FTG-S12G-B53S-040

GBIC 1000Base-EX, BiDi, 1550/1310nm, single-mode, 40km

Description

FTG-S12G-B53S-040 series GBIC transceiver can be used to setup a reliable, high speed serial data link over single-mode fiber. Maximum link span can reach 40km. This transceiver is based on WDM (BiDi) technology thus it is possible to send (TX:1550nm) and receive (RX:1310nm) data simultaneously in both directions over single strain of fiber. To establish working connection this transceiver should be matched with companion module (FTG-S12G-B35S-040). Module is fully compliant with GBIC MSA specifications and it is available in two hardware versions:

Model	Operating case temperature
FTG-S12G-B53S-040	0~70°C
FTG-S12G-B53S-040I	-40~85°C

Host device can access module internal EEPROM memory via I^{2}C interface.

Transceiver can be prepared as compatible with: Cisco, HP, Netgear, Avaya, D-Link, Brocade, Extreme Networks, Huawei, Enterasys, 3Com, Alcatel-Lucent and other. To confirm compatibility please contact technical support before ordering.

Applications

- Gigabit Ethernet (1.25Gbps)
- Fiber Channel (1.0625Gbps)

Key features

- SC Simplex receptacle
- Transmission distance up to 40km**
- BOSA with DFB laser diode (1550nm) transmitter, PIN photodiode receiver (1310nm)
- Throughput up to 1.25Gb/s (1x Fibre Channel, Gigabit Ethernet)
- Fully compliant with GBIC MSA INF-8053
- Hot-Pluggable
- RoHS compliant
- Class 1 laser safety
- Low power dissipation (<1W)
- Metal case for low EMI
- Operating case temperature* : 0~70°C / -40~85°C

Specification

Supported transmission technology
Gigabit Ethernet, Fibre Channel

Speed supported for Ethernet technology
1.25Gbps

Speed supported for Fibre Channel technology
1.0625Gbps

Transmission medium
Single-mode fiber 9/125µm

Transmission distance**
40km

Receptacle type
SC Simplex

Wavelength
TX: 1550nm / RX:1310nm

Output power
-5~+3dBm

Receiver sensitivity
-23dBm

Power supply voltage
5V

Total power consumption
< 1W

Operating environment – temperature*
0~70°C / -40~+85°C

Operating environment - humidity
5~95% non-condensing

Dimensions
65.35mm × 33.3mm × 10.5mm

* - standard / industrial version

** - transmission distance depends on optical link attenuation

Detailed technical specification

Pin Description

Pin	Name	Function/Description	Notes
1	RX_LOS	Loss of Signal	4
2	RGND	Receiver Ground	
3	RGND	Receiver Ground	
4	MOD_DEF(0)	Module Definition 0-Grounded in module	3
5	MOD_DEF(1)	Module Definition 1-Two wire serial ID interface	3
6	MOD_DEF(2)	Module Definition 2-Two wire serial ID interface	3
7	TX_DISABLE	Transmitter Disable-Module disables on high or open	2
8	TGND	Transmitter Ground	-
9	TGND	Transmitter Ground	-
10	TX_FAULT	Transmitter Fault Indication	1
11	RGND	Receiver Ground	-
12	RD-	Inverse Received Data out	5
13	RD+	Received Data out	5
14	RGND	Receiver Ground	-
15	VccR	Receiver Power - +5V±5%	6
16	VccT	Transmitter Power - +5V±5%	6
17	TGND	Transmitter Ground	-
18	TD+	Transmitter Data In	7
19	TD-	Inverse Transmitter Data In	7
20	TGND	Transmitter Ground	-

Notes:

1. TX Fault is open collector/drain output which should be pulled up externally with a 4.7KΩ-10KΩ resistor on the host board. When high, this output indicates a laser fault of some kind. Low indicates normal operation.

2. TX Disable input is used to shut down the laser output per the state table below. It is pulled up to Vcc within the module.

   Low (0 – 0.8V): Transmitter on

   Open or High (2.0 – VccT): Transmitter Disabled

3. Mod-Def 0, 1, 2. These are the module definition pins. They should be pulled up to Vcc with a 4.7KΩ-10KΩ resistor on the host board

   Mod-Def 0 is grounded by the module to indicate that the module is present.

   Mod-Def 1 is clock line of two wire serial interface for optional serial ID.

   Mod-Def 2 is data line of two wire serial interface for optional serial ID.

4. LOS (Loss of signal) - when high, this output indicates the received optical power is below the worst case receiver sensitivity (as defined by the standard in use). Low indicates normal operation.

5. These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω differential at the user SERDES. The AC coupling is done inside the module and thus not required on the host board.

6. VccR and VccT are the receiver and transmitter power supplies. They are defined as 5V±5% at the GBIC connector pin. The in-rush current will typically be no more than 30mA above steady state supply current after 500ns.

7. TD-/+: These are the differential transmitter inputs. They are AC coupled differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on host board.

Electrical parameters

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter Differential Input Volt	+/-TX_DAT	650		2000	mV p-p	1
Receiver Differential Output Volt	+/-RX_DAT	600		2000	mV p-p	2
Tx_Disable Input Voltage – Low	V_{IL}	0		0.8	V	
Tx_Disable Input Voltage – High	V_{IH}	2.0		Vcc	V	
Tx_Fault Output Voltage – Low	V_{OL}	0		0.8	V	3
Tx_Fault Output Voltage – High	V_{OH}	2.0		Vcc	V	3
Rx_LOS Output Voltage- Low	V_{OL}	0		0.8	V	3
Rx_LOS Output Voltage- High	V_{OH}	2.0		Vcc	V	3
Throughput	B		1250		Mb/s	
Total current requirement				270	mA	

Transmitter parameters

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Central wavelength	λc	1480	1550	1570	nm	
Spectral width	Δλ			1	nm	
Site mode suppression ratio	SMSR	30			dB	
Launch optical power	P_o	-5		+3	dBm	4
Extinction ratio	EX	9			dB	
Dispersion penalty				1	dB	
Optical rise/fall time	T_{rise}/T_{fall}			260	ps	5
Eye diagram	Compliant with IEEE802.3-2005 Gigabit Ethernet 1000BASE-EX					

Receiver parameters

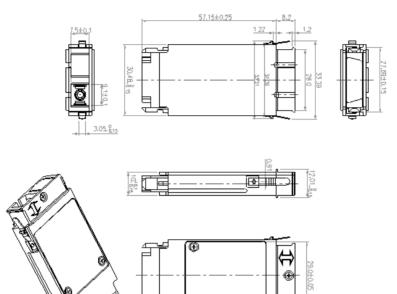| Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Sensitivity	P_{min}			-23	dBm	6
Central wavelength	λc	1270	1310	1360	nm	
Receiver overload	P_{MAX}	-3			dBm	6
RX_LOS Asserted	S_A	-35			dBm	
RX_LOS De-Asserted	S_D			-24	dBm	
RX_LOS Hysteresis	-		3.0		dB	
Optical return loss	ORL	12			dB	

Notes:

1. Internally AC coupled and terminated to 100Ω differential load.

2. Internally AC coupled, but requires a 100Ω differential termination or internal to Serializer/Deserializer.

3. It is open collector/drain output which should be pulled up externally to Vcc with a 4.7KΩ-10KΩ resistor on the host board. LOS: logic 0 indicates normal operation; logic 1 indicates no signal detected.

4. Optical power is launched into SMF

5. 20-80%

6. Measured with PRBS $2^{23}-1$ at 10^{-12} BER

Mechanical specification

Recommended environment conditions

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature Range (industrial)	T	-40	-	85	^{0}C
Operating Temperature Range (standard)	T	0	25	70	^{0}C
Supply Voltage	V_{CC}	4.75	5	5.25	V
Relative Humidity	RH	5	-	95	%

Ordering information

FTG-S12G-B53S-040 – 1550/1310nm, 40km, single-mode, SC simplex, commercial temperature (0~70°C)

FTG-S12G-B53S-040**I** – 1550/1310nm, 40km, single-mode, SC simplex, **extended temperature** (-40~85°C)

For further information regarding host device PCB layout recommendation, power supply requirements, EEPROM memory map please check:

INF-8053 - Technical specification for GBIC transceiver

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