

Features

- Bandwidths up to 60 GHz
- -20°C to +65°C Operating Temperature Range
- High Spur Free Dynamic Range (SFDR)
- Stable Optical Power Output
- Low IMD (actively controlled operating point)
- Stable Fixed RF Gain Over Operating Temperature Range
- Front Panel LED Status Indications
- Monitoring via SSH, HTTP/Web, Embedded GUI
- Supports SNMP v2 and v3
- Laser Conforms to Class 1 Emission Level* per CDRH and IEC 835 (EN 60825 Standards)

Options

- Low Noise Transmitter RF Amplifier Options
- Receiver RF Post-Amplifier Options
- 20 kHz Lower Roll-off Frequency
- DWDM Wavelengths Available
- 1310nm (standard in 1550nm, DWDM optional)

Applications

- Microwave Antenna Distribution
- Remote Antenna Location
- Radar Signal Transport
- Broadband Delay Lines
- Multi-Band Satcom Transport
- Phased Array Antenna Systems
- Shipboard RF Distribution, CDL
- Frequency Distribution Systems
- Avionics

JXM Series

Description

The JXM series of high frequency plugin modules for the J-Chassis platforms extend RF/microwave over fiber transport into the Ku-, K-, Ka-, Q-, and V-Bands. Modules may be broadband with lower frequency rolloff as low as 20 kHz (100 MHz nominal). For narrow band and custom bandwidths, please contact Optical Zonu.

The JXM series transmitters feature low RIN, high power cooled DFB source lasers and LiNbO₃ external modulators. JXM series receivers (see JXM Series Receivers datasheet) offer low noise matching RF post-amplifiers. Spur free dynamic range (SFDR) in the range of 108 dB/Hz^{2/3} for a link is typical. There are several options for low noise amplifier integration into the fiber optic transmitter. There are also several options for low noise post-amplifier integration into the fiber optic receiver. With this flexibility, noise figure, input 1dB compression, and input 3rd order intercept (IIP3) performance may be optimized for a range of optical loss budgets and RF input power ranges. Built in RF shielding facilitates low EMI/EMC/RF interference. Modules have 50Ω RF interfaces and K-connectors for up to 40 GHz and V-connectors for higher frequencies.

JXM modules in J-Chassis may be monitored and controlled via SSH, Web UI, OZC GUI, and SNMP v2 and v3 ([see JS14 Managed Switch datasheet](#)). Locally, LEDs on the modules provide visual status indications.

* Class 1 lasers are safe under all operating conditions. There is no risk to eyes or skin.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Absolute W/O Damage	Units
Operating Temperature	T_{op}	-20	-	+65	-	°C
Storage Temperature	$T_{storage}$	-40	-	+85	-	°C
DC Supply Voltage	V_{CC}	11.5	12	12.5	16	V
Transmitter RF Input (no LNA)	RF_{in}	-	-	+15	25	dBm
Transmitter RF Input (+15 dB LNA)	RF_{in}	-	-	0	10	dBm
Transmitter RF Input (+25 dB LNA)	RF_{in}	-	-	-10	0	dBm
Transmitter RF Input (+35 dB LNA)	RF_{in}	-	-	-20	-10	dBm
Transmitter Optical Output	$P_{Tx,out}$	-	-	+10	-	dBm
Receiver Optical Input	$P_{Rx,in}$	-	-	+10	12	dBm
Unpackaged Weight	-	-	-	320	-	g
Relative Humidity	RH	20	-	90	-	%
Altitude	-	-	-	10,000	-	MASL

DC Characteristics

Parameter	Symbol	Min	Typical	Max	Units
DC Supply Voltage	V_{CC}	11.5	12	12.5	V
Transmitter Current (no LNA)	$I_{CC,Tx}$	-	0.5	0.75	A
Transmitter Current (+15 dB LNA)	$I_{CC,Tx,15dB}$	-	0.85	1.1	A
Transmitter Current (+25 dB LNA)	$I_{CC,Tx,25dB}$	-	1.05	1.2	A
Transmitter Current (+35 dB LNA)	$I_{CC,Tx,35dB}$	-	1.25	1.4	A

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Units
Transmitter Output Power	$P_{Tx,out}$	7	9	10	dBmO
Transmitter Wavelengths ¹	λ_{Tx}	1520	-	1560	nm
	-	-	1310	-	nm
Receiver Wavelengths	λ_{Rx}	1270	-	1610	nm

¹ 1310 nm (optional)

RF Characteristics – 18 GHz (Link)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	f_{high}	-	18000	-	MHz	
Low Frequency Cutoff	f_{low}	-	100	-	MHz	
Frequency Response Flatness	S21	-	3	5	dB _{P-P}	1
RF Gain	G	-25 -27	- -	- -	dB	1,2 1,3
Noise Figure	NF	36 39	- -	- -	dB	1,2 1,3
Input 1dB Compression	P1dB	+18 +16	- -	- -	dBm	1,2 1,3
Input 3rd Order Intercept	IIP3	+28 +27	+30 +29	- -	dBm	1,2 1,3
Spur Free Dynamic Range	SFDR	110 108	- -	- -	dB/Hz ^{2/3}	1,2 1,3
Group Delay	GD	-	-	12	nsec	1
Input/Output Impedance	$Z_{in/out}$	-	50	-	Ω	
Input/Output Return Loss	$RL_{in/out}$	7	10	-	dB	

¹ No integrated RF amplifiers in transmitter or receiver.

² at 10 GHz

³ at 18 GHz

RF Characteristics – 20 GHz (Link)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	f_{high}	-	20000	-	MHz	
Low Frequency Cutoff	f_{low}	-	100	-	MHz	
Frequency Response Flatness	S21	-	3	5	dB _{P-P}	1
RF Gain	G	-25 -27	- -	- -	dB	1,2 1,3
Noise Figure	NF	36 39	- -	- -	dB	1,2 1,3
Input 1dB Compression	P1dB	+18 +16	- -	- -	dBm	1,2 1,3
Input 3rd Order Intercept	IIP3	+28 +27	+30 +29	- -	dBm	1,2 1,3
Spur Free Dynamic Range	SFDR	110 108	- -	- -	dB/Hz ^{2/3}	1,2 1,3
Group Delay	GD	-	-	12	nsec	1
Input/Output Impedance	$Z_{in/out}$	-	50	-	Ω	
Input/Output Return Loss	$RL_{in/out}$	7	10	-	dB	

¹ No integrated RF amplifiers in transmitter or receiver.

² at 10 GHz

³ at 20 GHz

RF Characteristics – 22 GHz (Link)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	f_{high}	-	22000	-	MHz	-2
Low Frequency Cutoff	f_{low}	-	100	-	MHz	-
Frequency Response Flatness	S21	-	3	5	dB_{P-P}	1
RF Gain	G	-25 -27	- -	- -	dB	1,2 1,3
Noise Figure	NF	36 39	- -	- -	dB	1,2 1,3
Input 1dB Compression	P1dB	+18 +16	- -	- -	dBm	1,2 1,3
Input 3rd Order Intercept	IIP3	+28 +27	+30 +29	- -	dBm	1,2 1,3
Spur Free Dynamic Range	SFDR	110 108	- -	- -	dB/Hz ^{2/3}	1,2 1,3
Group Delay	GD	-	-	12	nsec	1
Input/Output Impedance	$Z_{in/out}$	-	50	-	Ω	-
Input/Output Return Loss	$RL_{in/out}$	7	10	-	dB	-

¹ No integrated RF amplifiers in transmitter or receiver.

² at 10 GHz

³ at 22 GHz

RF Characteristics – 30 GHz (Link)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	f_{high}	-	30000	-	MHz	
Low Frequency Cutoff	f_{low}	-	100	-	MHz	
Frequency Response Flatness	S21	-	5	7	dB_{P-P}	1
RF Gain	G	-23 -27 -29	- - -	- - -	dB	1,2 1,3 1,4
Noise Figure	NF	36 39 40	- - -	- - -	dB	1,2 1,3 1,4
Input 1dB Compression	P1dB	+16 +14 +13	- - -	- - -	dBm	1,2 1,3 1,4
Input 3rd Order Intercept	IIP3	+28 +27	+30 +29	- -	dBm	1,2 1,3
Spur Free Dynamic Range	SFDR	110 108 106	- - -	- - -	dB/Hz ^{2/3}	1,2 1,3 1,4
Group Delay	GD	-	-	12	nsec	1
Input/Output Impedance	$Z_{in/out}$	-	50	-	Ω	
Input/Output Return Loss	$RL_{in/out}$	7	10	-	dB	

¹ No integrated RF amplifiers in transmitter or receiver.

² at 10 GHz

³ at 20 GHz

⁴ at 30 GHz

RF Characteristics – 40 GHz (Link)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	f_{high}	-	40000	-	MHz	-
Low Frequency Cutoff	f_{low}	-	100	-	MHz	
Frequency Response Flatness	S21	-	7	9	dB _{p-p}	1
RF Gain	G	-23	-	-	dB	1, 2
		-26	-	-		1, 3
		-31	-	-		1, 4
Noise Figure	NF	36	-	-	dB	1, 2
		39	-	-		1, 3
		42	-	-		1, 4
Input 1dB Compression	P1dB	+16	-	-	dBm	1, 2
		+14	-	-		1, 3
		+12	-	-		1, 4
Input 3rd Order Intercept	IIP3	+28	+30	-	dBm	1, 2
		+26	+28	-		1, 3
		+25	+27	-		1, 4
Spur Free Dynamic Range	SFDR	110	-	-	dB/Hz ^{2/3}	1, 2
		108	-	-		1, 3
		105	-	-		1, 4
Group Delay	GD	-	-	12	nsec	1
Input/Output Impedance	$Z_{in/out}$	-	50	-	Ω	-
Input/Output Return Loss	$RL_{in/out}$	7	10	-	dB	-

¹ No integrated RF amplifiers in transmitter or receiver.

² at 10 GHz

³ at 20 GHz

⁴ at 40 GHz

RF Characteristics – 50 GHz (Link)

Parameter	Symbol	Min	Typical	Max	Units	Notes
High Frequency Cutoff	f_{high}	-	50000	-	MHz	
Low Frequency Cutoff	f_{low}	-	100	-	MHz	
Frequency Response Flatness	S21	-	10	14	dB _{p-p}	1
RF Gain	G	-27	-25	-	dB	1, 2
		-31	-29	-		1, 3
		-34	-32	-		1, 4
Noise Figure	NF	39	-	-	dB	1, 2
		42	-	-		1, 3
		44	-	-		1, 4
Input 1dB Compression	P1dB	+14	-	-	dBm	1, 2
		+12	-	-		1, 3
		+11	-	-		1, 4
Input 3rd Order Intercept	IIP3	+26	+28	-	dBm	1, 2
		+24	+26	-		1, 3
		+22	+23	-		1, 4

RF Characteristics – 50 GHz (Link) (continued)

Parameter	Symbol	Min	Typical	Max	Units	Notes
Spur Free Dynamic Range	SFDR	108	-	-	dB/Hz ^{2/3}	1,2
		105	-	-		1,3
		102	-	-		1,4
Group Delay	GD	-	-	12	nsec	1
Input/Output Impedance	Z _{in/out}	-	50	-	Ω	-
Input/Output Return Loss	RL _{in/out}	7	10	-	dB	-

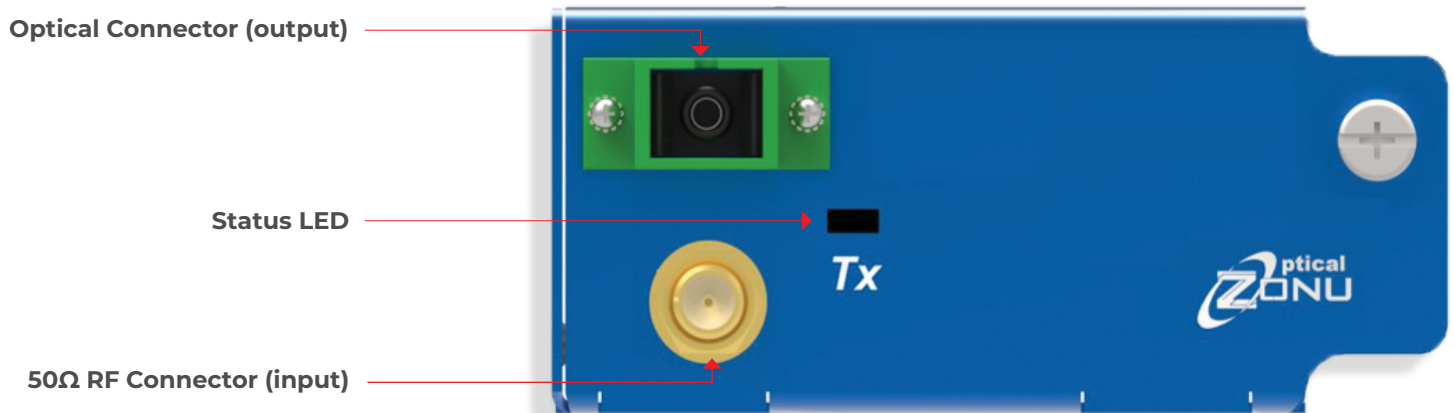
¹ No integrated RF amplifiers in transmitter or receiver.

² at 10 GHz

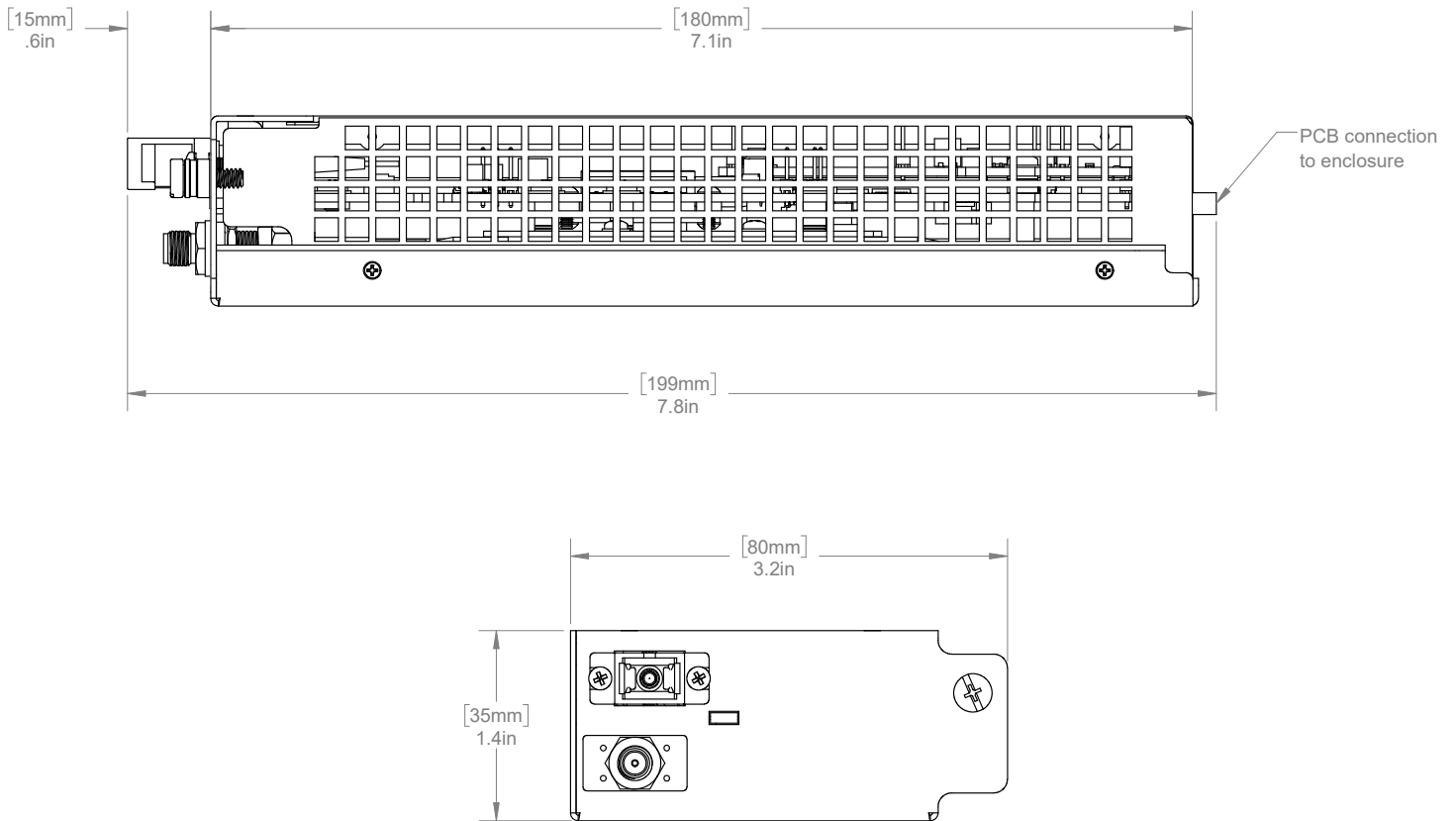
³ at 20 GHz

⁴ at 50 GHz

Front Panel Features



Mechanical Outline



LED Definitions

LED State

GREEN

GREEN (blinking)

RED

RED (blinking)

Transmitter Condition

Normal Operation

TEC Not Locked Alarm

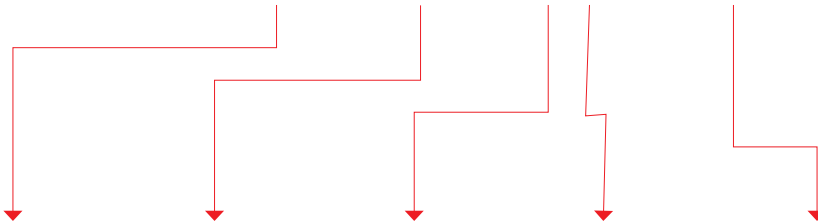
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Transmitter Bias Alarm, and/or
Modulator Alarm

Voltage Alarm, and/or
PCB Temperature Alarm, and/or
Supply Current Alarm, and/or
TEC Current Alarm

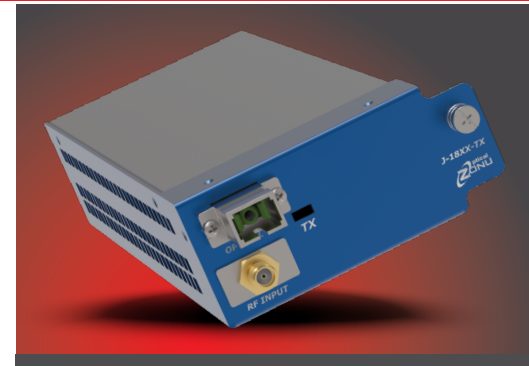
Ordering Information

PART NO.

A13-JXMA-XX-XXXX-XX-SXXX



18 – 18 GHz	55 – 1550 nm	A – 50Ω SMA	S – SC/APC	(blank) – No LNA
20 – 20 GHz	DWyy – DWDM ITU _{yy}	K – 50Ω K	F – FC/APC	L15 – 15 dB LNA
22 – 22 GHz		V – 50Ω V		L25 – 25 dB LNA
30 – 30 GHz				L35 – 35 dB LNA
40 – 40 GHz				
50 – 50 GHz				



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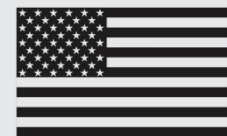
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