Raytheon

RMWW12001
12-24 GHz Doubler MMIC

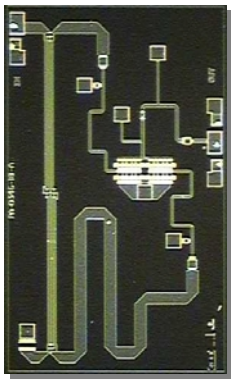
PRODUCT INFORMATION

Description

The RMWW12001 is a 12 to 24 GHz Doubler 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 and 26 GHz transmit/receive chipset. The RMWW12001 utilizes Raytheon's 0.25 µm power PHEMT process and is sufficiently versatile to serve in a variety of multiplier applications.

Features

- 4 mil substrate
- Conversion loss 10 dB (typ.)
- No DC bias required
- Chip size 1.5 mm x 2.5 mm



Absolute Maximum Ratings

Parameter	Symbol	Value	Units
RF Input Power (from 50 Ω source)	P_{IN}	+22	dBm
Operating Baseplate Temperature	T_C	-30 to +85	°C
Storage Temperature Range	T_{stg}	-55 to +125	°C

Electrical Characteristics

(At 25°C), 50Ω system, Pin=+18 dBm

Parameter	Min	Typ	Max	Unit
Input Frequency Range	8.5		12	GHz
Output Frequency Range	17		24	GHz
Input Drive Power	+16	+18		dBm
Conversion Loss		10	12.5	dB
Conversion Loss Variation vs. Frequency		2		dB

Parameter	Min	Typ	Max	Unit
Fundamental Rejection		-20		dBc
3rd Harmonic Rejection		-25		dBc
4th Harmonic Rejection		-25		dBc
5th Harmonic Rejection		-35		dBc
Input Return Loss (Pin = +18 dBm)		12		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°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.

Recommended Procedure for Operation

The following sequence of steps must be followed to properly test the amplifier:

Step 1: The RMWW12001 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.

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

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Figure 1
Functional Block Diagram

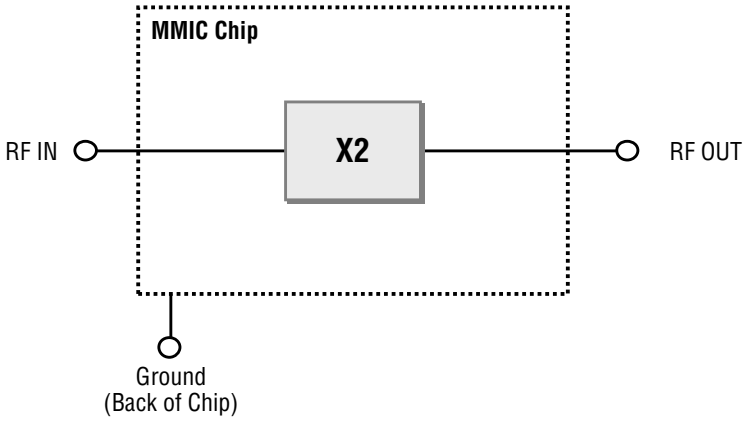

Figure 2
Chip Layout and Bond Pad Locations

Chip Size is 1.5 mm x 2.5 mm 100 µm. Back of chip is RF ground

Dimensions in mm

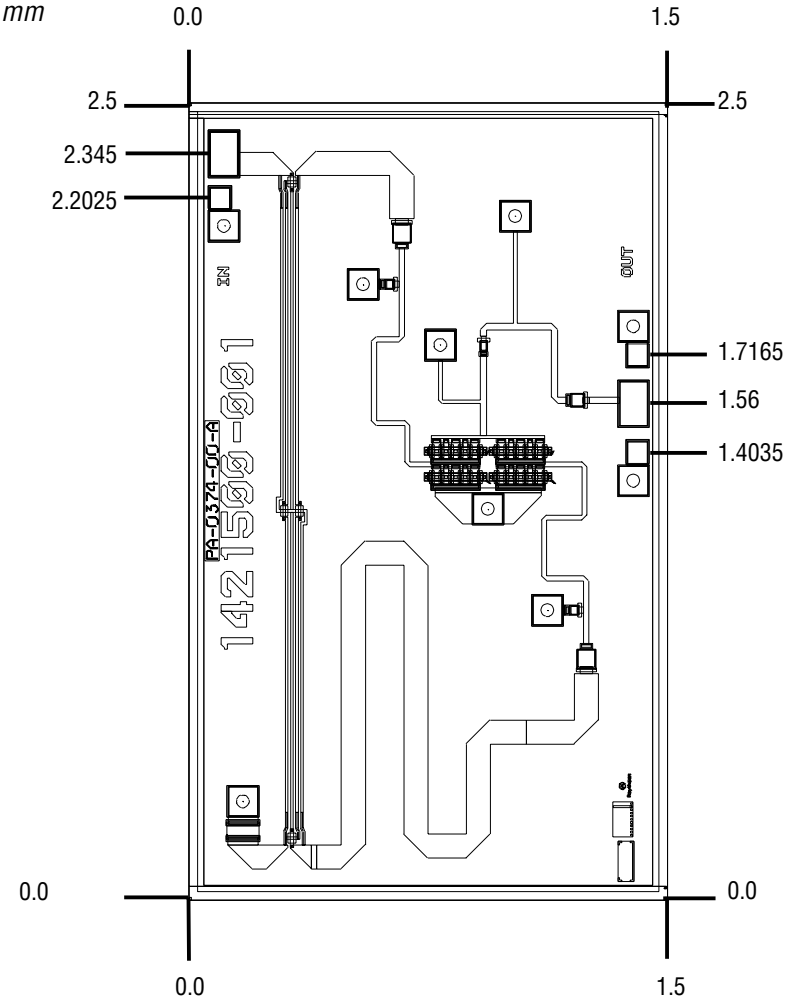

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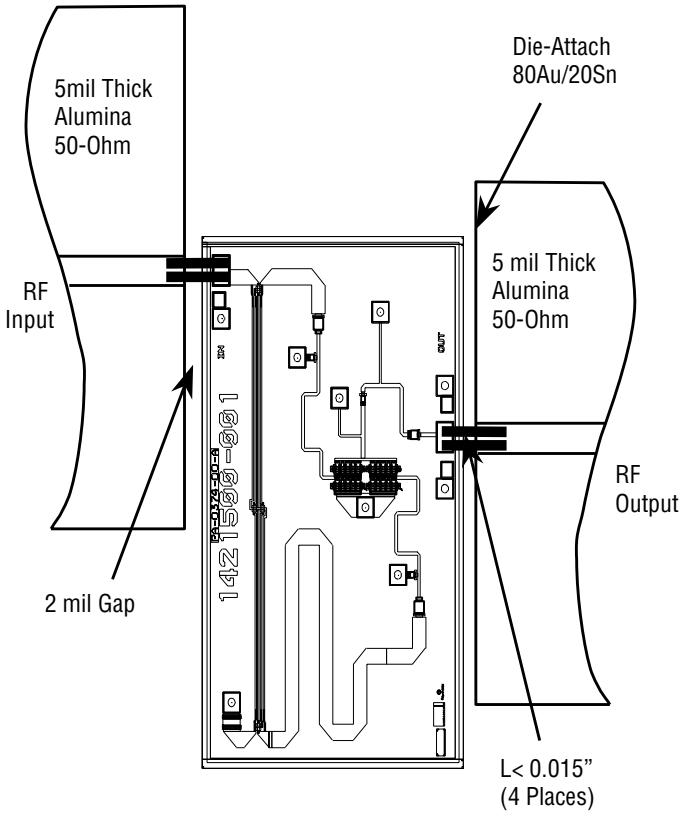
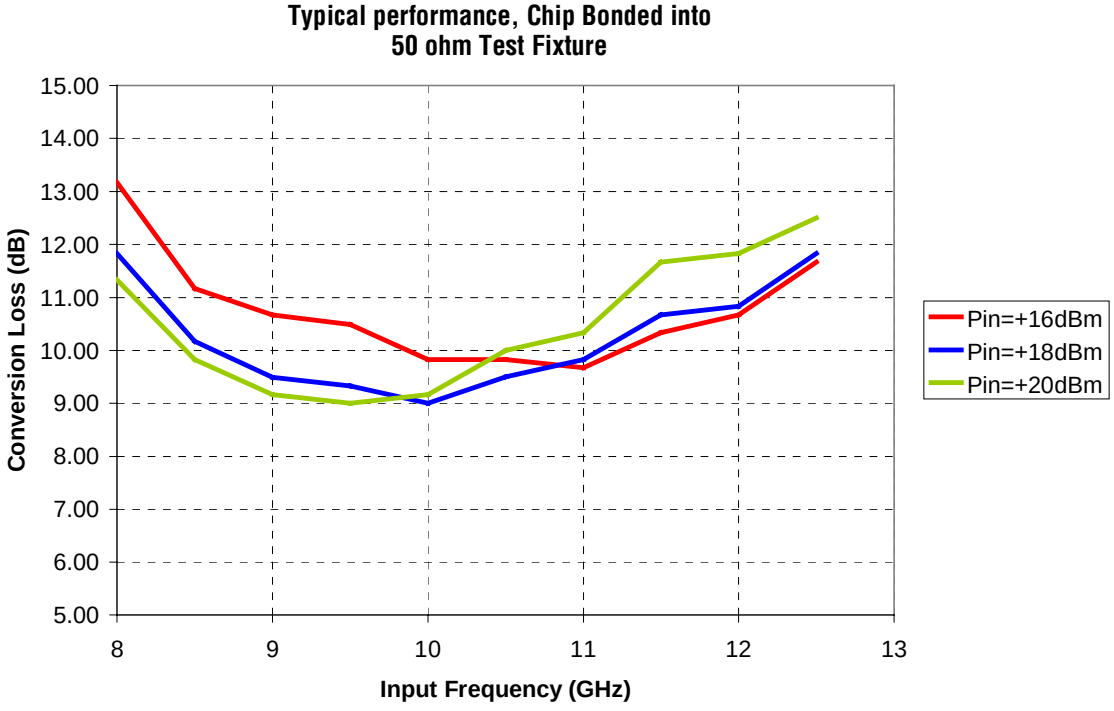
Figure 3
Recommended
Assembly Diagram



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.

Performance Data



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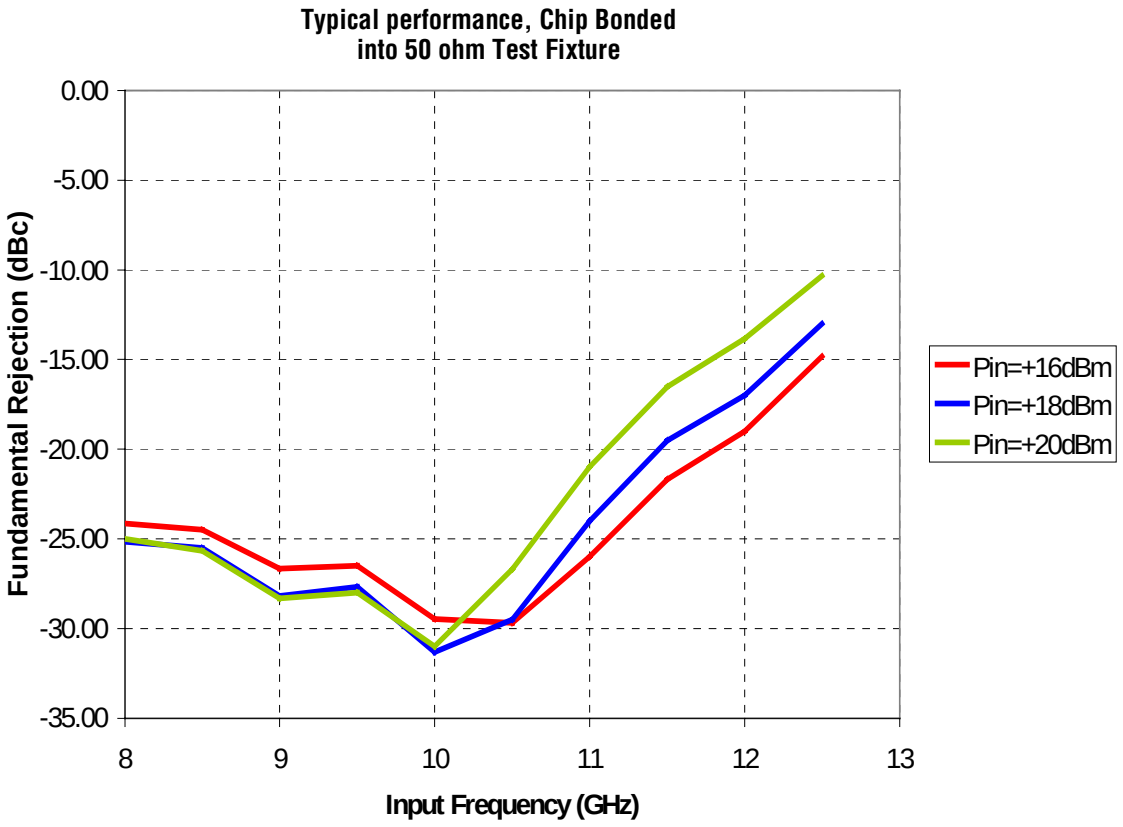
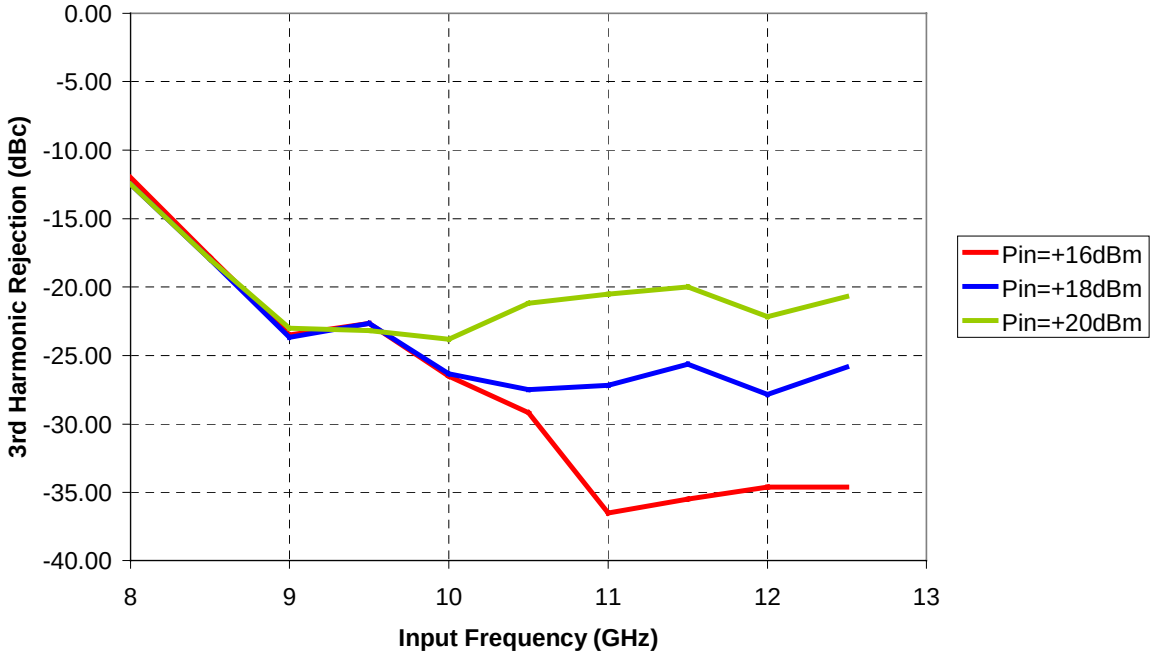
Performance Data (Cont'd)





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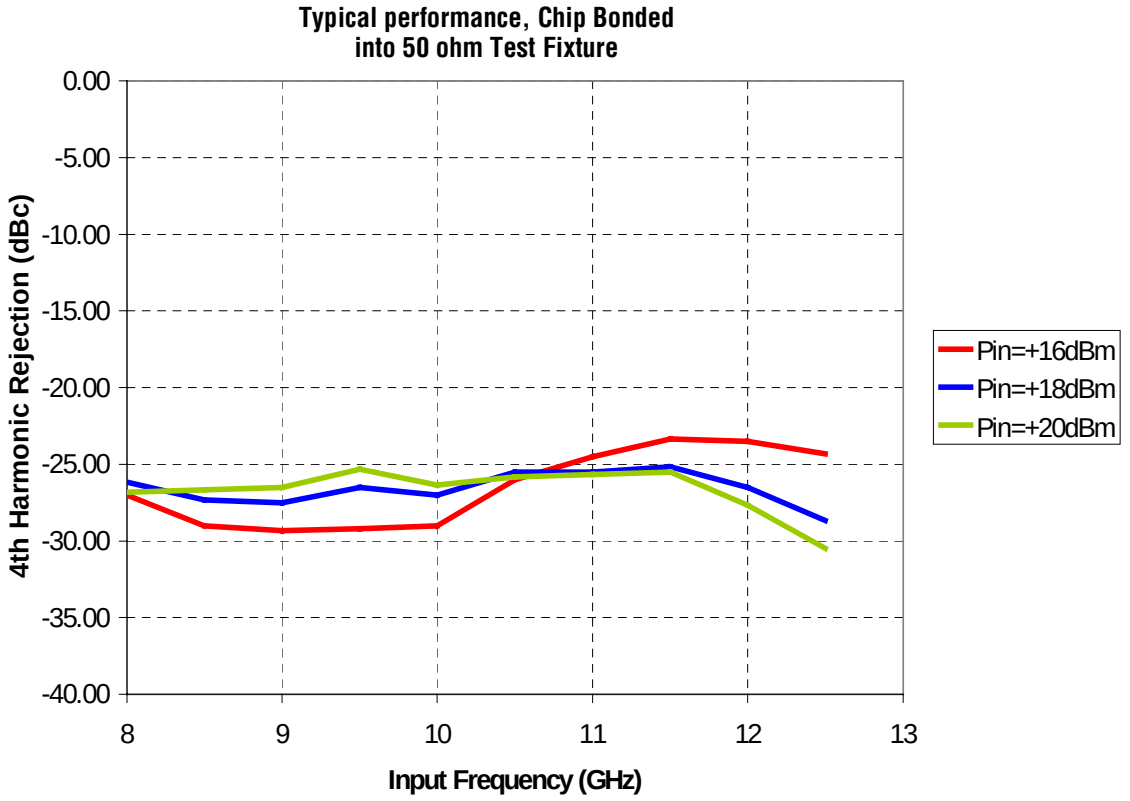

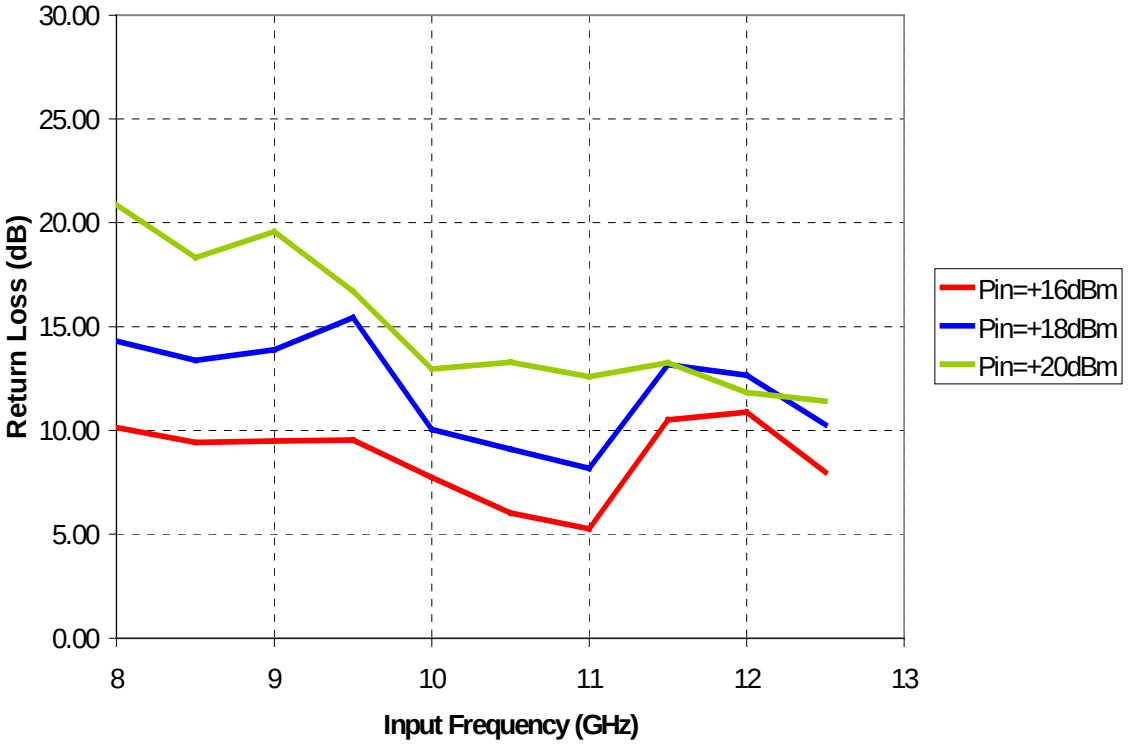

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