

1.25Gbps BIDI GBIC Single-Mode 40km Optical Transceiver

BSGB-1G35-40-xx

BSGB-1G53-40-xx



Features

- Support 1.25Gbps data links
- A type: 1310nm Tx/1550nmRx
B type: 1550nm Tx/1310nmRx
- 40km with 9/125um SMF
- 3.3/5V Power supply and TTL Logic Interface
- Hot-Pluggable SFP Footprint Simplex SC Connector Interface
- Class 1 FDA and IEC60825-1 laser safety compliant
- Operating case temperature
Standard : 0°C to +70°C
Extended: -20°C to +85°C
Industrial: -40°C to +85°C
- Compliant with GBIC Specification Rev.5.5
- Compliant with IEEE 802.3z Gigabit Ethernet 1000BASE-SX
- Compliant with Fiber Channel FC-PH-2 for 100-M5-SN-1 and 100-M6-SN-1

Applications

- Gigabit Ethernet Switches and Routers
- Fiber Channel Switch Infrastructure
- Other optical link

Description

The GBIC BIDI series optical transceivers meet the Gigabit Interface Converter (GBIC) specification Rev.5.5. It satisfies the optical interface specifications defined in IEEE 802.3z Drift 5.0 for Gigabit Ethernet. This module is designed for singlemode fiber and operates at a nominal wavelength of 1310nm/1550nm.

The transmitter section uses a multiple quantum well FP laser and is a class 1 laser compliant according to International Safety Standard IEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

A PECL input / output logic interface is used. TTL RX-LOS output simplifies interface to external circuitry. A 20-pin SCA-2 host connector is used to connect the converter to the host system.

Specifications

Table 1 - Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.6	V

Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	-	95	%

Table 2 - Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard Temperature	0		+70	°C
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			300	mA
Data Rate	GBE		1.25		Gbps
	FC		1.063		

Table 3 - Performance Specifications - Electrical

Parameter		Symbol	Min	Typ	Max	Unit	Notes
Transmitter							
LVPECL Inputs(Differential)		Vin	400		2000	mVpp	AC coupled inputs*(note3)
Input Impedance (Differential)		Zin	85	100	115	ohms	Rin > 100 kohms @ DC
Tx_Dis	Disable		2		Vcc	V	
	Enable		0		0.8		
Tx_FAULT	Fault		2		Vcc+0.3	V	
	Norma		0		0.5		
Receiver							
LVPECL Outputs (Differential)		Vout	370		2000	mVpp	AC coupled outputs*(note3)
Output Impedance (Differential)		Zout	85	100	115	ohms	
Rx_LOS	LOS		2		Vcc+0.3	V	
	normal		0		0.8	V	
MOD_DEF (0:2)		VoH	2.5			V	With Serial ID
		VoL	0		0.5	V	

Optical and Electrical Characteristics
(BSGB-1G35-40-xx, 1310nm FP and PIN)

Parameter	Symbol	Min	Typical	Max	Unit
50µm Core Diameter MMF	L		40		km
Data Rate			1.063/1.25		Gbps
Transmitter					
Centre Wavelength	λC	1270	1310	1350	nm
Spectral Width (-20 dB)	Δλ			1	nm
Side Mode Suppression Ratio	SMSR	30			dB

Average Output Power ^{*(note1)}		Pout	-2	-3	dBm
Extinction Ratio ^{*(note2)}		ER	9		dB
Rise/Fall Time(20%~80%)		tr/tf		0.26	ns
Output Optical Eye ^{*(note2)}		Compatible with IEEE 802.3ah-2004 ^{*(note5)}			
TX_Disable Assert Time		t_off		10	us
Receiver					
Centre Wavelength		λ	1480	1580	nm
Receiver Sensitivity ^{*(note4)}	GBE	Pmin		-24	dBm
	FC			-24	dBm
Receiver Overload		Pmax	-3		dBm
LOS De-Assert		LOSD		-25	dBm
LOS Assert		LOSA	-35		dBm
LOS Hysteresis ^{*(note6)}			1.0		dB

(BSGB-1G53-40-xx, 1550nm FP and PIN)

Parameter	Symbol	Min	Typical	Max	Unit
50 μ m Core Diameter MMF	L		40		km
Data Rate			1.063/1.25		Gbps
Transmitter					
Centre Wavelength	λ_C	1480	1550	1580	nm
Spectral Width (-20 dB)	$\Delta\lambda$			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power ^{*(note1)}	Pout	-2		3	dBm
Side Mode Suppression Ratio	SMSR	30			dB
Extinction Ratio ^{*(note2)}	ER	9			dB
Rise/Fall Time(20%~80%)	tr/tf			0.26	ns
Output Optical Eye ^{*(note2)}	Compatible with IEEE 802.3ah-2004 ^{*(note5)}				
TX_Disable Assert Time	t_off			10	us
Pout@TX Disable Asserted	Pout			-45	dBm
Receiver					
Centre Wavelength	λ	1260	1310	1360	nm
Receiver Sensitivity ^{*(note4)}	GBE	Pmin		-24	dBm
	FC			-24	dBm
Receiver Overload		Pmax	-3		dBm
LOS De-Assert		LOSD		-25	dBm
LOS Assert		LOSA	-35		dBm
LOS Hysteresis ^{*(note4)}			1.0		dB

Notes:

Note1: Output is coupled into a 50/125 μ m MMF

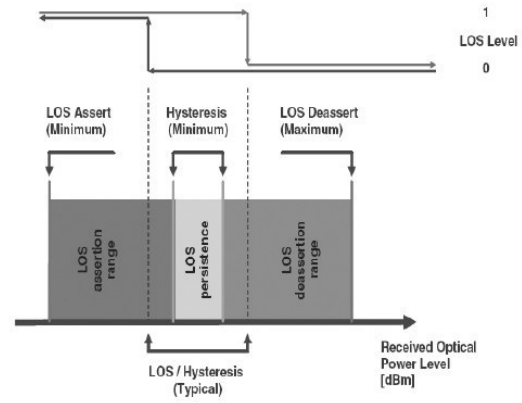
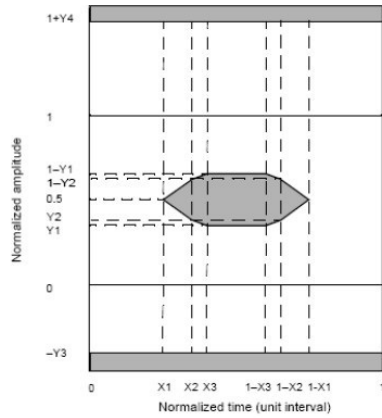
Note2: Filtered, measured with a PRBS 2⁷-1 test pattern @1.25Gbps

Note3: LVPECL logic, internally AC coupled.

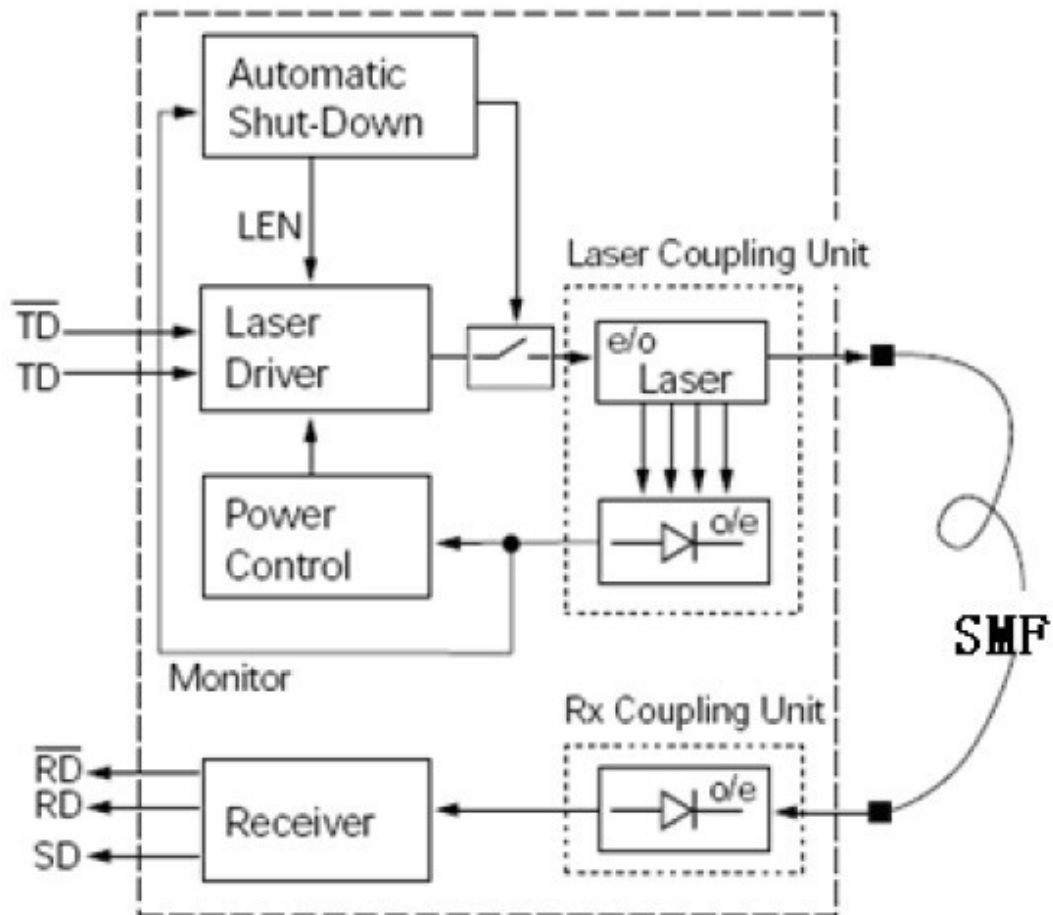
Note4: Minimum average optical power measured at BER less than 1E-12, with a 2⁷-1 PRBS and ER=9 dB.

Note5: Eye pattern mask

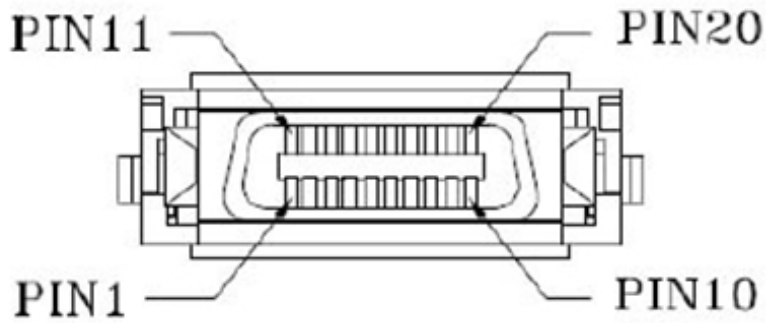
Note6: LOS Hysteresis



Functional Description of Transceiver



GBIC Transceiver Electrical Pad Layout



Pin Name	Pin#	Sequence
RX_LOS	1	2
RGND	2	2
RGND	3	2
MOD_DEF(0)	4	2
MOD_DEF(1)	5	2
MOD_DEF(2)	6	2
TX_DISABLE	7	2
TGND	8	2
TGND	9	2
TX_FAULT	10	2
RGND	11	1
-RX_DAT	12	1
+RX_DAT	13	1
RGND	14	1
VDDR	15	2
VDDT	16	2
TGND	17	1
+TX_DAT	18	1
-TX_DAT	19	1
TGND	20	1

Pin Function Definitions

Pin Name	Pin#	Name/Function	Signal Specification
Receiver Signals			
RGND	2,3,11,14	Receiver Ground(may be connected with TGND in GBIC)	Ground, to GBIC

VDDR	15	Receiver +5 volt (may be connected with VDDT in GBIC)	Power, to GBIC
-RX_DAT	12	Receive Data, Differential PECL	High speed serial, from GBIC
+RX_DAT	13	Receive Data, Differential PECL	High speed serial, from GBIC
RX_LOS	1	Receiver Loss of Signal, logic high, open collector compatible, 4.7 K to 10 K Ohm pullup to VDDT on host	Low speed, from GBIC
Transmitter Signals			
TGND	8,9,17,20	Transmitter Ground (may be connected with RGND internally)	Ground, to GBIC
VDDT	16	Transmitter +5 volt (may be connected with VDDR in GBIC)	Power, to GBIC
+TX_DAT	18	Transmit Data, Differential PECL	High speed serial, to GBIC
-TX_DAT	19	Transmit Data, Differential PECL	High speed serial, to GBIC
TX_DISABLE	7	Transmitter Disable, logic high, open collector compatible, 4.7 K to 10 K Ohm pull up to VDDT on GBIC	Low speed, to GBIC
TX_FAULT	10	Transmitter Fault, logic high, open collector compatible, 4.7 K to 10 K Ohm pull up to VDDT on host	Low speed, from GBIC
Control Signals			
MOD_DEF(0)	4	GBIC module definition and presence, bit 0, 4.7 K to 10 K Ohm pull up to VDDT on host	Low speed, from GBIC
MOD_DEF(1)	5	GBIC module definition and presence, bit 1, 4.7 K to 10 K Ohm pull up to VDDT on host	Low speed, from GBIC
MOD_DEF(2)	6	GBIC module definition and presence, bit 2, 4.7 K to 10 K Ohm pull up to VDDT on host	Low speed, from GBIC

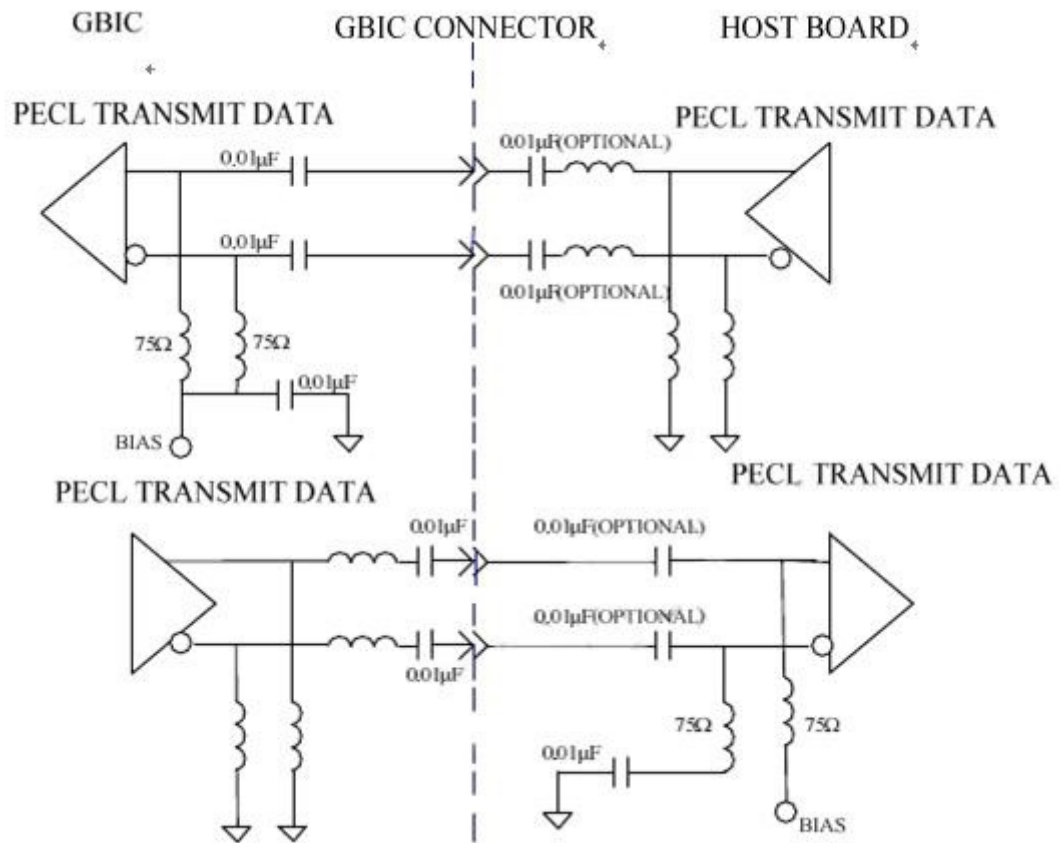
Serial ID Memory Contents

Addr	Size (Bytes)	Name of Field	Hex	Description
BASE ID FIELDS				
0	1	Identifier	01	GBIC
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	01	SC Connector
3-10	8	Transceiver	XX XX XX XX XX XX XX XX	Transceiver Code
11	1	Encoding	01	8B10B
12	1	BR, Nomina	0D	1.25Gbps
13	1	Reserved	00	
14	1	Length (9μm)km	00	Transceiver transmit distance

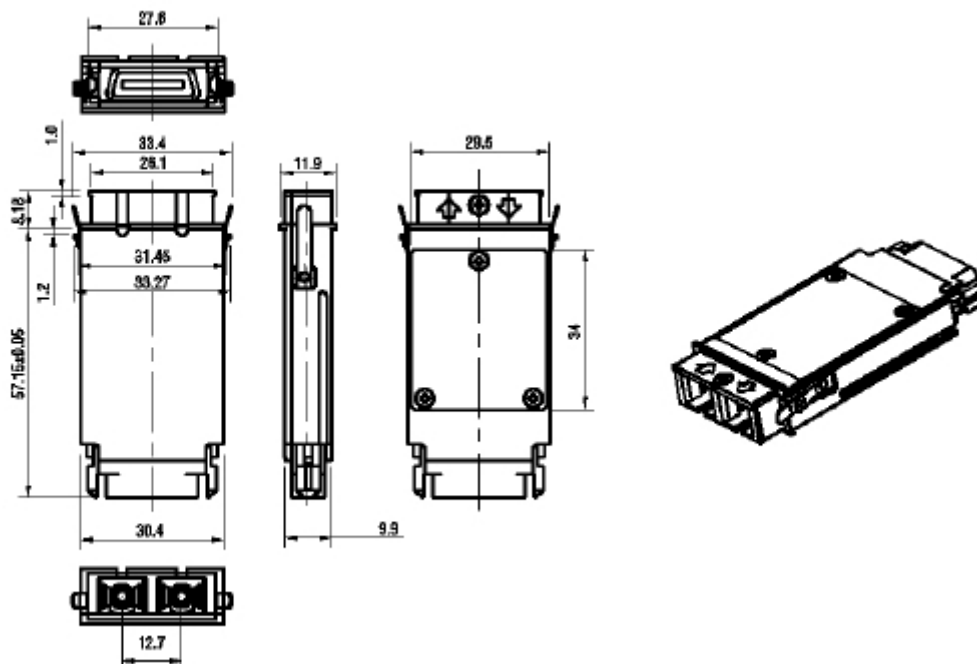
15	1	Length(9μm)100m	00	
16	1	Length (50μm) 10m	C8	
17	1	Length(62.5μm)10m	37	
18	1	Length (Copper)	00	Not compliant
19	1	Reserved	00	
20-35	16	Vendor name	XX XX XX XX XX XX XX XX 20 20 20 20 20 20 20 20	Vendor name (ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	XX XX XX	
40-55	16	Vendor PN		Transceiver part number
56-59	4	Vendor rev	XX XX XX XX	
60-61	2	Wavelength	05 1E/06 0E	1310nm/1550nm
62	1	Reserved	00	
63	1	CC_BASE	Check Sum (Variable)	Check code for Base ID Fields
EXTENDED ID FIELDS				
64-65	2	Options	00 1A	TX_DISABLE, TX_FAULT and Loss of Signal implemented.
66	1	BR,max	00	
67	1	BR,min	00	
68-83	16	Vendor SN	XX XX XX XX XX XX XX XX 20 20 20 20 20 20 20 20	Serial Number of transceiver (ASCII). For example "B000822".
84-91	8	Date code	XX XX XX XX XX XX XX XX	Manufactory date code. For example "080405"
92	1	Diagnostic Monitoring Type	00	Digital diagnostic monitoring implemented
93	1	Enhanced Options	00	Optional flags
94	1	SFF_8472 Compliance	00	01 for diagnostics (Rev9.3 SFF-8472).
95	1	CC_EXT	Check Sum (Variable)	Check sum for Extended ID Field.
VENDOR SPECIFIC ID FIELDS				
96-127	32	Vendor Specific	Read only	Depends on customer information
128-255	128	Reserved	Read only	

Note: The "XX" byte should be filled in according to practical case. For more information, please refer to the related document of SFP Multi-Source Agreement (MSA).

Recommend Circuit Schematic



Mechanical Specifications



Laser Emission



Ordering Information

Part No.	Data Rate (Gbps)	Fiber	Connector Type	Wavelength	Transmission Distance (km)	Operating case temperature (°C)
BSGB-1G35-40-xx	1.25	SMF	SC	1310nm/1550nm	40	0 to +70
BSGB-1G35-40E-xx	1.25	SMF	SC	1310nm/1550nm	40	-20 to +85
BSGB-1G35-40I-xx	1.25	SMF	SC	1310nm/1550nm	40	-40 to +85

Notes:

xx means compatible brand. (For example: CO= Cisco, JU=Juniper, FD=Foundry, EX=Extreme, NE=Netgear,etc.)

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