

LQ-SM31100-DR1C

100G QSFP28 DR1 Transceiver

Product Features

- QSFP28 MSA compliant
- Compliant to 802.3cu
- 100G DR1 Specification compliant
- Non-hermetic package design
- Maximum power consumption 4.0W
- LC connector
- Up to 500m transmission on single mode fiber with FEC
- Operating case temperature: 0°C~70°C
- Single 3.3V power supply
- RoHS-2 compliant

Applications

- Data Center Interconnect

Product Selection

Part Number	Operating Case temperature	DDMI
LQ-SM31100-DR1C	Commercial(0~70°C)	Yes

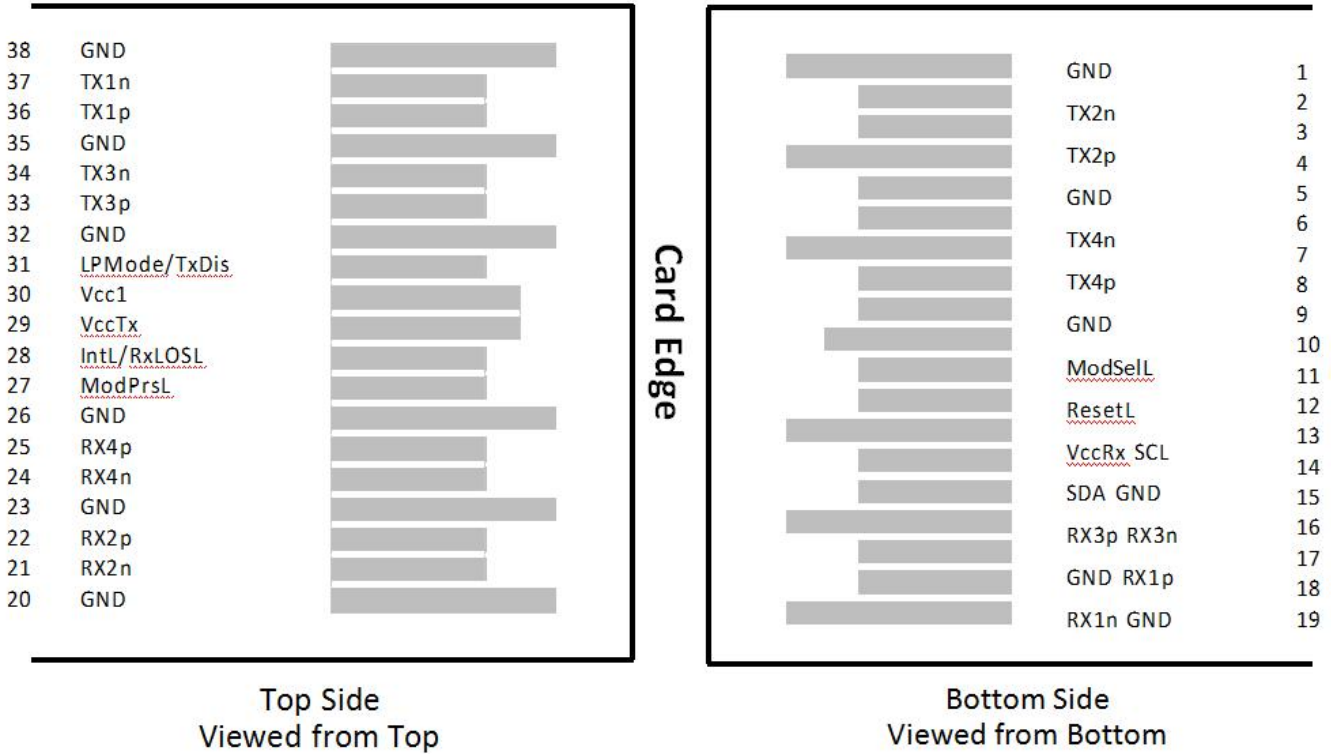
Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883 Method 3015
- ESD to the Duplex LC Receptacle: compatible with EN 61000-4-2
- Immunity compatible with EN 61000-4-3
- EMI compatible with FCC Part 15 Class B
- Laser Eye Safety compatible with FDA 21CFR 1040.10 and 1040.11 IEC 60950, IEC60825-1,2

Pin Descriptions

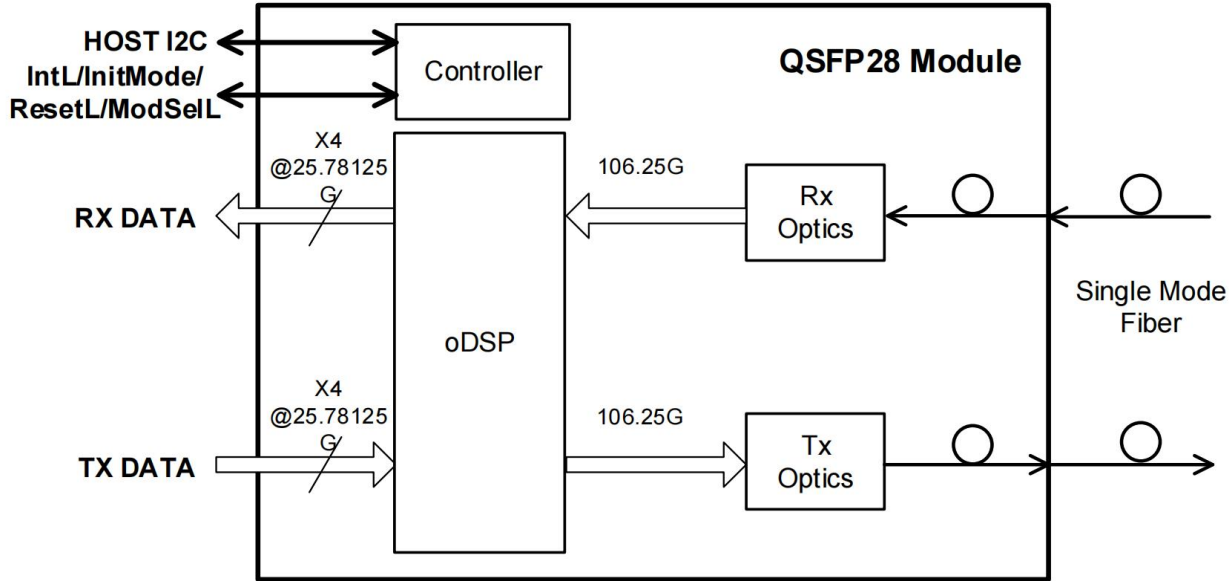
1	GND	Ground	
2	Tx2n	Transmitter Inverted Data Input	
3	Tx2p	Transmitter Non-Inverted Data Input	
4	GND	Ground	
5	Tx4n	Transmitter Inverted Data Input	
6	Tx4p	Transmitter Non-Inverted Data Input	
7	GND	Ground	
8	ModSelL	Module Select	
9	ResetL	Module Reset	
10	VccRx	+ 3.3V Power Supply Receiver	
11	SCL	2-Wire Serial Interface Clock	
12	SDA	2-Wire Serial Interface Data	
13	GND	Ground	
14	Rx3p	Receiver Non-Inverted Data Output	
15	Rx3n	Receiver Inverted Data Output	
16	GND	Ground	
17	Rx1p	Receiver Non-Inverted Data Output	
18	Rx1n	Receiver Inverted Data Output	
19	GND	Ground	
20	GND	Ground	
21	Rx2n	Receiver Inverted Data Output	
22	Rx2p	Receiver Non-Inverted Data Output	
23	GND	Ground	
24	Rx4n	Receiver Non-Inverted Data Output	
25	Rx4p	Receiver Inverted Data Output	
26	GND	Ground	
27	ModPrsL	Module Present	
28	IntL	Interrupt	
29	VccTx	+3.3 V Power Supply transmitter	
30	Vcc1	+3.3 V Power Supply	
31	LPMODE	Low Power Mode	
32	GND	Ground	
33	Tx3p	Transmitter Non-Inverted Data Input	

34	Tx3n	Transmitter Inverted Data Input	
35	GND	Ground	
36	Tx1p	Transmitter Non-Inverted Data Input	
37	Tx1n	Transmitter Inverted Data Input	
38	GND	Ground	



Pin-out of Connector Block on Host Board

Transceiver Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Maximum Supply Voltage	Vcc	-0.3	3.3	3.6	V	
Storage Temperature	TS	-40		+85	°C	
Relative Humidity	RH	0		85	%	Non-condensing
Damage Threshold, each lane	THd	5			dBm	

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	Vcc	3.135	3.30	3.465	v
Case Temperature	Tc	0		+70	°C
Data Rate, each lane			26.5625		Gbit/s
Data Rate Accuracy		-100		100	ppm
Link Distance with G.652		2		500	m

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Power dissipation	P		4	W	
Supply Current	I _{cc}		1.212	A	
Transmitter (module output)					
Data Rate, each lane			26.5625±100ppm	GBd	
Differential input Voltage pk-pk	V _{pp}		900	mV	
Common Mode Voltage	V _{cm}	-350	2850	mV	
Common Mode Noise	RMS		17.5	mV	
Differential Termination Resistance Mismatch			10	%	1
Differential Return Loss	SDD22		See CEI-28-VSR Equation (13-2)	dB	
Common Mode to Differential Conversion	SDC22		See CEI-28-VSR Equation (13-4)	dB	
Common Mode Return Loss	SCC22		-2		2
Transition Time		9.5		ps	3
Vertical Eye Closure	VEC	5.5		dB	
Eye Width at 10-15 probability	EW15	0.57		UI	
Eye Height at 10-15 probability	EH15	228		mV	
Receiver(module input)					
Data Rate, each lane			26.5628±100ppm	GBd	
Overload Differential Voltage pk-pk	V _{pp}	900		mV	
Common Mode Voltage	V _{cm}	-350	2850	mV	
Differential Termination Resistance Mismatch		10		%	1
Differential Return Loss	SDD11		See CEI-28-VSR Equation (13-2)	dB	
Differential to Common Mode Conversion	SCD11		See CEI-28-VSR Equation (13-3)	dB	
Stressed Input Test			See CEI-28-VSR Section 13.3.11.2.1		

Notes:

1. At 1 MHz.
2. From 250 MHz to 30 GHz.
3. 20%~80%.

Optical Characteristics

Transmitter				
Data Rate		106.25±100ppm		GBd
Modulation Format		PAM4		
Line wavelengths	1304.5	1311	1317.5	nm
Average launch power	-2.9		4	dBm
Optical Modulation Amplitude (OMA)	-0.8		4.2	dBm
Extinction Ratio	3.5			dB
Side-Mode Suppression Ratio(SMSR)	30			dB
Launch power in OMA minus TDECQ		-2.2(ER≥5dB) -1.9(ER<5dB)		dBm
TDECQ – 10log10(Ceq)			3.4	dB
Transmitter and Dispersion Eye Clouser for PAM4, each Lane (TDECQ)			3.4	dB
Transmitter transition time			17	ps
Optical Return Loss Tolerance			15.5	dB
Transmitter Reflectance			-26	dB
Average Launch Power of OFF Transmitter			-15	dBm

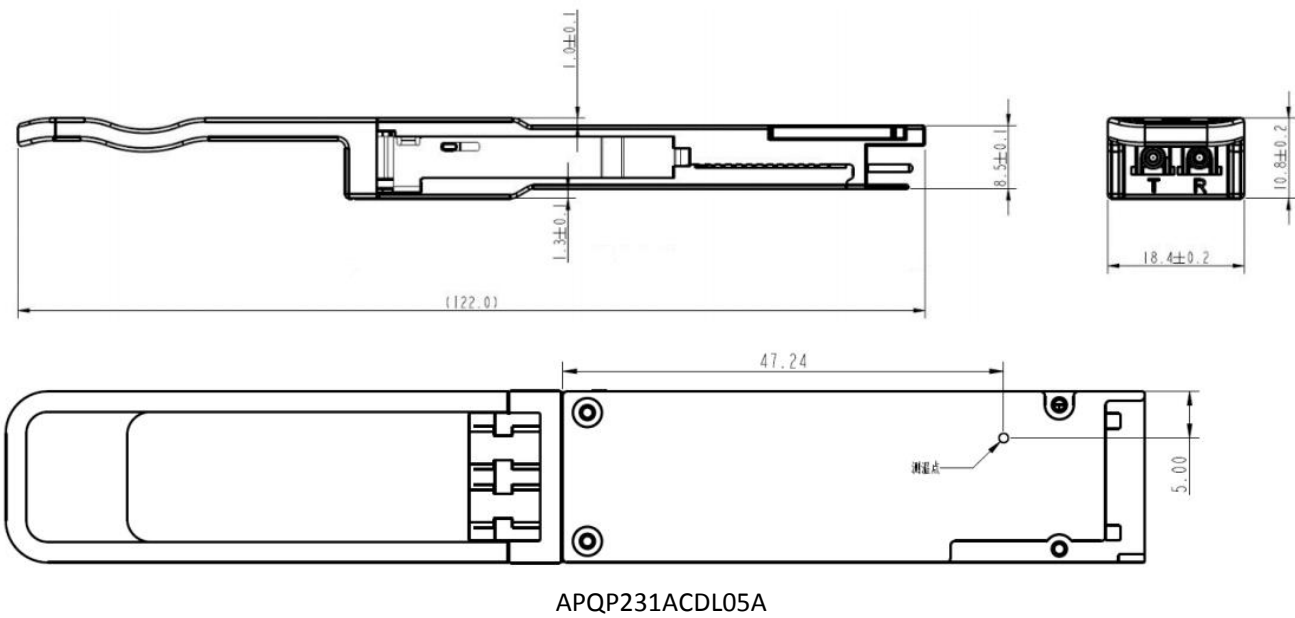
Receiver				
Data Rate		106.25±100pm		GBd
Modulation Format		PAM4		
Damage Threshold	5.0			dBm
Line wavelengths	1304.5	1311	1317.5	nm
Average receiver power	-5.9		4.0	dBm
Receiver power (OMA)			4.2	dBm
Receiver Sensitivity (OMAouter)			-3.9	dBm
Stressed receiver Sensitivity (OMAouter)			-1.9	dBm
LOS Assert	-15			dBm
LOS Deassert			-7	dBm
LOS Hysteresis	0.5			dB
Receiver reflectance			-26	dB

Conditions of stressed receiver sensitivity				
Stressed eye closure for PAM4 (SECQ), lane under test			3.4	dB

Notes:

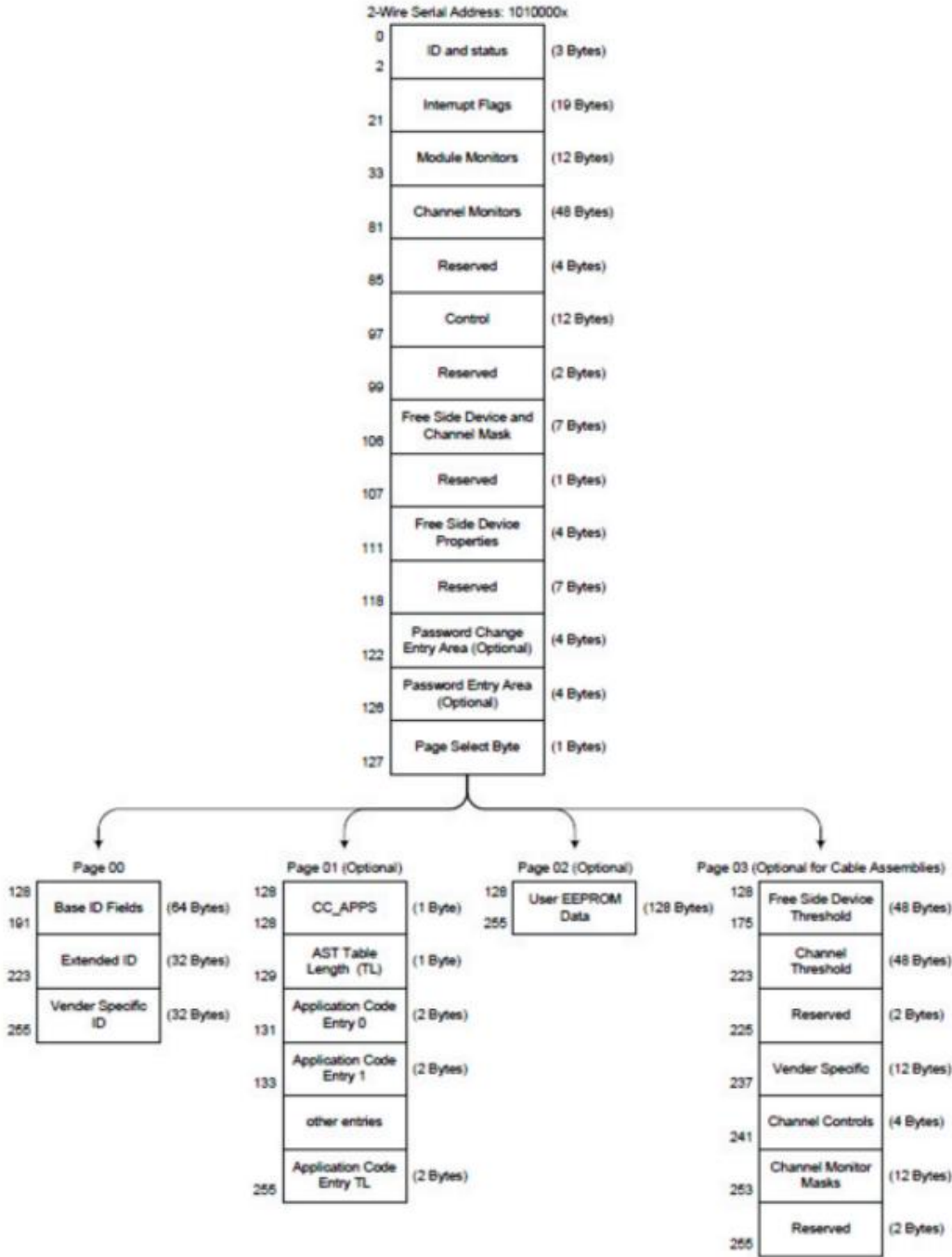
- Receiver sensitivity (OMA_{outer}), each lane (max) is informative and is defined for a transmitter with SECQ of 0.9 dB. Measured with conformance test signal for BER = 2.4x10⁻⁴. A compliant receiver shall have stressed receiver sensitivity (OMA_{outer}), each lane values below the mask of Mechanical Specifications, for SECQ values between smaller than 3.4 dB.

Mechanical Specifications



EEPROM Information

EEPROM memory map specific data field description is as below:



Digital Diagnostic Monitoring Interface

Five transceiver parameter values are monitored.

Parameter	Alarm & Warning	Data Address Alarm & Warning thresholds	Monitor
Temperature	Lowpage 6	Page03 (128-135)	Lowpage (22-23)
Voltage	Lowpage 7	Page03 (144-151)	Lowpage (26-27)
Bias Current	Lowpage (11-12)	Page03 (184-191)	Lowpage (42-49)
Power	Lowpage (13-14)	Page03 (192-199)	Lowpage (50-57)
RX Power	Lowpage (9-10)	Page03 (176-183)	Lowpage (34-41)

Ordering information

Part Number	Product Description
LQ-SM31100-DR1C	100Gbps, QSFP28, DR1, 500m, 0° C~+70° C, with DDM