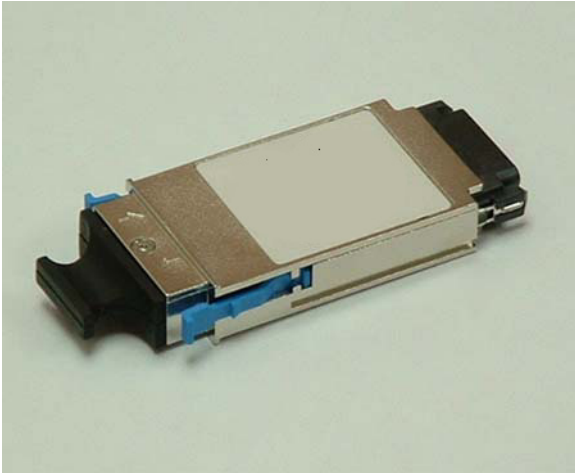


# 1310nm Single-mode Transceiver 20km Gigabit Interface Converters (GBIC), 3.3V/5V 1.25 Gbps Gigabit Ethernet



## Features

- Compliant with Gigabit Interface Converter Specification
- Compliant with IEEE802.3z Gigabit Ethernet standard
- SCA-2 Host connector
- Duplex SC connector
- Differential PECL inputs and outputs
- Single power supply 3.3/5 V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1

## Application

- Distributed multi-processing
- Switch to switch interface
- High speed I/O for file server
- Bus extension application
- Channel extender, data storage

## Ordering Information

PART NUMBER	INPUT/OUTPUT	SIGNAL DETECT	VOLTAGE	TEMPERATURE
GBIC-ELX	AC/AC	TTL	3.3/5 V	0°C to 70°C

## Absolute Maximum Ratings

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Storage Temperature	$T_S$	-40	85	°C	
Supply Voltage	$V_{CC}$	-0.5	6.0	V	
Input Voltage	$V_{IN}$	-0.5	$V_{CC}$	V	
Output Current	$I_o$	---	50	mA	
Operating Current	$I_{OP}$	---	400	mA	

### Recommended Operating Conditions

PARAMETER	SYMBOL	MIN	MAX	UNITS	NOTE
Ambient Operating Temperature	$T_{AMB}$	0	70	°C	
Supply Voltage	$V_{CC}$	3.1	5.25	V	
Supply Current (3.3V)	$I_{TX} + I_{RX}$	---	300	mA	
Supply Current (5V)	$I_{TX} + I_{RX}$	---	400	mA	

### Transmitter Electro-optical Characteristics

$V_{CC} = 3.1 \text{ V to } 5.25 \text{ V}$ ,  $T_A = 0 \text{ }^\circ\text{C to } 70 \text{ }^\circ\text{C}$

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNITS	NOTE
Output Optical Power 9/125 $\mu\text{m}$ fiber	$P_{out}$	-6	---	0	dBm	Average
Extinction Ratio	$ER$	9	---	---	dB	
Center Wavelength	$\lambda_C$	1270	1310	1355	nm	
Spectral Width (RMS)	$\Delta\lambda$	---	---	2.5	nm	
Rise/Fall Time, (20–80%)	$T_{r,f}$	---	---	260	ps	
Total Jitter	$TJ$	---	---	227	ps	
Output Eye	Compliant with IEEE802.3z					
Max. $P_{out}$ TX-DISABLE Asserted	$P_{OFF}$	---	---	-35	dBm	
Differential Input Voltage	$V_{DIFF}$	0.65	---	2.0	V	
Transmit Fault Output-Low	$TX\_FAULT_L$	0.0	---	0.5	V	
Transmit Fault Output-High	$TX\_FAULT_H$	2.4	---	$V_{CC}$	V	
TX_DISABLE Assert Time	$t_{off}$	---	---	10	$\mu\text{s}$	
TX_DISABLE Negate Time	$t_{on}$	---	---	1	ms	
Time to initialize, include reset of TX_FAULT	$t_{init}$	---	---	300	ms	
TX_FAULT from fault to assertion	$t_{fault}$	---	---	100	$\mu\text{s}$	
TX_DISABLE time to start reset	$t_{reset}$	10	---	---	$\mu\text{s}$	

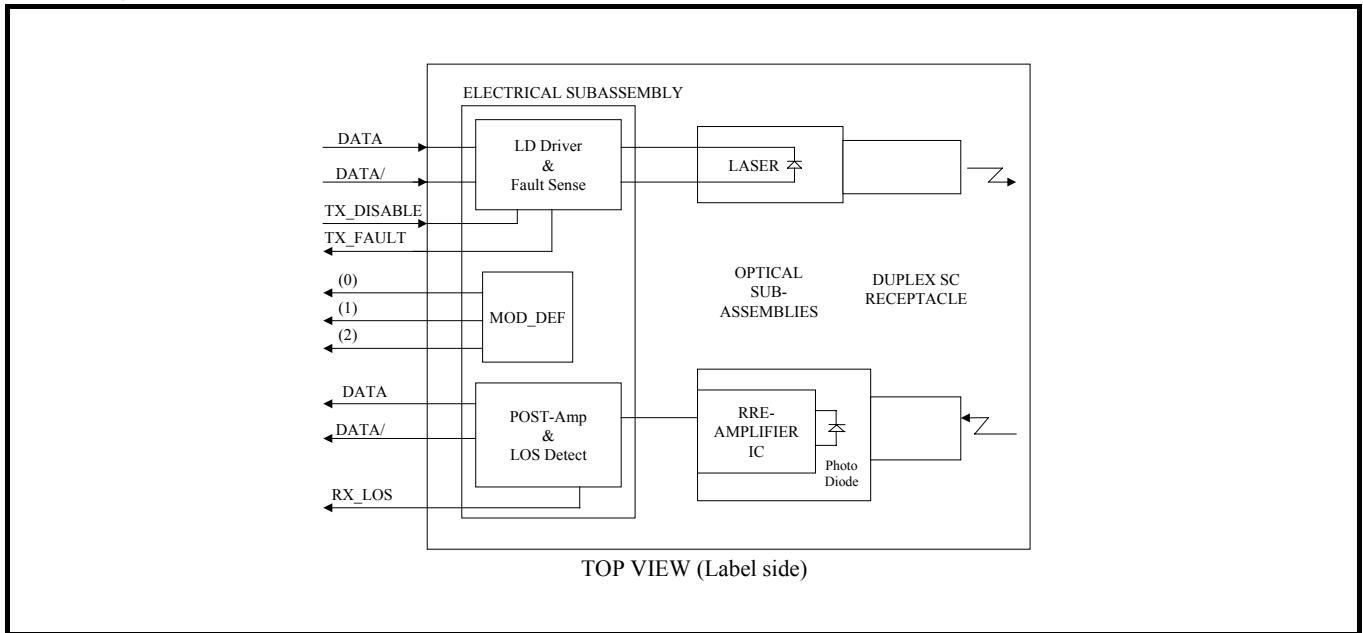
## Receiver Electro-optical Characteristics

 $V_{CC} = 3.1 \text{ V to } 5.25 \text{ V}, T_A = 0^\circ \text{C to } 70^\circ \text{C}$ 

<i>PARAMETER</i>	<i>SYMBOL</i>	<i>MIN</i>	<i>TYP.</i>	<i>MAX</i>	<i>UNITS</i>	<i>NOTE</i>
Optical Input Power-maximum	$P_{IN}$	-1	---	---	dBm	BER < $10^{-12}$
Optical Input Power-minimum (Sensitivity)	$P_{IN}$	---	---	-22	dBm	BER < $10^{-12}$
Operating Center Wavelength	$\lambda_C$	1260	---	1600	nm	
Optical Return Loss	$ORL$	12	---	---	dB	
Receiver Electrical 3dB Upper Cutoff Frequency	---	---	---	1500	MHz	
Signal Detect-Asserted	$P_A$	---	---	-22	dBm	
Signal Detect-Deasserted	$P_D$	-31	---	---	dBm	
Differential Output Voltage	$V_{DIFF}$	0.37	---	2.0	V	
Data Output Rise, Fall Time (20–80%)	$T_{r,f}$	---	---	0.35	ns	
Receiver Loss of Signal Output Voltage-Low	$RX\_LOS_L$	0	---	0.5	V	
Receiver Loss of Signal Output Voltage-High	$RX\_LOS_H$	2.4	---	$V_{CC}$	V	
Receiver Loss of Signal Assert Time (off to on)	$t_{A,RX\_LOS}$	---	---	100	$\mu\text{s}$	
Receiver Loss of Signal Assert Time (on to off)	$t_{D,RX\_LOS}$	---	---	100	$\mu\text{s}$	

Note 1: Measured with conformance test signal at TP3 for BER =  $10^{-12}$  at the eye center.

**Block Diagram of Transceiver**



**Transmitter Section**

The transmitter section consists of a 1310 nm InGaAsP laser in an eye safe optical subassembly (OSA) which mates to the fiber cable. The laser OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current.

**TX\_FAULT**

When sensing an improper power level in the laser driver, the GBIC set this signal high and turns off the Laser. TX\_FAULT can be reset with the TX\_DISABLE line. The signal is in TTL level.

**TX\_DISABLE**

The TX\_DISABLE signal is high (TTL logic “1”) to turn off the laser output. The laser will turn on within 1ms when TX\_DISABLE is low (TTL logic “0”).

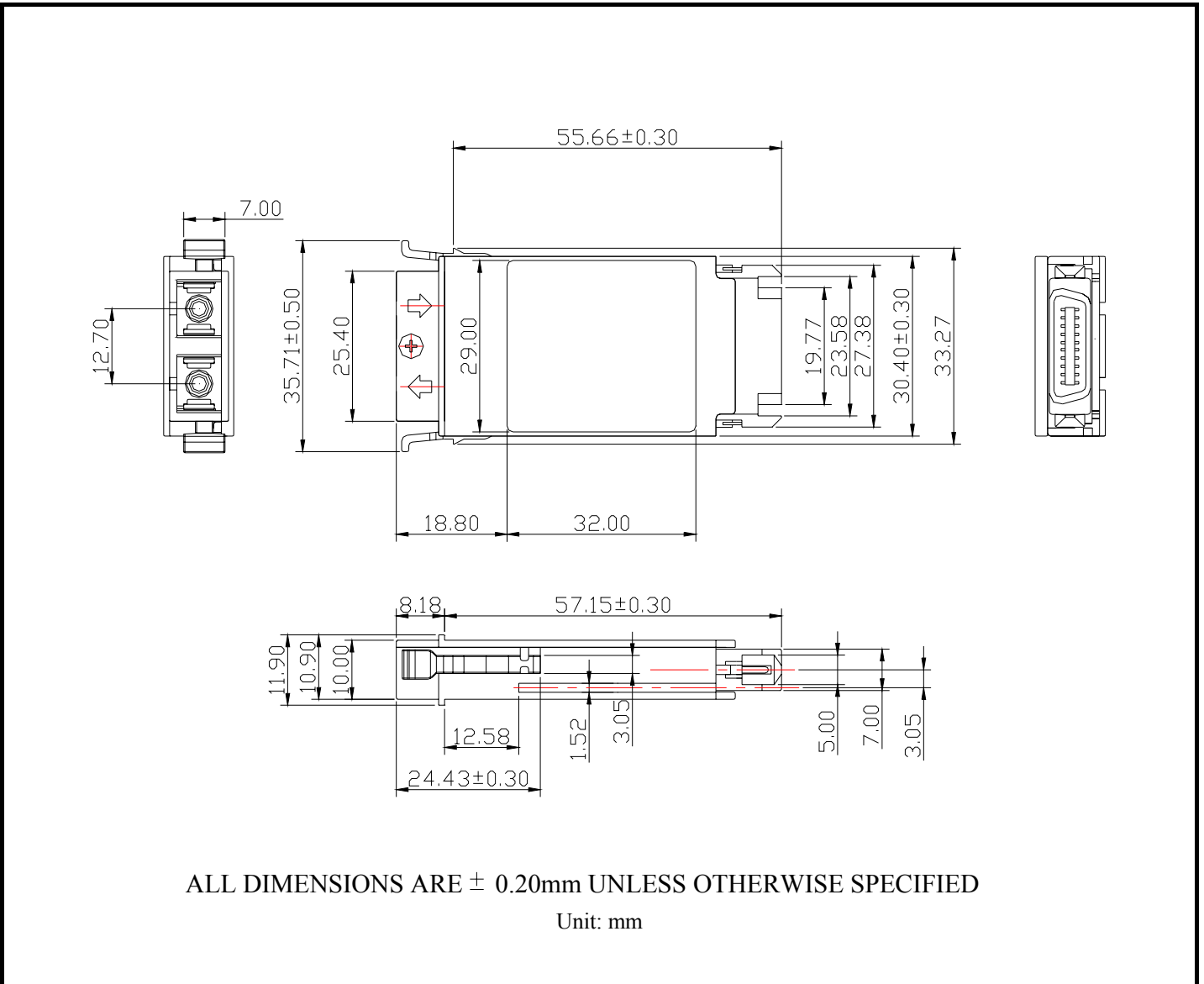
**Receiver Section**

The receiver utilizes an InGaAs PIN photodiode mounted together with a trans-impedance preamplifier IC in an OSA. This OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

**Receive Loss (RX\_LOS)**

The RX\_LOS is high (logic “1”) when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

Dimensions



Eye Safety

The GBIC-ELX series Single-mode transceiver is a class 1 laser product. It complies with EN 60825-1 and FDA 21 CFR 1040.10 and 1040.11. In order to meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

**Caution**

All adjustments have been done at the factory before the shipment of the devices. No maintenance and user serviceable part is required. Tampering with and modifying the performance of the device will result in voided product warranty.

**Required Mark**

**Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11**