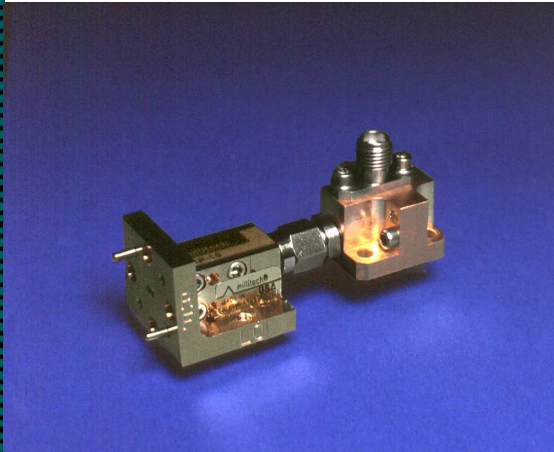


SERIES MSH

SUBHARMONIC MIXERS



FEATURES:

- Second or third harmonic operation
- Low conversion loss
- Wide bandwidth
- Low LO drive power

APPLICATIONS:

- Swept receivers up to 110 GHz
- Frequency extension to 260 GHz
- Radiometer front ends
- Automated test equipment
- Instrumentation

DESCRIPTION

Millitech series MSH subharmonic mixers operate at second or third harmonic of the local oscillator frequency. Hence, the local oscillator frequency is either one-half or one-third of the RF in the applicable waveguide band. These mixers offer the advantage of a lower frequency local oscillator while achieving conversion loss typically between 9 and 15 dB for second harmonic and 15 to 20 dB for third harmonic. The unwanted harmonic conversion is at least 20 dB lower than the designated harmonic (second or third).

Typical mixers in this series are similar to the waveguide balanced mixers (series MXP), with a diplexer to separate the LO and IF signals. This diplexer connects to the IF port of the mixer.

Mixers covering an RF frequency of 50 to 75 GHz and 75 to 110 GHz are offered with an external diplexer. They have a WR-28 waveguide port for local oscillator input, and an SMA-F for IF output from 1 MHz to 4 GHz. The LO frequency is 25 to 37 GHz.

Mixers at and above 120 GHz have internal diplexers. Subharmonic mixers have been optimized to operate at a fixed LO frequency and provide a broad IF frequency coverage of 1 MHz to 10 GHz.

This product can be pumped by a broadband tunable swept local oscillator source if desired. Thus, compact downconversion modules are particularly useful for instruments, test equipment, and frequency extension of measurement equipment.

ELECTRICAL SPECIFICATIONS (STANDARD PRODUCTS)*1

Model Number	MSH-15-2	MSH-10-3	MSH-06-2	MSH-05-3
RF frequency range (GHz)	50-70	75-110	120-170	150-200
LO frequency range (GHz)	23-35	25-36.67	60-85*3	50-67*3
Harmonic number	2	3	2	3
Conversion loss range (dB) (typ/max)*2	15/20	20/25	12/18	12/18
IF frequency range (GHz)	0.01-4		0.01-10	
LO power range	10-13dBm (14 dBm max)			
LO waveguide	WR-28	WR-28	WR-12	WR-15

*1 - Custom products available for other operating parameters and options. Please contact Millitech for details.

*2 - Conversion loss varies over RF band and within this range. Lower conversion loss over narrower frequency ranges.

*3 - Fixed LO.

NOTE: LO and IF connectors are SMA-F.

MECHANICAL SPECIFICATIONS

Model Number	MSH-15-2	MSH-10-3	MSH-06-2	MSH-05-3
RF Flange MIL.F-3922	/67B-008	/67B-010	/67B-M06	/67B-M05
LO Flange MIL.F-3922	/54-003*	/54-003*	/67B-009	/67B-008

*With #4-40 threaded holes.

HOW TO ORDER

Specify Model Number* MSH-XX-ABCØØ
XX = RF Waveguide Band WR – number
A = Harmonic Number 2 – second harmonic (WR-15 and WR-06 only) 3 – third harmonic (WR-10 and WR-05 only)
B = Bandwidth F – fullband RF/LO (WR-15 and WR-10 only) N – narrowband RF/LO (specify RF and LO frequency ranges)
C = Diplexer M – external diplexer provided by Millitech (WR-15 and WR-10 only) C – external diplexer provided by customer (WR-15 and WR-10 only) I – internal diplexer provided by Millitech (WR-06 and WR-05 only)
Ø = Special Options N – nonstandard (specify requirements)
* Please specify RF, LO and IF frequency ranges

EXAMPLE:

To Order: a standard WR-10 series MSH mixer for third harmonic operation with fullband RF and full LO band (25-37 GHz) with Millitech-supplied external diplexer

Specify: MSH-10-3FMØØ