

General Description

AccelLight AQP100C-ER4 optical transceiver is designed for 100G Ethernet links over 40km single mode fiber. It is compliant with QSFP28 Multi-Source Agreement (MSA) and 100G 4WDM-40 MSA.

The transmitter integrates 4- EML with center wavelength of 125.96 nm, 1300.05nm, 1304.58nm and 1309.14 nm. The 4 optical signals are multiplexed into one single mode fiber. On the receive side, the four lanes of optical data streams are optically de-multiplexed and each data stream is recovered by a PIN photo-detector and trans-impedance amplifier.

It's a hot pluggable module with CDR integrated, and a serial EEPROM that allows the user to access the monitoring and configuration data via a Two Wire Serial interface (I²C).



Product Features

- Support line rates of 103.125 Gbps
- 4x25Gbps EML LAN-WDM for up to 40km reach over SMF
- APD and TIA array receiver
- Duplex LC connector
- I²C interface with integrated Digital Diagnostics Monitoring
- Electrically hot-pluggable with built-in CDR
- Case operating temperature range: 0°C to 70°C
- 3.3V single Power Supply with power dissipation < 5 W

Applications

- 100G 4WDM-40 40km with FEC
- 100G Datacom and Telecom interconnects

Standards Compliance

- QSFP28 MSA
- 100G 4WDM-40 MSA
- Compliant to SFF-8436
- RoHS-6 Compliant

Absolute Maximum Rating

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	Ts	-40	-	85	°C	
Relative Humidity	RH	5	-	85	%	
Power Supply Voltage	VCC	-0.5	-	3.6	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	Tcase	0		70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Power Dissipation	P _D	-		5	W	
Data Rate	BR		25.78125		Gbps	Each channel
Transmission Distance	TD		-	40	km	
Coupled fiber	Single mode fiber					9/125um SMF

Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Transmitter						
Wavelength Assignment	λ0	1294.53	1295.56	1296.59	nm	
	λ1	1299.02	1300.05	1301.09	nm	
	λ2	1303.54	1304.58	1305.63	nm	
	λ3	1308.09	1309.14	1310.19	nm	
Signaling Speed per lane	BR		25.78125		Gbps	
Data Rate Variation		-100		+100	ppm	
Total Output. Power	P _{OUT}			12.5	dBm	
Average Launch Power Per lane	P _{AVG}	-2.5		6.5	dBm	1
Average launch power of transmitter OFF				-30	dBm	
Transmit OMA each lane	TxOMA	0.5		6.5	dBm	2
Difference in launch power between any two lanes (OMA)				4	dB	

Optical Return Loss Tolerance	BRT	20			dB	
Transmitter Reflectance	TxBR			-26	dB	3
Optical Extinction Ratio	ER	4.5			dB	
Output Eye Mask definition {X1, X2, X3, Y1, Y2, Y3}	{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}					4
Receiver						
Lane_0 Center Wavelength	λ0	1294.53	1295.56	1296.59	nm	
Lane_1 Center Wavelength	λ1	1299.02	1300.05	1301.09	nm	
Lane_2 Center Wavelength	λ2	1303.54	1304.58	1305.63	nm	
Lane_3 Center Wavelength	λ3	1308.09	1309.14	1310.19	nm	
Signaling Speed Per Lane	BR		25.78125		Gbps	
Data Rate Variation		-100		+100	ppm	
Damage Threshold	Rxdmg	-2.5			dBm	
Average Receive Power per lane	Rxpow	-20.5		-3.5	dBm	5
Unstressed Receiver Sensitivity (OMA)	RXSENS			-18.5	dBm	6
Stressed Receiver Sensitivity (OMA)	RXSRS			-16	dBm	7
Optical Return Loss	ORL			-26	dBm	
Conditions of stressed receiver sensitivity test						
Vertical Eye Closure Penalty	VECP	2.5			dB	
Stressed J2 Jitter	J ₂	0.33			UI	8
Stressed J4 Jitter	J ₄	0.48			UI	8
SRS eye Mask Definition {X1, X2, X3, Y1, Y2,Y3}	{0.39, 0.5, 0.5, 0.39, 0.39, 0.4}					8
LOS De-Assert	LOSD			-20	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A transmitter with launch power below this value cannot be compliant; however, a value above this does not ensure compliance.
2. Even if the TDP < 1.0dB, the OMA (min) must exceed this value.
3. Transmitter reflectance is defined looking into the transmitter.

4. Eye mask hit ratio is $5E^{-5}$.
5. Average launch power, each lane (min) is informative and not the principal indicator of signal strength. A received power below this value cannot be compliant; however, a value above this does not ensure compliance.
6. Receiver sensitivity (OMA), each lane (max) at $5E^{-5}$ BER is a normative specification.
7. Measured with conformance test signal at TP3 for BER = 5×10^{-5} .
8. Vertical eye closure penalty, stressed eye J2 Jitter, stressed eye J4 Jitter, and SRS eye mask definition are test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	NOTE
Supply Voltage	Vcc	3.135	3.3	3.465	V	
Supply Current	Icc			1515	mA	
Transmitter						
Input differential impedance	Zin	90	100	110	Ω	
Differential data input swing	Vin,pp			900	mV	
Stressed input parameters						
Eye width		0.46			UI	
Applied pk-pk sinusoidal jitter		IEEE 802.3bm Table 88-13				
Eye height			95		mV	
DC common mode voltage		-350		2850	mV	
Receiver						
Differential data output swing	Vout,pp	200		900	mV	
Differential Output Impedance	Zout	90	100	110	Ω	
Eye Width		0.57			UI	
Eye Height (differential)		228			mV	
Vertical Eye Closure				5.5	dB	

Pin Assignment

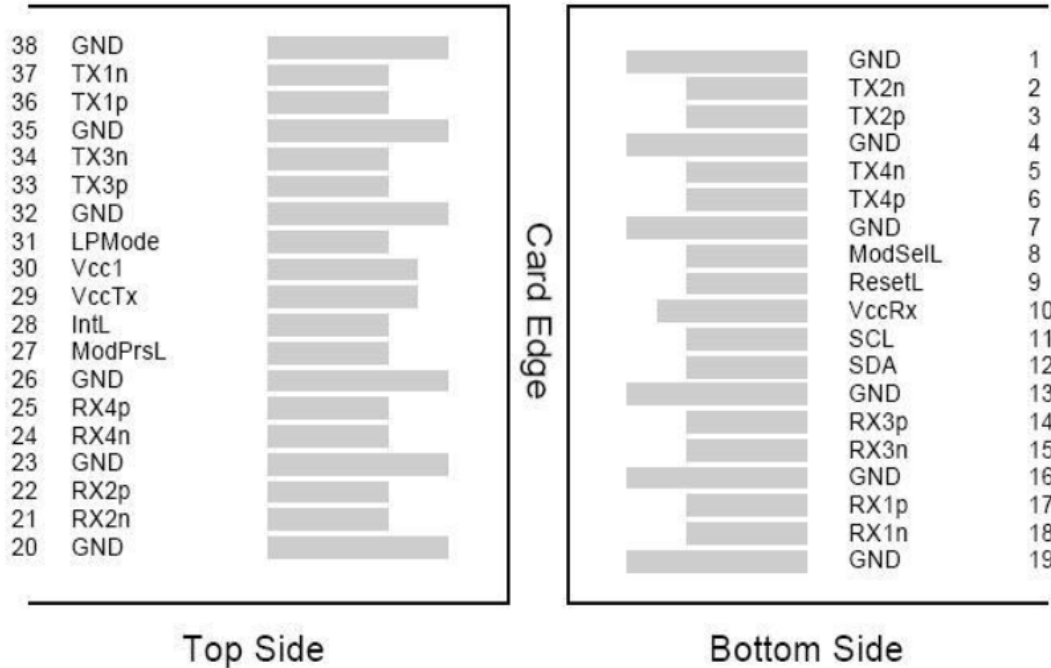


Figure 1 Pin out of connector block on host board.

Pin	Logic	Symbol	Name/Description	NOTE
1		GND	Transmitter Ground (Common with Receiver Ground)	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	
4		GND	Transmitter Ground (Common with Receiver Ground)	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	
7		GND	Transmitter Ground (Common with Receiver Ground)	1
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		VccRx	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	Transmitter Ground (Common with Receiver Ground)	
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Transmitter Ground (Common with Receiver Ground)	1
17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Transmitter Ground (Common with Receiver Ground)	1
20		GND	Transmitter Ground (Common with Receiver Ground)	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Transmitter Ground (Common with Receiver Ground)	1
24	CML-O	Rx4n	Receiver Inverted Data Output	1

25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Transmitter Ground (Common with Receiver Ground)	1
27	LVTTL-O	ModPrsl	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		VccTx	3.3V power supply transmitter	2
30		Vcc1	3.3V power supply	2
31	LVTTL-I	LPMODE	Low Power Mode, not connect	
32		GND	Transmitter Ground (Common with Receiver Ground)	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Input	
35		GND	Transmitter Ground (Common with Receiver Ground)	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Input	
38		GND	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. GND is the symbol for signal and supply (power) common for QSFP28 modules. All are common within the QSFP28 module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.
2. VccRx, Vcc1 and VccTx are the receiving and transmission power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP28 transceiver module in any combination. The connector pins are each rated for a maximum current of 500mA.

Mechanical Dimensions

