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Optical Network Transceiver Innovator

GPB-4303x-L6C(D)

155Mbps SFP Bi-Directional Transceiver, 60km Reach 1490nm TX / 1310 nm RX

Features

- Up to 155Mbps data-rate
- 1490nm DFB laser and PIN photodetector for 60km transmission
- Compliant with SFP MSA and SFF-8472 with simplex LC receptacle
- Digital Diagnostic Monitoring:
 Internal Calibration or External Calibration
- Compatible with RoHS
- +3.3V single power supply
- Operating case temperature:

Standard: 0 to +70°C

Applications

- ◆ SDH STM-1, S-1.1,L-1.1, L-1.2
- SONET OC-3 IR1,LR1,LR2
- Other optical links

Description

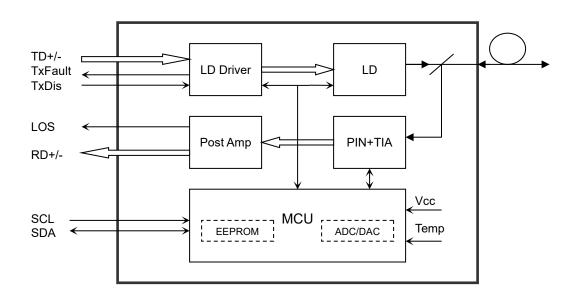
The SFP-BIDI transceivers are high performance, cost effective modules supporting data-rate of 155Mbps and 60km transmission distance with SMF.

The transceiver consists of three sections: a DFB laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement (MSA) and SFF-8472. For further information, please refer to SFP MSA.

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Absolute Maximum Ratings

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Conditions

Table 2 - Recommended Operating Conditions

Parameter		Symbol	Min	Typical	Max	Unit
Operating Case Temperature Standard		Тс	0		+70	°C
Power Supply Voltage		Vcc	3.13	3.3	3.47	V
Power Supply Current		Icc			300	mA
Data Rate				155		Mbps

Optical and Electrical Characteristics

GPB-4303x-L6C(D): (DFB and PIN, 1490nm, 60km Reach)



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Table 3 - Optical and Electrical Characteristics

Parai	Parameter		Min	Typical	Max	Unit	Notes
			Transmit	tter			
Centre V	Vavelength	λς	1470	1490	1510	nm	
Spectral V	Vidth (-20dB)	Δλ			1	nm	
Side Mode Su	uppression Ratio	SMSR	30			dB	
Average C	Output Power	Pout	-3		+3	dBm	1
Extinct	tion Ratio	ER	9			dB	
Data Input Sv	wing Differential	V _{IN}	400		1800	mV	2
Input Differer	ntial Impedance	Z _{IN}	90	100	110	Ω	
TV District	Disable		2.0		Vcc	V	
TX Disable	Enable		0		0.8	V	
TV Fault	Fault		2.0		Vcc	V	
TX Fault	Normal		0		0.8	V	
			Receive	er			
Centre V	Centre Wavelength		1260		1360	nm	
Receive	Sensitivity				-32	dBm	3
Receive	r Overload		-3			dBm	3
LOS	e-Assert	LOSD			-32	dBm	
LOS Assert		LOSA	-45			dBm	
LOS Hysteresis			1		4	dB	
Data Output S	Data Output Swing Differential		400		1800	mV	4
	00	High	2.0		Vcc	V	
L	.OS	Low			0.8	V	

Notes:

- 1. The optical power is launched into SMF.
- PECL input, internally AC-coupled and terminated.
 Measured with a PRBS 2²³-1 test pattern @155Mbps, BER ≤1×10⁻¹⁰.
- 4. Internally AC-coupled.

Timing and Electrical

Table 4 - Timing and Electrical



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Parameter	Symbol	Min	Typical	Max	Unit
Tx Disable Negate Time	t_on			1	ms
Tx Disable Assert Time	t_off			10	μs
Time To Initialize, including Reset of Tx Fault	t_init			300	ms
Tx Fault Assert Time	t_fault			100	μs
Tx Disable To Reset	t_reset	10			μs
LOS Assert Time	t_loss_on			100	μs
LOS De-assert Time	t_loss_off			100	μs
Serial ID Clock Rate	f_serial_clock			400	KHz
MOD_DEF (0:2)-High	V _H	2		Vcc	V
MOD_DEF (0:2)-Low	VL			0.8	V

Diagnostics

Table 5 - Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal / External
Voltage	3.0 to 3.6	V	±3%	Internal / External
Bias Current	0 to 100	mA	±10%	Internal / External
TX Power	-3 to +3	dBm	±3dB	Internal / External
RX Power	-30 to -8	dBm	±3dB	Internal / External

Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

The diagnostic information with internal calibration or external calibration all are implemented, including

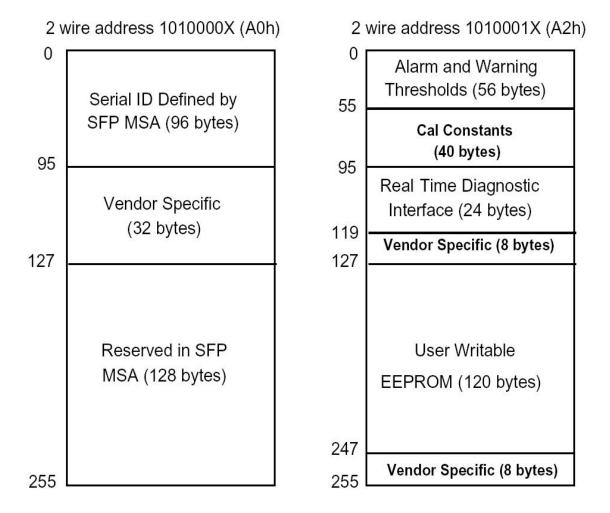


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received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



Pin Definitions

Pin Diagram

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20	VeeT	1 VeeT
19	TD-	2 TxFault
18	TD+	3 Tx Disable
17	VeeT	4 MOD-DEF(2)
16	VccT	5 MOD-DEF(1)
15	VccR	6 MOD-DEF(0)
14	VeeR	7 Rate Select
13	RD+	8 LOS
12	RD-	9 VeeR
11	VeeR	10 VeeR
	Top of Board	Bottom of Board (as viewed thru top of board)

Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1



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3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V _{EER}	Receiver ground	1	
10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V _{EET}	Transmitter Ground	1	

Notes:

Plug Seg.: Pin engagement seguence during hot plugging.

- 1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- 2) TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a $4.7k\sim10k\Omega$ resistor. Its states are:

Low (0 to 0.8V): Transmitter on (>0.8V, < 2.0V): Undefined

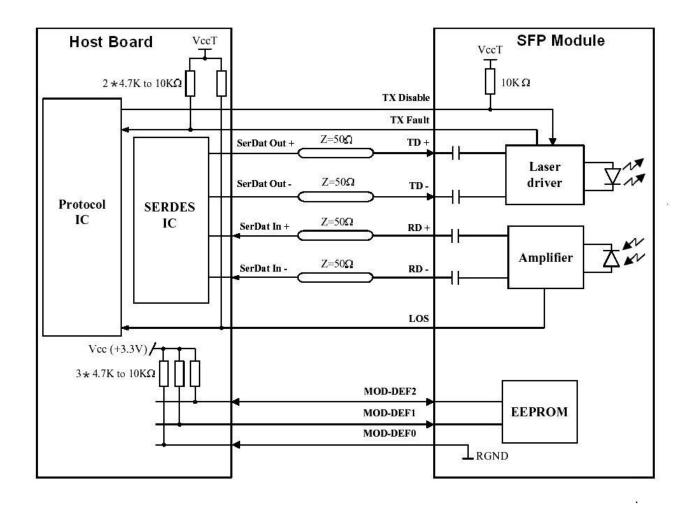
High (2.0 to 3.465V): Transmitter Disabled Open: Transmitter Disabled

- 3) Mod-Def 0,1,2. These are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.
 - Mod-Def 0 is grounded by the module to indicate that the module is present
 - Mod-Def 1 is the clock line of two wire serial interface for serial ID
 - Mod-Def 2 is the data line of two wire serial interface for serial ID
- 4) LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and Vcc+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
- 5) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- 6) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

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Recommended Interface Circuit

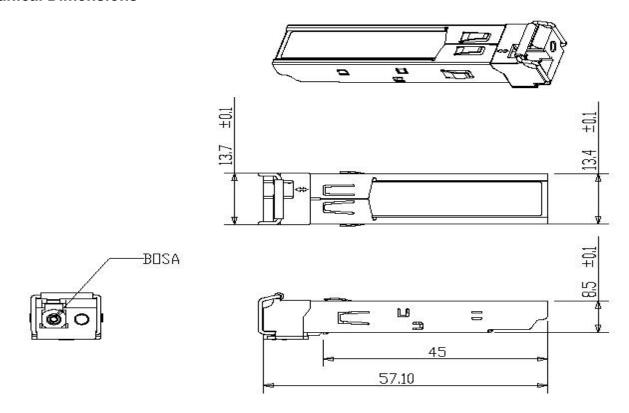




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Mechanical Dimensions



Ordering information

Part Number	Product Description	
GPB-4303S-L6C	1490nm, 155Mbps, SC, 60km,	0°C~+70°C
GPB-4303S-L6CD	1490nm, 155Mbps, SC, 60km,	0°C~+70°C, With Digital Diagnostic Monitoring
GPB-4303L-L6C	1490nm, 155Mbps, LC, 60km,	0°C~+70°C
GPB-4303L-L6CD	1490nm, 155Mbps, LC, 60km,	0°C~+70°C, With Digital Diagnostic Monitoring

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