

	Datasheet	No.	DS10-U005A
		Initial Date	2020-05-08
OU	OU8S341A	Written Team	R&D Dept. GH Zheng

I Preview

PN	OU8S341A
Description	100G QSFP28 ZR4 1310nm-band 100KM LC DDMI 0~70 °C

II Contents

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III Revision History

No.	Date	Items	Change Recording	Ver.	Rev.	Customer
1	2020-05-08	All	Initial registration	000	000	Standard
2						
3						
4						
5						
6						

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1. Features

- ◆ QSFP28 MSA compliant
- ◆ Hot pluggable 38 pin electrical interface
- ◆ 4 LAN-WDM lanes Mux/Demux design
- ◆ PIN Receiver with SOA
- ◆ Single +3.3V power supply
- ◆ 4x25.78125G Electrical Serial Interface (CEI-28G-VSR)
- ◆ Supports 103.125Gb/s aggregate bit rate
- ◆ Maximum power consumption 6.5W
- ◆ Up to 100KM transmission on single mode fiber with KR4-FEC
- ◆ Duplex LC receptacle
- ◆ RoHS-6 compliant
- ◆ Operating case temperature: 0~70°C

2. Applications

- ◆ 100GBASE-ZR4 Plus Ethernet Links
- ◆ 100G Telecom networking
- ◆ Other links

3. Description

The OCRECOM's OU8S341A is designed for 100km optical communication applications. This module contains 4-lane optical transmitter; PIN receiver with SOA and module management block including 2 wire serial inter-face. The optical signals are multiplexed to a single-mode fiber through an industry standard LC connector. A block diagram is shown in Figure 1.

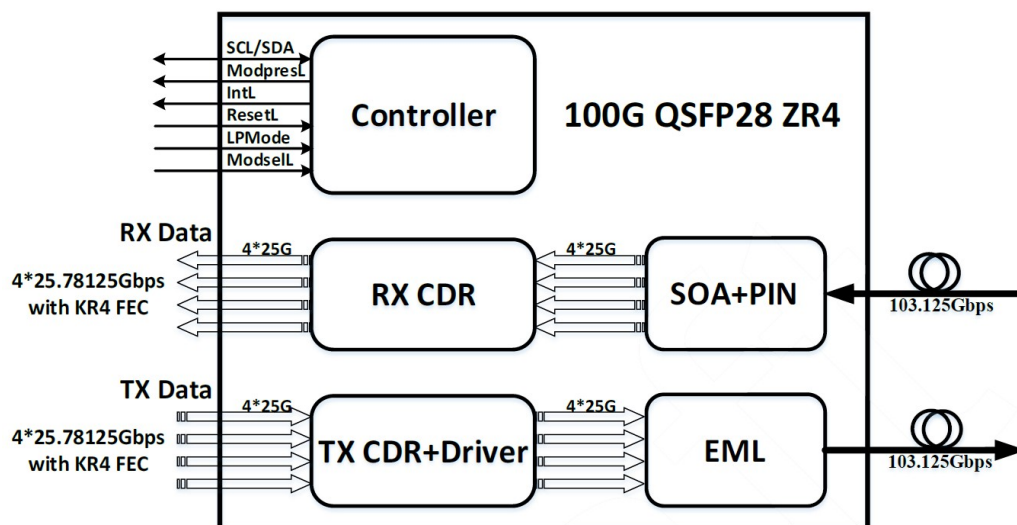


Figure 1. Transceiver Block Diagram

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4. Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Note
Storage Temperature	TST	-40	85	°C	
Relative Humidity(non-condensing)	RH	0	85	%	
Operating Case Temperature	TOPC	0	70	°C	
Supply Voltage	VCC	0	3.6	V	
Damage Threshold, each Lane	TH _d	5.5		dBm	

5. Operating Environment

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	TOPC	0		70	°C
Power Supply Voltage	VCC	3.13	3.3	3.47	V
Power Supply Current	I _{CC}	-	-	2.1	A
Power Consumption	P	-		6.5	W
Aggregate Bit Rate	BR _{AVE}		103.125		Gbps
Lane Bit Rate	BR _{LANE}		25.78		Gbps
Link Distance	D			100	km

Please notice the transmit distance is over SMF with FEC

6. Optical Characteristics

All parameters are specified under the recommended operating conditions with PRBS31 data pattern unless otherwise specified.

Transmitter						
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Wavelength Assignment	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Total Average Launch Power	P _r	7	-	12.5	dBm	1
Average Launch Power, each Lane	PAVG	2		7	dBm	1
Optical Modulation Amplitude (OMA)	POMA	3	-	8	dBm	1

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Difference in Launch Power between any two lanes	Ptx,diff			3.6	dB	
Extinction Ratio	ER	8			dB	
Optical Return Loss Tolerance	TOL			20	dB	
Average Launch Power OFF Transmitter, each Lane	P _{off}			-30	dBm	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				2
Receiver						
Wavelength Assignment	L0	1294.53	1295.56	1296.59	nm	
	L1	1299.02	1300.05	1301.09	nm	
	L2	1303.54	1304.58	1305.63	nm	
	L3	1308.09	1309.14	1310.19	nm	
Damage Threshold	THd	5.5			dBm	
Average Receive Power, each Lane		-30		-6	dBm	3
Receiver Sensitivity in OMA, each Lane	SEN			-29	dBm	3
Difference in launch power between lanes				4.5	dBm	
Los Assert	LosA	-40			dBm	
Los De-assert	LosDA			-30	dBm	
Los Hysteresis	LosH	0.5		5	dB	

Notes:

- 1, The optical power is launched into SMF.
- 2, Measured with a PRBS 231-1 test pattern @25.78125, Hit ratio≤5E-5.
3. Measured with a PRBS 231-1 test pattern @25.78125 Gb/s, BER≤5E-5.

7. Electrical Specifications

Parameter	Test Point	Min	Typical	Max	Units	Notes
Power Consumption				6.5	W	
Supply Current	Icc			2.1	A	

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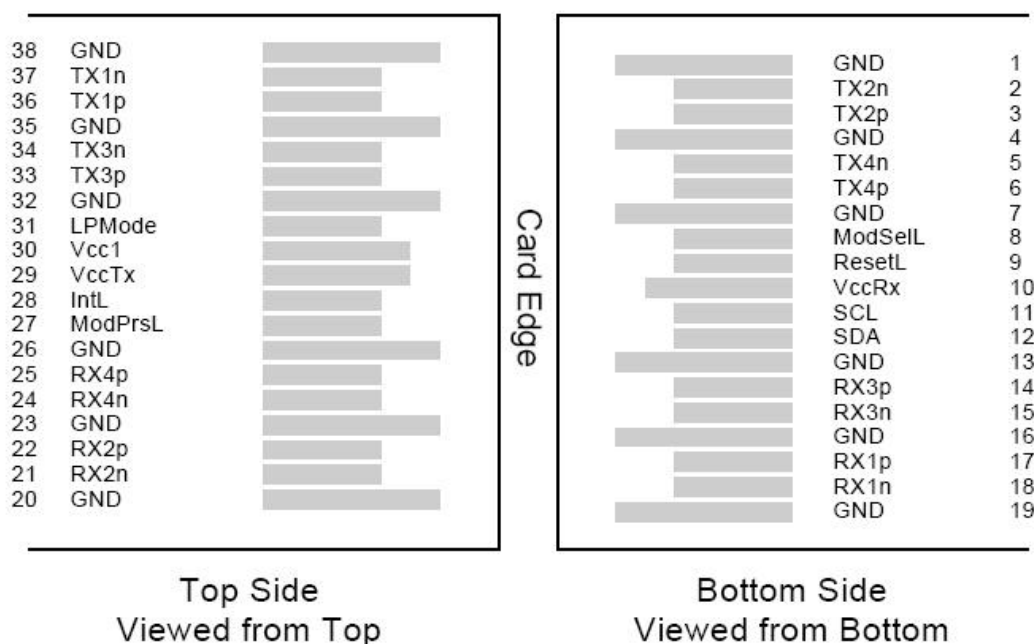
Transmitter (each Lane)						
Overload Differential Voltage pk-pk	TP1a			900	mV	
Common Mode Voltage (Vcm)	TP1	-350		2850	mV	At 1MHz
Differential Termination Resistance Mismatch	TP1			10	%	At 1MHz
Differential Return Loss (SDD11)	RLd(f)			Compliance with IEEE802.3ba Equation (83A-5)	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion (SDC11, SCD11)	RLdc(f)			Compliance with IEEE802.3ba Equation (83A-6)	dB	
LPMODE, Reset and ModSelL, V in low	V _{IL}	-0.3		0.8	V	
LPMODE, Reset and ModSelL, V in high	V _{IH}	2.0		V _{CC} +0.3	V	
Receiver (each Lane)						
Differential Voltage, pk-pk	TP4			900	mV	
Common Mode Voltage (Vcm)	TP4	-350		2850	mV	
Differential Termination Resistance Mismatch	TP4			10	%	At 1MHz
Differential Return Loss (SDD22)	RLd(f)			Compliance with IEEE802.3ba Equation (83A-7)	dB	
Common Mode to Differential conversion and Differential to Common Mode conversion	RLdc(f)			Compliance with IEEE802.3ba	dB	

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(SDC22, SCD22)				Equation (83A-8)		
Transition Time, 20 to 80%	TP4	12			ps	
ModPrsL and IntL, V out low	V _{OL}	0		0.4	V	
ModPrsL and IntL, V out high	V _{OH}	V _{CC} -0.5		V _{CC} +0.3	V	

8. Pin Descriptions



PIN	Logic	Symbol	Name/Description	Note
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Input	
6	CML-I	Tx4p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTLL-I	ModSelL	Module Select	
9	LVTLL-I	ResetL	Module Reset	
10		VccRx	+ 3.3V Power Supply Receiver	2

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11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock	
12	LVC MOS-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	
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		VccI	+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. GND is the symbol for signal and supply (power) common for the QSFP28 module. All are common within the module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.

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ModPrsL is pulled up to Vcc on the host board and grounded in the module. The ModPrsL is asserted “Low” when the module is inserted and deasserted “High” when the module is physically absent from the host connector.

IntL Pin

IntL is an output pin. When “Low”, it indicates a possible module operational fault or a status critical to the host system. The host identifies the source of the interrupt by using the 2-wire serial interface. The IntL pin is an open collector output and must be pulled up to Vcc on the host board.

9. Diagnostic Monitoring Interface

Digital diagnostics monitoring function is available on all OCRECOM’s OU8S341A QSFP28 ZR4 plus. A 2-wire serial interface provides user to contact with module. The structure of the memory is shown in the chart. The memory space is arranged into a lower, single page, address space of 128 bytes and multiple upper address space pages. This structure permits timely access to addresses in the lower page, such as Interrupt Flags and Monitors. Less time critical time entries, such as serial ID information and threshold settings, are available with the Page Select function. The interface address used is A0xh and is mainly used for time critical data like interrupt handling in order to enable a one-time-read for all data related to an interrupt situation. After an interrupt, IntL, has been asserted, the host can read out the flag field to determine the affected channel and type of flag.

Address	Size (Bytes)	Name	Description of Base ID Field	Optical Module
128	1	Identifier	Identifier Type of serial Module	
129	1	Ext. Identifier	Extended Identifier of Serial Module	
130	1	Connector	Code for connector type	
131-138	8	Specification compliance	Code for electronic compatibility or optical compatibility	
139	1	Encoding	Code for serial encoding algorithm	
140	1	BR, nominal	Nominal bit rate, units of 100 Mbits/s	
141	1	Extended rateselect Compliance	Tags for extended rate select compliance	
142	1	Length(SMF)	Link length supported for SMF fiber in km (note 1)	

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143	1	Length(OM3 50 um)	Link length supported for EBW 50/125 um fiber (OM3), units of 2m (note 1)	
144	1	Length(OM2 50 um)	Link length supported for 50/125 um fiber (OM2), units of 1m (note 1)	
145	1	Length(OM1 62.5 um)	Link length supported for 62.5/125 um fiber (OM1), units of 1m (note 1)	
146	1	Length (Copper)	Link length of copper or active cable, units of 1 m (note 1)Link length supported for 50/125 um fiber (OM4), units of 2 m) when Byte 147 declares 850nm VCSEL as defined inTable 37	
147	1	Device tech	Device technology	
148-163	16	Vendor name	QSFP28 vendor name(ASCII)	
164	1	Extended Module	Extended Module codes for InfiniBand	
165-167	3	Vendor OUI	QSFP28 vendor IEEE company ID	
168-183	16	Vendor PN	Part number provided by QSFP28 vendor(ASCII)	
184-185	2	Vendor rev	Revision level for part number provided by vendor(ASCII)	
186-187	2	Wave length or Copper cable Attenuation	Nominal laser wavelength (wavelength=value/20 in nm) or copper cable attenuation in dB at 2.5GH (Adrs 186) and 5.0GHz (Adrs 187)	
188-189	2	Wavelength tolerance	Guaranteed range of laser wavelength(+/- value) from nominal wavelength.(wavelength Tol.=value/200 in nm)	
190	1	Max case temp.	Maximum case temperature in degrees C	
191	1	CC_BASE	Check code for base ID fields (addresses 128-190)	
192	1	Link Code	Extended specification compliance codes	
193-195	4	Options	Rate Select, TX Disable, TX Fault, LOS, Warning indicators for: Temperature, VCC, RX, power, TX Bias	
196-211	16	Vendor SN	Serial number provided by vendor (ASCII)	

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212-219	8	Date Code	Vendor's manufacturing date code	
220	1	Diagnostic Monitoring Type	Indicates which types of diagnostic monitoring are implemented (if any) in the Module. Bit 1,0 Reserved	
221	1	Enhanced Options	Indicates which optional enhanced features are implemented in the Module.	
222	1	Baud Rate, Nominal	Nominal baud rate per channel, units of 250Mbd, Complements Byte 140.	
223	1	CC_EXT	Check code for the Extended ID Fields (addresses 192-222)	
Vendor Specific ID Fields				
224-255	32	Vendor Specific	Vendor Specific EEPROM	

Digital Diagnostic Functions

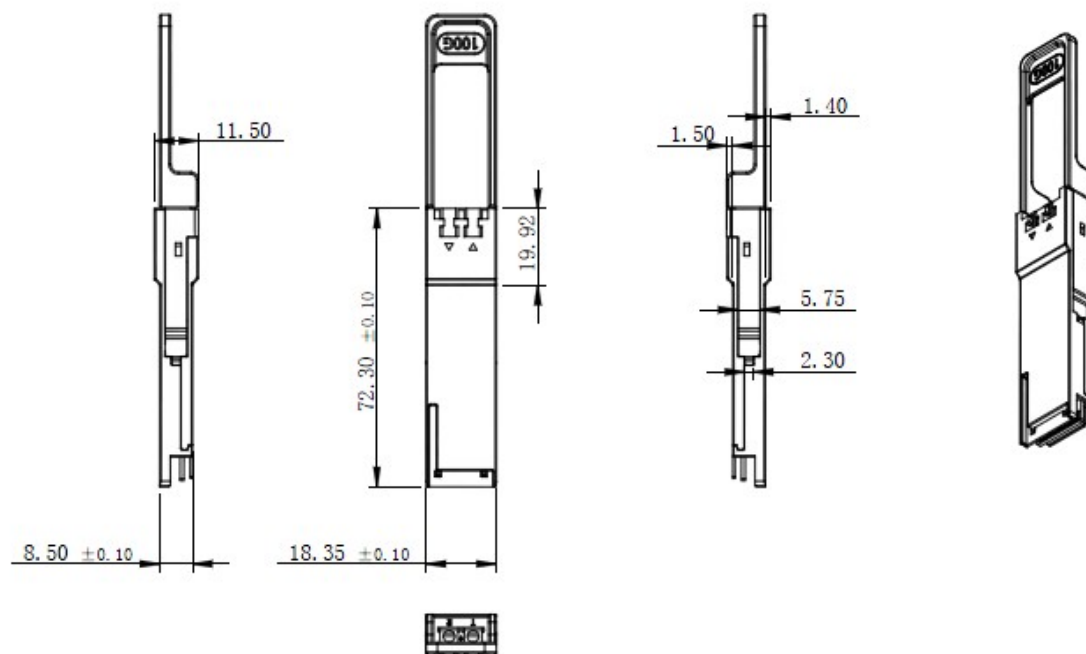
The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8436..

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	degC	Over operating temp
Supply voltage monitor absolute error	DMI_VCC	-0.1	0.1	V	Full operating range
Channel RX power monitor absolute error each lane	DMI_RX	-3	3	dB	Per channel
Channel Bias current monitor	DMI_Ibias	-10%	10%	mA	Per channel
Channel TX power monitor absolute error per lane	DMI_TX	-3	3	dB	Per channel

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10. Mechanical Dimensions



ESD

This transceiver is specified as ESD threshold 1KV for high speed data pins and 2KV for all others electrical input pins, tested per MIL-STD-883, Method 3015.4 /JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module. This transceiver is shipped in ESD protective packaging. It should be removed from the packaging and handled only in an ESD protected environment.

Laser Safety

This is a Class 1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007)

11. Module Ordering information

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