FAIRCHILD SEMICONDUCTOR®

June 2004

RMWM26001

26 GHz Mixer MMIC

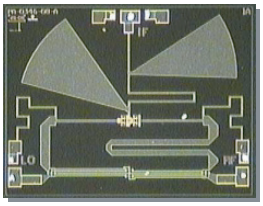
General Description

The RMWM26001 is a 26 GHz Mixer designed for use in point to point and point to multi-point radios, and various communications applications. In conjunction with other Fairchild 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 our 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 7.5dB (Upconverter)
- Conversion loss 8.5dB (Downconverter)
- No DC bias required
- Chip size 1.95mm x 1.5mm

Device



Absolute Ratings

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

Electrical Characteristics (At 25°C), 50 Ω system, LO = +12dBm

Parameter	Min	Typ	Max	Units
RF Frequency Range	21		26.5	GHz
LO Frequency Range		17 – 24.1	30	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
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
Infput P1dB at IF Port (Up-Conv)		8		dBm
Infput P1dB at RF Port (Down-Conv)		9		dBm

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

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.

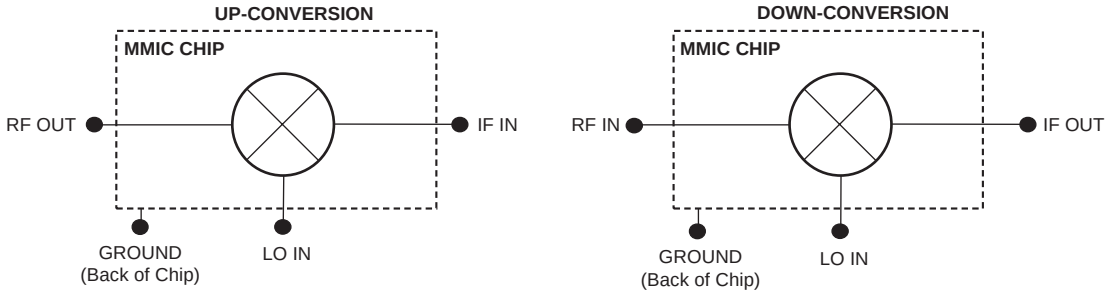
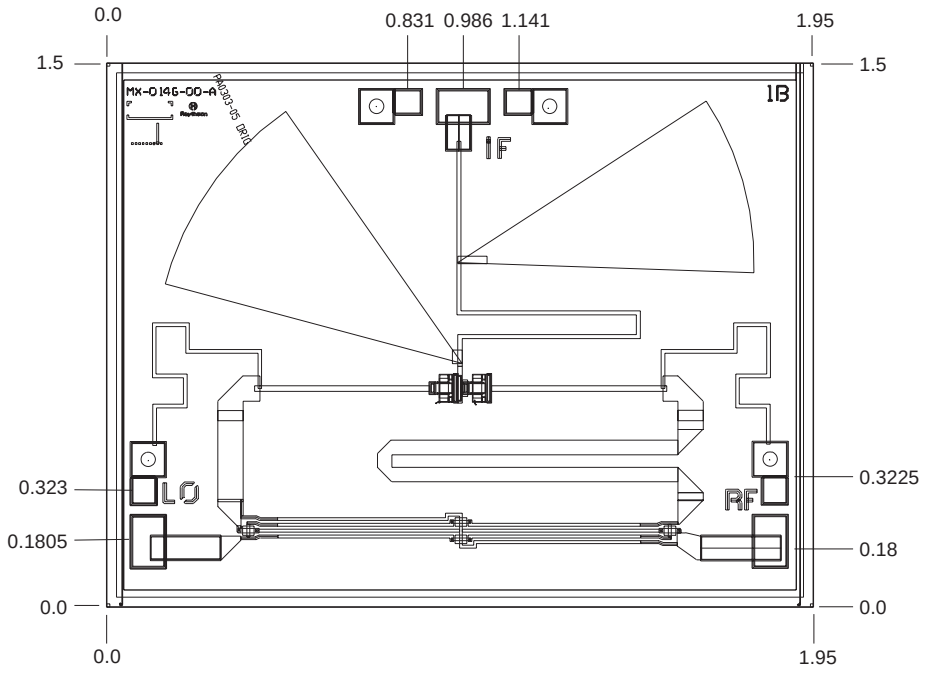
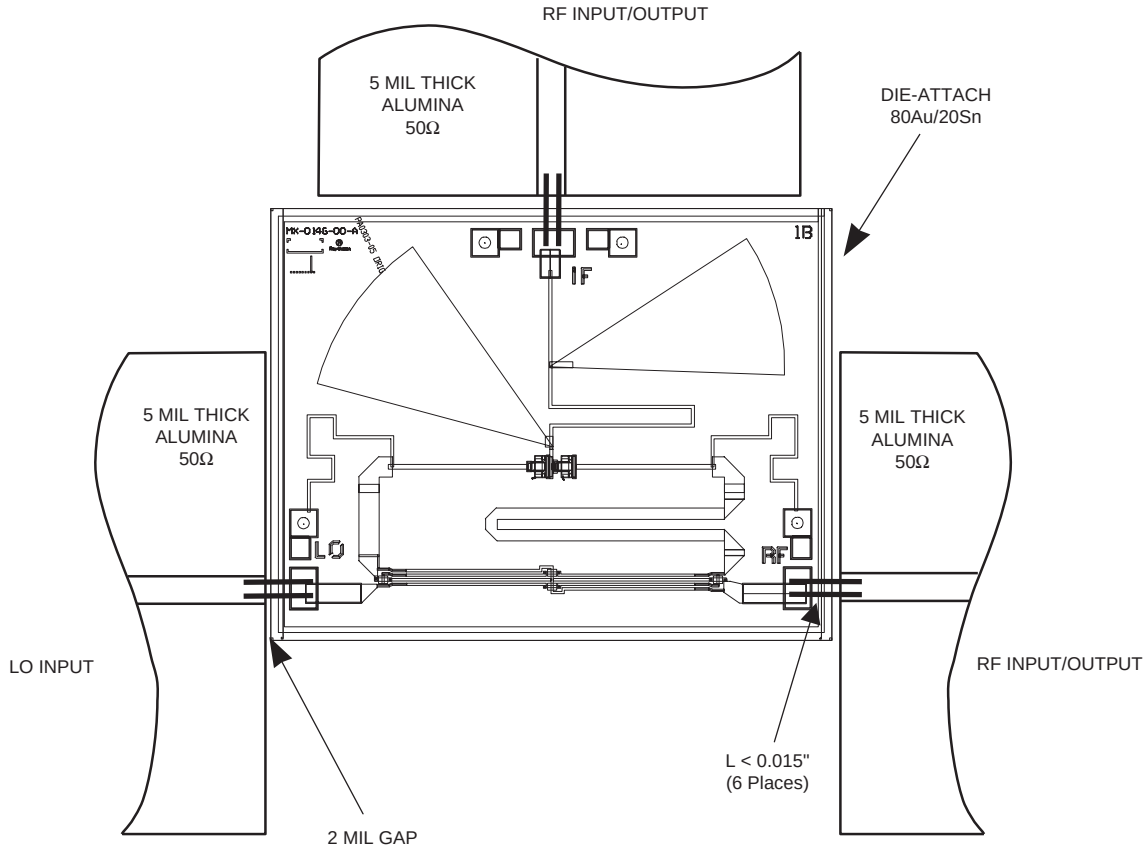


Figure 1. Functional Block Diagram



Dimensions in mm

Figure 2. Chip Layout and Bond Pad Locations
(Chip Size is 1.95mm x 1.5mm x 100µm. Back of chip is RF Ground)



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.

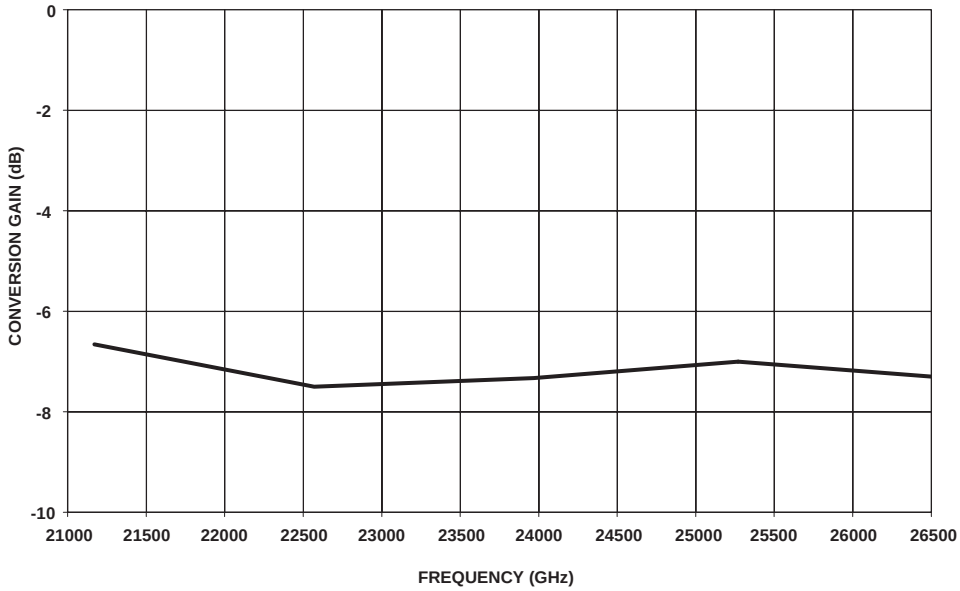
Figure 3. Recommended Assembly Diagram

Recommended Procedure for Operation

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

Typical Characteristics

RMWM26001 26 GHz Mixed On-Wafer UpConverter



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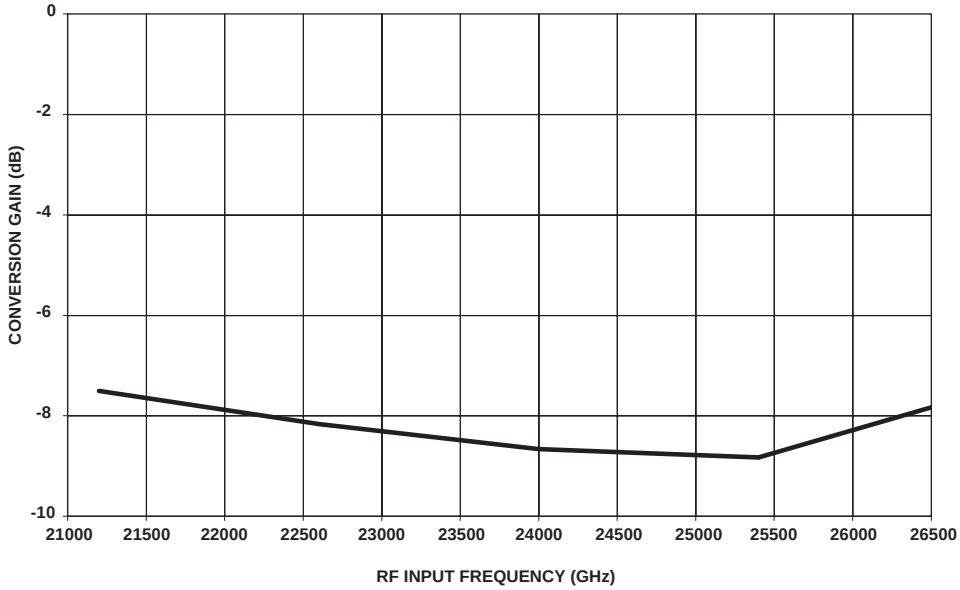
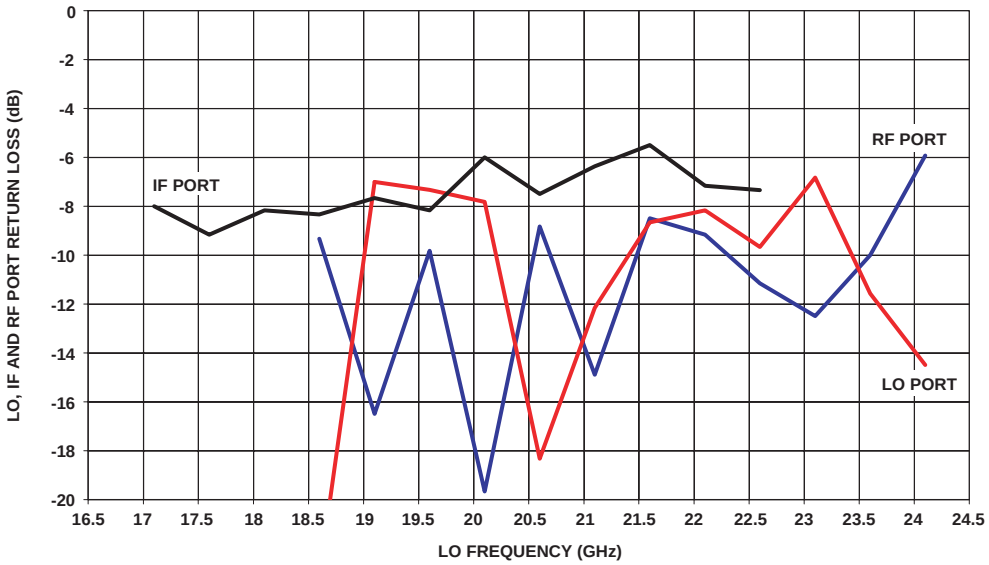


Typical Characteristics (Continued)

RMWL26001 26 GHz Mixed Typical Return Loss Performance
Measurements Include 50Ω Test Fixture



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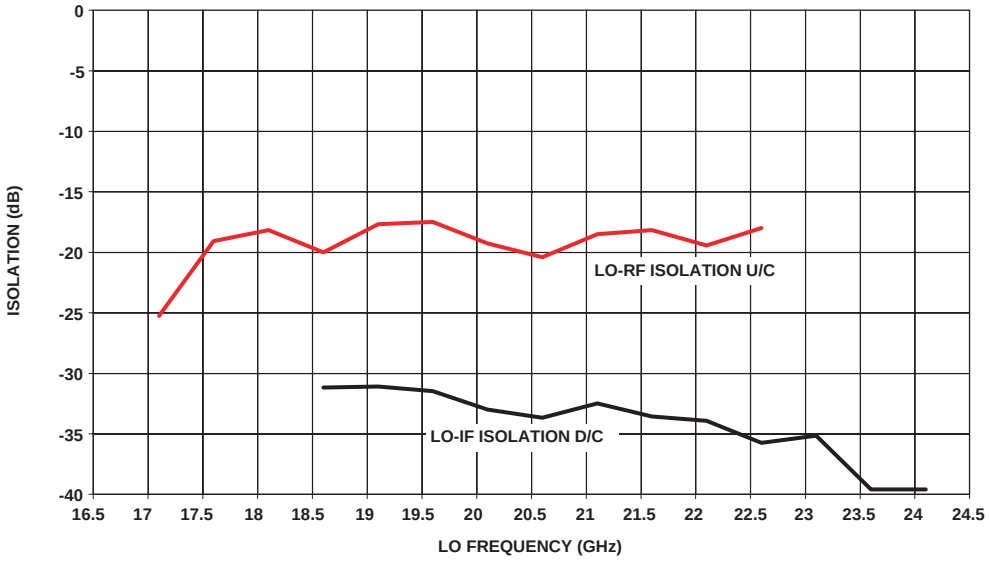

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