

1.25 Gb/s 20km SFP Transceiver

Hot Pluggable, BiDi LC, +3.3V, 1310nm/1550nm, FP-LD, Single-mode

Overview

This transceiver is a high-performance, cost-effective BiDi module with a simplex LC optical interface. It adopts standard AC-coupled CML for high-speed signals and LVTTTL control & monitoring signals. It integrates a WDM filter; the receiver uses a PIN photodiode, and the transmitter is equipped with an FP laser. A link budget up to 15 dB enables this module to be used for 1000BASE Ethernet 20km single-fiber transmission.



Features

- Up to 1.25 Gb/s Data Links
- Hot-pluggable
- BiDi simplex LC connector
- Up to 20km on 9/125μm SMF
- Single +3.3V Power Supply
- Typical power consumption < 1 W
- Maximum power consumption < 1.5 W
- Industrial /Extended/ Commercial operating temperature range: -20°C to 70°C/-5°C to 70°C/-0°C to 70°C Version available
- ROHS compliant and Lead Free

Working Environment

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T _s	-40		+85	°C
Supply Voltage	V _{cc}	-0.5		4	V
Relative Humidity	RH	0		85	%

Case operating Temperature	Industrial	T_c	-20		70	°C
	Extended		-5		70	°C
	Commercial		0		70	°C
Supply Current		I_{cc}			300	mA
Inrush Current		I_{surge}			I_{cc+30}	mA
Maximum Power		P_{max}			1	W

Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter:						
Input Differential Impedance	R_{in}	90	100	110	Ω	
Single ended data input swing	$V_{in\ pp}$	250		1200	mV _{p-p}	2
Transmit Disable Voltage	V_D	$V_{CC}-1.3$		V_{CC}	V	2
Transmit Enable Voltage	V_{EN}	V_{EE}		$V_{EE}+0.8$	V	
Transmit Disable Assert Time	$V_{dessert}$			10	μs	
Receiver						
Single ended data output swing	$V_{out,pp}$	250		800	mV	3
LOS Fault	$V_{losfault}$	$V_{CC}-0.5$		$V_{CC}-host$	V	5
LOS Normal	$V_{los\ norm}$	V_{EE}		$V_{EE}+0.8$	V	5
Power Supply Rejection	PSR	100			mV _{p-p}	6

Notes:

1. AC coupled or open circuit.
2. Terminated with 100 Ω differential resistance.
3. LOS signal level is LVTTTL. Logic 0 = normal signal; Logic 1 = no optical signal detected.
4. This single-fiber BiDi module integrates an internal WDM filter for wavelength separation of transmit and receive signals.
5. All transceiver parameters remain valid under sinusoidal power supply noise from 20 Hz to 1.5 MHz, with amplitude limited to the rated value after passing through the power filter network.

Optical Characteristics

Port A: Tx 1310nm / Rx 1550nm

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter Section:						
Center Wavelength	λ_c	1290	1310	1330	nm	
Spectral Width(RMS)	σ_{RMS}			3	nm	
Optical Output Power	P_{out}	-9		-3	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time	t_r/t_f			260	ps	2
Relative Intensity Noise	RIN			-120	dB/Hz	
Output Eye Mask	Compliant with IEEE802.3 z (class 1 laser safety)					

Receiver Section:						
Optical Input Wavelength	λ_c	1530	1550	1565	nm	
Receiver Overload	P_{ol}	-3			dBm	4
RX Sensitivity	Sen			-24	dBm	4
RX_LOS Assert	LOS_A	-40			dBm	
RX_LOS De-assert	LOS_D			-25	dBm	
RX_LOS Hysteresis	LOS_H	0.5			dB	
General Specifications:						
Data Rate	BR		1.25		Gb/s	
Bit Error Rate	BER			10^{-12}		
Max. Supported Link Length on 9/125 μ m SMF@1.25Gb/s	L_{MAX}		20		Km	
Total System Budget	LB	15			dB	

Port B: Tx 1550nm / Rx 1310nm

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter Section:						
Center Wavelength	λ_C	1530	1550	1565	nm	
Spectral Width(RMS)	σ_{RMS}			3	nm	
Optical Output Power	P_{out}	-9		-3	dBm	1
Extinction Ratio	ER	9			dB	
Optical Rise/Fall Time	t_r/t_f			260	ps	2
Relative Intensity Noise	RIN			-120	dB/Hz	
Output Eye Mask	Compliant with IEEE802.3 z (class 1 laser safety)					
Receiver Section:						
Optical Input Wavelength	λ_C	1290	1310	1330	nm	
Receiver Overload	P_{ol}	-3			dBm	4
RX Sensitivity	Sen			-24	dBm	4
RX_LOS Assert	LOS_A	-40			dBm	
RX_LOS De-assert	LOS_D			-25	dBm	
RX_LOS Hysteresis	LOS_H	0.5			dB	
General Specifications:						
Data Rate	BR		1.25		Gb/s	
Bit Error Rate	BER			10^{-12}		
Max. Supported Link Length on 9/125 μ m SMF@1.25Gb/s	L_{MAX}		20		Km	
Total System Budget	LB	15			dB	

Notes:

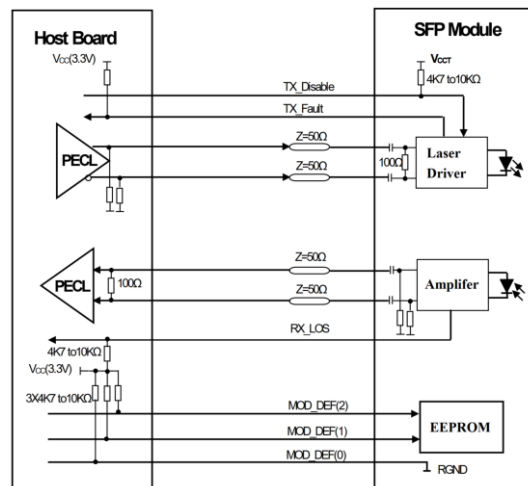
1. The optical power is launched into SMF.
2. Jitter measurements are taken using the Agilent OMNIBERT 718 in accordance with GR-253.
3. Measured with PRBS 2^7-1 at a BER of 10^{-12} .
4. This is a single-fiber BiDi module with a built-in WDM filter; transmit and receive wavelengths operate on separate wavebands.

Regulatory Compliance

This complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Single LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC)60825-1,2	Compatible with Class 1 laser product

Recommended Circuit



SFP Host Recommended Circuit

** Subject to change without notice **