LPCRMB31-S50C

QSFP56 200Gb/s DR4 500m DDM

PRODUCT FEATURES

- Hot-pluggable QSFP56 form factor
- Built-in 200G PAM4 DSP
- Supports 212.5Gb/s aggregate bit rates
- Low power dissipation < 6W
- Single 3.3V power supply
- Up to 500m link length with SMF
- 4 channels 1310nm DML transmitter (uncooled)
- 4 channels photo detector array receiver
- MPO12/APC connector receptacle
- 200GAUI-4 electrical interface
- Compliant with CMIS4.0
- I2C management interface
- Built-in digital diagnostic functionality
- RoHS compliant (lead free)
- Case operating temperature, Commercial: 0°C to +70°C

APPLICATIONS

- 200GBASE-DR4 Ethernet(PAM4)
- Data Center Network

Compliance

- QSFP56 MSA.
- SFF-8679
- CMIS4.0
- RoHS2.0

Ordering information

Part NO.	Bit Rate (Gbps)	Laser (nm)	Distance (m)	Media	DDMI	Connector	Temp (℃)
LPCRMB31-S50C	212.5	1310	500	SMF	YES	MPO 1X12	0~70

I. Pin Diagram

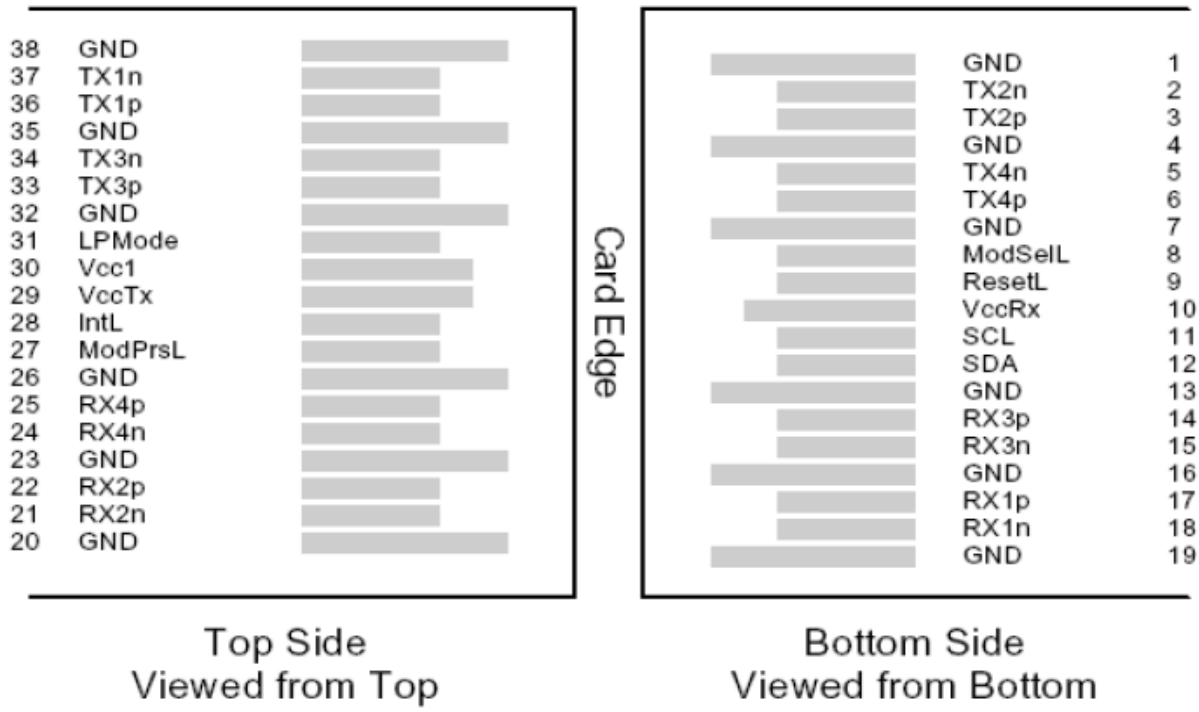


Figure 1. Electrical Pin-out Details

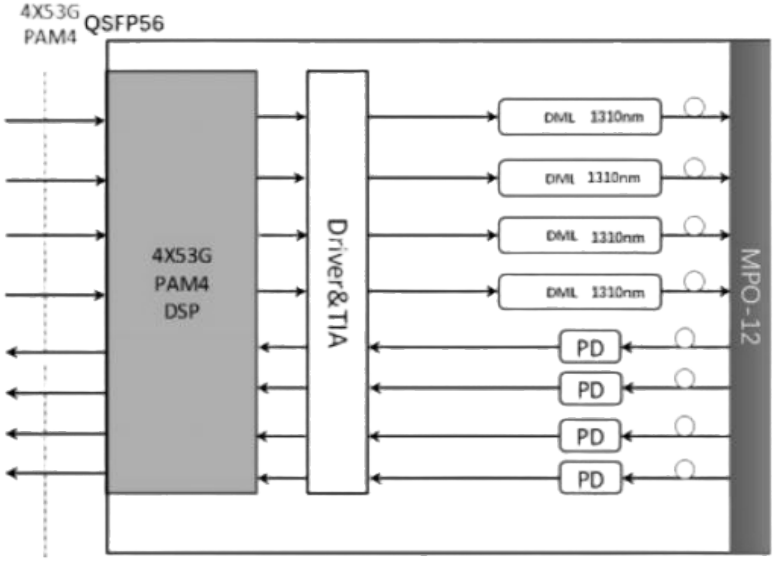
II. Pin Descriptions

Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Module Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data Input	
4		GND	Module Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Input	
7		GND	Module Ground	1
8	LVTTL-I	ModSe1L	Module Select	2
9	LVTTL-I	ResetL	Module Reset	2
10		Vcc Rx	+3.3V Power supply receiver	
11	LVCMOS-I	SCL	2-wire serial interface clock	2
12	LVCMOS-I/O	SDA	2-wire serial interface data	2
13		GND	Module Ground	1
14	CML-O	Rx3p	Receiver Non-Inverted Data Output	
15	CML-O	Rx3n	Receiver Inverted Data Output	
16		GND	Module Ground	1

17	CML-O	Rx1p	Receiver Non-Inverted Data Output	
18	CML-O	Rx1n	Receiver Inverted Data Output	
19		GND	Module Ground	1
20		GND	Module Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	
22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Module Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Module Ground	1
27	LVTTL-O	ModPrSL	Module Present	
28	LVTTL-O	IntL	Interrupt	
29		Vcc Tx	+3.3V Power supply transmitter	
30		Vcc1	+3.3V Power Supply	
31	LVTTL-I	LPMode	Low Power Mode	2
32		GND	Module Ground	1
33	CML-I	Tx3p	Transmitter Non-Inverted Data Input	
34	CML-I	Tx3n	Transmitter Inverted Data Input	
35		GND	Module Ground	1
36	CML-I	Tx1p	Transmitter Non-Inverted Data Input	
37	CML-I	Tx1n	Transmitter Inverted Data Input	
38		GND	Module Ground	1

Note：

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector should be pulled up with 4.7K to 10K ohms on host board to a voltage between 3.15V and 3.46V.



Module Block Diagram

LinkPro™

III. Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Storage Temperature	T_S	-20		85	ºC	
Case Operating Temperature	T_C	0		70	ºC	
Storage Ambient Humidity	RH	5		95	%	
Supply Voltage	V_{CC}	-0.3		3.6	V	
Input Voltage	V_{in}	-0.3		V_{CC+}3.0	V	

IV. Recommended Operating Conditions

Data Rate Spcifications	Symbol	Min.	Typ.	Max.	Unit	Ref.
Supply Voltage	Vcc	3.13	3.3	3.47	V	
Baud Rate(per channel) PAM4	BR		26.5625		GBd	1
Operating Case Temperature	T_C	0		70	ºC	
Humidity	RH	5		85	%	
Power Dissipation	Pm			6.0	W	

V. Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Supply Voltage	V_{CC},	3.15		3.45	V	
Power Dissipation	Pm			6.0	W	
Transmitter(per Lane)						
Input different impedance	R_{in}	90	100	110	Ω	
Differential Input Voltage Amplitude	Vin,pp	300		900	mV	
Input Logic Level High	VIH	2.0		Vcc	V	
Input Logic Level Low	VIL	0		0.8	V	
Receiver (per Lane)						
Error Bit Rate	BER			2.4E-4		
Output different impedance	R_{out}	90	100	110	Ω	
Differential Output Voltage Amplitude	Vout,pp	300		900	mV	
Output Logic Level High	VOH	Vcc-0.5		Vcc	V	
Output Logic Level Low	VOL	0		0.4	V	

LinkPro™

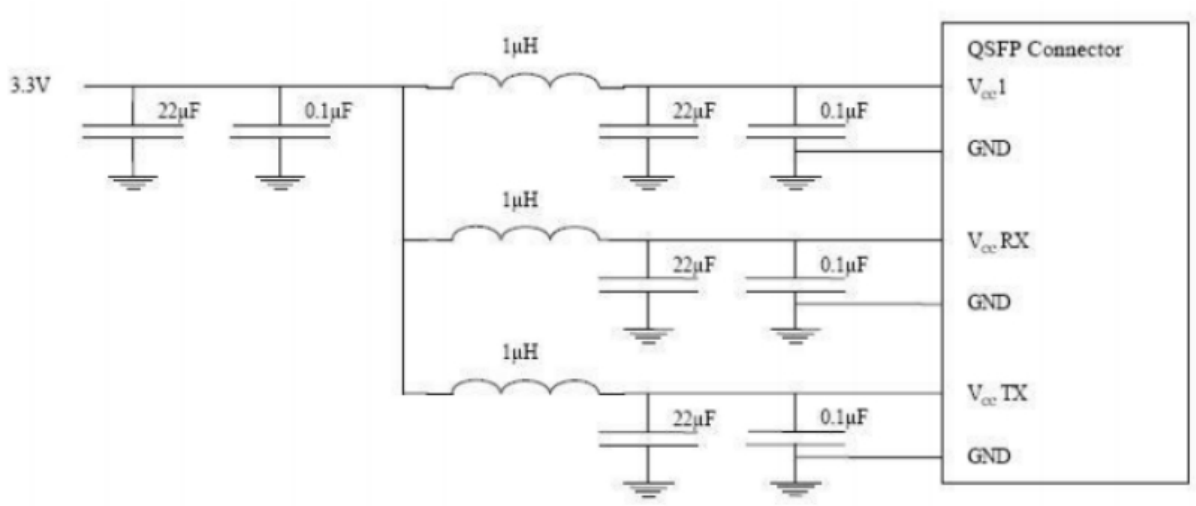
VI. Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Ref.
Transmitter(per lane)						
Average Output Power per lane	POUT	-5.1		3.0	dBm	
Average Output Power total	Ptotal			10.7	dBm	
Outer Optical Modulation Amplitude per lane	OMA_{OUT}	-3.0		2.8	dBm	
Extinction Ratio	ER	3.5			dB	
Center Wavelength	L1	1304.5		1317.5	nm	
	L2	1304.5		1317.5	nm	
	L3	1304.5		1317.5	nm	
	L4	1304.5		1317.5	nm	
SMSR	SMSR	30			nm	
Transmitter and dispersion eye closure (each lane)	TDECQ			3.4	dB	
Transmitter OFF Output Power	POff			-30	dBm	
Optical Return Loss Tolerance	ORLT			21.4	dB	
Transmitter reflectance	TR			-26	dB	
Receiver(per lane)						
Center Wavelength	L1	1304.5		1317.5	nm	
	L2	1304.5		1317.5	nm	
	L3	1304.5		1317.5	nm	
	L4	1304.5		1317.5	nm	
Average Receive Power per lane	Pin	-8.1		3.0	dBm	
Receiver Power (OMA_{OUT}) each lane	R_{OMA}			2.8	dBm	
Receiver Sensitivity (OMA_{OUT}) (each lane)	SEN			-6.6	dBm	1
Stressed Rx Sensitivity(OMA) per lane	SEN_S			-4.1	dBm	
Damage threshold	Pdam	4.0			dBm	
Receiver Reflectance	Rfl			-26	dBm	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-9	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Note:

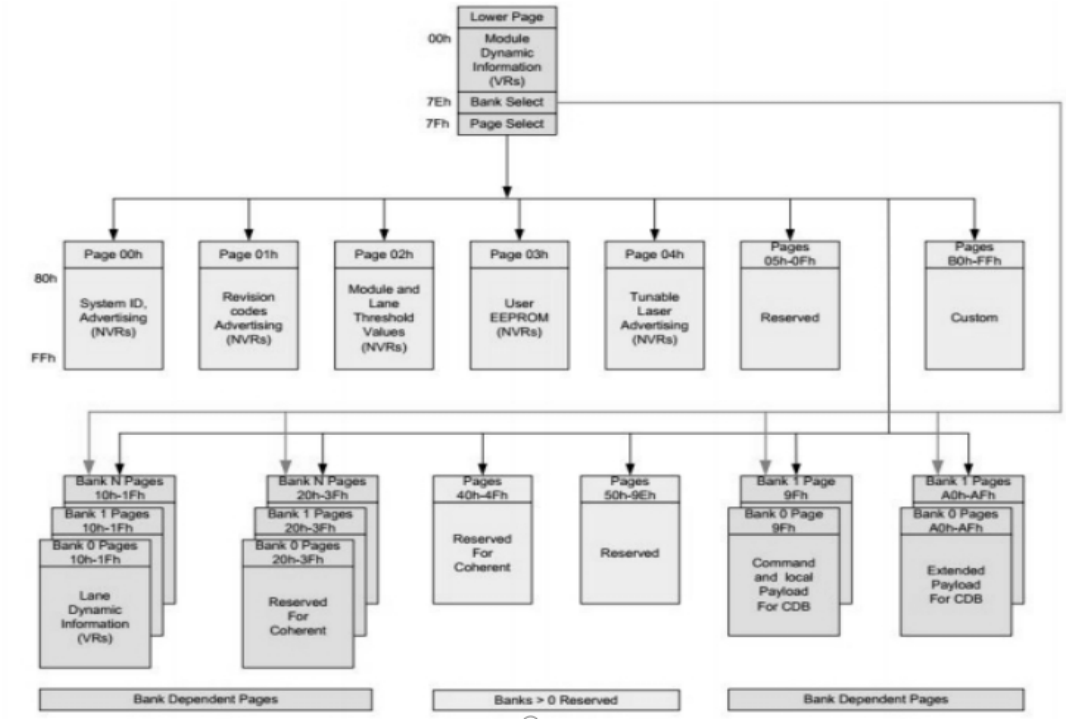
1. Measured with conformance test signal at TP3 for the BER specified in IEEE 802.3 200GBASE-DR4.

VII. Power Supply Filtering



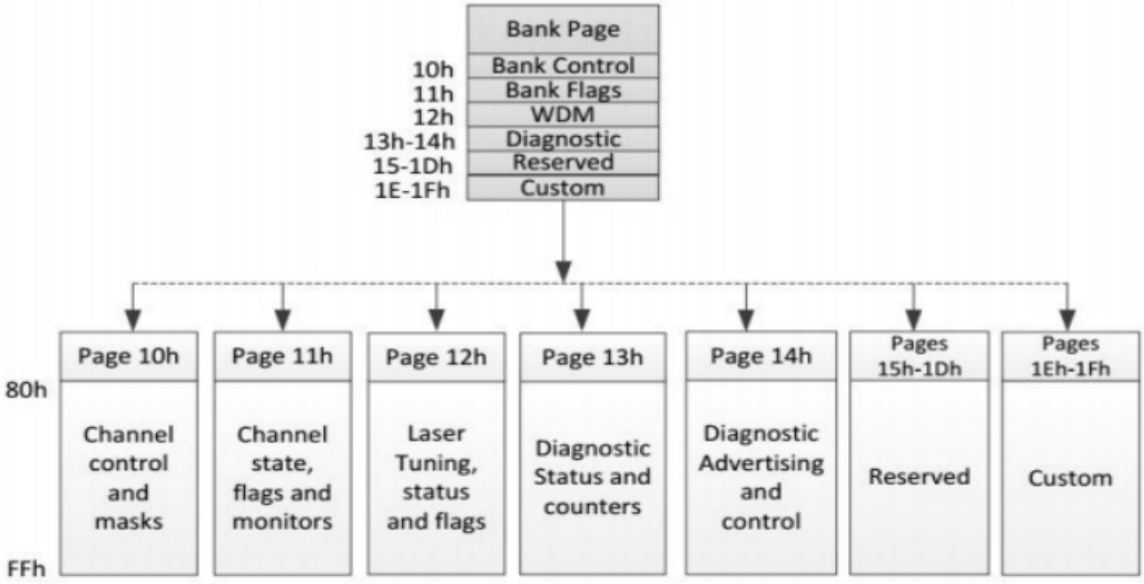
Host Board Power Supply Filtering

VIII. Diagnostic Monitoring Interface



The CMIS memory structure also provides address expansion by adding additional upper pages as needed. Upper pages 00-02 all contain static, non-volatile advertising registers. Upper page 01 provides revision codes and advertising registers that indicate the capabilities of the module. Upper page 02

provides thresholds for monitored functions. Upper page 03 provides a user read/write space.The lower page, upper pages 00h-03h and bank 0 page 10h-11h are supported in our module.



Additional Supported Bank Page Memory Map

The Lower Memory consists of the lower 128 bytes of the 256 byte two-wire serial bus addressable space. The Lower Page is used to access a variety of module level measurements, diagnostic functions and control functions, as well as to select which of the various Upper Pages in the structured memory map are accessed by byte addresses greater or equal than 128.

IX. Mechanical Specifications (Unit: mm)