GJS1L0C85

25Gb/s SFP+ SR 100m optical Transceiver

Overview

GJS1L0C85 optical transceivers are based on 25GEthernet IEEE802.3 standard.

They are compliant with FC-PI-6、SFF-8402、SFF-8419、SFF-8432 and SFF-8472, providing a fast and reliable interface for 25G Ethernet applications. The product implements the digital diagnostics required by the SFF-8472 via a 2-wire serial bus.

Features

• Operating data rate support 25.2Gbps to 28.1Gbps

• Compliant with IEEE 802.3

• Compliant with FC-PI-6

• Compliant with SFF-8402

• Compliant with SFF-8419

• Compliant with SFF-8432

• Compliant with SFF-8472

• Clock data recovery on transmit and receive channels CDR

• Hot-pluggable SFP+ footprint

• 850nm VCSEL laser transmitter

• Duplex LC connector

• Built-in digital diagnostic functions

• Up to 70m on OM3 MMF and 100m on OM4 MMF

• Single power supply 3.3V

• RoHS-6 Compliant

• Operating temperature range: 0℃ to 70℃(Case temperature)

Applications

• 25GBASE-SR Ethernet

• eCPRI Wireless Networks

Ordering Information

Part Number	Description	Color on Clasp
GJS1L0C85	25GBASE-SR SFP28 850nm LC Connectors, up to 70m(OM3) or 100m(OM4) on MMF, with DOM function	Black

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General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Operating Temperature	T_C	0		70	°C	1
Storage Temperature	TSTO	-40		85	°C	2
Supply Current	ICC		145	290	mA	3
Input Voltage	VCC	3.15	3.3	3.46	V	
Maximum Voltage	VMAX	-0.5		4	V	3

Notes:

1. Case temperature
2. Ambient temperature
3. For electrical power interface

Link Distances

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data rate	DR		25.78		Gbps	1
Bit error rate	BER			5×10^{-5}		2
OM3 multimode fiber (bandwidth 2000MHz*km)	L			70	M	3
OM4 multimode fiber (bandwidth 4700MHz*km)	L			100	M	3

Notes:

1. IEEE802.3
2. Measured with data rate at 25.78Gbps, PRBS 2^{31}-1
3. This module requires RS-FEC on the host ports for operation at 25G

Optical – Characteristics – Transmitter

VCC=3.15V to 3.46V,TC=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Optical Power	PTX	-8.4		2.4	dBm	1
Optical Center Wavelength	λ_C	840	850	860	nm	
Optical Modulation Amplitude	OMA	-6.4		3	dBm	
Extinction Ratio	ER	2			dB	
Spectral Width (RMS)	$\Delta\lambda$			0.6	nm	
Relative Intensity Noise	RIN			-128	dB/Hz	
Transmitter Dispersion Penalty	TDP			4.3	dB	

Notes:

1. Average

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Optical – Characteristics – Receiver

VCC=3.15V to 3.46V, TC=0℃ to 70℃

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Optical Center Wavelength	λC	840	850	860	nm	
Optical Input Power@25.78Gbps	PRX	-10.3		3	dBm	1
Optical Return Loss	ORL	12			dB	
LOS Assert	LOSA	-30			dBm	
LOS De-Assert	LOSD			-13	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:
1. Average

Electrical – Characteristics – Transmitter

VCC=3.15V to 3.46V,TC=0◦C to 70◦C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	RIN		100		Ω	
Differential data input swing	VIN PP	180		1600	mV	
Transmit Disable Voltage	VD	2		VCC	V	
Transmit Enable Voltage	VEN	VEE		VEE+0.8	V	

Electrical – Characteristics – Receiver

VCC=3.15V to 3.46V,TC=0◦C to 70◦C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Differential output swing	VOUT PP	370	600	850	mV	
LOS Assert	LOS A	2		VCC	V	
LOS De-Assert	LOS D	VEE		VEE+0.5	V	

Digital Diagnostic Functions

GJS1L0C85 supports the 2-wire serial communication protocol defined in SFF-8472,which accesses digital diagnostic information via a 2-wire interface at address 0xA2. Digital diagnostics default to internal calibration, and the internal micro-control unit accesses device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power, and transceiver supply voltage in real time. The module implements the alarm function of the SFF-8472, alerts the user when a particular operating parameter exceeds the factory-set normal range.

Digital Diagnostic Threshold Range				
Parameter	High Alarm(HEX)	High Warning(HEX)	LowWarning(HEX)	Low Alarm(HEX)
Temperature(°C)	80(0x5000)	70(0x4600)	0(0x0000)	-10(0xF600)
Voltage(V)	3.63(0x8DCC)	3.46(0x8728)	3.13(0x7A44)	2.97(0x7404)
Bias Current(mA)	9(0x1194)	8(0x0FA0)	4(0x07D0)	2(0x03E8)
Tx Power(dBm)	5(0x7B86)	3(0x4DF0)	-9(0x04EB)	-11(0x031B)
Rx Power(dBm)	5(0x7B86)	3(0x4DF0)	-15(0x013D)	-17(0x00C8)

A0、A2 Write Protection

Security Level 1 Password		
Password Entry ADDr	Size	Vaules(HEX)
Page A2, 7BH-7EH	4	00 00 00 00

Gearlink's GJS1L0C85 has the A0/A2 write protection function.The user can enter the security level 1 working state and write the contents of Table 00 and Table 01 of the device address A0H and A2H of the module. The method to enter the working state of security level 1 is to write the security level 1 password in order in the 7BH-7EH registers of A2h of the module. After entering security level 1, the user can directly write to the contents of the A0H device address, or modify the contents of the A2H 7F table selection register to write to the contents of Table 00 or Table 01. This version of the module does not support users to modify the password of security level 1. If you need to modify the security level 1 password, you must notify our company to modify it before shipping.

IIC Memory Map(Page A0 HEX, Unlisted Fields are Blank/Empty)

IIC ADDr	Name	Description	Vaules(HEX)
0	Identifier	SFP	03
1	Ext. Identifier	Ext. Identifier	04
2	Connector	Connector Type=LC	07
3-10	Transceiver	25G Base SR	00 00 00 00
11	Encoding	Code for high speed serial enconding	06
12	BR,Nominal	Nominal Bit Rate 25.78Gbps	FF
13	Rate Identifier	Type of rate select functionality	00
14	Length(9um)-km	Link Length in Thousands of Meters/SMF=NA	00
15	Length(9um)100m	Link Length in Hundreds of Meters/SMF=NA	00
16	Length(50um)10m	50-micron MMF Link Length=NA	00
17	Length(62.5um)10m	62.5-micron MMF Link Length=NA	00
18	Length(OM4)10m	100m Link Length in OM4 MMF	0A
19	Length(OM3)10m	70m Link Length in OM3 MMF	07
20-35	Vendor name	OEM	ASCII Format
36	Transceiver	Code for electronic or optical compatibility	00
37-39	Vendor OUI	SFP Vendor IEEE Company ID	00 00 00
40-55	Vendor PN	The Part number in the Ordering Information	ASCII Format

56-59	Vendor rev	Programmed by Factory	Programmed by Factory
60-61	Wavelength	Laser Wavelength=850nm	03 52
62	Reserved	Reserved	00
63	CC_BASE	Check sum of bytes 0-62	Programmed by Factory
64-65	Transceiver Options	1.Internal CDR	08 1A
66	BR,max	Upper bit rate margin	00
67	BR,min	Lower bit rate margin	00
68-83	Vendor SN	Vendor SN	Programmed by Factory
84-91	Date code	Year,Month,Day	Programmed by Factory
92	Diagnostic Monitoring	Internally Calibrated Received power measurement type-	68
93	Enhanced Options	1.Optional Alarm/Warning Flags Implemented	FA
94	SFF-8472 Compliance	Indicates which revision of SFF8472 the transceiver	08
95	CC_BASE	Check sum of bytes 64-94	Programmed by Factory
96-127	Vendor Specific	Vendor Specific EEPROM	Programmed by Factory
128-255	Reserved	Vendor Specific	Programmed by Factory

Block-Diagram-of-Transceiver
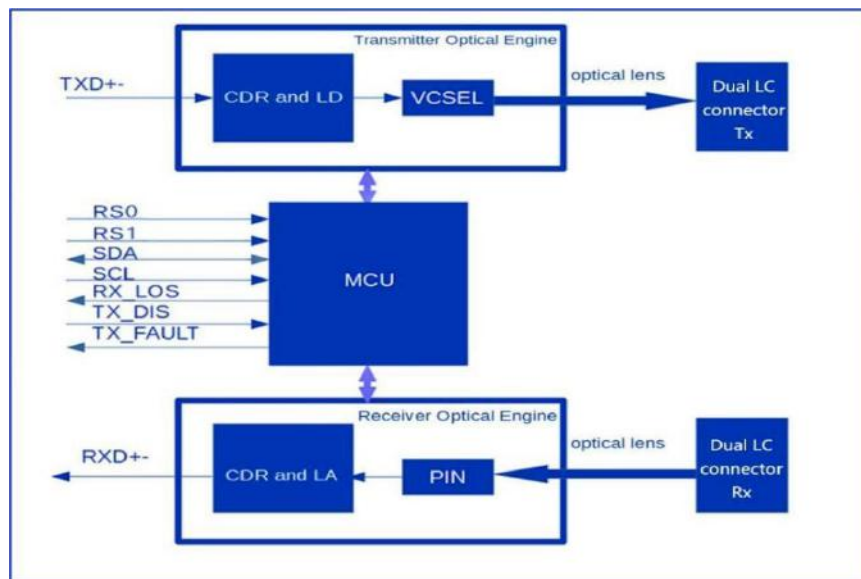
Functions Description

GJS1L0C85 module is manufactured using the advanced COB(Chip on Board) process. It consists of a microcontroller, a transmitter optical engine and a receiver optical engine. The module has built-in clock and data recovery functions.The operating rate range of the build-in CDR for the transmitter and receiver is: 25.2-28.1Gbps. If you need other speed range versions or dual rate range versions, you can contact us for special customization. Our company can also provide custormized of vulcanization resistant hardware.

Microcontrollers communicate with the host via a 2-wire serial communication interface, providing module control, status reporting and monitoring (DOM), which is SFF-8472 compliant.

The transmitter optical engine includes a transmitter clock recovery circuit (CDR) and a laser driver circuit (LD), a VCSEL laser, and a detection photodiode (MPD). The high-speed differential electrical signal output by the host is recovered by the CDR, sent to the laser driver for amplification, and the VCSEL laser is driven to generate an optical signal, which is coupled to the optical fiber through the optical lens. The light engine integrates a photodiode for detection for output optical power detection, and the laser driver uses an automatic optical power control loop to ensure the stability of the transmitted optical power.

The receiving end light engine includes a photodiode (PIN), a signal amplifier (TIA/LA) and a receiving end clock data recovery circuit (CDR). The optical signal in the optical fiber is coupled to the receiving photodiode (PIN) through the optical lens to be converted into The photo-generated current, the photogenerated current signal is amplified by the amplifier, sent to the CDR circuit and recovered from the clock and data signals, and finally output to the host as a high-speed differential signal. The microcontroller reads the light intensity received by the photodiode and reports the loss of the received signal if it falls below the set threshold.

Dimensions

Module Weight：16.0g
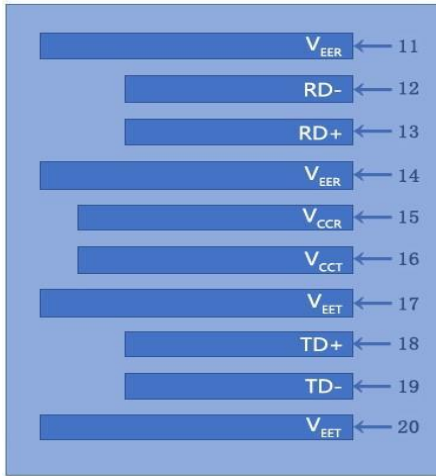
Dust Cap Weight：0.95g
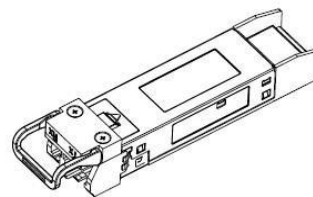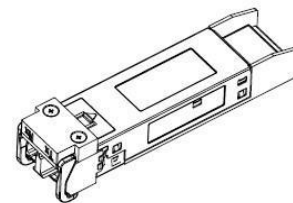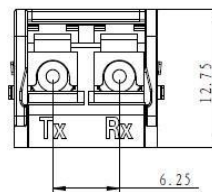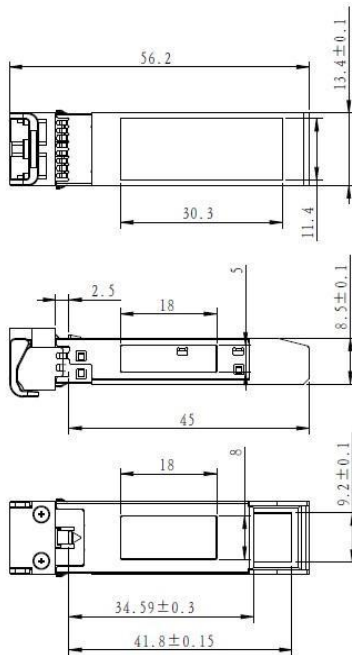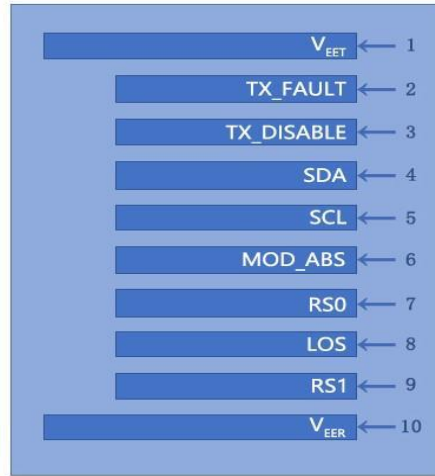

ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED
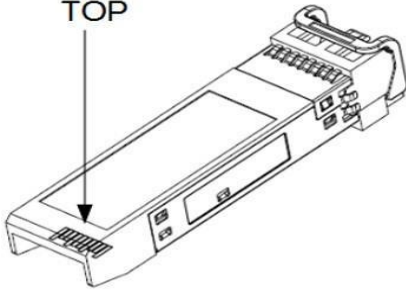UNIT: mm

Electrical Pad Layout

Top View Of Board

Pad	Signal
11	V_{EER}
12	RD-
13	RD+
14	V_{EER}
15	V_{CCR}
16	V_{CCT}
17	V_{EET}
18	TD+
19	TD-
20	V_{EET}

Bottom View Of Board

Pad	Signal
1	V_{EET}
2	TX_FAULT
3	TX_DISABLE
4	SDA
5	SCL
6	MOD_ABS
7	RS0
8	LOS
9	RS1
10	V_{EER}

TOP

Bottom
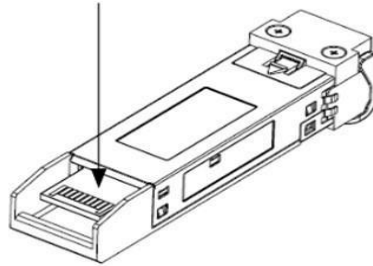
Typical Eye Diagram
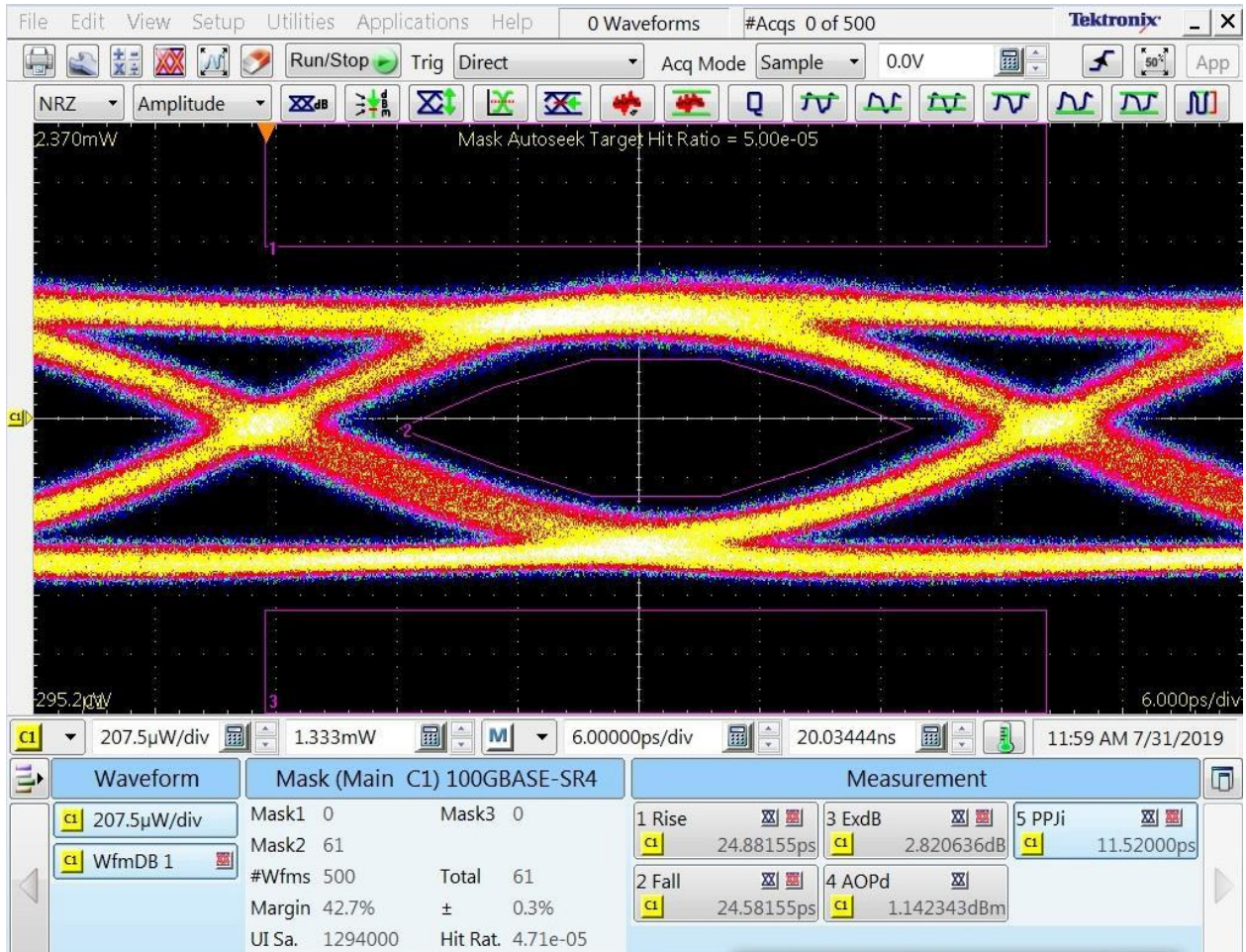
Pin Assignment

PIN #	Symbol	Description	Remarks
1	VEET	Transmitter ground (common with receiver ground)	1
2	TX FAULT	Transmitter Fault	
3	TX DISABLE	Transmitter Disable. Laser output disabled on high or open	2
4	SDA	2-wire Serial Interface Data Line	3
5	SCL	2-wire Serial Interface Clock Line	3
6	MOD ABS	Module Absent. Grounded within the module	3
7	RS0	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	4
9	RS1	No connection required	1
10	VEER	Receiver ground (common with transmitter ground)	1
11	VEER	Receiver ground (common with transmitter ground)	1
12	RD–	Receiver Inverted DATA out. AC coupled	
13	RD+	Receiver Non-inverted DATA out. AC coupled	

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14	VEER	Receiver ground (common with transmitter ground)	1
15	VCCR	Receiver power supply	
16	VCCT	Transmitter power supply	
17	VEET	Transmitter ground (common with receiver ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC coupled	
19	TD–	Transmitter Inverted DATA in. AC coupled	
20	VEET	Transmitter ground (common with receiver ground)	1

Notes:

1. Circuit ground is isolated from chassis ground

2. Disabled: T_{DIS}>2V or open,Enabled: T_{DIS}<0.8V

3. Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V

4. LOS is open collector output

References

1.IEEE standard 802.3. IEEE Standard Department, 2018

2.FIBRE CHANNEL Physical Interface-6(FC-PI-6).Rev3.10 October 25, 2013

3.SFF-8402 SFP+ 1X28 Gb/s Pluggable Transceiver Solution(SFP28).Rev1.1 September 13, 2014

4.SFF-8419 SFP+ Power and Low Speed Interface.Rev1.3 June 11, 2015

5.SFF-8432 SFP+ Module and Cage.Rev5.2a November 30, 2018

6.SFF-8472 Management Interface for SFP+.Rev12.3. July 29, 2018