Ceramic, Hermetically Sealed, Wideband

High Gain Mixer

MRA-42LH+

Level 10 (LO Power+10 dBm) 1000 to 4200 MHz

Product Features

- wide bandwidth, 1000 to 4200 MHz
- excellent conversion gain, 11.5 dB typ.
- excellent L-R isolation, 33 dB typ.
- LTCC double balanced mixer
- aqueous washable
- low cost
- small size, .300”x.250”x.060”
- ceramic, hermetic, nitrogen filled

CASE STYLE: DZ1650

+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Typical Applications

- cellular
- PCN
- fixed satellite
- WCDMA
- defense radar
- defense communications

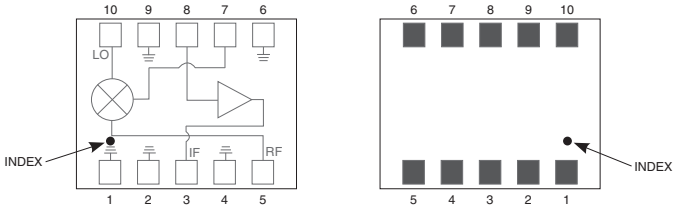
Model is not recommended for new designs and will be discontinued

General Description

The MRA-42LH+ combines a double balance mixer with a highly linear, low noise IF amplifier to provide a high gain active mixer for efficient operation from 1000 MHz to 4200 MHz. The MRA-42LH+, due to its ultra compact size, offers the additional flexibility to enable the user to install design specific components (i.e., filters, attenuators, switches...) based upon the design needs.

The Schottky diode and MMIC amplifier are bonded to a multilayer integrated LTCC substrate, and then sealed under a controlled nitrogen atmosphere with gold plated covers and eutectic Au-Sn solder. These very compact active mixers have been tested to MIL requirements for gross leak, fine leak, thermal shock, vibration, acceleration, mechanical shock and HTOL.

Functional Schematic



Top View *Bottom View*

Function	Pad Number	Description
RF	5	RF
LO	10	LO
IF	3	IF
GND	1,2,4,6,9	Connected to ground
	7,8	Connected externally (see Application Circuit, Fig 2)

Notes
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Electrical Specifications at 25°C

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range, LO/RF		1000		4200	MHz
Frequency Range, IF		10		800	MHz
Conversion Gain*	1000 - 4200	9.0	11.5		dB
Noise Figure	1000 - 4200		8.0		dB
LO to RF Isolation	1000 - 4200	25	35		dB
LO to IF Isolation	1000 - 4200	12	20		dB
Output IP3	1000 - 4200		21		dBm
RF Input Power at 1 dB Compression	1000 - 4200		4		dBm
DC Power Volt			3		V
DC Power Current				100	mA

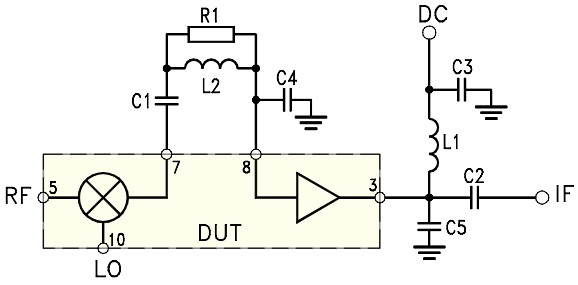
*Conversion Gain measured at 30 MHz IF.

Absolute Maximum Ratings

Parameter	Ratings
Operating Temperature (ground lead)	-55°C to 125°C
Storage Temperature	-65°C to 150°C
RF Power	50 mW
DC Voltage	5 V

Permanent damage may occur if any of these limits are exceeded.

Characterization Test Circuit

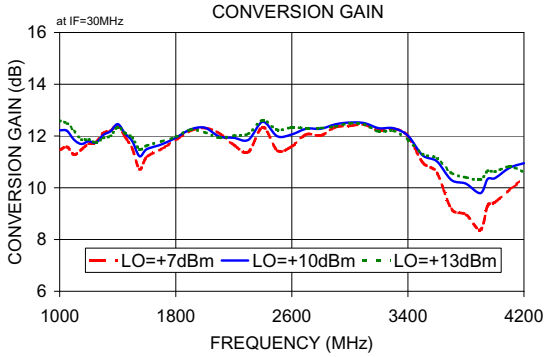


Component	Value
C1, C2	.001 µF
C3	.1 µF
L1	1.5 µH
L2	6.8 nH
C4	2.0 pF
C5	1.0 pF
R1	150 ohm

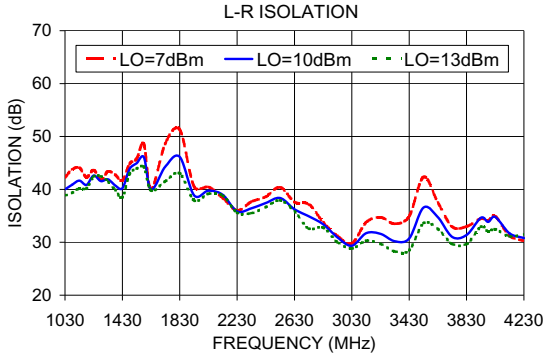
Fig 1. Block Diagram of Test Circuit used for characterization. (DUT soldered on Mini-Circuits Characterization Test Board TB-660+) Gain, Output power at 1dB compression (P1dB), Output IP3 (OIP3) are measured using R&S Network Analyzer ZVA-24. Noise Figure measured using Agilent's N8974A Noise Figure Analyzer
Conditions:
1. Gain: RF Power=-15 dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, 0 dBm/tone at output.
3. DC voltage=3V

Typical Performance Curves

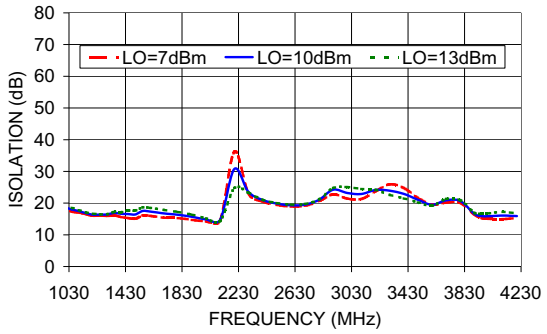
MRA-42LH+
CONVERSION GAIN



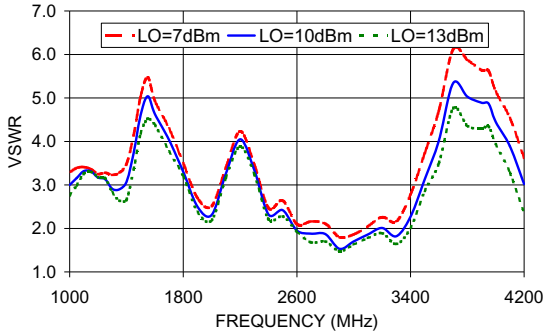
MRA-42LH+
L-R ISOLATION



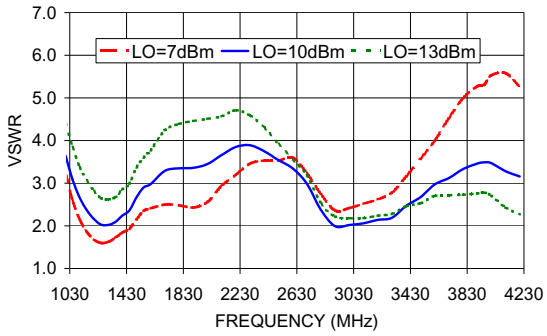
MRA-42LH+
L-I ISOLATION



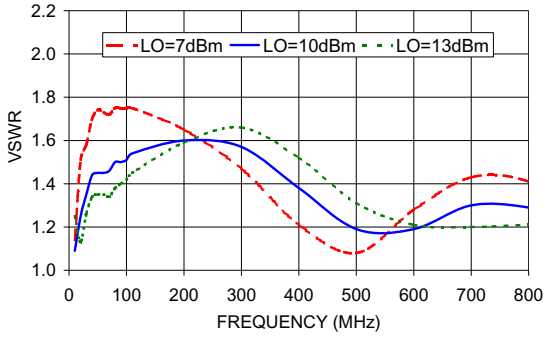
MRA-42LH+
RF VSWR



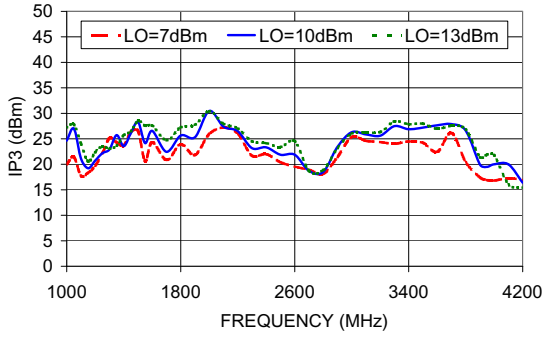
MRA-42LH+
LO VSWR



MRA-42LH+
IF VSWR



MRA-42LH+
OUTPUT IP3



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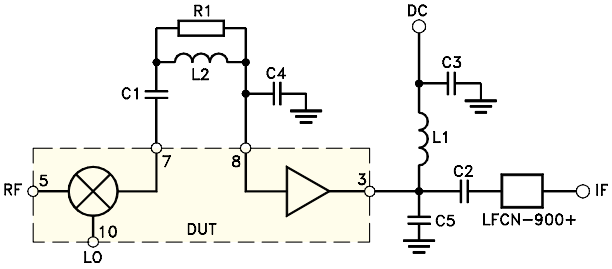
Electrical Performance for Suggested Application Circuit

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range, LO/RF		1000		4200	MHz
Frequency Range, IF		10		800	MHz
Conversion Gain*	1000 - 4200		11.5		dB
Noise Figure	1000 - 4200		8.0		dB
LO to RF Isolation	1000 - 4200		35		dB
LO to IF Isolation	1000 - 4200		60		dB
Output IP3	1000 - 4200		21		dBm
RF Input Power at 1 dB Compression	1000 - 4200		4		dBm
DC Power Volt			3		V
DC Power Current			—		mA

Suggested Application Circuit (Fig. 2)



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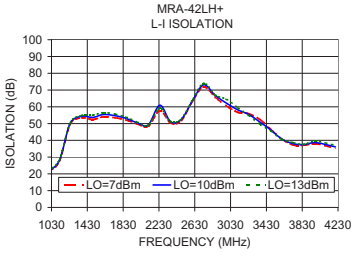

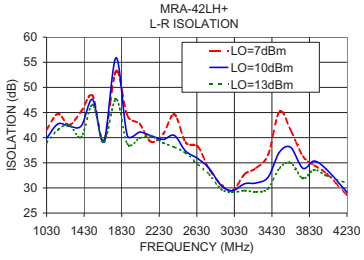

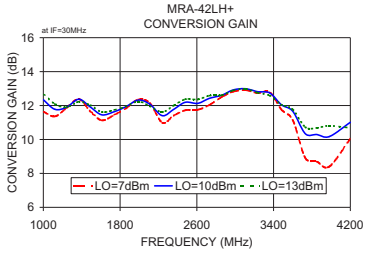

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Additional Detailed Technical Information *additional information is available on our dash board. To access this information click here*	
Performance Data	Data Table
	Swept Graphs
Case Style	DZ1650
Tape & Reel **Standard quantities available on reel**	F34 *7" reels with 10, 20, 50, 100, 200 or 500 devices.* *13" reels with 1K devices.*
Suggested Layout for PCB Design	PL-369
Evaluation Board	TB-660-42LH+
Environmental Ratings	ENV-64

ESD Rating

Human Body Model (HBM): Class 1B in accordance with ANSI/ESD STM 5.1 - 2001; passes 500V.
Machine Model (MM): Class M1 in accordance with ANSI/ESD STM5.2-1999; passes 20V

MSL Rating

Moisture Sensitivity: MSL1

Qualification Testing

Test Description		Test Method/Process	Results
1	Hermeticity (fine and gross leak)	MIL-STD-202 Method 112, Cond. C & D	Pass
2	Acceleration, 30Kg, Y1 Direction	MIL-STD-883 Method 2001 Cond. E	Pass
3	Vibration , 10-2000Hz sine, 20g, 3 axis	MIL-STD-202 Method 204, Cond. D	Pass
4	Mechanical shock	MIL-STD-202 Method 213, Cond . A	Pass
5	PIND 20G's @130 Hz	MIL-STD-750 Method 2052.2	Pass
6	Temp Cycle -55C/+125C, 1000 Cycles	MIL-STD-202 Method 107	Pass
7	Autoclave, 121C, RH 100%, 15 Psig, 96 hrs	JESD22-A102C	Pass
8	HTOL, 1000hrs, 105C at rated Voltage condition	MIL-STD-202 Method 108, Cond . D	Pass
9	Bend Test	JESD22-B113	Pass
10	Resistance to soldering heat, 3x reflow, 260C peak	JESD22-B102	Pass
11	Drop Test	JESD22-B111	Pass
12	Adhesion Strength	Push Test>10 lb	Pass