QSFP-40G-PSM-LR4

Features

- Supports 40GBASE-LR4(PSM4);
- Lane bit rate 10.3 Gb/s;
- Up to 10km transmission on SMF;
- DML laser and PIN receiver;
- I2C interface with integrated Digital Diagnostic monitoring;
- QSFP+ MSA package with single MPO(APC) connector receptacle;
- Single +3.3V power supply;
- Maximum power consumption 3.5 W;
- Operating case temperature: 0 to +70 °C;
- Complies with QSFP+ MSA: SFF-8436 and SFF-8679;
- Complies with EU Directive 2011/65/EU (RoHS 6/6);

Application

- 40GBASE-LR4;

Order Information

Table 1- order information

Part No.	Data Rate	Laser	Fiber Type	Distance	Optical Interface	Temp	DDMI
QSFP-40G-PSM-LR4	40Gbps	1310nm DML	SMF	10km	MPO	0~70 C	Y

Absolute Maximum Ratings

Table 2-Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Storage Temperature	T_S	-40	-	+85	°C	
Supply Voltage	V_{CC}	-0.3	-	+3.6	V	
Operating Relative Humidity	RH	-	-	+85	%	

Recommended Operating Conditions

Table 3-Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	T_C	0	-	+70	°C	
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current	I_{CC}	-	-	1.1	A	
Maximum Power Dissipation	P_D	-	-	3.5	W	
Aggregate Bit Rate	BR_{AVE}	-	41.25	-	Gb/s	
Lane Bit Rate	BR_{LANE}	-	10.3125	-	Gb/s	
Transmission Distance	TD		-	10	km	Over SMF

Optical Characteristics

Table 4-Optical Characteristics

Transmitter						
Parameter	**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**	**Notes**
Center Wavelength per Lane	λ	1260	1310	1360	nm	
Total Launch Power, 40GE	P_{ALL}	-	-	10.5	dBm	1
Average Launch Power per Lane, 40GE	P_{TX_LANE}	-8.2	-	0.5	dBm	1
OMA per Lane, 40GE	OMA	-5.2	-	2	dBm	1
OMA–TDP per Lane, 40GE	OMA_TDP	-9.7	-	-	dBm	
Difference in launch power between lanes	$P_{TX_DELTA_LANE}$	-	-	5	dB	
Average Output Power (Laser Turn off)	$P_{0UT-OFF}$	-	-	-30	dBm	
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Extinction Ratio, 40GE	ER	3.5	-	-	dB	
Transmitter and Dispersion Penalty	TDP	-	-	2.3	dB	2
Optical Return Loss Tolerance	ORLT	-	-	20	dB	
Optical Eye Mask, 40GE	Compliant with IEEE 802.3ba					2
Receiver						
Parameter	**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**	**Notes**
Center Wavelength per Lane	λ	1260	1310	1360	nm	
Average Rx Power per Lane, 40GE	P_{RX_LANE}	-13.7		3	dBm	3
OMA Sensitivity per Lane, 40GE	P_{OMA_LANE}	-	-	-12.6	dBm	3
Receiver Overload	P_{IN-OL}	4.5	-	-	dBm	
Reflectance	Ref	-	-	-26	dB	
LOS Assert per lane	LOS_A	-30	-	-	dBm	
LOS De-assert	LOS_D	-	-	-15	dBm	
LOS Hysteresis	LOS_H	0.5	-	6	dB	

Notes:

1. The optical power is launched into SMF. .
2. Measured with a PRBS 2^{31}-1 test pattern @10.3125, Hit ratio≤5E-5
3. Measured with a PRBS 2^{31}-1 test pattern @10.3125 Gb/s, BER≤1E-12.

Electrical Characteristics

High-Speed Signal: **Compliant to SFF-8436**

Low-Speed Signal: **Compliant to SFF-8679**

Table 5-Electrical Characteristics

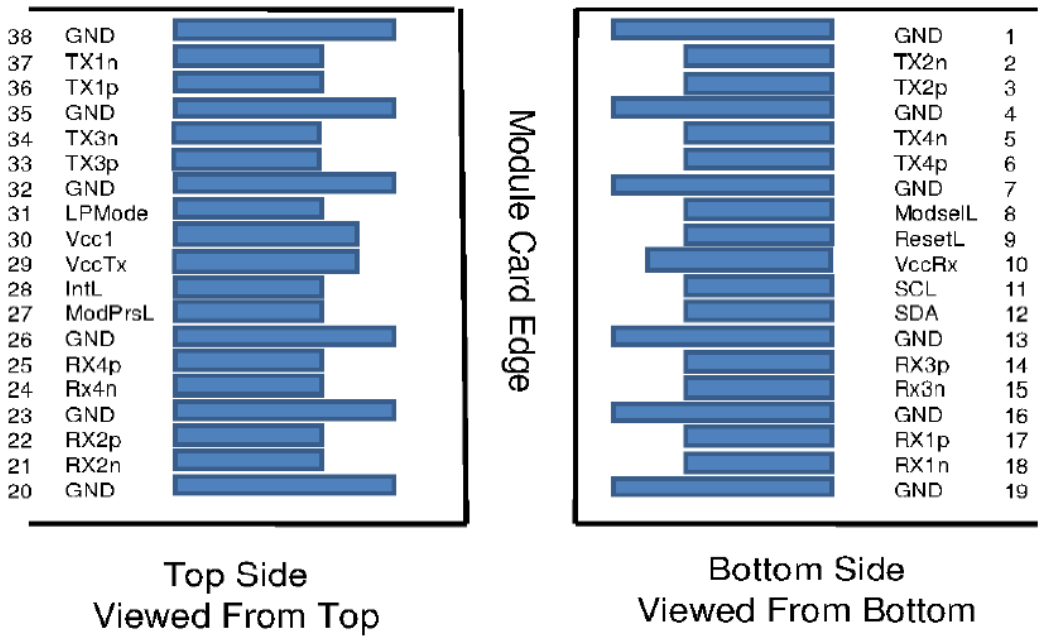
Transmitter (Module Input)						
Parameter		**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**	**Notes**
Differential Data Input Amplitude		$V_{IN,P-P}$	300	-	1100	mVpp	
Differential Termination Mismatch			-	-	10	%	
Tx_Disable	Normal Operation	V_{IL}	-0.3	-	0.8	V	
	Laser Disable	V_{IH}	2.0	-	V_{CC}+0.3	V	
Receiver (Module Output)							
Parameter		**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**	**Notes**
Differential Data Output Amplitude		$V_{OUT,P-P}$	500	-	800	mVpp	
Differential Termination Mismatch（1MHZ）			-	-	10	%	
Output Rise/Fall Time, 20%~80%		T_R	12	-	-	ps	
Rx_LOS	Normal Operation	V_{OL}	-	-	0.4	V	
	Lose Signal	V_{OH}	V_{CC}-0.5	-	-	V	

Digital Diagnostics

Table 6-Digital Diagnostics

Parameter	Range	Accuracy	Unit	Calibration
Temperature	0 to 70	±3	ºC	Internal
Voltage	0 to V_{CC}	0.1	V	Internal
Tx Bias Current Per Lane	0 to 100	10%	mA	Internal
Tx Output Power Per Lane	-2.9 to 2.9	±3	dBm	Internal
Rx Power (Each Lane)	-15 to 5	±3	dBm	Internal

Pin Definitions



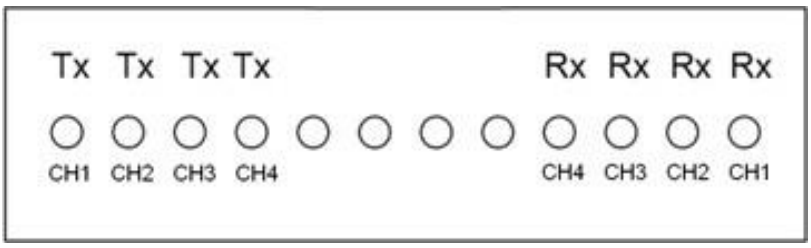
Pin	Logic	Name	Description	Note
1	GND	GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4	GND	GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7	GND	GND	Ground	1
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10	VccRx	VccRx	+ 3.3V Power Supply Receiver	2
11	LVCMOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMOS-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	
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	

Pin	Logic	Name	Description	Note
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	1
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		VccTx	+3.3 V Power Supply transmitter	2
30		Vcc1	+3.3 V 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 Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Output	
38		GND	Ground	1

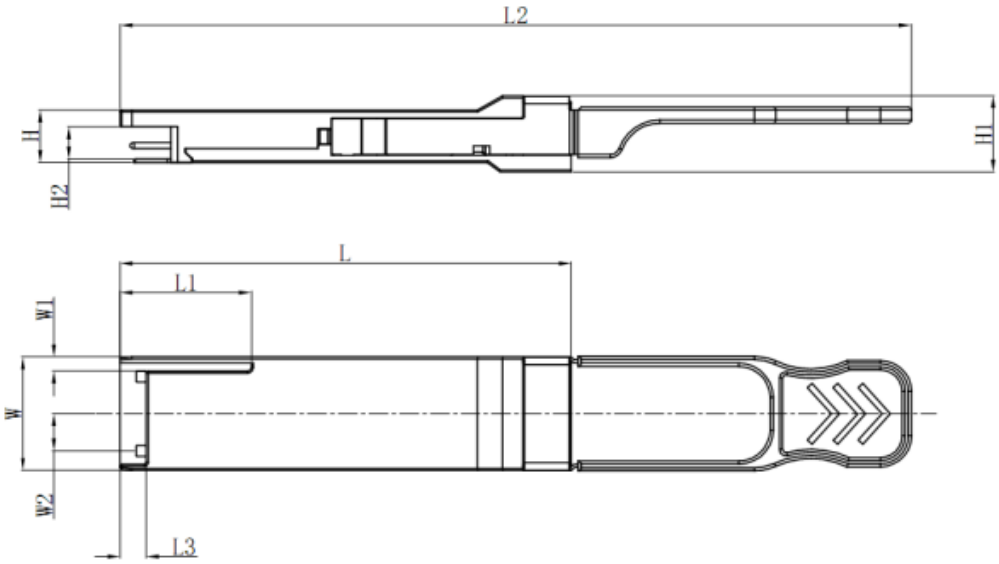
Notes:

1. Module circuit ground is isolated from module chassis ground within the module. GND is the symbol for signal and supply (power) common for QSFP modules.
2. The connector pins are each rated for a maximum current of 500mA.

Optical interface arrangement



Mechanical Dimension



Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation