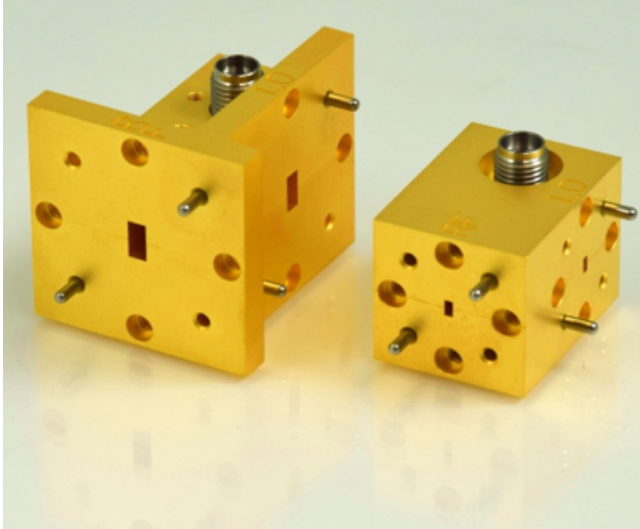


# MXP Series

## Balanced Mixers



Smiths Interconnect's MXP Series balanced mixers are high performance broadband mixers in a very compact size. They offer low conversion loss and low noise figure over a wide range of IF and local oscillator frequencies. Series MXP covers frequencies from 26.5 to 140 GHz in seven waveguide bands. LO agility (swept LO) and extremely broadband IF are attainable.

MXP single-balanced mixers use GaAs Schottky Barrier Diodes and can operate with relatively low local oscillator power, generally 13 to 15 dBm. Custom models can be made to your specification. Special designs with LO input waveguide in a higher or lower waveguide band can be provided. External waveguide filters, LO reject filters, and compact 90° waveguide twists allow the user to change the mixer waveguide orientation (LO, RF or both) without taking much additional space. Detachable low-noise IF amplifiers are offered as options with these mixers.

When only a limited local oscillator power (0 to +3 dBm) is available, DC biasable series MB1 mixers are recommended. Smiths Interconnect also offers a harmonic mixer to operate with fractional LO frequencies (series MSH).

MXP Series,  
frequency range from  
26.5 to 140 GHz in  
7 waveguide bands

## Features and Benefits

- Low Conversion Loss and Noise Figure
- 13 dBm LO Drive Power
- Matched IF Amplifier and LO Offered
- Small, Rugged Package

## Applications

- Radars and Radiometry
- Electronic Warfare/ELINT
- Communications
- Test Equipment

# Technical Characteristics

## Electrical

Model Number	Outline	STEP File	RF		Local Oscillator		IF		Conversion Loss (dB) (typ)	
			Freq. Range (GHz)	WG Band	Freq. Range (GHz)	WG Band	Freq. Range (GHz)	Connector	IF=1 GHz, LO=13 dBm	Fixed LO, LO=13 dBm
<a href="#">MXP-28</a>	MXP-28	28	26.5-40	WR-28	26.5-40	WR-28	0.1-13.5	SMA	7 dB, RF=28-38	8.3 dB, see plot
<a href="#">MXP-22</a>	MXP-22	22	33-50	WR-22	33-50	WR-22	0.1-17	2.92 mm	6.5 dB, RF=34-50	8.3 dB, see plot
<a href="#">MXP-19</a>	MXP-19	19	40-60	WR-19	40-60	WR-19	0.1-20	2.92 mm	6.2 dB, RF=42-60	9 dB, see plot
<a href="#">MXP-15</a>	MXP-15	15	50-75	WR-15	50-75	WR-15	0.1-25	2.92 mm	6.5 dB, RF=50-71	11 dB, see plot
<a href="#">MXP-15 *</a>	MXP-15L	15L	50-75	WR-15	40-50	WR-15	0.1-25	2.92 mm	NA	10 dB, see plot
<a href="#">MXP-12</a>	MXP-12	12	60-90	WR-12	60-90	WR-12	0.1-30	2.92 mm	6.5 dB, RF=62-90	9.5 dB, see plot
<a href="#">MXP-10</a>	MXP-10	10	75-110	WR-10	75-110	WR-10	0.1-35	2.92 mm	6.5 dB, RF=75-108	9 dB, see plot
<a href="#">MXP-08</a>	MXP-08	08	90-140	WR-08	90-140**	WR-08	0.1-40	2.92 mm	7 dB, RF=95-100	

\* Note that the LO waveguide is WR-19 for this model

\*\* Currently testing MXP-08 only for LO from 90-100 GHz

**Noise figure (DSB) is typically the conversion loss minus 3 dB, plus the IF amplifier noise figure. Some typical amplifier choices:**

IF Amplifier Frequency	IF Amplifier Noise Figure (typ/max)	Gain (typ)
0.1-4 GHz	1.5 dB / 1.7 dB	35 dB
1-8 GHz	1.5 dB / 2.0 dB	33 dB
2-18 GHz	3.0 dB / 5.0 dB	33 dB
6-18 GHz	2.0 dB / 2.75 dB	30 dB
26.5-40 GHz	.5 dB / 4.5 dB	22 dB

Please contact our Northampton, MA office for other IF ranges and lower noise figure options.

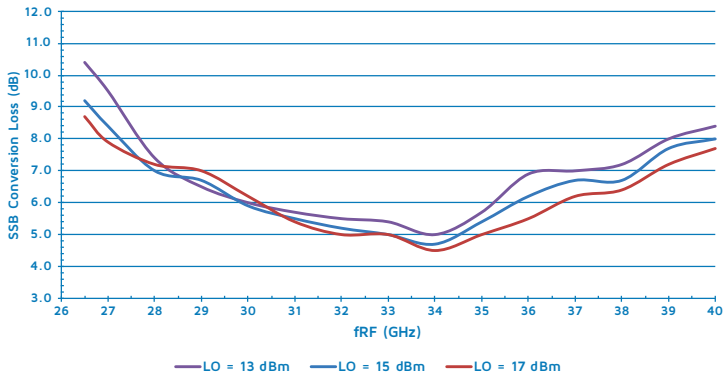
## Common Operating Characteristics:

<b>VSWR at RF Port:</b>	2:1 (typ)
<b>1dB Compression Point :</b>	+3 dBm (typ) input, either as a downconverter or an upconverter
<b>LO Drive Power:</b>	+13 dBm (typ)
<b>LO/RF Isolation:</b>	25 dB (typ)
<b>LO/IF Isolation:</b>	25 dB (typ)
<b>Maximum RF/IF Power:</b>	+19 dBm CW, +25 dBm pulse with 25% duty cycle or less (no damage, 25 C)

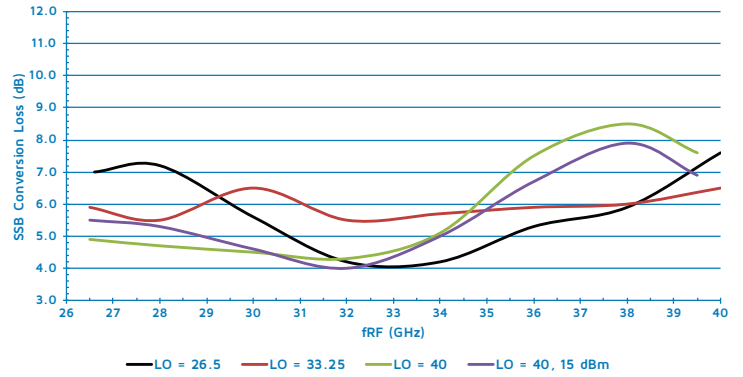
# Technical Characteristics

## Typical Output Power

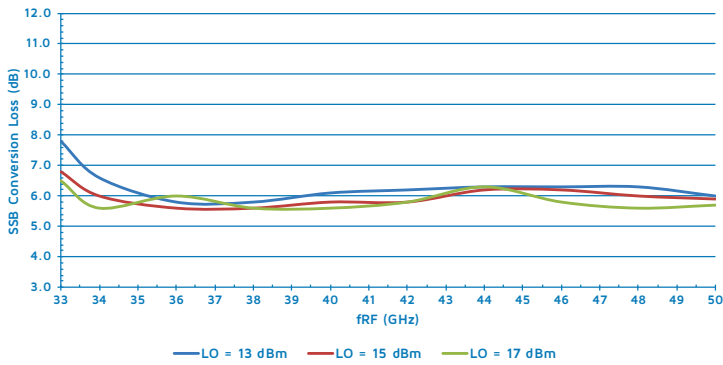
**MXP-28, IF = 1 GHz, fLO = fRF - 1 GHz**



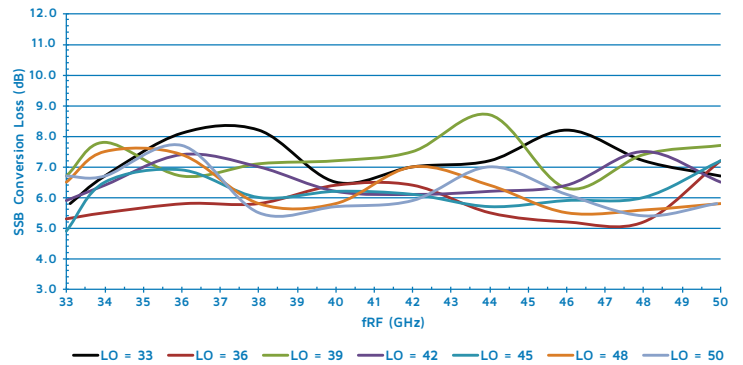
**MXP-28, Fixed LO (13 dBm), LO Tuned**



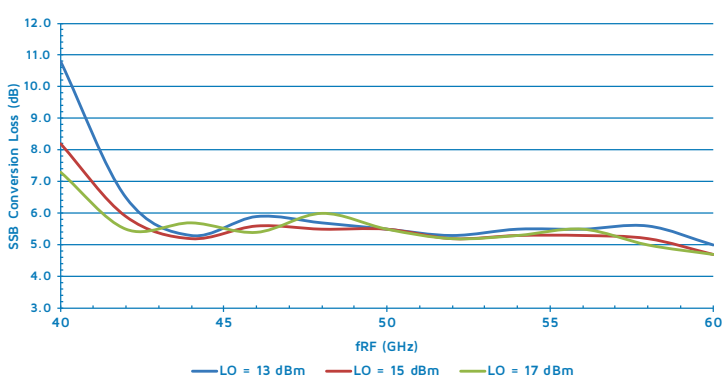
**MXP-22, IF = 1 GHz, fLO = fRF - 1 GHz**



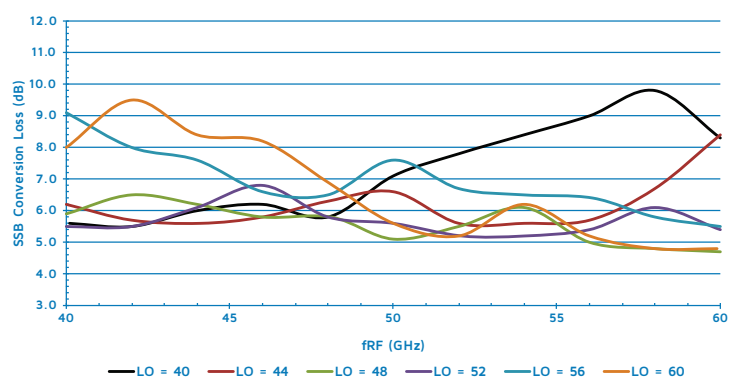
**MXP-22, Fixed LO (13 dBm), LO Tuned**



**MXP-19, IF = 1 GHz, fLO = fRF - 1 GHz**



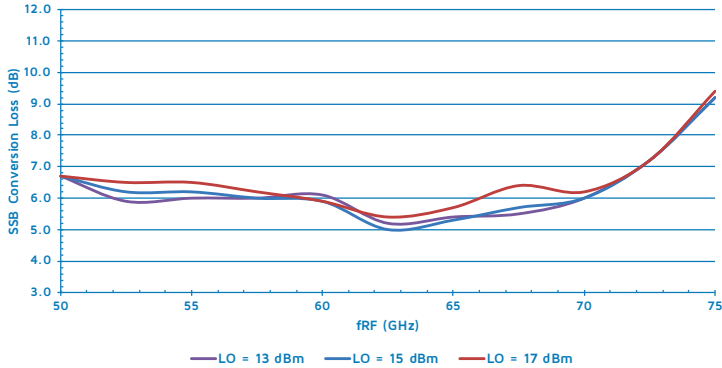
**MXP-19, Fixed LO (13 dBm), LO Tuned**



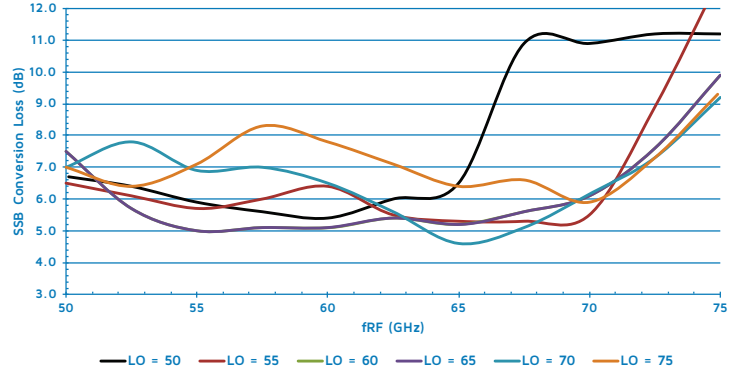
# Technical Characteristics

## Typical Output Power

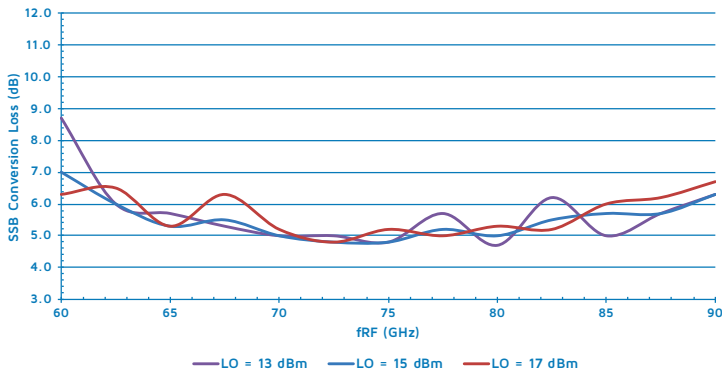
**MXP-15, IF = 1 GHz, fLO = fRF - 1 GHz**



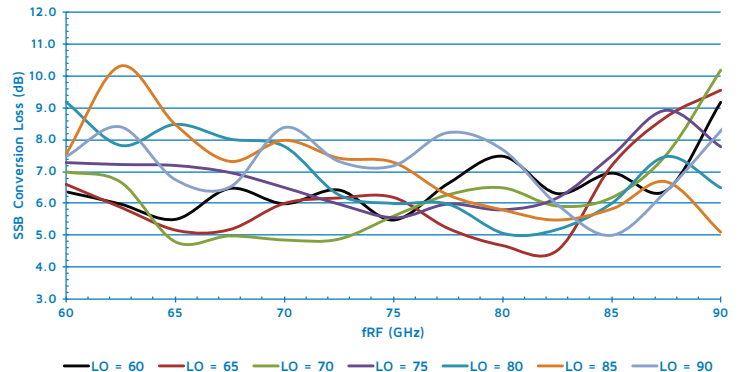
**MXP-15, Fixed LO (13 dBm), LO Tuned**



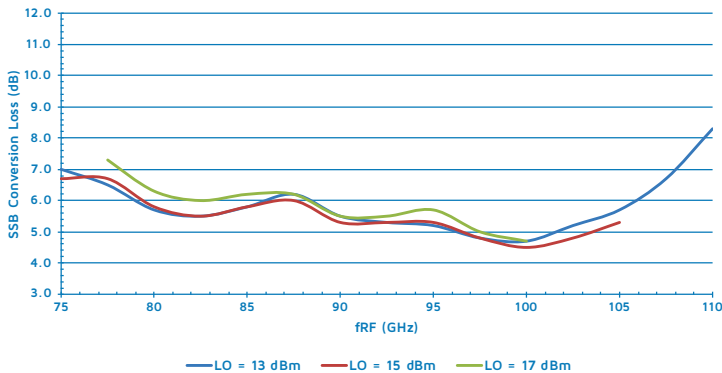
**MXP-12, IF = 1 GHz, fLO = fRF - 1 GHz**



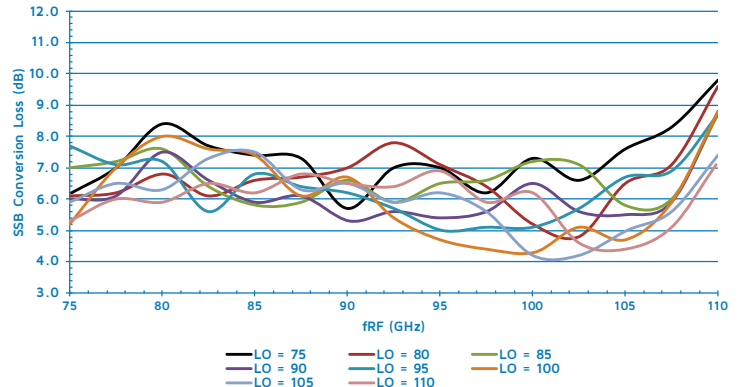
**MXP-12, Fixed LO (13 dBm), LO Tuned**



**MXP-10, IF = 1 GHz, fLO = fRF - 1 GHz**



**MXP-10, Fixed LO (13 dBm), LO Tuned**



# How To Order

Specify Model Number: **MXP-XX-ABCD1**

<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">M</div> <div style="border: 1px solid gray; padding: 2px;">X</div> <div style="border: 1px solid gray; padding: 2px;">P</div> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">W</div> <div style="border: 1px solid gray; padding: 2px;">R</div> <div style="border: 1px solid gray; padding: 2px;">-</div> <div style="border: 1px solid gray; padding: 2px;"> </div> <div style="border: 1px solid gray; padding: 2px;"> </div> </div> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;"> </div> <div style="border: 1px solid gray; padding: 2px;"> </div> <div style="border: 1px solid gray; padding: 2px;"> </div> <div style="border: 1px solid gray; padding: 2px;"> </div> <div style="border: 1px solid gray; padding: 2px;">1</div> </div>							
<b>MXP</b>	-	<b>XX</b>	-	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>MXP</b> Series Name	<div style="display: flex; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">M</div> <div style="border: 1px solid gray; padding: 2px;">X</div> <div style="border: 1px solid gray; padding: 2px;">P</div> <span style="margin-left: 10px;">Series</span> </div>						
<b>XX</b> Waveguide Band	<div style="display: flex; align-items: center;"> <div style="border: 1px solid gray; padding: 2px;">W</div> <div style="border: 1px solid gray; padding: 2px;">R</div> <div style="border: 1px solid gray; padding: 2px;">-</div> <div style="border: 1px solid gray; padding: 2px;"> </div> <div style="border: 1px solid gray; padding: 2px;"> </div> <span style="margin-left: 10px;">Number</span> <span style="margin-left: 10px;">28</span> <span style="margin-left: 10px;">22</span> <span style="margin-left: 10px;">19</span> <span style="margin-left: 10px;">15</span> <span style="margin-left: 10px;">12</span> <span style="margin-left: 10px;">10</span> <span style="margin-left: 10px;">08</span> </div>						
<b>A</b> RF Range	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid gray; padding: 2px;">F</div> Fullband           <div style="border: 1px solid gray; padding: 2px;">S</div> Specified Bandwidth (Please Specify)         </div> <div style="border: 1px solid gray; padding: 2px;">X</div> Fixed Frequency (Please Specify)						
<b>B</b> IF Range	<div style="border: 1px solid gray; padding: 2px;">S</div> Specified IF Bandwidth (please specify, IF amplifier not included) <div style="border: 1px solid gray; padding: 2px;">X</div> Fixed Frequency (please specify, IF amplifier not included) <div style="border: 1px solid gray; padding: 2px;">W</div> Specified IF Bandwidth (please specify, IF amplifier included)						
<b>C</b> LO Range	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid gray; padding: 2px;">F</div> Fullband           <div style="border: 1px solid gray; padding: 2px;">L</div> Lower Waveguide Band (Band Below RF Band)         </div> <div style="border: 1px solid gray; padding: 2px;">S</div> Specified Bandwidth (please specify) <div style="border: 1px solid gray; padding: 2px;">S</div> Fixed Frequency (please specify)						
<b>D</b> Measurement/Data Options (Test Conditions)	<div style="border: 1px solid gray; padding: 2px;">L</div> Mixer offered without IF amplifier: L – tested for conversion loss alone. Mixer offered with IF amplifier: tested for noise figure and conversion gain: <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid gray; padding: 2px;">O</div> 0.1-4 GHz           <div style="border: 1px solid gray; padding: 2px;">1</div> 1-8 GHz           <div style="border: 1px solid gray; padding: 2px;">2</div> 2-18 GHz         </div> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid gray; padding: 2px;">3</div> 6-18 GHz           <div style="border: 1px solid gray; padding: 2px;">4</div> 26.5-40 GHz           <div style="border: 1px solid gray; padding: 2px;">N</div> Other         </div>						

**Please specify frequency range for all narrowband units.**

**Examples:** To order a fullband fundamental mixer in WR-10 with LO and RF swept, specify MXP-10-FXFL1, with the IF specified by the customer for what IF that the mixer will be tested. Generally, the test data will be ~ 10 test points across the RF band at the IF chosen. Additional test data or a specific test plan can be quoted.

To order a fullband fundamental mixer in WR-10 with LO fixed and RF swept, specify MXP-10-FSXL1, with the fixed LO specified by the customer. Test data will again generally be ~ 10 test points across the RF band with the LO fixed, constrained by the maximum IF shown in the spec. table (35 GHz for MXP-10).

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