

# EOLC-851HG-S-02-MO Series

Multi-Mode 100GBASE-SR4 CFP4 Transceiver  
RoHS6 Compliant

## Features

- ◆ Supports 103.1Gbps aggregate bit rates
- ◆ Single 3.3V Power Supply and Power dissipation < 4W
- ◆ Up to 70m transmission on MMF OM3 and 100m transmission on MMF OM4
- ◆ Hot-Pluggable CFP4 Footprint MPO Connector Interface
- ◆ Class 1 FDA and IEC60825-1 Laser Safety Compliant
- ◆ RoHS6 Compliant
- ◆ Operating Case Temperature Standard: 0°C~+70°C
- ◆ Compliant with CFP4 MSA Specification
- ◆ MDIO interface with integrated Digital Diagnostic Monitoring
- ◆ No external reference clock



## Applications

- ◆ 100GBASE-SR4 Ethernet

## Ordering Information

Part No.	Data Rate	Distance	Interface	Temp.	DDMI
EOLC-851HG-S-02-MO	103.1Gbps	MMF OM3 for 70m MMF OM4 for 100m	MPO	Standard	Yes

\*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. For the latest certification information, please check with Eoptolink.

## Absolute Maximum Ratings\*note1

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*note2			500	V

Note1: Exceeding any one of these values may destroy the device immediately.

Note2: Human body model.

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Tc	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		4	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
<b>Transmitter</b>						
Input Amplitude (Differential)	Vin	150		1050	mVpp	AC coupled inputs*(Note3)

Input Impedance (Differential)	Z <sub>in</sub>	85	100	115	ohms	R <sub>in</sub> > 100 kohms @ DC
<b>Receiver</b>						
Output Amplitude (Differential)	V <sub>out</sub>	200		1100	mVpp	AC coupled outputs*(Note3)
Output Impedance (Differential)	Z <sub>out</sub>	85	100	115	ohms	
Output Rise/Fall Time	t <sub>r</sub> /t <sub>f</sub>		12		ps	20%~80%

### 1.2V MDIO Interface Specifications

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Input Voltage	V <sub>IH</sub>	0.84		1.5	V	
	V <sub>IL</sub>	-0.3		0.36	V	
Input Leak current	I <sub>IN</sub>	-100		100	uA	
Output Voltage	V <sub>OH</sub>	1.0		1.5	V	
	V <sub>OL</sub>	-0.3		0.2	V	
Input Capacitance	C <sub>I</sub>			10	pF	
Input MDC Clock	f <sub>MDC</sub>	0.1		4	MHz	
MDC Clock Period	T <sub>MDC</sub>	250		10000	ns	
MDIO Hold Time	T <sub>hold</sub>	10			ns	
MDIO SetupTime	T <sub>setup</sub>	10			ns	
Clock to output delay from the MMD	T <sub>dely</sub>	0		300	ns	
GLB_ALM	T <sub>glb_alm_ass</sub>			150	ms	
	T <sub>glb_alm_dea</sub>			150	ms	
MDC High time	T <sub>high</sub>			160	ns	
MDC Low time	T <sub>low</sub>			160	ns	

### Optical and Electrical Characteristics

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
Center Wavelength	λ <sub>C</sub>	840	850	860	nm
Average Launch Power per Lane*(note4)	P <sub>each</sub>	-9.1		2.4	dBm
Optical modulation amplitude	P <sub>oma</sub>			4	dBm
Average launch power of OFF transmitter per lane				-30	dBm
Optical Return Loss Tolerance				12	dB
Extinction Ratio*(Note5)	ER	3			dB
Transmitter eye mask definition {X1, X2, X3, Y1, Y2, Y3}*(Note6)			IEEE 802.3bm 100Gbase-SR4		

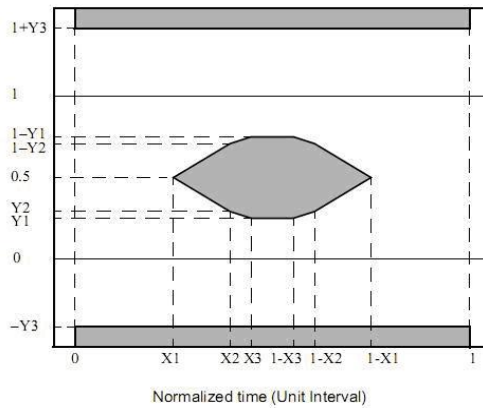
Receiver					
Signaling Speed per Lane	BR <sub>AVE</sub>		25.78		Gbps
Data Rate Variation		-100		+100	ppm
Damage threshold	R <sub>dam</sub>	3.4			dBm
Center Wavelength	$\lambda_c$	840	850	860	nm
Average Receive Power per Lane <sup>*(Note7)</sup>	R <sub>pow</sub>	-10.3		2.4	dBm
Receive Sensitivity in OMA per Lane <sup>*(Note8)</sup>	P <sub>min</sub>			-5.2	dBm
LOS Assert	LOSA	-20			dBm
LOS De-Assert	LOSD			-12	dBm
LOS Hysteresis <sup>*(Note9)</sup>		0.5			dB

Note3: High speed I/O, internally AC coupled.

Note4: Output is coupled into a 50/125 $\mu$ m multi-mode fiber.

Note5: Filtered, measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78Gbps.

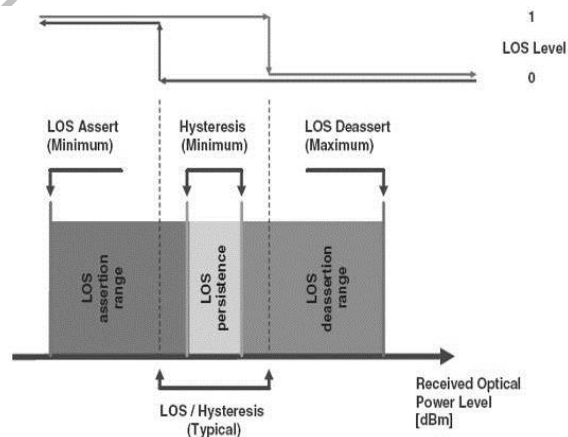
Note6: Filtered, measured with a PRBS 2<sup>31</sup>-1 test pattern @25.78Gbps.



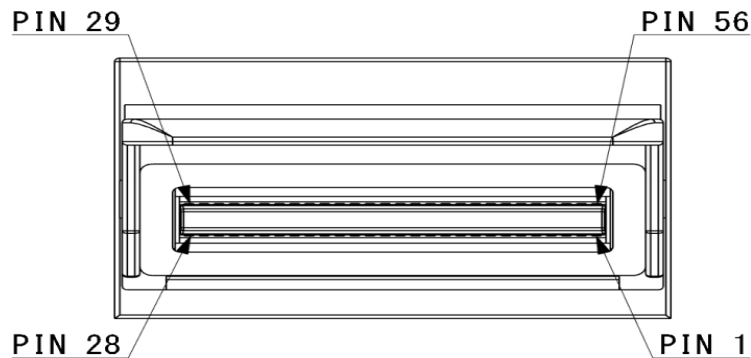
Note7: BER less than 5E-5 when R<sub>pow</sub> = -10.3 dBm, with a 2<sup>31</sup>-1 PRBS.

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

Note9: LOS Hysteresis



## CFP4 Transceiver Electrical Pad Layout



### Pin Function Definitions

CFP4	
Top	
56	GND
55	TX3n
54	TX3p
53	GND
52	TX2n
51	TX2p
50	GND
49	TX1n
48	TX1p
47	GND
46	TX0n
45	TX0p
44	GND
43	(REFCLKn)
42	(REFCLKp)
41	GND
40	RX3n
39	RX3p
38	GND
37	RX2n
36	RX2p
35	GND
34	RX1n
33	RX1p
32	GND
31	RX0n

CFP4	
Bottom	
1	3.3V_GND
2	3.3V_GND
3	3.3V
4	3.3V
5	3.3V
6	3.3V
7	3.3V_GND
8	3.3V_GND
9	VND_IO_A
10	VND_IO_A
11	TX_DIS (PNG_CNTL1)
12	TX_LOS (PNG_ALRM1)
13	GLB_ALRMn
14	MOD_LOPWR
15	MOD_ABS
16	MOD_RSTn
17	MDC
18	MDIO
19	PRTADR0
20	PRTADR1
21	PRTADR2
22	VND_IO_C
23	VND_IO_D
24	VND_IO_E
25	GND
26	(MCLKn)

30	RX0p
29	GND

27	(MCLKp)
28	GND

## Bottom Row Pin Descriptions

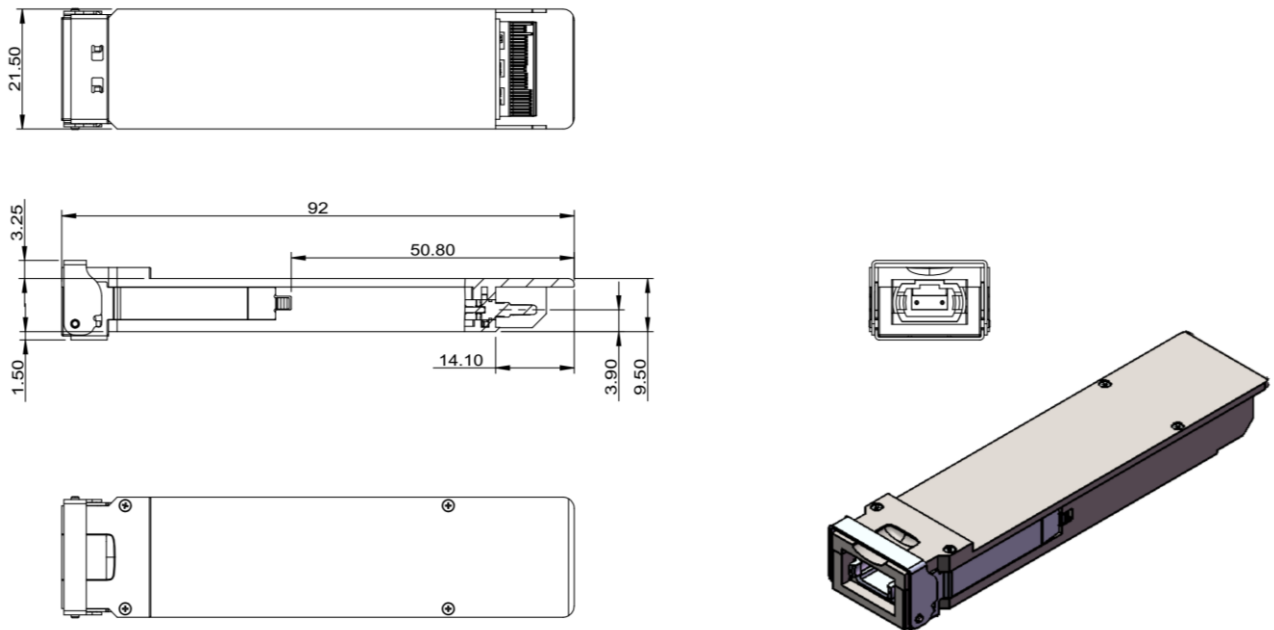
Pin Num.	Name	Function	Notes
1	3.3V_GND	Ground	3.3V Module Supply Ground, Internally connected to Signal Ground
2	3.3V_GND		
3	3.3V	3.3V Module Supply Voltage	3.3V ± 5%
4	3.3V		
5	3.3V		
6	3.3V		
7	3.3V_GND	Ground	3.3V Module Supply Ground, Internally connected to Signal Ground
8	3.3V_GND		
9	VND_IO_A	I/O	Module Vendor I/O A, NC
10	VND_IO_B	I/O	Module Vendor I/O B, NC
11	TX_DIS (PNG_CNTL1)	I	"1" or NC = transmitter disabled, "0" = transmitter enabled
12	TX_LOS (PNG_ALRM1)	O	"1" = loss of signal (low optical signal), "0" = normal condition
13	GLB_ALRMn	O	"0" = alarm condition in any MDIO Alarm register, "1" = no alarm condition,
14	MOD_LOPWR	I	"1" or NC = module in low power (safe) mode, "0" = power-on enabled
15	MOD_ABS	O	"1" or NC = module absent, "0" = module present
16	MOD_RSTn	I	"0" = resets the module, "1" or NC = module enabled
17	MDC	1.2V COMS I	Management Data Clock
18	MDIO	1.2V COMS I/O	Management Data I/O bi-directional data
19	PRTADR0	1.2V COMS I	MDIO Physical Port address bit 0
20	PRTADR1	1.2V COMS I	MDIO Physical Port address bit 1
21	PRTADR2	1.2V COMS I	MDIO Physical Port address bit 2
22	VND_IO_C	I/O	Module Vendor I/O C, NC
23	VND_IO_D	I/O	Module Vendor I/O D, NC
24	VND_IO_E	I/O	Module Vendor I/O E, NC
25	GND	Ground	Signal Ground

26	(MCLKn)	CML O	For optical waveform testing
27	(MCLKp)	CML O	For optical waveform testing
28	GND	Ground	Signal Ground

## Top Row Pin Descriptions

Pin Num.	Name	Function	Notes
56	GND	Ground	Signal Ground
55	TX3n	Lane 3 Tx Input I	CML Input
54	TX3p		
53	GND	Ground	Signal Ground
52	TX2n	Lane 2 Tx Input I	CML Input
51	TX2p		
50	GND	Ground	Signal Ground
49	TX1n	Lane 1 Tx Input I	CML Input
48	TX1p		
47	GND	Ground	Signal Ground
46	TX0n	Lane 0 Tx Input I	CML Input
45	TX0p		
44	GND	Ground	Signal Ground
43	(REFCLKn)	Reference Clock I	Reference Clock Input
42	(REFCLKp)		
41	GND	Ground	Signal Ground
40	RX3n	Lane 3 Rx Output O	CML Output
39	RX3p		
38	GND	Ground	Signal Ground
37	RX2n	Lane 2 Rx Output O	CML Output
36	RX2p		
35	GND	Ground	Signal Ground
34	RX1n	Lane 1 Rx Output O	CML Output
33	RX1p		
32	GND	Ground	Signal Ground
31	RX0n	Lane 0 Rx Output O	CML Output
30	RX0p		
29	GND	Ground	Signal Ground

## Mechanical Specifications



\*This 2D drawing only for reference, please check with Eoptolink before ordering.

## Obtaining Document

You can visit our website: <http://www.eoptolink.com>

Or contact Eoptolink Technology Inc., Ltd. listed at the end of the documentation to get the latest documents.

## Revision History

Revision	Initiated	Reviewed	Approved	Revision History	Release Date
V1.a	Nico	Marvin		Preliminary.	Jan 23, 2017

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