Raytheon

RF Components

RMWM26001

26 GHz Mixer MMIC

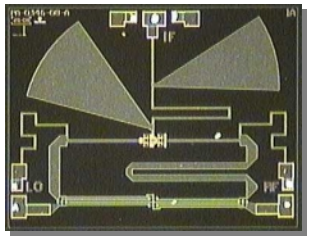
PRODUCT INFORMATION

Description

The RMWM26001 is a 26 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 RF Components amplifiers, multipliers and mixers it forms part of a complete 23 and 26 GHz transmit/receive chipset. The RMWM26001 is a GaAs MMIC diode mixer utilizing Raytheon RF Components' 0.25µm 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 7.5 dB (Upconverter)
- Conversion loss 8.5 dB (Downconverter)
- No DC bias required
- Chip size 1.95 mm x 1.5 mm



Absolute Ratings

Parameter	Symbol	Value	Units
RF Input Power (from 50 Ω source)	P_{IN}	+25	dBm
Operating Baseplate Temperature	T_C	-30 to +85	°C
Storage Temperature Range	T_{stg}	-55 to +125	°C

Electrical Characteristics

(At 25°C), 50 Ω system, LO = +12 dBm

Parameter	Min	Typ	Max	Unit
RF Frequency Range	21		26.5	GHz
LO Frequency Range		17 - 24.1		GHz
IF Frequency Range (Up-Conv)		4.02 - 4.12		GHz
IF Frequency Range (Down-Conv)		2.552 - 2.602		GHz
LO Drive Power		12	16	dBm
Up Conversion Loss		7.5		dB
Down Conversion Loss[1]		8.5	10	dB
Conversion Loss Variation vs Freq.		2		dB

Parameter	Min	Typ	Max	Unit
RF Port Return Loss		12		dB
LO Port Return Loss		10		dB
IF Port Return Loss		8		dB
LO to RF Isolation		20		dB
LO to IF Isolation		35		dB
Input P1dB at IF Port (Up-Conv)		8		dBm
Input P1dB at RF Port (Down-Conv)		9		dBm

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 typical 2 mil gap between the chip and the substrate material.

Note:

1. Device 100% RF tested as downconverter only. LO drive = +12 dBm, RF Pin = -10 dBm, IF = 2.6 GHz.

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

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Figure 1
Functional Block Diagram

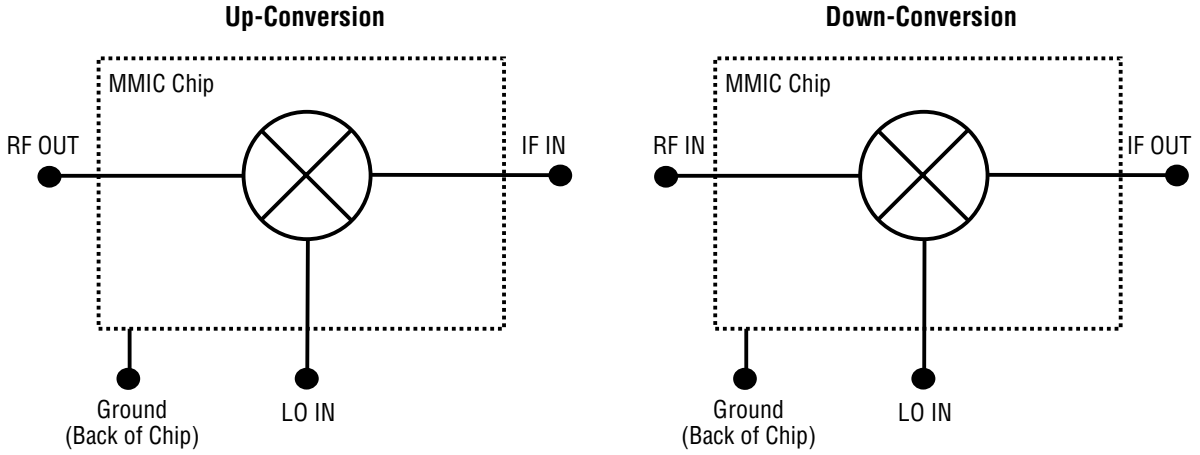

Figure 2
Chip Layout and Bond Pad Locations

Chip Size is 1.95 mm x 1.5 mm x 100 µm. Back of chip is RF ground

Dimensions in mm

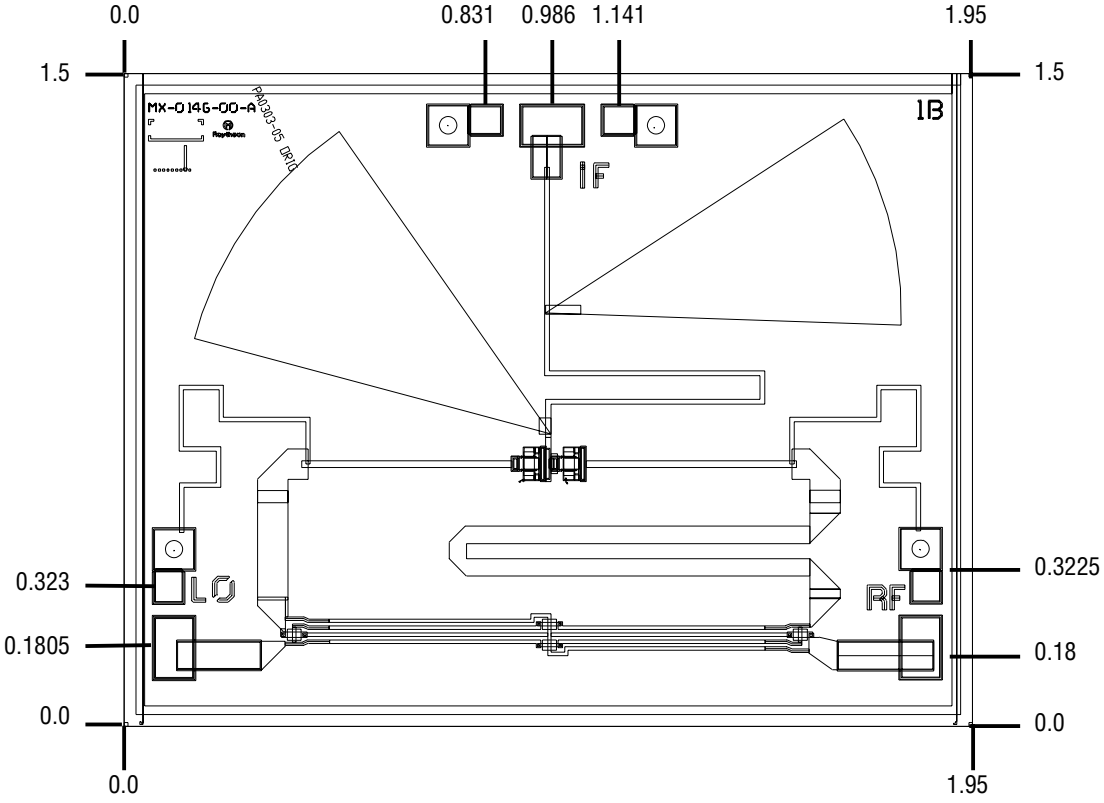

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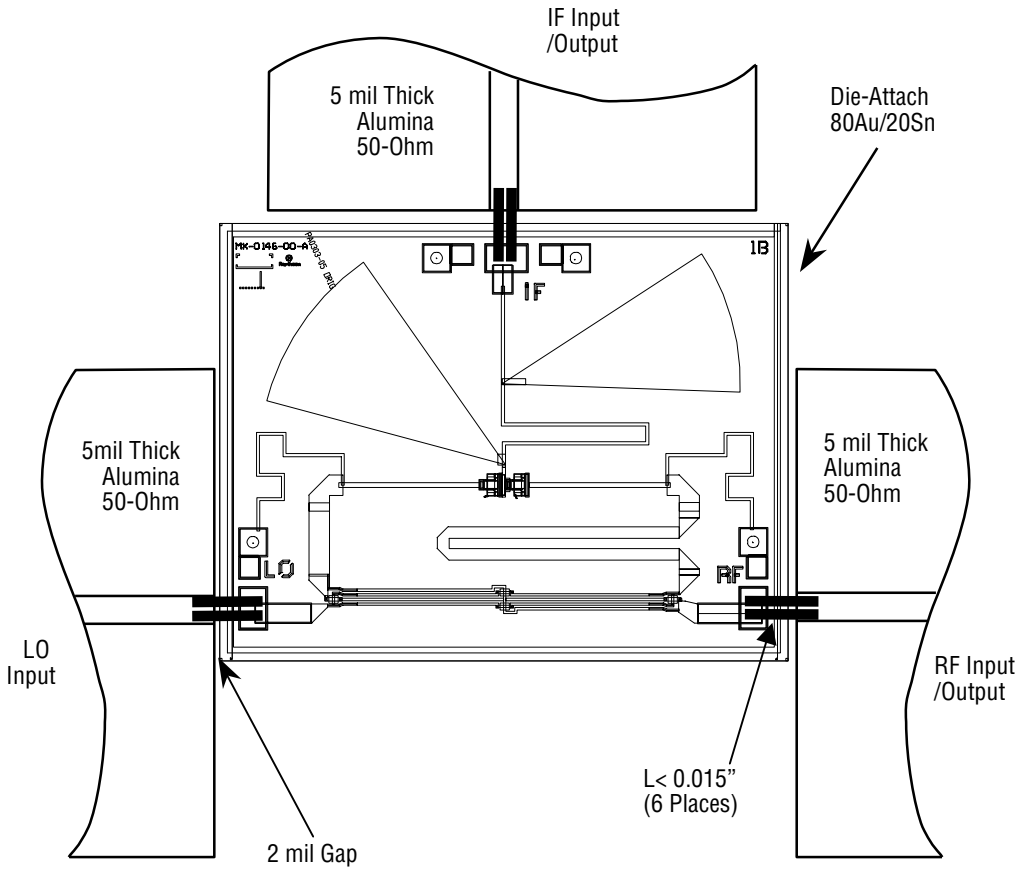
Figure 3
Recommended
Assembly Diagram



Note:
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

The RMWM26001 does not require DC bias. Apply RF input signal at the appropriate frequency band and input drive level.

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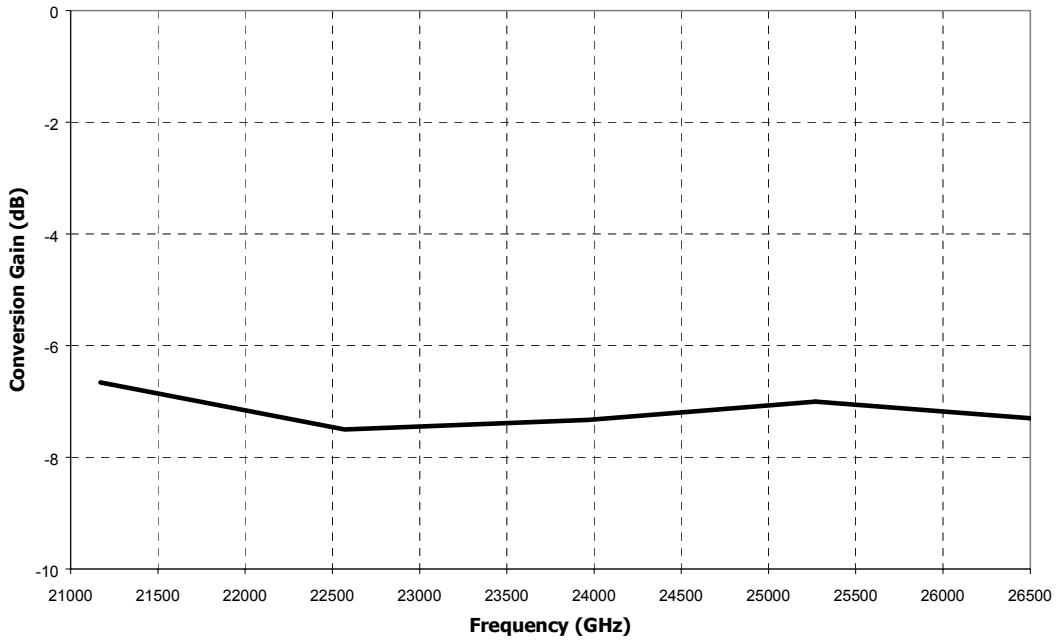
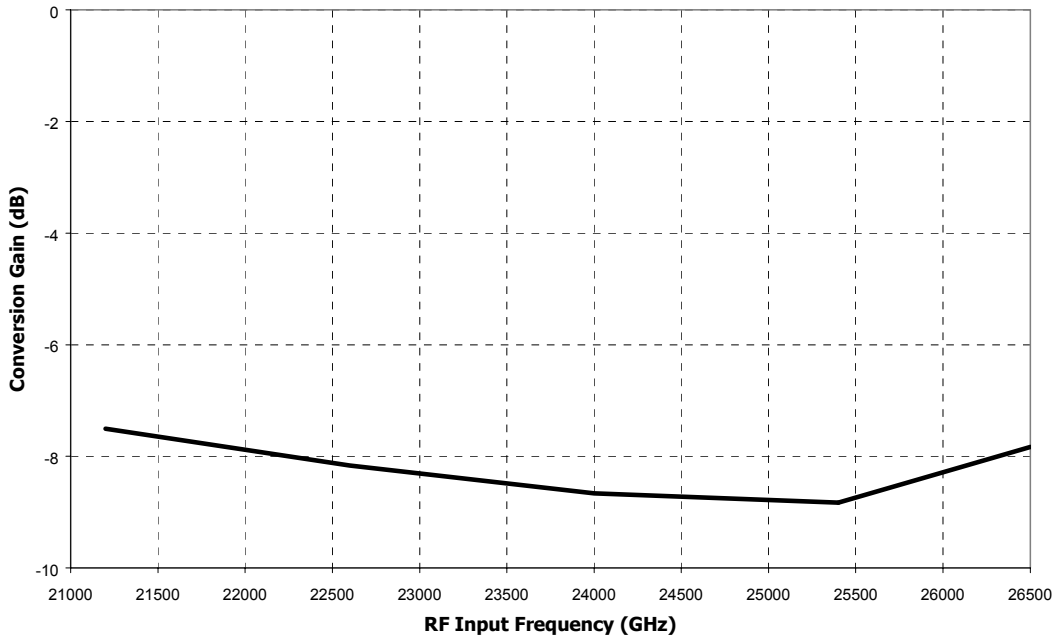
Performance Data

RMWM26001 26 GHz Mixer On-Wafer Performance UpConverter



RMWM26001 26 GHz Mixer Typical On-Wafer Performance DownConverter



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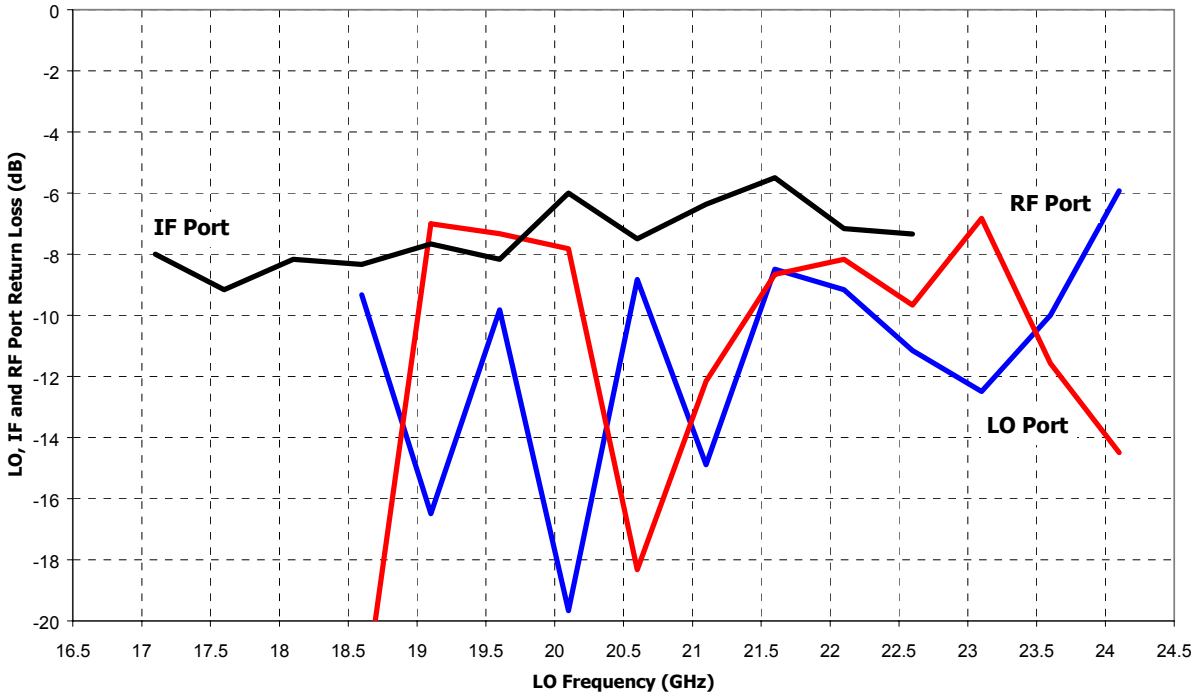
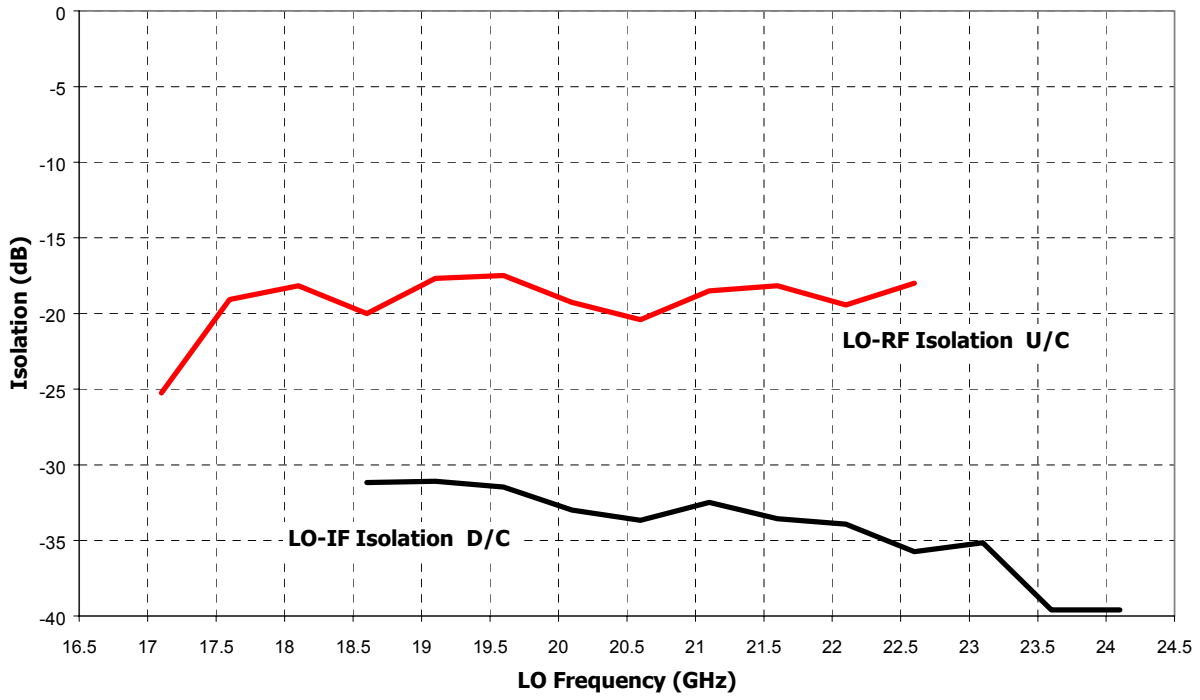
Performance Data

RMWL26001 26 GHz Mixer Typical Return Loss Performance
Measurements Include 50 Ohm Test Fixture



RMWL26001 26 GHz Mixer Typical Isolation Performance
Measurements Include 50 Ohm Test Fixture



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