 9: LOS Hysteresis



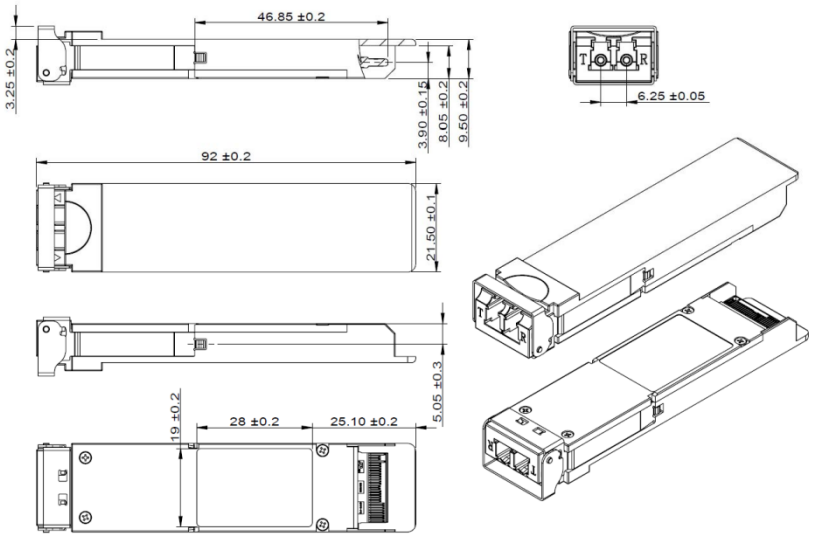
Note10: Filtered, measured with a PRBS 2^{31}-1 test pattern @25.78Gbps

Note11: 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.

SNR-CFP4-100G-LR4-10

CFP4, 100G BASE Series

Mechanical Specifications



GUARANTEE:

Contact:

Addres: Russian Federation, Ekaterinburg, Predelnaya st. 57/2
Tel: +7(343) 379-98-38
Fax: +7(343) 379-98-38
E-mail: info@nag.ru
Online shop: http://shop.nag.ru