

LPWSMM85-S10C-SR4

QSFP-DD, 400G SR4, MPO12, 850nm MMF, 100m

Features

- Supports 4x106Gb/s aggregate bit rate
- 8x26.5625GBd (PAM4) 400GAUI-8 electrical interface
- 4x VCSEL850nm arrays and 4x PIN PD arrays
- Hot-pluggable QSFP-DD form factor
- Maximum link length of 100m on OM4 fiber with FEC
- +3.3V single power supply
- Power dissipation < 10W
- Single MPO- 12 APC connector
- Case operating temperature: 0°C to +70°C
- RoHS compliant



Applications

- 400G Ethernet
- Data centers and cloud networks

Ordering information

Part NO.	Bit Rate	Laser	Distance *1	Fiber Media	DDMI	Connector	Temp *2
LPWSMM85-S10C-SR4	425.Gbps	850nm VCSEL	100m (OM4)	MMF	YES	1xMPO-12 (APC)	0~70°C

Note:

1. 100M for OM4 fiber, and 60m for OM3 fiber, with FEC
2. Case Temperature.

I. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	VCC	-0.5	-	+3.6	V	
Storage Temperature	T _s	-40	-	+85	°C	
Operating Humidity	RH	5	-	85	%	No condensation
Receiver damage Threshold	Rin _{dam}	5			dBm	each lane

II. Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.135	3.3	3.465	V	
Operating Case Temperature	T _c	0	-	+70	°C	
Power Dissipation	Pd	-	-	10	W	
Link Distance (OM4)	d	-	-	100	meters	

III. Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Transmitter(per lane)						
Signaling Rate per Lane	SR	53.125 ± 100 ppm			Gbd	
Modulation format	-	PAM4			-	
Center wavelength	λC	842	-	948	nm	
RMS Spectral Width	SW	-	-	0.65	dBm	1
Average Launch Power per Lane	AOP	-4.6	-	4.0	dBm	
Outer Optical Modulation Amplitude (OMA _{outer}),each lane (min);	Tx _{OMA}	-2.6~-4.4 (maxTECQ,TD ECQ)	-	3.5	dBm	
Transmitter and Dispersion Eye Closure for PAM4 (TDECQ), each lane	TDECQ	-	-	4.4	dB	
Overshoot/undershoot	-	-	-	29	%	
Transmitter power excursion, each lane	-	-	-	2.3	dBm	
Transition Time	Tt	-	-	17	ps	
Average Launch Power of OFF Transmitter, each lane	TOFF	-	-	-30	dBm	
Extinction Ratio, each lane	ER	2.5	-	-	dB	
Encircled flux	-	≥86% at 19μm ≤30% at 4.5μm			dBm	2

Receiver(per lane)						
Signaling Rate per Lane	SR	53.125 ± 100 ppm			Gbd	
Modulation format	-	PAM4			-	
Wavelength	W	842	-	948	nm	
Damage Threshold, average optical power, each lane	DT	5	-	-	dBm	3
Average Receive Power, each lane	RXPx	-6.3	-	4	dBm	4
Receive Power (OMA) per Lane	RxOMA	-	-	3.5	dBm	
LOS Assert	LOSA	-15	-	-	dBm	
LOS De-assert	LOSD	-	-	-9.2	dBm	
LOS Hysteresis	LOSH	0.5	-	-	dB	
OMA _{outer} of each aggressor lane	-	-	3.5	-	dBm	5

Note:

1. RMS spectral width is the standard deviation of the spectrum
2. If measured into type A1a.2 or type A1a.3, or A1a.4 of 50um fiber, in accordance with IEC 61280-1-4
3. The receiver shall be able to tolerate, without damage, continuous exposure to a modulated optical input signal having this power level on one lane. The receiver does not have to operate correctly at this input power
4. Average receive 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
5. Receiver sensitivity (OMA_{outer}) is informative and is defined for a transmitter with value of TECQ up to 4.4 dB

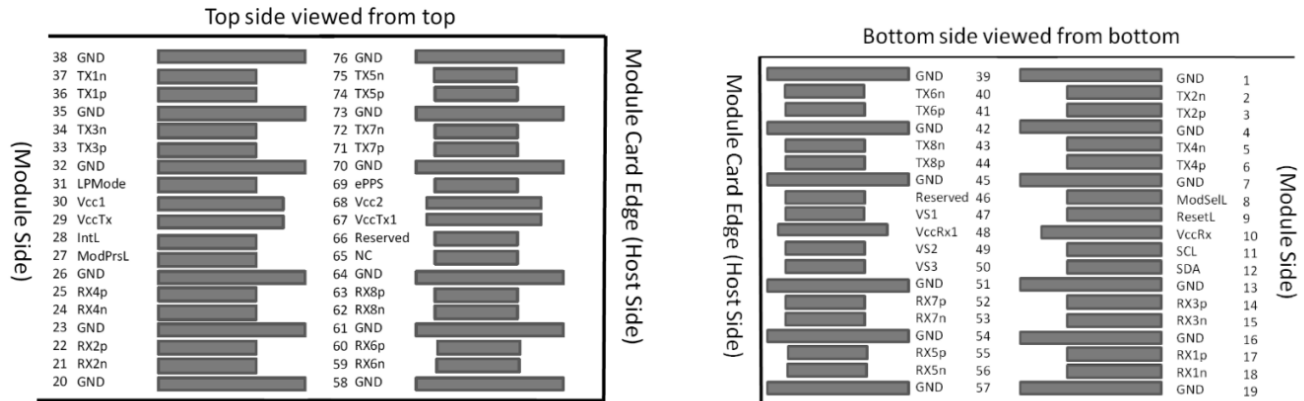
IV. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Notes
Supply Voltage	V _{CC}	3.135		3.465	V	
Power Dissipation	P _d			10	W	
Transmitter						
Differential pk-pk input Voltage tolerance	-	900	-	-	mV	
Differential termination mismatch	-	-	-	10	%	
Single-ended voltage tolerance range	-	-0.4	-	3.3	V	
DC common mode Voltage	-	-350	-	2850	mV	
Receiver						
AC common-mode output Voltage (RMS)	-	-	-	17.5	mV	
Differential output Voltage	-	-	-	900	mV	
Near-end Eye height, differential	-	70	-	-	mV	
Far-end Eye height, differential	-	30	-	-	mV	
Far end pre-cursor ISI ratio	-	-4.5	-	2.5	%	

Differential Termination Mismatch	-	-	-	10	%	
Transition Time (min, 20% to 80%)	-	9.5	-	-	ps	
DC common mode Voltage	-	-350	-	2850	mV	

V. Pin Diagram

Pin view:



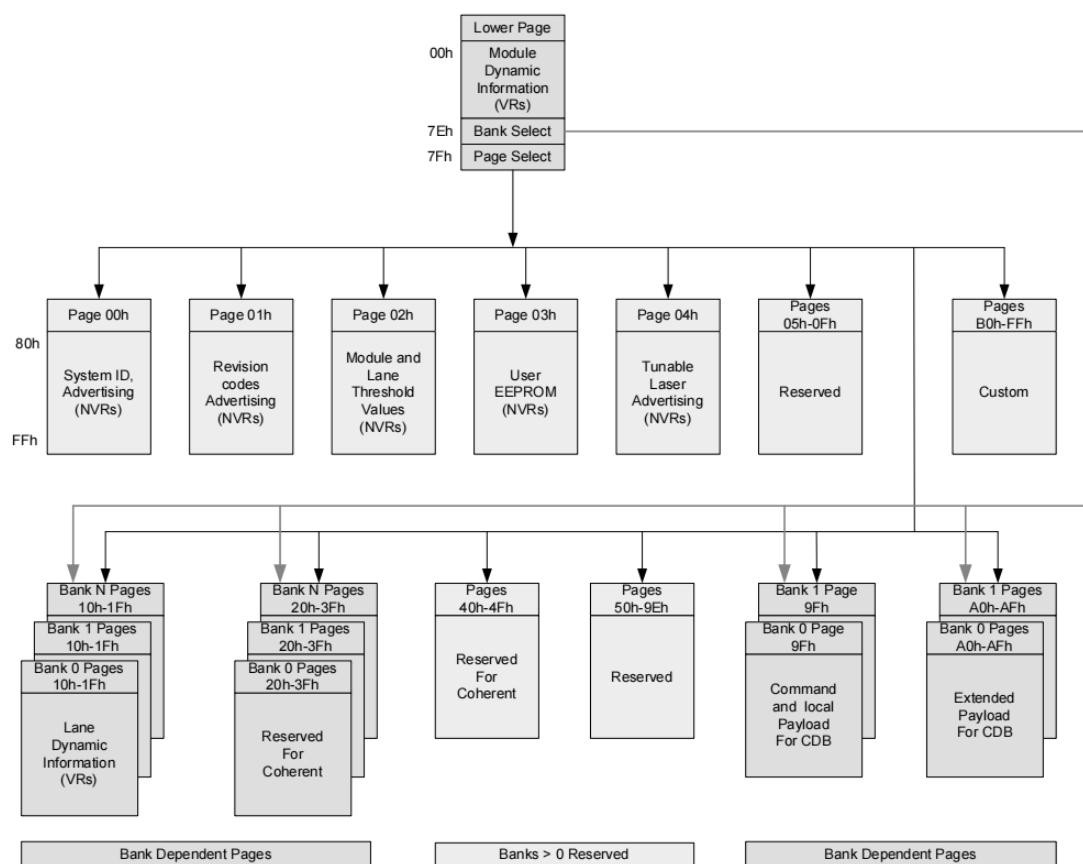
Pin Descriptions:

Pin NO.	Logic	Symbol	Definition	PinNO.	Logic	Symbol	Definition
1		GND	Ground	39		GND	Ground
2	CML-I	Tx2n	Transmitter Inverted Data Input	40	CML-I	Tx6n	Transmitter Inverted Data Input
3	CML-I	Tx2p	Transmitter Non-inverted Data Input	41	CML-I	Tx6p	Transmitter Non-inverted Data Input
4		GND	Ground	42		GND	Ground
5	CML-I	Tx4n	Transmitter Inverted Data Input	43	CML-I	Tx8n	Transmitter Inverted Data Input
6	CML-I	Tx4p	Transmitter Non-inverted Data Input	44	CML-I	Tx8p	Transmitter Non-inverted Data Input
7		GND	Ground	45		GND	Ground
8	LVTTL-I	ModSelL	Module Select	46		Reserved	
9	LVTTL-I	ResetL	Module Reset	47		VS1	Module Vendor Specific 1
10		VccRx	+3.3V Power Supply Receiver	48		VccRx1	3.3V Power Supply
11	LVC MOS -I/O	SCL	2-wire serial interface clock	49		VS2	Module Vendor Specific 2
12	LVC MOS -I/O	SDA	2-wire serial interface data	50		VS3	Module Vendor Specific 3
13		GND	Ground	51		GND	Ground
14	CML-O	Rx3p	Receiver Non-inverted Data Output	52	CML-O	Rx7p	Receiver Non-inverted Data Output
15	CML-O	Rx3n	Receiver Inverted Data Output	53	CML-O	Rx7n	Receiver Inverted Data Output
16		GND	Ground	54		GND	Ground
17	CML-O	Rx1p	Receiver Non-inverted Data Output	55	CML-O	Rx5p	Receiver Non-inverted Data Output
18	CML-O	Rx1n	Receiver Inverted Data Output	56	CML-O	Rx5n	Receiver Inverted Data Output
19		GND	Ground	57		GND	Ground
20		GND	Ground	58		GND	Ground

21	CML-O	Rx2n	Receiver Inverted Data Output	59	CML-O	Rx6n	Receiver Inverted Data Output
22	CML-O	Rx2p	Receiver Non-inverted Data Output	60	CML-O	Rx6p	Receiver Non-inverted Data Output
23		GND	Ground	61		GND	Ground
24	CML-O	Rx4n	Receiver Inverted Data Output	62	CML-O	Rx8n	Receiver Inverted Data Output
25	CML-O	Rx4p	Receiver Non-inverted Data Output	63	CML-O	Rx8p	Receiver Non-inverted Data Output
26		GND	Ground	64		GND	Ground
27	LVTTL-O	ModPrsL	Module Present	65		NC	Not connected
28	LVTTL-O	IntL	Interrupt	66		Reserved	
29		VccTx	+3.3V Power Supply Transmitter	67		VccTx1	3.3V Power Supply
30		Vcc1	+3.3V Power Supply	68		Vcc2	3.3V Power Supply
31	LVTTL-I	InitMode	Initialization mode	69		Reserved	
32		GND	Ground	70		GND	Ground
33	CML-I	Tx3p	Transmitter Non-inverted Data Input	71	CML-I	Tx7p	Transmitter Non-inverted Data Input
34	CML-I	Tx3n	Transmitter Inverted Data Input	72	CML-I	Tx7n	Transmitter Inverted Data Input
35		GND	Ground	73		GND	Ground
36	CML-I	Tx1p	Transmitter Non-inverted Data Input	74	CML-I	Tx5p	Transmitter Non-inverted Data Input
37	CML-I	Tx1n	Transmitter Inverted Data Input	75	CML-I	Tx5n	Transmitter Inverted Data Input
38		GND	Ground	76		GND	Ground

VI. Memory Map

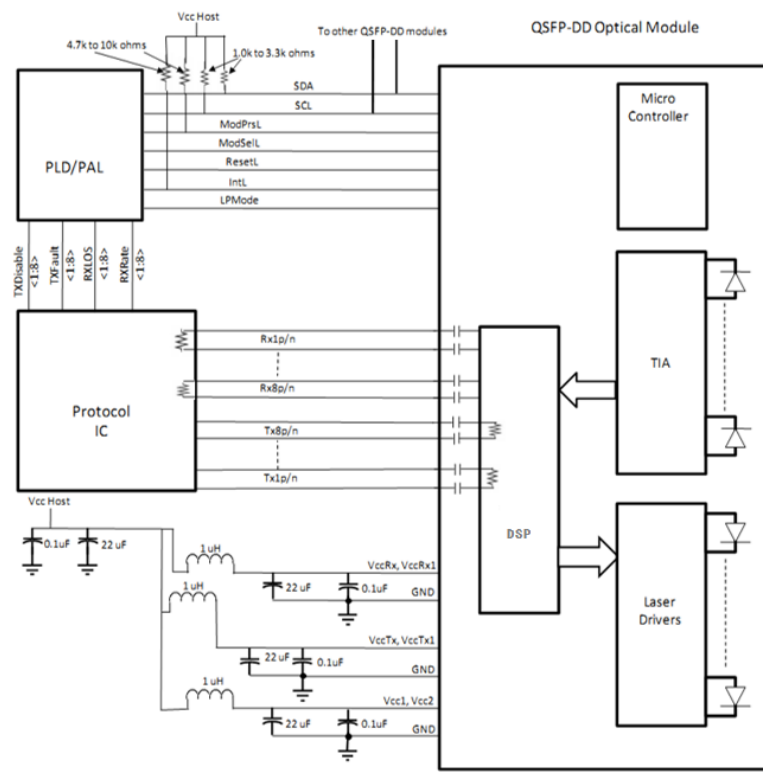
Compatible with CMIS rev4.0 and upper .



VII. Digital Diagnostic Monitor Accuracy

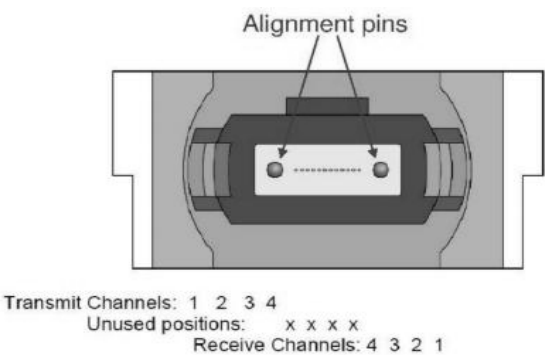
Parameter	Accuracy	Unit
Internally Measured Transceiver Temperature	+/-3	°C
Internally Measured Transceiver Supply Voltage	+/-3	%
Measured Tx Bias Current	+/-10	%
Measured Tx Output Power	+/-3	dB
Measured Rx Received Average Optical Power	+/-3	dB

VIII. Recommended Interface Circuit



Recommended Interface Circuit

IX. Optical interface arrangement



Optical interface arrangement

X. Mechanical Specification

The transceivers are compatible with the QSFP-DD Type 2 Specification

(Unit: mm)

