

# RMWM38001

## 38 GHz Mixer MMIC

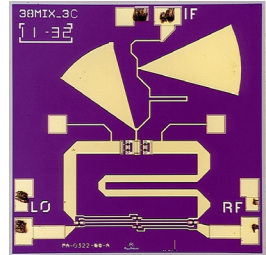
## PRODUCT INFORMATION

**Description**

The RMWM38001 is a 38 GHz Mixer designed to be used in point to point radios, point to multi-point communications, LMDS, and other millimeter wave applications. In conjunction with other Raytheon amplifiers, multipliers and mixers it forms part of a complete 38 GHz transmit/receive chipset. The RMWM38001 is a GaAs MMIC diode mixer utilizing Raytheon's 0.25 $\mu$ m power PHEMT process. The MMIC can be used as both an Upconverter and a Downconverter and is sufficiently versatile to serve in a variety of mixer applications.

**Features**

- ◆ 4 mil substrate
- ◆ Conversion loss 5 dB (Upconverter)
- ◆ Conversion loss 8 dB (Downconverter)
- ◆ No DC bias required
- ◆ Chip size 1.4 mm x 1.4 mm

**Absolute Maximum Ratings**

Parameter	Symbol	Value	Unit
RF Input Power (from 50 $\Omega$ source)	$P_{IN}$	+25	dBm
Operating Baseplate Temperature	$T_C$	-30 to +85	$^{\circ}$ C
Storage Temperature Range	$T_{stg}$	-55 to +125	$^{\circ}$ C

**Electrical Characteristics**  
 (At 25 $^{\circ}$ C),  
 50  $\Omega$  system,  
 LO = +12 dBm

Parameter	Min	Typ	Max	Unit
RF Frequency Range	37		40	GHz
LO Frequency Range		32 - 35		GHz
IF Frequency Range		4.7 - 5.3		GHz
LO Drive Power		12	16	dBm
Up Conversion Loss		5		dB
Down Conversion Loss <sup>1</sup>		8	10	dB
Conversion Loss Variation vs Freq		3		dB

**Notes:**

1. Device 100% RF tested as downconverter only. LO drive = +12 dBm, RF Pin = -10 dBm, IF = 5 GHz.

**Characteristic performance data and specifications are subject to change without notice.**

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**Application Information**

**CAUTION: THIS IS AN ESD SENSITIVE DEVICE.**

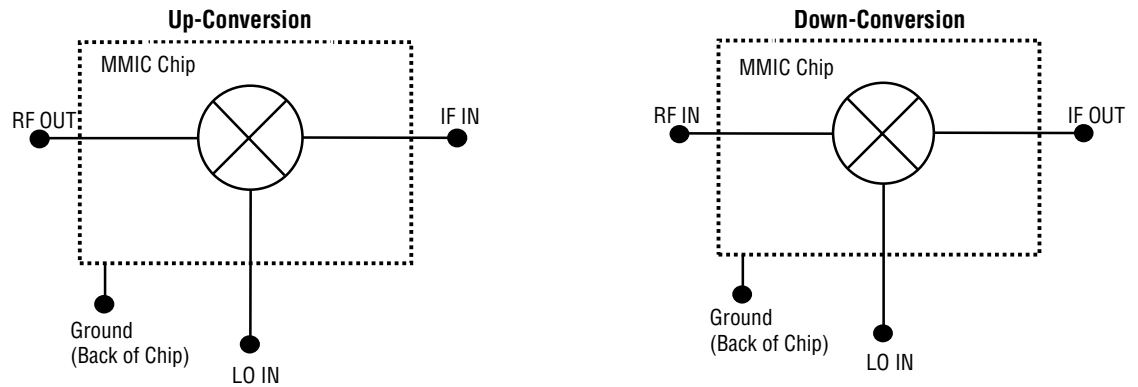
Chip carrier material should be selected to have GaAs compatible thermal coefficient of expansion and high thermal conductivity such as copper molybdenum or copper tungsten. The chip carrier should be machined, finished flat, plated with gold over nickel and should be capable of withstanding 325°C for 15 minutes.

Die attachment should utilize Gold/Tin (80/20) eutectic alloy solder and should avoid hydrogen environment for PHEMT devices. Note that the backside of the chip is gold plated and is used as RF ground.

These GaAs devices should be handled with care and stored in dry nitrogen environment to prevent contamination of bonding surfaces. These are ESD sensitive devices and should be handled with appropriate precaution including the use of wrist grounding straps. All die attach and wire/ribbon bond equipment must be well grounded to prevent static discharges through the device.

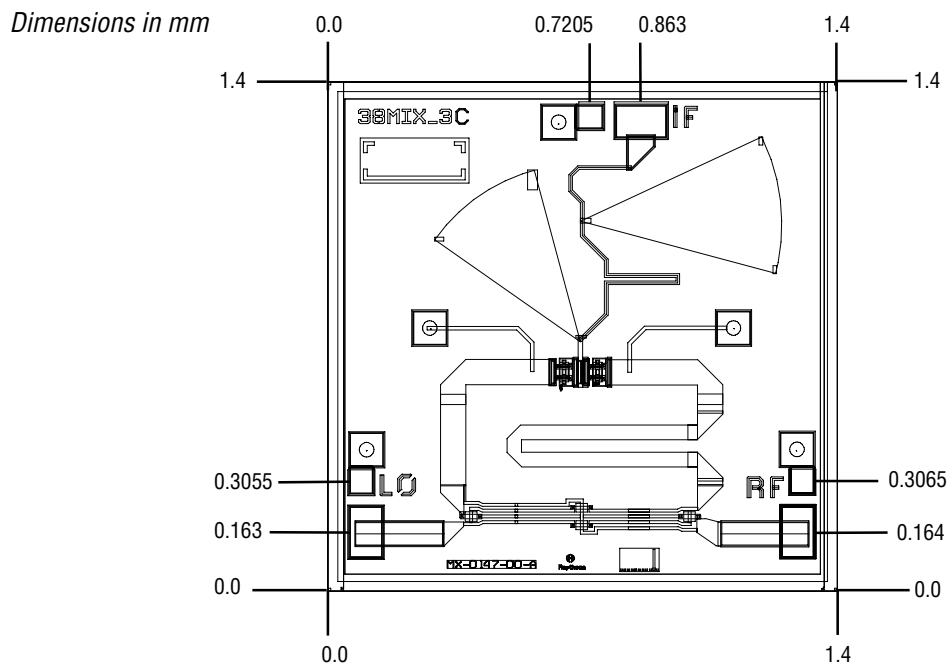
Recommended wire bonding uses 3 mils wide and 0.5 mil thick gold ribbon with lengths as short as practical allowing for appropriate stress relief. The RF input and output bonds should be typically 0.012" long corresponding to a typically 2 mil between the chip and the substrate material.

**Figure 1**  
Functional Block Diagram



**Figure 2**  
Chip Layout and Bond Pad Locations

Chip Size is 1.4 mm x 1.4 mm x 100 μm.  
Back of chip is RF ground

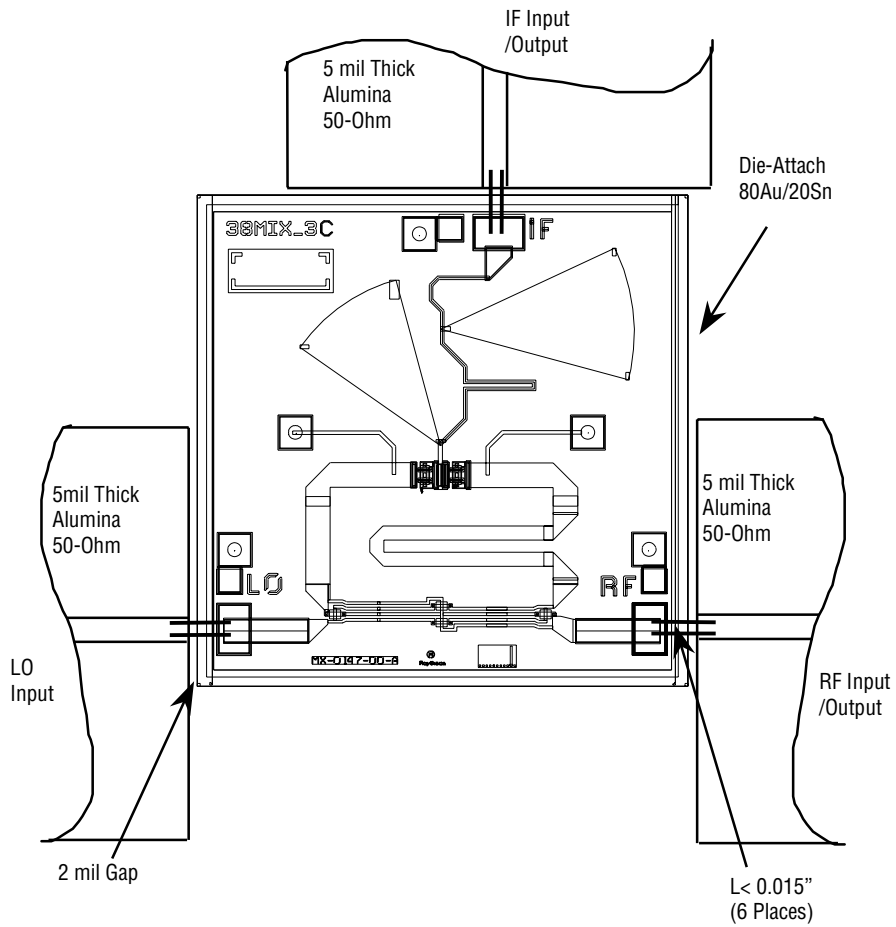


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**Figure 3**  
Recommended  
Assembly Diagram<sup>1</sup>



**Note:**

1. Use 0.003" by 0.0005" Gold Ribbon for bonding. RF input and output bonds should be less than 0.015" long with stress relief.

**Recommended  
Procedure for  
Operation**

**CAUTION: THIS IS AN ESD SENSITIVE DEVICE**

The RMWM38001 does not require DC bias. Apply RF input signal at the appropriate frequency band and input drive level.

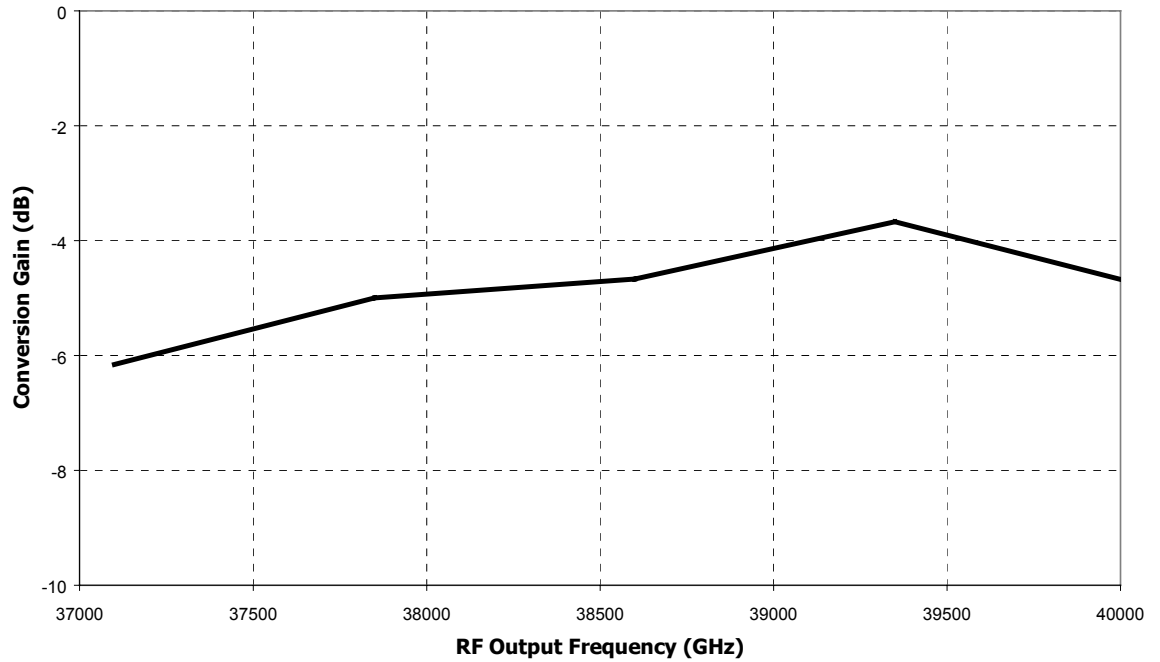
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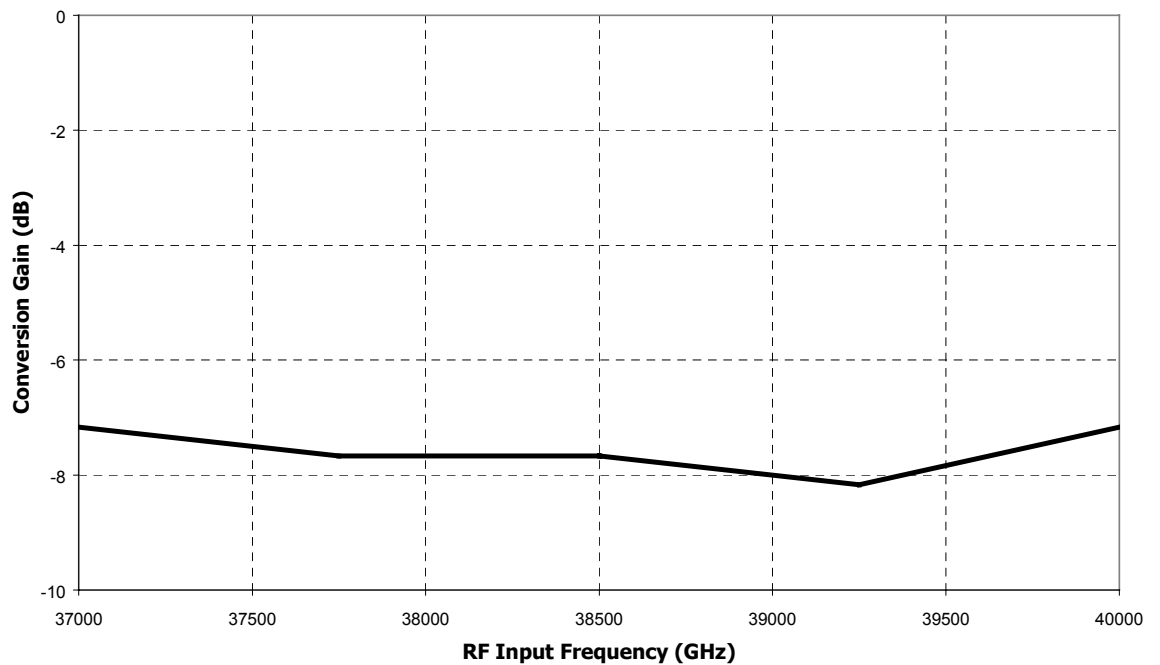
## 38 GHz Mixer MMIC

Performance  
Data

**RMWM38001 38 GHz Mixer on-Wafer Performance UpConverter.  
LO Drive Power = 12 dBm**



**RMWP38001 38 GHz Mixer Typical On-Wafer Performance DownConverter.  
LO Drive Power = 12 dBm**



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