

QPS-2110WG

(RoHS Compliant)

41.25Gbps / 10km / CWDM 4-λ QSFP+ LC Single-Mode Optical Transceiver

FEATURES

- Up to 10.3125 Gbps Bi-directional Data Links Per Lane
- Support 3.125Gbps Lane Rate
- Compliant with SFF-8436 QSFP+ MSA
- Complaint with IEEE 802.3ba 40GBASE-LR4
- Hot Pluggable Electrical Interface
- Link Length up to 10km with SMF
- Uncooled CWDM 4-Wavelength DFB LDs: 1271, 1291, 1311, and 1331 nm
- 2-Wire Interface for Integrated Digital Diagnostic Monitoring
- Power Consumption < 2.5W
- Single +3.3V Power Supply
- RoHS Compliant
- 0 to 70°C Case Operating Temperature
- Duplex LC Connector

APPLICATIONS

- 40GBASE-LR4 (41.25Gbps)

DESCRIPTION

QPS-2110WG series single mode QSFP+ transceiver is designed for single-mode fiber optical data communications such as 40GBASE-LR4.

The transceiver consists of two sections: The transmitter section consists of four directly modulated uncooled CWDM 4-λ 1271, 1291, 1311, and 1331 nm DFB lasers and four drivers. The receiver section incorporates four PIN photodiodes integrated with four trans-impedance preamplifiers (TIA) and four limiting post-amplifier ICs.

The module is with the QSFP+ 38-pin connector to allow hot plug capability. The internally ac coupled high speed serial I/O simplifies interfacing to external circuitry. Only single 3.3V power supply is needed.

A serial EEPROM in the transceiver allows the user to access transceiver digital diagnostic monitoring and configuration data via the 2-wire QSFP+ Management Interface. This interface uses a single address, A0h, with a memory map divided into a lower and upper area. Basic digital diagnostic data is held in the lower area while specific data is held in a series of tables in the high memory area.

LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC-60825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

ORDER INFORMATION

P/No.	Bit Rate (Gb/s)	40GBASE	Wavelength (nm)	Package	Connector	Temp (°C)	RoHS Compliant
QPS-2110WG	41.25	LR4	CWDM 4-λ*	QSFP+ with DMI	LC	0 to 70	Yes

CWDM 4-λ*: 1271, 1291, 1311, and 1331 nm DFB LDs.

Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	Tstg	0	85	°C	
Operating Case Temperature	Topr	0	70	°C	
Relative Humidity	RH	0	85	%	Non condensing

Recommended Operating Conditions					
Parameter	Symbol	Min	Typ	Max	Units / Notes
Power Supply Voltage	V _{CC}	3.15	3.3	3.45	V
Power Supply Current	I _{CC}			800	mA
Power Dissipation	P _D	1.4		2.5	W
Operating Case Temperature	T _{opr}	0		70	°C

Transmitter Optical Specifications (T _{opr} = 25°C, V _{cc3} = 3.3V ±5%)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Signaling rate, each lane		3.125	10.3125		Gbps	
Average Launch Power, each lane	P _{O, Avg}	-7		2.3	dBm	
Launch Power in OMA, each lane	P _{O, OMA}	-4		3.5	dBm	
Total average launch power	P _{O, Total}			8.3	dBm	
Difference in launch power between any two lanes in OMA				6.5	dB	
Center Wavelength – lane 0	λ _{C0}	1264.5		1277.5	nm	
Center Wavelength – lane 1	λ _{C1}	1284.5		1297.5	nm	
Center Wavelength – lane 2	λ _{C2}	1304.5		1317.5	nm	
Center Wavelength – lane 3	λ _{C3}	1324.5		1337.5	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	3.5			dB	
Transmitter and Dispersion Penalty, each lane	TDP			2.6	dB	
Average Launch Power of OFF Transmitter				-30	dBm	

Receiver Optical Specifications (T _{opr} = 25°C, V _{cc3} = 3.3V ±5%)						
Parameter	Symbol	Min	Typ	Max	Units	Notes
Signaling rate, each lane		3.125	10.3125		Gbps	
Average receive power, each lane		-13.7		2.3	dBm	
Receiver power (OMA), each lane				3.5	dBm	
Receiver sensitivity (OMA)	Sen			-11.5	dBm	
Difference in receive power between any two lanes (OMA)				7.5	dB	
Damage Threshold		3.3			dBm	
LOS -- Deasserted	LOS _D			-15	dBm	Transition: low to high
LOS -- Asserted	LOS _A	-28			dBm	Transition: high to low
LOS -- Hysteresis		0.5			dB	
Wavelength of Operation – lane 0	λ _{C0}	1264.5		1277.5	nm	
Wavelength of Operation – lane 1	λ _{C1}	1284.5		1297.5	nm	
Wavelength of Operation – lane 2	λ _{C2}	1304.5		1317.5	nm	
Wavelength of Operation – lane 3	λ _{C3}	1324.5		1337.5	nm	
Receiver reflectance (max)				-26	dB	

CONNECTION DIAGRAM

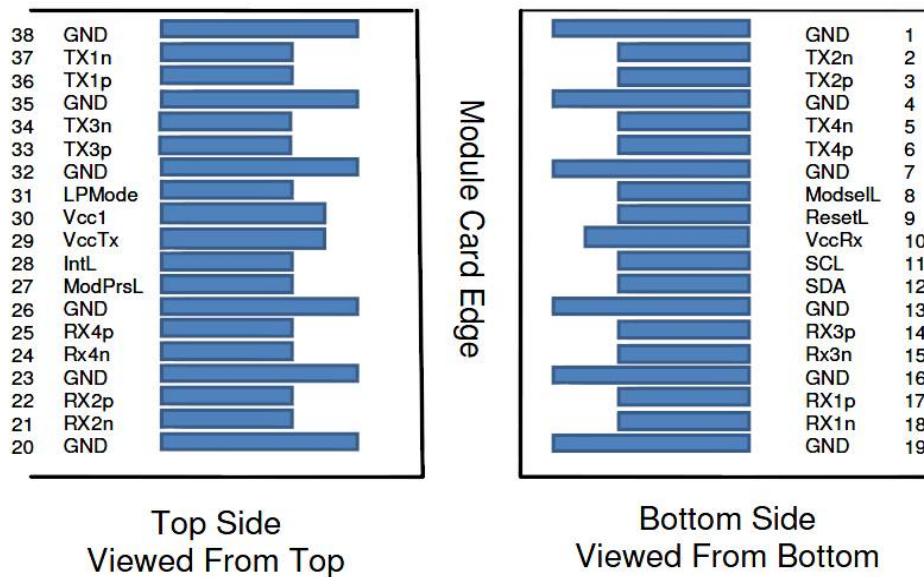


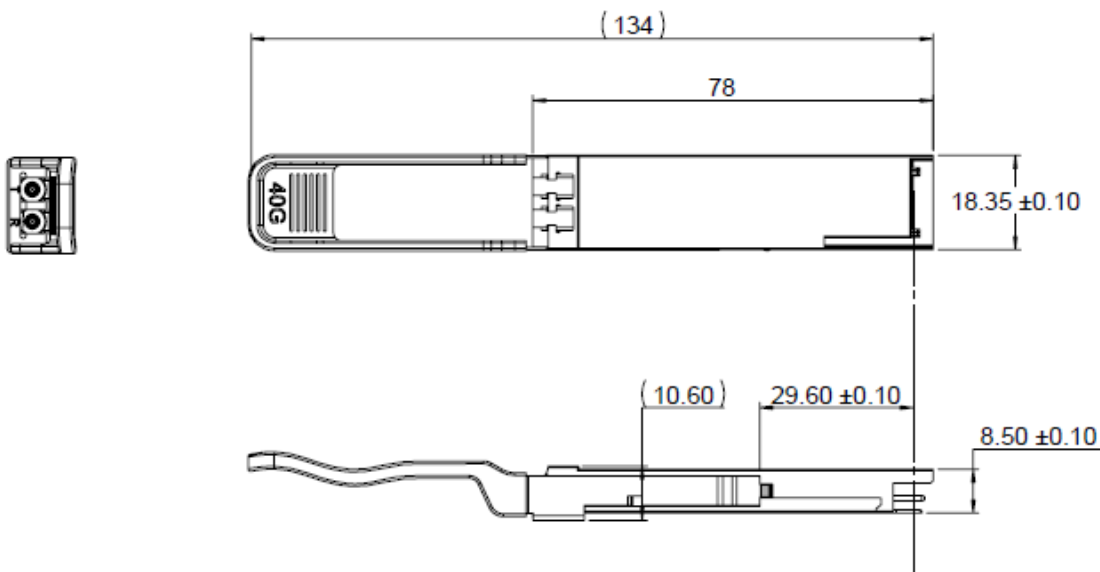
Table 3 PIN Description

PIN	Logic	Signal Name	Description	Note
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	
7		GND	Ground	1
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		Vcc Rx	+3.3V Power Supply Receiver	2
11	LVC MOS-I/O	SCL	2-wire serial interface clock	
12	LVC MOS-I/O	SDA	2-wire serial interface data	
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		Vcc Tx	+3.3V Power supply transmitter	2
30		Vcc1	+3.3V Power supply	2
31	LVTTL-I	LPMode	Low Power Mode	

32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Input	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Input	
38		GND	Ground	1

1. Module ground pins GND are isolated from the module case and chassis ground within the module.
2. Vcc Rx, Vcc I and Vcc Tx are the receiver and transmitter power supplies and shall be applied concurrently. Vcc Rx Vcc I and Vcc Tx may be internally connected within the QSFP+ module in any combination.

MECHANICAL SPECIFICATION (UNITS IN MM)



Note: Specifications subject to change without notice.

REVISION HISTORY

Version	Subject	Release Date
1.0	Initial datasheet	2016/1/25
2.0	Revise spec and mechanical dimension	2018/9/23
3.0	Add 3.125Gbps lane rate	2020/9/15
3.1	Update Receiver Optical Specifications	2021/8/19