



Features

- Very Small Package Outline
- Size: 0.7" x 1.6" x 0.3"
Weight Only 18.7 Grams
- 30 MHz to 6 GHz Bandwidth.
- Direct Modulation FO Link
- 1.5 or 1.3 μm Isolated DFB Lasers
- +5V Modules
- -40°C to +75°C Operating Temperature @ 1310nm
- High Spurious Free Dynamic Range
- LED Front Status Indicator
- Automatic Optical Power Control
- Laser Conforms to Class 1 Laser Safety, EN60825-1:2007

Options

- Low Noise Amplifier (LNA)
- +3.7 V Power Supply Option
- CWDM Wavelengths
- Extended Bandwidth to 1 MHz
- Multimode Fiber Compatibility
- I2C Micro-USB ROM Monitoring/Control

Applications

- Radiation Pattern Measurements
- High Density Deployments
- In-Building DAS Solutions
- Avionics
- Low Voltage Battery Powered
- 4G LTE 5G CBRS
- Optical Delay Line
- Remote Antenna Location
- Satcom
- GPS Distribution

OZ10X

Description

The OZ10X Series of Miniature, Broadband Optical Links are used for a variety of linear RF over Fiber (RFoF) applications. The OZ10X Series are small, light-weight, cost-effective modular components. The Link delivers high Spurious Free Dynamic Range (SFDR) with operational frequencies from 30 MHz to 6.0 GHz.

Model/Bandwidths :	OZ101 - up to 3GHz
	OZ104 - up to 4GHz
	OZ106 - up to 6GHz

The OZ10X Series Fiberoptic Link consists of individual Transmitter and Receiver Modules, connected via optical fiber (usually Single Mode Fiber), which offers an excellent alternative to using coaxial cable. This solution provides significant improvement in the transport of high frequency RF signals reliably, across a broad range of frequencies.

One of the primary applications of these miniaturized RFoF Modules is in antenna radiation pattern measurements. Optical Zonu's Fiber Optic Links enable the measurement of the radiation pattern of small antennas without any coaxial cable interference or radiation effects. The product family was designed to enable the testing of hand-held cellular telephones and emerging LTE (employing Antenna Diversity) devices, operating from the low voltage battery supply of the phone itself (down to +3.7 Volts). With very simple integration, the OZ10X Series Links can be integrated in the 19" 1RU J Chassis system (see [J1 Datasheet](#)) up to 36 Transmit and/or Receive modules can be housed in a 1RU chassis. Average Automatic Power Control (AAPC) is incorporated for optimal optical power stability over

the full temperature range. With low power consumption, easy control and monitoring via micro-USB (incl. I²C interface for internal control and Alarms) and RF interface via 50 Ohm SMA connector, this product family is ideal for integration within other systems that require compact, high performance, low size/weight/power fiber transport.

Absolute Maximum Ratings

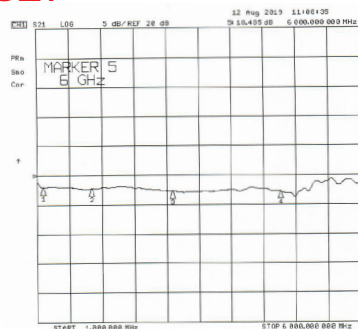
Parameter	Symbol	Min	Max	Units
Storage Temperature (Case)	T _s	-40	+85	°C
Operating Temperature (Case) 1310nm DFB Laser, -20°C for 1550 nm Laser	T _o	-40	+70	°C
DC Supply Voltage 5V version	V _{cc}	4.75	5.5	Volts
DC Supply Voltage 3.7V version	V _{cc}	3.5	+5.25	Volts
Maximum RF Input into TX (with LNA)		0	0	dBm
Maximum RF Input into TX (No LNA)		+15	+15	dBm
Maximum Optical Input into Rx			10	mW

Characteristics of OZ10X (+5V Version)

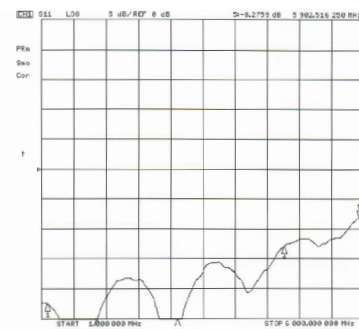
Parameter	Symbol	Min	Typical	Max	Units	Notes
Power Supply Voltage (+5V Version)	V _{cc}		+5	+5.25	Volts	
Power Supply Current TX						
High Gain LNA option	I _{cc,TX}		140	170	mA	
Unity Gain No LNA	I _{cc,TX}		85	105	mA	
Power Supply Current RX						
High Gain LNA option	I _{cc,RX}		160	170	mA	
Unity Gain No LNA	I _{cc,RX}		80	95	mA	
Laser Optical Output Power TX			2	3.5	mW	
Transmitter Operating Wavelength	λ	1270	1550/1310	1610	nm	

Example of Frequency Response for OZ106. Contact factory for specific plots of interest.

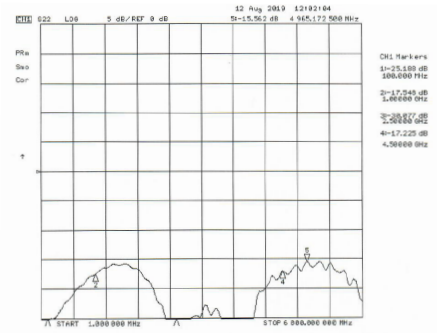
S21



S11



S22



Characteristics of OZ101 (+5V Version)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	HFC	2700	3000		MHz	
Low Frequency Cutoff	LFC		30		MHz	1
Frequency Response (30 - 3000 Mhz)			+/- 1.5		dB	
Input Impedance	Z		50		Ohms	
Input VSWR (30 - 3000 MHz)			1.7:1	1.9:1		
Spur Free Dynamic Range @ 1 GHz						
With LNA	SFDR		108	104 @ 3GHz	(dB/Hz)	2
No LNA	SFDR		109	104 @ 3GHz	(dB/Hz)	2
RF Link Gain (30 - 3000 MHz)						
With LNA		+19	+20	+22	dB	2
No LNA		-1	0	+2	dB	2
Input Noise Floor Density @ 1 GHz						
With LNA	EIN		-153	-149 @ 3GHz	dBm-Hz	2
No LNA	EIN		-133	-129 @ 3GHz	dBm-Hz	2
Input Third Order Intercept @ 1 GHz						
With LNA	IIP3		10	8 @ 3GHz	dBm	2
No LNA	IIP3		28	25 @ 3GHz	dBm	2

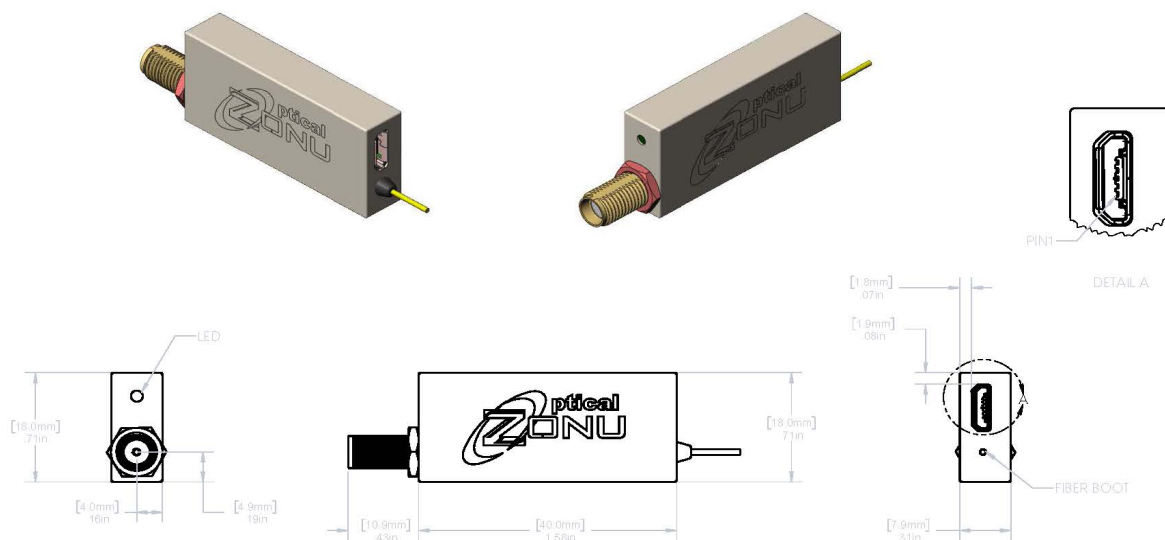
Characteristics of OZ104 (+5V Version)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	HFC	3700	4000		MHz	
Low Frequency Cutoff	LFC		30		MHz	1
Frequency Response (30 - 4000 Mhz)			+/- 1.5		dB	
Input Impedance	Z		50		Ohms	
Input VSWR (30 - 4000 MHz)			1.7:1	1.9:1		
Spur Free Dynamic Range @ 1 GHz						
With LNA	SFDR		105	104 @ 4Ghz	(dB/Hz)	2
No LNA	SFDR		107	102 @ 4Ghz	(dB/Hz)	2
RF Link Gain (30 - 4000 MHz)						
With LNA		+15	+17	+20	dB	2
No LNA		-1	0	+2	dB	2
Input Noise Floor Density @ 1 GHz						
With LNA	EIN		-150	-148 @ 4Ghz	dBm-Hz	2
No LNA	EIN		-133	-128 @ 4Ghz	dBm-Hz	2
Input Third Order Intercept @ 1 GHz						
With LNA	IIP3		8	8 @ 4Ghz	dBm	2
No LNA	IIP3		27	25 @ 4Ghz	dBm	2

Characteristics of OZ106 (+5V Version)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	HFC	5700	6000		MHz	
Low Frequency Cutoff	LFC		30		MHz	1
Frequency Response (30 - 6000 Mhz)			+/- 1.5		dB	
Input Impedance	Z		50		Ohms	
Input VSWR (30 - 6000 MHz)			1.7:1	1.9:1		
Spur Free Dynamic Range @ 1 GHz						
With LNA	SFDR		105	101 @ 6Ghz	(dB/Hz)	2
No LNA	SFDR		107	100 @ 6Ghz	(dB/Hz)	2
RF Link Gain (30 - 6000 MHz)						
With LNA		+15	+17	+20	dB	2
No LNA		-1	0	+2	dB	2
Input Noise Floor Density @ 1 GHz						
With LNA	EIN		-150	-146 @ 6Ghz	dBm-Hz	2
No LNA	EIN		-133	-126 @ 6Ghz	dBm-Hz	2
Input Third Order Intercept @ 1 GHz						
With LNA	IIP3		8	6 @ 6Ghz	dBm	2
No LNA	IIP3		26	24 @ 6Ghz	dBm	2

Mechanical Outline



Characteristics of OZ101 (+3.7V Version)

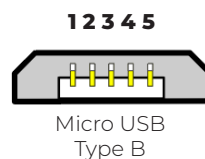
Parameter	Symbol	Min	Typical	Max	Units	Notes
Power Supply Voltage	V_{CC}	+3.4	+3.7		Volts	
Power Supply Current TX	$I_{CC,Tx}$		55	75	mA	
Power Supply Current TX (with LNA)	$I_{CC,Tx}$		90	100	mA	
Power Supply Current RX	$I_{CC,Rx}$		95	105	mA	
Power Supply Current RX (with LNA)	$I_{CC,Rx}$		95	115	mA	
Frequency Response (30 - 3000 MHz)			+/- 1.75		dB	
Spur Free Dynamic Range @ 1GHz	SFDR		104		(dB/Hz)	2
Spur Free Dynamic Range @ 1 GHz (with LNA)	SFDR		102		(dB/Hz)	2
RF Link Gain (30 - 3000 MHz)		-1	0	+1	dB	2
RF Link Gain (30 - 3000 MHz) (with LNA)		+15	16	+17	dB	2
Input Noise Floor Density @ 1 GHz	EIN		-133		dBm-Hz	2
Input Noise Floor Density @ 1 GHz (with LNA)	EIN		-150		dBm-Hz	2
Input Third Order Intercept @ 1 GHz	IIP3		23		dBm	2
Input Third Order Intercept @ 1 GHz (with LNA)	IIP3		3		dBm	2

¹ Typical Low Frequency Cutoff (LFC) is 30 MHz; for lower LFC - contact factory.

² Measured with 1 meter of optical fiber. For +3.7 Volts operation the IMD is measured using 2-tone each at -5 dBm. Other variations of Gain, NF and IIP3 are available upon request. Contact factory for more details. On this model higher Gain, up to 6 dB available. All measurements taken at @ 25°C

Pin Assignments

Pin	Tx/Rx
1	Power Supply (+5V)
2	SDA, IIC (optional)
3	SCA, IIC (optional)
4	NO CONNECT
5	Ground



In addition to supplying the DC power input to the OZ10X modules, the micro-USB (type B) connector also provides an optional I²C interface to module Read Only Memory (ROM). Select alarms, warnings, and critical parameters are made available. Note that in order to implement proper logic levels, customer side interface must supply a 10K Ohm pull-up resistor. Please contact Optical Zonu for option information and details.

Ordering Information

PART NO.

AX3 - Z10X - XXX - AX - XX *



0 - Unidirectional Set (Tx & Rx)	1 - 3 GHz	D31 - 1310 nm	L - LC/APC	S - Single Mode Fiber Compatible	- No LNA
1 - Transmitter Only (Tx)	4 - 4 GHz	D55 - 1550 nm	S - SC/APC	M - Multi-mode Fiber Compatible	L - Built-in LNA on TX
2 - Receiver Only (Rx)	6 - 6 GHz	00 - for Rx only	F - FC/APC		
		CWDM wavelengths available	For Multi-mode Rx - PC		

* For OZ101 Battery Operation, add 3.7 at the end of the Part Number.
e.g. A03-Z101-D31-AS-SL3.7

Accessories

PART NO.

ZA1 - 1 - 05 - 10 - USB

Power Supply (AC to +5VDC, 1A, 5W, Micro USB-B)

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