

RMWT04001

4-12 GHz Tripler MMIC

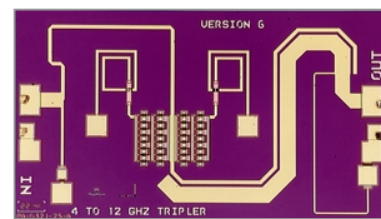
PRODUCT INFORMATION

Description

The RMWT04001 is a 4 to 12 GHz Tripler designed to be used in the LO chain of 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 23, 26 and 38 GHz transmit/receive chipset. The RMWT04001 utilizes Raytheon's 0.25 μm power PHEMT process and is sufficiently versatile to serve in a variety of multiplier applications.

Features

- u 4 mil substrate
- u Conversion loss 14 dB (typ.)
- u No DC bias required
- u Chip size 1.8 mm x 1.05 mm

**Absolute Maximum Ratings**

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

Electrical Characteristics

(At 25 $^{\circ}\text{C}$),
50 Ω system,
 $P_{in} = +18$ dBm

Parameter	Min	Typ	Max	Unit
Input Frequency Range	2.8		4.0	GHz
Output Frequency Range	8.4		12.0	GHz
Input Drive Power	+16	+18		dBm
Conversion Loss		14	16.5	dB
Conversion Loss Variation vs Freq		0.7		dB

Parameter	Min	Typ	Max	Unit
Fundamental Rejection		-25		dBc
2nd Harmonic Rejection		-20		dBc
4th Harmonic Rejection		-20		dBc
5th Harmonic Rejection		-30		dBc
Input Return Loss ($P_{in} = +18$ dBm)		10		dB

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 $^{\circ}\text{C}$ 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.

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

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Figure 1
Functional Block Diagram

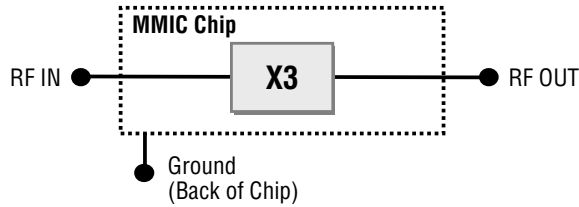


Figure 2
Chip Layout and Bond Pad Locations

Chip Size is 1.8 mm x 1.05 mm x 100 μ m. Back of chip is RF ground

Dimensions in mm

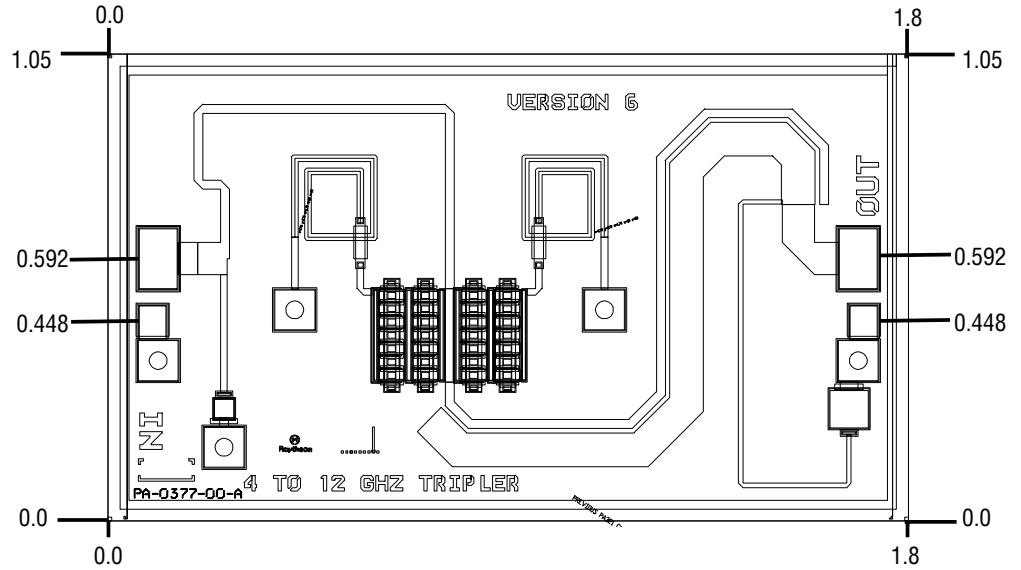
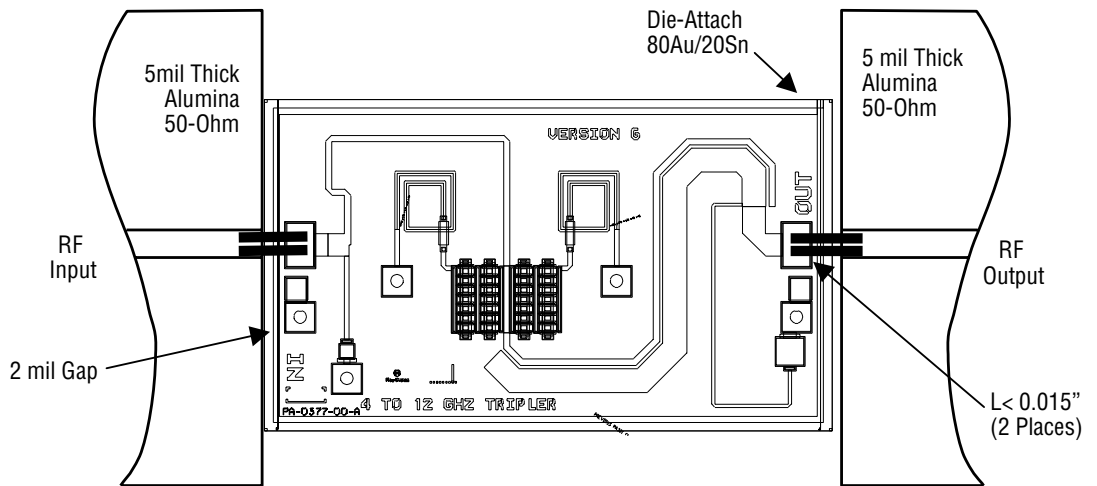


Figure 3
Recommended Assembly Diagram



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 following sequence must be followed to properly test the amplifier.

Step 1: The RMWT04001 does not require DC bias. Apply RF input signal at the appropriate frequency band and input drive level.

Step 2: Follow turn-off sequence of: Turn off RF input power.

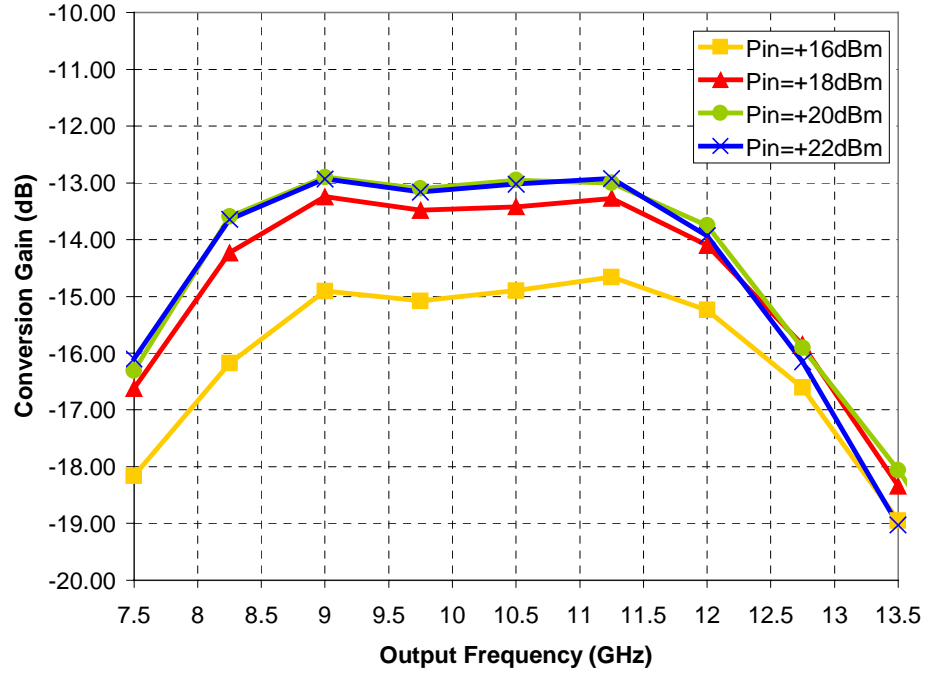
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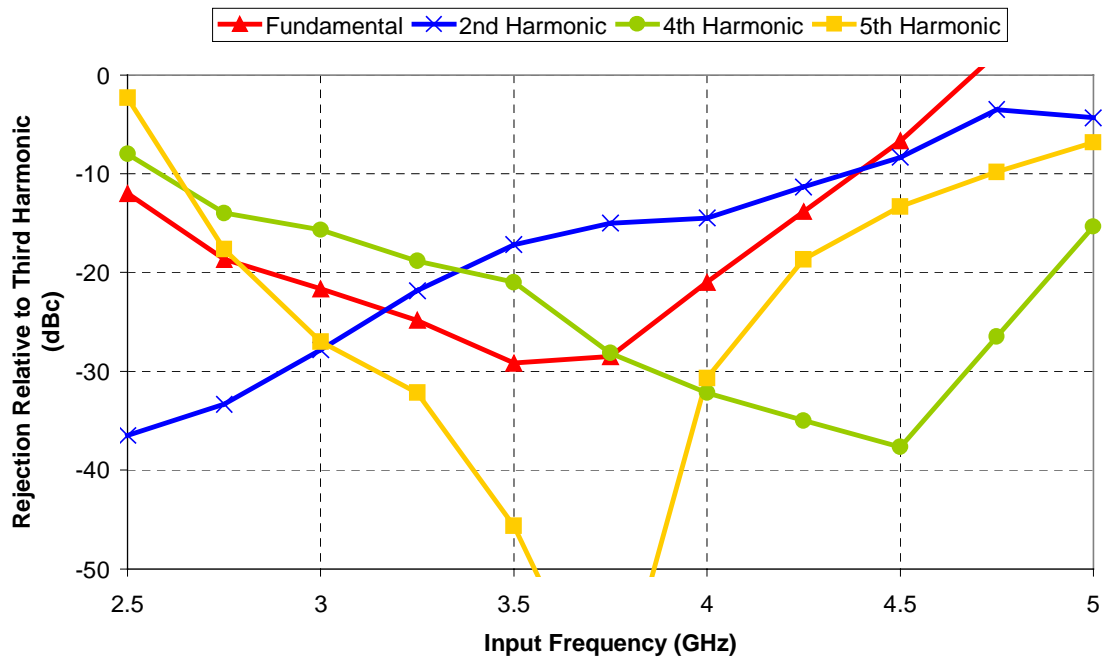
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Performance Data

RMWT04001, 4 to 12 GHz Tripler, Typical Performance, Chip Bonded into 50 ohm Test Fixture



RMWT04001, 4 to 12 GHz Tripler, Typical Performance, Chip Bonded into 50 ohm Test Fixture



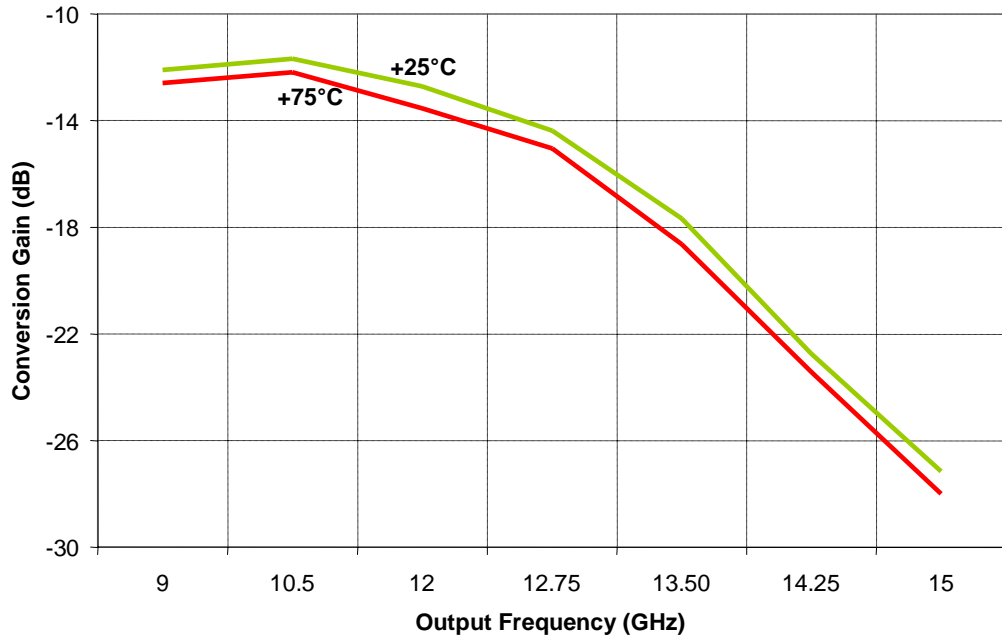
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RMWT04001

4-12 GHz Tripler MMIC

Performance Data

RMWT04001, 4 to 12 GHz Tripler, Typical Performance Variation with Temperature, Chip Bonded into 50 ohm Test Fixture



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