

100G QSFP28 LR4 Double Receiver Datasheet



Features:

- 8 independent LAN-WDM channels
- Up to 28Gbps data rate per channel
- Hot-pluggable QSFP28 form factor
- Digital diagnostic capabilities
- Maximum link length of 10km on Single Mode Fiber(SMF)
- Single +3.3V power supply
- Operating case temperature: 0~70°C
- Low power consumption < 4W
- RoHS-6 compliant

Applications:

- 100GBASE LR4 100G Ethernet
- OTU4 4I1-9D1F

Product Description

The TQR-HG10-31DCR-R is a parallel 100Gbps Quad Small Form-factor Pluggable (QSFP) optical module receiver. It provides increased port density and total system cost savings. The QSFP28 full-duplex optical module offers 8 independent receive channels, each capable of 28Gbps operation for an aggregate data rate of 100Gbps over 10km of single mode fiber.

An optical fiber cable with duplex LC connectors can be plugged into the QSFP28 module receptacle. The module operates by a single +3.3V power supply. LVCMOS/LVTTL global control signals, such as Module Present, Reset, Interrupt and Low Power Mode, are available with the modules. A 2-wire serial interface is available to send and receive more complex control signals, and to receive digital diagnostic information.

The TQR-HG10-31DCR-R is designed with form factor, optical/electrical connection and digital diagnostic interface according to the QSFP Multi-Source Agreement (SFF-8436). It has been designed to meet the harshest external operating conditions including temperature, humidity and EMI interference. The module offers very high functionality and feature integration, accessible via a two-wire serial interface.

Ordering information

Part No.	Data Rate	Laser	Fiber Type	Distance* ^{Note1}	Optical Interface	Temp.* ^{Note2}	DDMI
TQR-HG10-31DCR-R	100Gbps	-	SMF	10km	LC	ST	Y

Note1: 10km with 9/125µm SMF

Note2: ST: -5 ~ +70 deg C

Regulatory Compliance

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883G Method 3015.7	HBM class 1, 1000volts and above, Contact discharge on Golden Finger.
Electrostatic Discharge to the enclosure	IEC-61000-4-2 GR-1089-CORE	Compliant with standards.
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022:2006 VCCI Class B	Compliant with standards Noise frequency range: 30MHz to 18 GHz. System margins depend on customer host board and chassis design.
Immunity	IEC 61000-4-3	Compliant with standards.
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN (IEC) 60825-1:2007 EN (IEC) 60825-2:2004+A1	CDRH compliant and Class I laser product.
Component Recognition	UL and CUL EN60950-1:2006	Compliant with standards.
RoHS6	2002/95/EC 4.1&4.2 2005/747/EC 5&7&13	Compliant with standards* ^{note3}

Note3:

In light of item 5 in RoHS exemption list of RoHS Directive 2002/95/EC, Item 5: Lead in glass of cathode ray tubes, electronic components and fluorescent tubes.

In light of item 13 in RoHS exemption list of RoHS Directive 2005/747/EC, Item 13: Lead and cadmium in optical and filter glass. The three exemptions are being concerned for Trixon transceivers, because Trixon transceivers use glass, which may contain Pb, for components such as lenses, windows, isolators, and other electronic components.

Absolute Maximum Ratings*^{Note4}

Parameter	Symbol	Min	Max	Unit
Storage Temperature	Tst	-40	85	degC
Relative Humidity (non-condensation)	RH	15	85	%
Supply Voltage	VCC	-0.5	3.6	V
Voltage on LVTTTL Input	Vilvttl	-0.5	VCC+0.5	V
LVTTTL Output Current	Iolvttl	-	15	mA

Note4: Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	T _{opc}	0	-	70	°C	
Power Supply Voltage	VCC	3.135	-	3.465	V	
Fiber Length: SMF		-	-	10	km	

Performance Specifications – Electrical

Parameter	Symbol	Min	Typ.	Max	Unit	Notes
Data Rate, each Lane		-	25.78125	27.95	Gbps	
Power Consumption (XLPP1)		-	-	2.0	W	
Supply Current	ICC	-	-	1.12	A	
Control I/O Voltage, High	V _{IH}	2.0	-	VCC	V	
Control I/O Voltage, Low	V _{IL}	0	-	0.8	V	
Tx Input Diff Voltage	V _I	150	-	1200	mV	
Tx Input Diff Impedance	Z _{IN}	85	100	115	Ω	
Rx Output Diff Voltage	V _o	200	-	1100	mV	
Rx Output Diff Impedance	Z _{OUT}	85	100	115	Ω	

Performance Specifications – Optical

100GBASE-LR4 Operation

Parameter	Symbol	Min	Typ.	Max	Unit
Receiver					
Center Wavelength	λ	1294.53		1296.59	nm
		1299.02		1301.09	
		1303.54		1305.63	
		1309.09		1310.19	
Average Power at Receiver Input, each Lane		-10.6	-	4.5	dBm
Receiver Reflectance		-	-	-12	dB
Los Assert	LosA	-25	-	-	dBm
Los Dessert	LosD	-	-	-11.6	dBm
Los Hysteresis	LosH	0.5	-	-	dB

OTU4 4I1-9D1F Operation

Parameter	Symbol	Min	Typ.	Max	Unit
Receiver					
Center Wavelength	λ	1294.53		1296.59	nm
		1299.02		1301.09	
		1303.54		1305.63	
		1309.09		1310.19	
Average Power at Receiver Input,		-10.6	-	4.5	dBm

each Lane					
Receiver Reflectance		-	-	-12	dB
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Los Dessert	LosD	-	-	-11.6	dBm
Los Hysteresis	LosH	0.5	-	-	dB

Pin Descriptions

38	GND	GND	1
37	RXB0n	RXB1n	2
36	RXB0p	RXB1p	3
35	GND	GND	4
34	RXB2n	RXB3n	5
33	RXB2p	RXB3p	6
32	GND	GND	7
31	RXBLOS	ModSelL	8
30	Vcc1	ResetL	9
29	VccTx	VccRx	10
28	RXALOS	SCL	11
27	ModPrsL	SDA	12
26	GND	GND	13
25	RXA4p	RXA3p	14
24	RXA4n	RXA3n	15
23	GND	GND	16
22	RXA2p	RXA1p	17
21	RXA2n	RXA1n	18
20	GND	GND	19

Pin Function Definitions

PIN	Logic	Symbol	Name/Description	Note
1		GND	Ground	1
2	CML-I	RxB1n	Transmitter Inverted Data Input	
3	CML-I	RxB1p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	RxB3n	Transmitter Inverted Data Input	
6	CML-I	RxB3p	Transmitter Non-Inverted Data output	
7		GND	Ground	1
8	LVTTLL-I	ModSelL	Module Select	
9	LVTTLL-I	ResetL	Module Reset	3
10		VccRx	+ 3.3V Power Supply Receiver	2
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	RxA3p	Receiver Non-Inverted Data Output	
15	CML-O	RxA3n	Receiver Inverted Data Output	

16		GND	Ground	1
17	CML-O	RxA1p	Receiver Non-Inverted Data Output	
18	CML-O	RxA1n	Receiver Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	RxA2n	Receiver Inverted Data Output	
22	CML-O	RxA2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	RxA4n	Receiver Inverted Data Output	1
25	CML-O	RxA4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTL-O	ModPrsL	Module Present	
28	LVTTL-O	RXALOS	Channel A los	
29		VccTx	+3.3 V Power Supply transmitter	2
30		Vcc1	+3.3 V Power Supply	2
31	LVTTL-I	RXBLOS	Channel B los	
32		GND	Ground	1
33	CML-I	RxB2p	Transmitter Non-Inverted Data Input	
34	CML-I	RxB2n	Transmitter Inverted Data Output	
35		GND	Ground	1
36	CML-I	RxB0p	Transmitter Non-Inverted Data Input	
37	CML-I	RxB0n	Transmitter Inverted Data Output	
38		GND	Ground	1

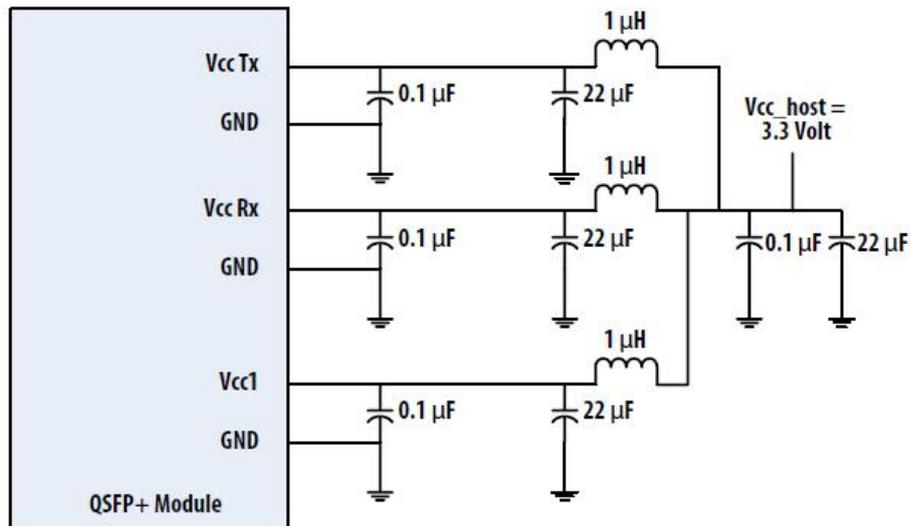
Note1. GND is the symbol for signal and supply (power) common for QSFP modules. All are common within the QSFP module and all module voltages are referenced to this potential unless otherwise noted. Connect these directly to the host board signal common ground plane.

Note2. VccRx, Vcc1 and VccTx are the receiver and transmitter power suppliers and shall be applied concurrently.

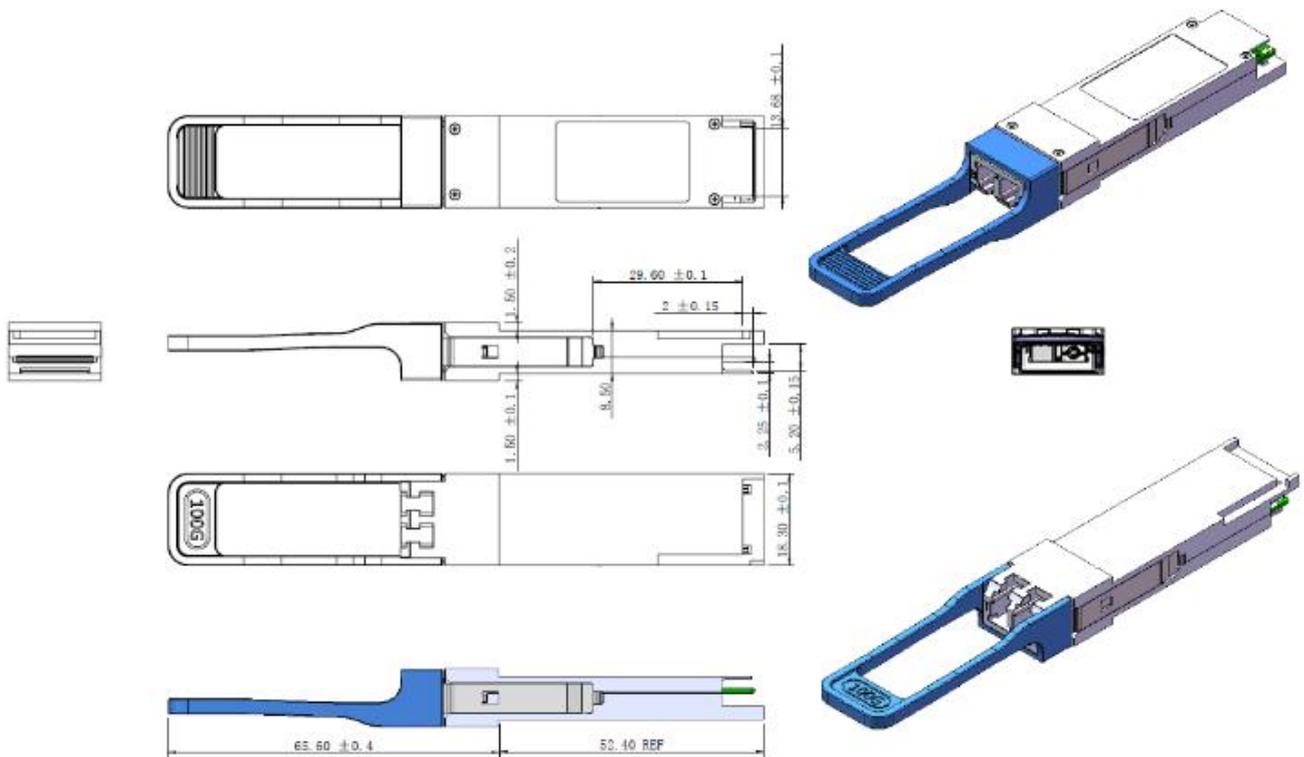
Recommended host board power supply filtering is shown below. Vcc Rx, Vcc1 and Vcc Tx may be internally connected within the QSFP transceiver module in any combination. The connector pins are each rated for a maximum current of 500mA.

Note3. ResetL PIN can reset the whole module. The software reset can control the A or B Channel by setting A0 Byte65 Bit0 and Bit1. Bit0 control Channel A, and Bit1 control Channel B. The value 0 means normal mode, and value 1 means reset mode.

Recommended Host Board Power Supply Circuit



Mechanical Dimension



All dimensions in mm

Eye Safety

These transceivers are Class 1 laser products. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

Obtaining Document

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