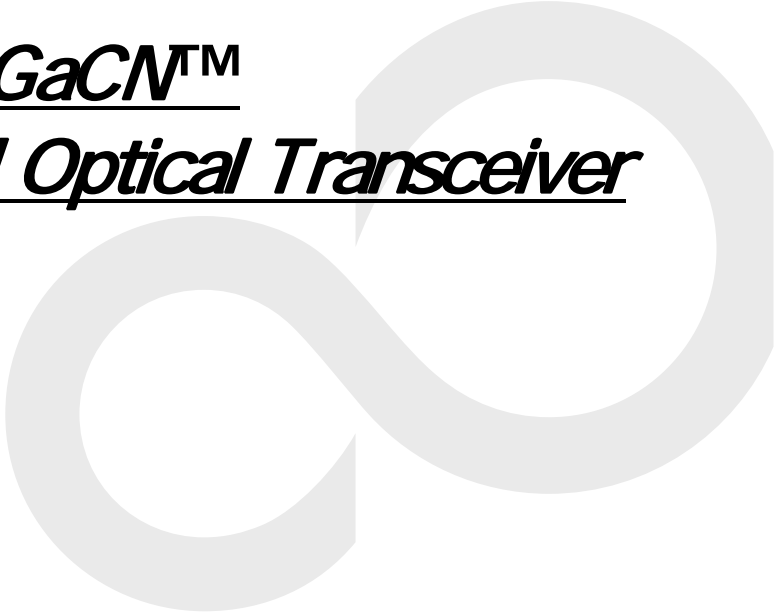


o-microGiGaCN™
4-Channel Optical Transceiver



FUJITSU COMPONENT LIMITED

shaping tomorrow with you

Copyright 2010 FUJITSU COMPONENT LIMITED

o-microGiGaCN™ *4-Channel Optical Transceiver*

Part Number of Module: FPD-10*R008-0E



Figure 1: Over view

Description

Newly developed optical transceiver, FUJITSU COMPONENT's o-microGiGaCN™ series supports electric to optical interface conversion and provides 5 Gbps x 4 channel, bidirectional data transfer. The Electrical interface is FUJITSU COMPONENT's industry standard high-speed differential copper connector, microGiGaCN™ that has been selected by InfiniBand™ and 10G Ethernet.

The o-microGiGaCN™ makes it possible to extend transmission length up to 300m (2.5Gbps) over fiber optic cable from Industry Standard 4 lane copper cable with Media Detection Circuit (connector detect and power supply circuit) on the customer's board/host side. The module provides flexibility, allowing the user to select interface options with the one low cost copper I/O connector on the board. The module provides a low cost solution for data center requirements.

Features

- Converts 4x microGiGaCN™ to 4x optical interface
- Optical interface 12-channel MPO connector
- Up to 100m links with standard 50/125um MMF ribbon cable at 3.125Gbps and 5 Gbps, and up to 300m at 2.5 Gbps
- Reliable, Low cost 850nm VCSEL technology
- 0 to + 50 degree C operating temperature range
- Low power: 0.9 Watts Typical with 3.3V power supply supplied through connector
- Hot Pluggable electrical interface
- IEC Class 1M laser eye safety compliant
- RoHS compliant

Absolute Maximum Rating

Stress beyond the values stated below may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Table 1: Absolute Maximum Rating

Parameter	Minimum	Typical	Maximum	Units	Notes
Storage Temperature	-20		+85	degree C	
Relative Humidity	5		95	%	
Supply Voltage	3.14	3.3	3.47	V	

Recommended Operating Conditions

Table 2: Operating Conditions

Parameter	Minimum	Typical	Maximum	Units	Notes
Operating Temperature	0		+50	degree C	
Operating Humidity			85	%	
Operating Case Temperature	0		+70	degree C	
Differential Peak-to-peak Input Voltage	100		1600	mV _{p-p}	

Notes:

1. Transmitter Differential Input Voltage = $(V_{in+p-p}) - (V_{in-p-p})$
2. Limits assume PRBS2²³-1. Signaling rates lower than indicated may be used with encoding schemes such as 8B/10B coding.

Electrical Characteristics

Table 3: Receiver Electrical Characteristics

(Operating Temperature: +20 to +50 , Power Supply: 3.14V to 3.47V)

Parameter	Minimum	Typical	Maximum	Units	Notes
Differential Peak-to-Peak Output Voltage	400		800	mV	1
Contributed Deterministic Jitter			54	ps	
Contributed Total Jitter			112	ps	

Notes:

1. Outputs are compatible with 10K, 10KH, 100K ECL and PECL inputs.

Optical Characteristics (Reference)

Table 4: Transmitter Optical Characteristics

(Operating Temperature: +20 to +50 , Power Supply: 3.14V to 3.47V)

Parameter	Minimum	Typical	Maximum	Units	Notes
Output Optical Power			-2.0	dBm avg.	
Input Optical Power			-2.0	dBm avg.	
Wavelength	830	850	860	nm	

Laser Eye Safety

The transceiver comply with Laser Product Class 1M laser eye safety requirements per IEC/RN 60825-1 Amendment 2: 2001.

LED Indicator

Table 5: LED Indicator

LED light up	Status
Not light up	The power is not supplied.
Green light up	Power on, Input Optical Power >-17dBm
Green and Red light up	Power on. Input Optical Power <-30dBm

Link Overview

Optical link carries a duple 4x link as shown in Figure 2.

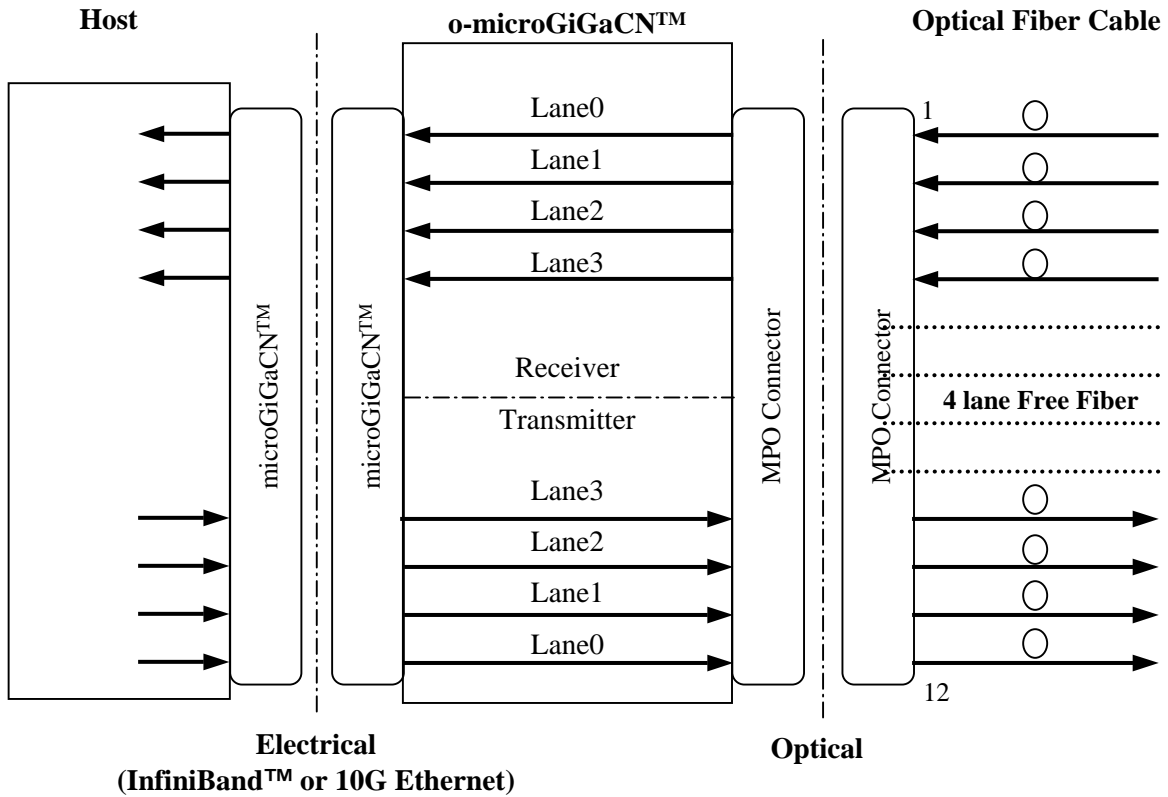


Figure 2: o-microGiGaCN™ Link Overview

Link Distance

The following Table 8 lists the reach distance of the o-microGiGaCN™ for different multi-mode (MMF) types and bandwidths. Each case includes a maximum of 2 dB per channel connection loss for path cables.

Table 6: Link distance

Data rate \ MMF type	50/125 um 500MHz.km	50/125 um 2000MHz.km
2.5 Gbps / channel	300m	500m
3.125 Gbps / channel	100m	200m
5 Gbps / channel	100m	200m

Optical Fiber Cable Specification

The following Table 7 the optical fiber cable specification for o-microGiGaCN™.

Table 7: Optical fiber cable specification

Item	Value	Note
Connector type	MPO/MTP	
Polishing	Flat Polishing	
Polarity	Without pin	
Channel	12 channels	
Fiber Type	Multi Mode, 50/125um, GI, Ribbon type	
Insertion Loss	1.0dB max	
Transmission Band	500MHz*km or 2000MHz*km	

Supply Power to the o-microGiGaCN™

The microGiGaCN™ usually does not provide power for the module. The draft proposal of FC-PI-2 allows the re-assignment of some ground pins as power pins, as shown in the following Table 8.

This re-assignment does not affect the function or performance of standard cable connection for InfiniBand™ and 10G Ethernet applications, as the power is added only when the system is sure the attached module is “active”. The re-assigned pins are all AC ground to minimize the effect on high-speed signal integrity.

Table 8: Pin assignment in FC-PI-2

Connector Pin Number	Alternate Signal Definitions
G1	Signal Ground
G2	ODIS
G3	Signal Ground
G4	Signal Ground
G5	Signal Ground
G6	Fault-
G7	Type_Sense
G8	Vcc
G9	Signal Ground
S1	RX0+
S2	RX0-
S3	RX1+
S4	RX1-
S5	RX2+
S6	RX2-
S7	RX3+
S8	RX3-
S9	TX3-
S10	TX3+
S11	TX2-
S12	TX2+
S13	TX1-
S14	TX1+
S15	TX0-
S16	TX0+
Housing	Chassis Ground

FUJITSU COMPONENT recommends the following Figure 3 on customer's board to perform the media detect function. The circuitry uses less than 1/4 square inch of board space on a single layer, and use less than 1mA of current.

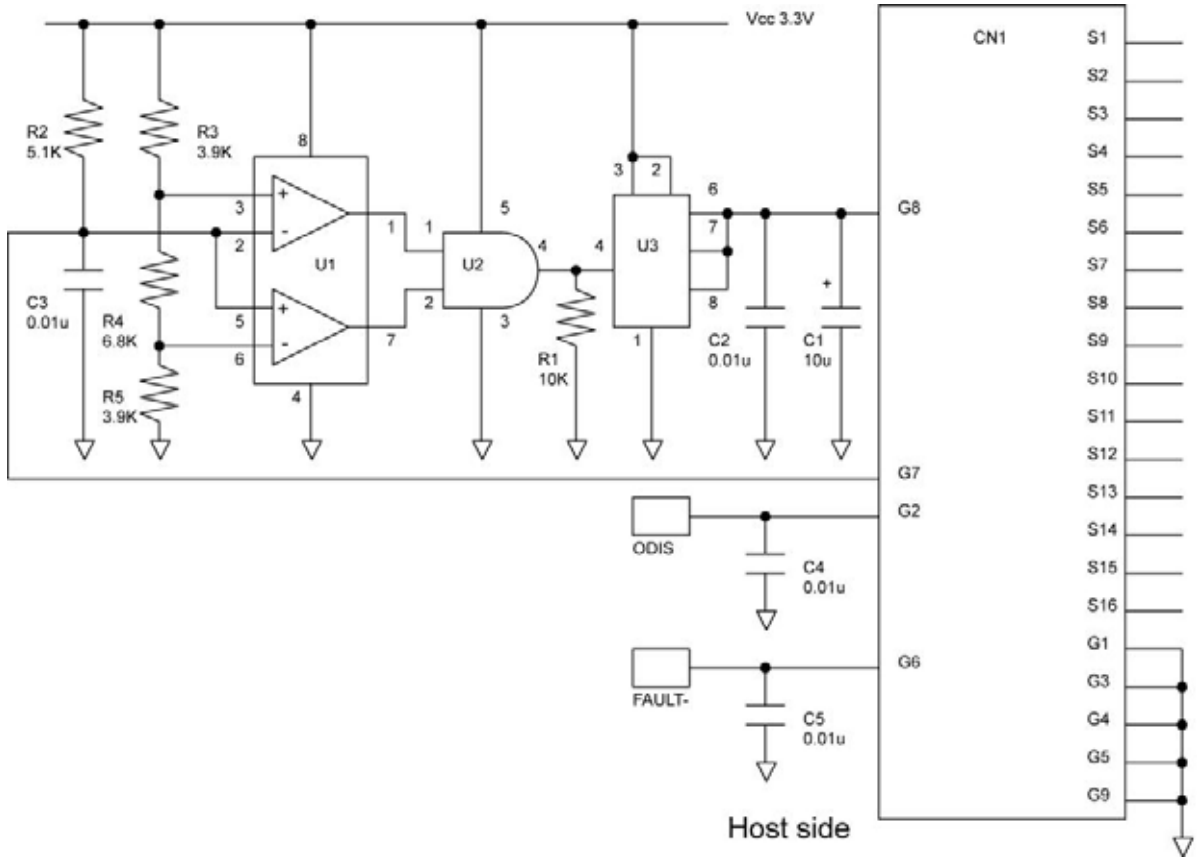


Figure 3: Recommended MDC

ODIS (Optics Disable) -Input-: Disable the optics when this signal is pull HIGH. Enables the optics when this signal is pull LOW. If it is tied to GND then the optical transmitter is default on when power is applied.

FAULT- (TX_Fault Indicator) –Open Drain Output-: It is default high, and will turn low when there is a fault. Shorting this pin to ground will not affect the performance of the module.

The recommended parts are listed in the following Table 9.

Table 9: Recommended parts of MDC

Item	Designator	Description	Q'ty	Maker	Part number
1	U1	Dual push-pull output comparator	1	Maxim	MAX9032AKA
2	R2	5.1K 0402 resistor	1		
3	R1	10K 0402 resistor	1		
4	R3, R5	3.9K 0402 resistor	2		
5	R4	6.8K 0402 resistor	1		
6	C3, C4, C5	0.01 uF ceramic 0402 capacitor	3		
7	U2	Single 2-Input Positive-AND Gate	1	TI	SN74AHC1G08DCKR
8	U3	Power Distribution Switch	1	TI	TPS2031D
9	C2	0.1 uF ceramic 0402	1		
10	C1	10 uF Tantulum Case B capacitor	1		
11	CN1	microGiGaCN™	1	Fujitsu	

Product Family

Module

Part Number	Data rate
FPD-101R008-0E	3.125 Gbps / channel
FPD-102R008-0E	5Gbps / channel

Dimensions of o-microGiGaCN™ is shown as following Figure 4.

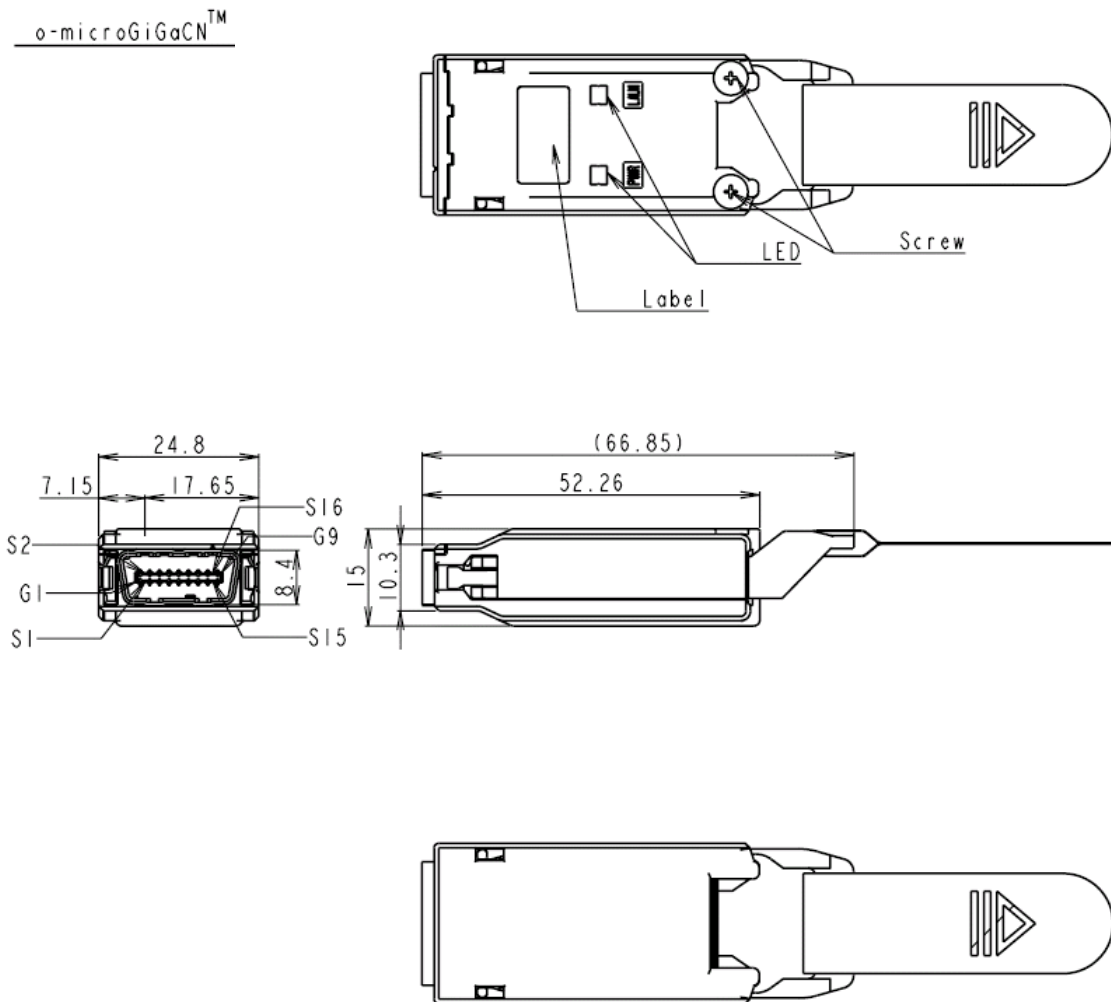
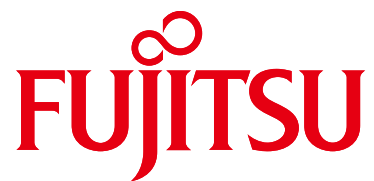


Figure 4: Dimensions

In a continuing effort to improve our products, FUJITSU COMPONENT reserve the right to change specifications/datasheets without prior notice.



shaping tomorrow with you