

Pluggable Optical Line System (Dual QSFP EDFA Module)

60P050001(1515425)

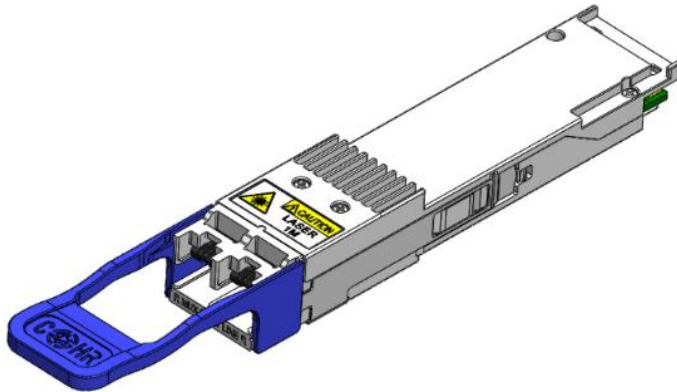
The Coherent Pluggable Optical Line System (POLS) targets the requirements of Internet Service and Cloud Hosting Providers for high capacity optical data center links in an QSFP (Qual Small Form-factor Pluggable) module form factor that is easy to deploy and operate.

The POLS solution integrates the key elements of an optical transport system into a pluggable QSFP module supporting multi-channel DWDM wavelengths with a single fibre pair and delivering up to 25.6Tbps(800Gbpsx32ch) of data center traffic over span loss 28~40dB..

Enabled by Coherent high performance, miniature optical components including a 3-pin micro DCP pump laser POLS provides an extremely compact, low power, cost effective solution with autonomous plug and play operation.

Deployed as a pair, the POLS modules include compact bidirectional optical amplifiers that can be directly plugged into an QSFP transceiver slot. An integrated cable provides colored Mux/DeMux of 32CH, 150GHz for the client side optics and asymmetric optical connectors provide error proof fiber connections. Auto provisioning manages link configuration and laser safety.

The POLS modules also support APC mode and AGC mode to adapt to various application scenarios with various transceivers and traffic distances besides POLS(auto mode).



FEATURES

- QSFP module to support OIF 400/800G ZR+
- Bidirectional, pluggable optical line system
- Requires passive cable for colored Mux/DeMux/32CH
- Mini type optical interface (Senko-CS) with LC/CS jumper (included) at in/out port.
- Auto-provisioning (plug & play) to simplify OAM&P
- APC and AGC mode to adapt to various scenarios
- Implementation of CMIS v4.0 memory map for easy deployment
- CDB upgrade is supported
- Eye Safe (Class 1M Laser Safety)

APPLICATIONS

- Data Center Interconnects (DCI)

1.0	Scope	3
2.0	Related Documents	3
3.0	Product Variations.....	3
4.0	Optical Specifications	4
5.0	Electrical Specifications	7
6.0	Mechanical Specifications.....	8
7.0	Firmware Specifications	9
8.0	Environmental Specification	9
9.0	Ordering Information.....	9
10.0	RoHS Compliance	10
11.0	User Safety	10
12.0	Important Notice	10
13.0	Document Tracking	10

1.0 Scope

A pair of POLS modules provide autonomous optical amplification and MUX/DMUX capability to transport multi channels between data center using a simple self-provisioning architecture. The MUX/DMUX cables provide true plug and play operation (not included).

Typical application of P05 supports 32channels, 150GHz channel spacing, full C-band 4.8THz range of 21dBm max output power. Three modes to support various scenarios

- Auto Mode: Mode A with auto link, plug and play
- APC Mode: Mode P, user can set power for both BA and PA
- AGC Mode: Mode G, user can set gain for both BA and PA

2.0 Related Documents

2.1 Internal Documents:

Documents incorporated by reference: this document together with the documents incorporated by reference, form the entire product specification.

Document #	Title

2.2 External Documents (for reference only):

Document #	Title
CMIS 4.0	CMIS 4.0 rev 4.0 (8-May-2019) Common Management Interface Specification
SFF-8679	SFF-8679 Revision 1.8 (October 4, 2018) QSFP+ 4X Hardware and Electrical Specification
SFF-8661	SFF-8661 Rev 2.5, June 22, 2018 Specification for QSFP+ 4X Module

3.0 Product Variations

Product Name	Coherent PN	Coherent Product Code	Description
FB POLS, 21dBm	1515425	60P050001	Full band POLS, 21dBm,C-band, 4.8THz

4.0 Optical Specifications

4.1 General Specification

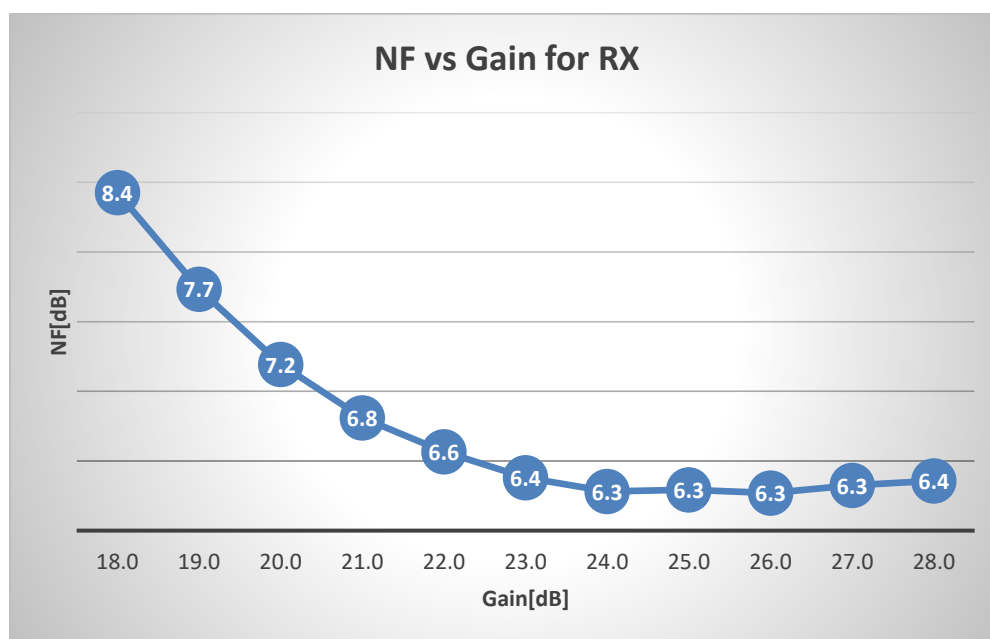
Tx and Rx Amplification	Min	Typ	Max	Unit	Note
Total Power Dissipation		4.5	8.0	W	Class 8
Operating Case Temperature	0		70	C	
Form factor and Pin definition	Compliant with QSFP MSA				
Connector Line In & Out	CS				CS/LC jumper provided
Connector MDM Comm In & Out	CS				
Management I/F	CMIS4.0				

4.2 TX (BA) Optical Amplifier Absolute Parameter

Tx Amplifier	Min	Typical	Max	Units	Note
Channels	2	32	32	CH	
Channel Spacing	150			GHz	
Wavelength range	1528.77		1567.13	nm	
Frequency range	196.10		191.30	THz	
Input power range	-30		15	dBm	
Output power range	-25		21	dBm	
Input LOS of signal for "APC(mode P)/AGC(mode G)"	-30			dBm	Pump off
Input LOS of signal for "Auto(Mode A)"	-6.5			dBm	Pump off
Gain for "APC(mode P)/AGC(mode G)"		10	25	dB	
Gain for for "Auto(Mode A)"		10		dB	
Noise Figure			8	dB	@Gain 10dB
Gain Flatness			2	dB	@Gain 10dB
Polarization Dependent Gain			0.5	dB	

4.3 RX (PA) Optical Amplifier Absolute Parameter

Rx Amplifier	Min	Typical	Max	Units	
Channels	2	32	32		
Channel Spacing	150			GHz	
Wavelength range	1528.77		1567.13	nm	32CH
Frequency range	196.10		191.30	GHz	
Input power range	-30		15	dBm	
Output power range	-25		21	dBm	
Input LOS of signal for "APC(mode P)/AGC(mode G)"	-30			dBm	Pump off
Input LOS of signal for "Auto(Mode A)"	-23			dBm	Pump off
Gain for "APC(mode P)/AGC(mode G)"	18		28	dB	
Gain for for "Auto(Mode A)"	18		28	dB	
Total Output Power			21	dBm	
Noise Figure			7	dB	@Gain 28
Gain Flatness			5.5	dB	Gain 18-28dB
Polarization Dependent Gain			0.5	dB	



4.4 TX (BA) & RX (PA) Optical Amplifier Specification for Auto Mode(Mode A, POLS mode) with 32ch Mux/DeMux, ZRP with 1dBm output power.

The minimum count of channels for BA input must be greater than 2CHs.

The following table shows the allowable span loss range at different input conditions.

Min channel count	BA input [dBm]	BA gain	BA output	Span loss	PA input	PA gain	PA output	Span Loss Range
CH	dBm	dB	dBm	dB	dBm	dB	dBm	dB
2	-2.5	10	7.5	28	-20.5	18	-2.5	28-30
2	-2.5	10	7.5	30	-22.5	20	-2.5	
2	-1.5	10	8.5	28	-19.5	18	-1.5	
2	-1.5	10	8.5	30	-21.5	20	-1.5	
3	-0.7	10	9.3	28	-18.7	18	-0.7	28-32
3	-0.7	10	9.3	32	-22.7	22	-0.7	
3	0.3	10	10.3	28	-17.7	18	0.3	
3	0.3	10	10.3	32	-21.7	22	0.3	
5	1.5	10	11.5	28	-16.5	18	1.5	28-34
5	1.5	10	11.5	34	-22.5	24	1.5	
5	2.5	10	12.5	28	-15.5	18	2.5	
5	2.5	10	12.5	34	-21.5	24	2.5	
8	3.5	10	13.5	28	-14.5	18	3.5	28-36
8	3.5	10	13.5	36	-22.5	26	3.5	
8	4.5	10	14.5	28	-13.5	18	4.5	
8	4.5	10	14.5	36	-21.5	26	4.5	
12	5.3	10	15.3	28	-12.7	18	5.3	28-38
12	5.3	10	15.3	38	-22.7	28	5.3	
12	6.3	10	16.3	28	-11.7	18	6.3	
12	6.3	10	16.3	38	-21.7	28	6.3	
18	7.1	10	17.1	28	-10.9	18	7.1	28-40
18	7.1	10	17.1	40	-22.9	28	5.1	
18	8.1	10	18.1	28	-9.9	18	8.1	
18	8.1	10	18.1	40	-21.9	28	6.1	
32	9.6	10	19.6	28	-8.4	18	9.6	28-40
32	9.6	10	19.6	40	-20.4	28	7.6	
32	10.6	10	20.6	28	-7.4	18	10.6	
32	10.6	10	20.6	40	-19.4	28	8.6	

5.0 Electrical Specifications

The POLS module electrical pinout is designed to match the QSFP-28 MSA without data paths.

Pin	Logic	Symbol	Description	Plug Sequence	Note
1		GND	Module Ground	1	4
2		NC		3	3
3		NC		3	3
4		GND	Module Ground	1	4
5		NC		3	3
6		NC		3	3
7		GND	Module Ground	1	4
8	LVTTL-I	ModSelL	Module Select	3	1
9	LVTTL-I	ResetL	Module reset	3	1
10		VCC3P3	+3.3V Power Supply	2	4
11	OC-I	SCL	I2C Clock	3	1, 2
12	OC-I/O	SDA	I2C Data Line	3	1, 2
13		GND	Module Ground	1	4
14		NC		3	
15		NC		3	
16		GND	Module Ground	1	4
17		NC		3	
18		NC		3	
19		GND	Module Ground	1	4
20		GND	Module Ground	1	4
21		NC		3	
22		NC		3	
23		GND	Module Ground	1	4
24		NC		3	
25		NC		3	
26		GND	Module Ground	1	4
27	LVTTL-O	ModPresL	Module Present	3	1
28	LVTTL-O	IntL/INLOS	interrupt, optionally configured as INLOS, EDFA	3	1
29		VCC3P3	+3.3V Power Supply	2	
30		VCC3P3	+3.3V Power Supply	2	
31	LVTTL-I	LPMode/TxDis	Low power mode, optionally configured as Tx Disable, EDFA	3	1
32		GND	Module Ground	1	4
33		NC		3	
34		NC		3	
35		GND	Module Ground	1	4
36		NC		3	
37		NC		3	
38		GND	Module Ground	1	4

Note:

1. There are seven low-speed signals: SCL, SDA, ModSelL, ResetL, LPMode/TxDis, IntL/INLOS and ModPresL.
2. The host is always the I²C (2-wire interface) master for the SCL and SDA signals.
3. High-speed pins should ideally be unconnected; however, the unit is designed to work in slots where these pins may be connected.
4. All GND pins should be connected to ground to avoid interference.

7.0 Firmware Specifications

7.1 Software Interface

The POLS module is compatible with the CMIS 4.0 rev 4.0 (8-May-2019) with specified vendor customizations. The CMIS 4.0 defines the interface used by pluggable modules with host to module management communication based on a Two-Wire-Interface (TWI), such as QSFP Double Density (QSFP-DD), OSFP, COBO, QSFP, and SFP-DD.

CMIS4.0 Vendor Customizations

- *Pump temperatures*
- *Amplifier operating mode*
- *Amplifier operating set-point*
- *Custom alarms / alarm masks*
- *Link status indicator*

Note, Module support firmware upgrade by Command Data Block (CDB) message communication. Contact Coherent for further details.

8.0 Environmental Specification

Parameter	Min	Max	Unit
Operating Case Temperature Range	0	+70	°C
Storage Temperature Range	-40	+85	°C
Operating Humidity ¹	+5	+95	% RH
ESD (human body model)		8	kV
VCC_Module (power supply)	3.135	3.465	V

9.0 Ordering Information

PN	Coherent PC	Description	Minimum Order Quantity
1515425	60P050001	QSFP Optical Amplifier Line System (Dual EDFA)	2pc ¹
60PC60002	60PC60002	CS/LC Converter (Generic)	4pc ¹
1622912	60PCD0001	2*1x32 Channel 150G Mux/DeMux Rack, 1RU	2pc ¹

10.0 RoHS Compliance

Coherent is fully committed to environment protection and sustainable development and has set in place a comprehensive program for removing polluting and hazardous substances from all of its products. The relevant evidence of RoHS compliance is held as part of our controlled documentation for each of our compliant products. RoHS compliance parts are available to order, please refer to the ordering information section for further details.



11.0 User Safety

ESD protection, it is important that devices are handled correctly during all stages of manufacture and use.

This product is a planned to be Class 1M (Class 1M) laser product and appropriate precautions should be taken. Refer to IEC60825-1:2014.



Figure 1: Laser safety labels – laser level certification to be confirmed

12.0 Important Notice

Performance figures, data and any illustrative material provided in this data sheet are typical and must be specifically confirmed in writing by Coherent before they become applicable to any particular order or contract.

In accordance with the Coherent policy of continuous improvement specifications may change without notice. Further details are available from any Coherent sales representative.

This product is protected by patent applications pending worldwide.

Contact Information

Coherent

Network Solutions Division

1389 Moffett Park Drive
Sunnyvale, CA 94089

Photonics.Sales@coherent.com

www.coherent.com

13.0 Document Tracking

Date	ECO	Description of Modifications	Name	Issue/Rev
2026/09/12	TBD	First release 60P050001 spec	Jacky Lin	A00