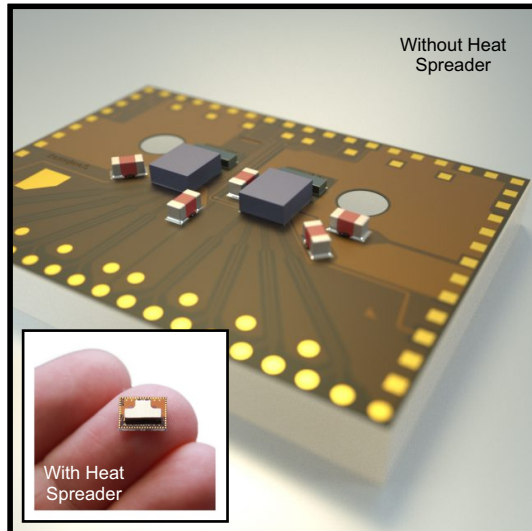


Fibre-Lyte 4x10G Transceiver Module

Features

- Highly integrated module with VCSELs, drivers, PDs and TIAs in an incredibly small **9.5x7.0x2.5mm**.
- Integrated optical waveguides.
- LGA pin out.
- Flexible mechanical interfacing.
- Low cost through wafer scale production processes.
- RoHS compliance.



Options

- 5G, 12.5G, 14G and 16G per channel operation.
- Long wavelength transmission.
- Passive MT/MPO alignment holes.
- Customer specified optical devices, drivers and TIAs.
- Reduced dimensions.
- Removable interconnects e.g. ACF or pin sockets.
- Custom variants.

Dimensions	Typ.	Units
Length	9.5	mm
Breadth	7.0	mm
Height	2.5	mm

Applications

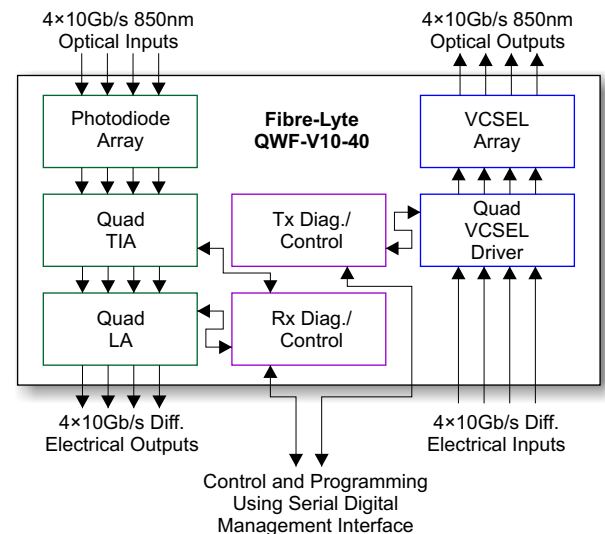
- Active optical cables (AOCs)
- Data storage and HPC I/O interfaces.
- ASIC/FPGA optical interfaces.
- Transceivers.

Overview

Conjunct's Fibre-Lyte transceiver is the world's smallest integrated transceiver module available today and is designed to interface with an external lens system or a range of proprietary connectors.

The module offers excellent electronic and optical performance and its small size allows it to be integrated into most platforms including PCBs. It is capable of being soldered, wire bonded, glued or flip chipped.

Functional Block Diagram



Performance

Fibre-Lyte Performance	Min.	Typ.	Max.	Units	Notes
Detection Wavelength	840		860	nm	
Emission Wavelength	840	850	860	nm	
Optical Crosstalk			-32.25	dBm	Rx measurement, 850nm, equipment limited.
Optical Coupling Efficiency		60		%	Underfilled components, no AR top surface.
Operational Temperature Range	0		85	°C	Assume +15°C over ambient in system.
Data Rate (Per Channel)		10	12.5	Gb/s	NRZ operation. Determined by components.
Optical Link Budget		13		dB	VCSEL at typical 2mW, 6mA. Target BER 10 ⁻¹² .
Power Consumption		500	674	mW	Total of all components.
Differential Signal Return Loss			-20	dB	15GHz, module RF performance.
Differential Signal Insertion Loss			-0.35	dB	15GHz, module RF performance.
Near End Electrical Crosstalk			-38	dB	15GHz, module RF performance.
Far End Electrical Crosstalk			-48	dB	15GHz, module RF performance.
Differential to Common Mode Conversion			-46	dB	15GHz, module RF performance.

Conjunct

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Fibre-Lyte 4x10G Electrical Performance

Fibre-Lyte Configuration	Status	Type	Rev.	Manufacturer
1x4 SW ULMPIN-14-TT-N0104Y	Preliminary	PD	v02	Philips-ULM
1x4 SW ULM850-14-TT-N0104Y	Preliminary	VCSEL	v02	Philips-ULM
1x4 IPTA12G011	Production	TIA/LA	08	IPtronics
1x4 IPVD12G011	Production	Driver	09	IPtronics

PD	Min.	Typ.	Max.	Units	Notes
Reverse Bias Voltage		-2	-20	V	
Photodetector Responsivity		0.6		A/W	
Variation of Responsivity		TBC		%	
Photodetector Dark Current		0.02	0.2	nA	At 25°C.
Capacitance		200		fF	

VCSEL	Min.	Typ.	Max.	Units	Notes
Threshold Current		0.7	1.5	mA	Typ. at 25°C, max at 85°C.
Slope Efficiency		0.4		W/A	
Roll-Off (P_{max})		TBC		mW	
Absolute Maximum Current			12	mA	
Signal Rise and Fall Time		30		ps	20% to 80%
Slope Efficiency Variation Over Temp.		-0.45		%/°C	0...85°C.
Wavelength Tuning Over Temperature		0.07		nm/K	

TIA/LA Amplifier	Min.	Typ.	Max.	Units	Notes
Input Sensitivity		20		µA p-p	BER 10^{-12} .
Low Frequency Cutoff		175		kHz	
Output Transition Time		24	28	ps	
Deterministic Jitter			5.8	ps	
Random Jitter			1.6	ps	
Power Supply Voltage	3.15	3.3	3.45	V	RX_VDD pins.
Power Dissipation		276	401	mW	69mW per channel typ., includes load.
Differential Output Amplitude	0		739	mV p-p	Programmable, RX_DOx and RX_DONx.
Differential Output Pre-Emphasis	0		2×325	mV p-p	Programmable, add to RX_DOx and RX_DONx.
Termination Resistance	100	120	140	Ohms	Differential, RX_DOx and RX_DONx.
Differential Parameters <8.8GHz			-8.9	dB	RX_DOx and RX_DONx. S_{22} .
Differential Parameters >8.8GHz			Notes	dB	Formula: $-10+(16.6 \times \log_{10}(f/8.8))$, with f in GHz. S_{22} .

VCSEL Driver	Min.	Typ.	Max.	Units	Notes
Electrical Crosstalk			-29.4	dB	
Channel to Channel Skew		1	10	ps	
Deterministic Jitter			2.3	ps	To be tested in production.
Random Jitter			1.6	ps	To be tested in production.
Power Supply Voltage	3.15	3.3	3.45	V	TX_VDD pins.
Power Dissipation		224	273	mW	56mW per channel typ., includes VCSEL.
Differential Input Voltage	300		1200	mV p-p	TX_DIx and TX_DINx voltage limits.
Single Ended Input Voltage	60		600	mV p-p	TX_DIx and TX_DINx voltage limits.
Differential Termination Resistance	85	100	115	Ohms	
Differential Parameters <8.8GHz			-10	dB	TX_DIx and TX_DINx. S_{11} .
Differential Parameters >8.8GHz			Notes	dB	Formula: $-10+(16.6 \times \log_{10}(f/8.8))$, with f in GHz. S_{11} .

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