7.5-30GHz Frequency Multiplier

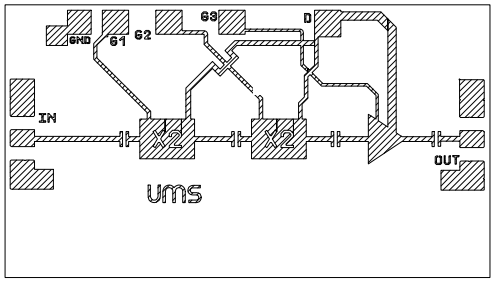
GaAs Monolithic Microwave IC

preliminary

Description

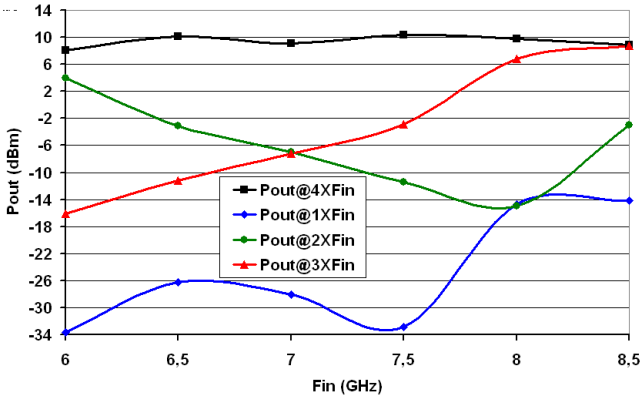
The MUX-PO9824 is a frequency multiplier by 4 monolithic circuit.
It is designed for a wide range of applications, from military to commercial communication systems. The backside of the chip is both RF and DC grounds. This helps simplify the assembly process.

The circuit is manufactured with a P-HEMT process, 0.25µm gate length, via holes through the substrate, air bridges and electron beam gate lithography.



Main Features

■ Broadband performance : 6.25-8.25 GHz
■ 11dBm output power for +12dBm input power
■ DC power consumption, 75mA @ 3.5V (with RF)
■ Chip size : 2.02 x 1.17 x 0.10 mm



Main Characteristics

Tamb=25℃

Symbol	Parameter	Min	Typ	Max	Unit
Fin	Input frequency range	6.25		8.25	GHz
Fout	Output frequency range	25		33	GHz
Pin	Input power		12		dBm
Pout 4xFin	Output power for +12dBm input power	8	11	14	dBm

ESD Protection : Electrostatic discharge sensitive device. Observe handling precautions !

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Electrical Characteristics

These values are representative on wafer measurements that are made without bonding wires at the RF ports.
Tamb=+25℃, Vd=3.5V Vg1=Vg2=-0.9V Vg3 adjusted fo r Id=75mA under RF Pin=+12dBm

Symbol	Parameter	Min	Typ	Max	Unit
Fin	Input frequency range	6.25		8.25	GHz
Fout	Output frequency range	25		33	GHz
Pin	Input power		12		dBm
Pout 4xFin	Output power for +12 dBm input power	8	11	14	dBm
Pout 1xFin	Fin level at the output (6.25 < Fin < 8.25GHz), for +12dBm input power		0	2	dBm
Pout 2xFin	2Fin level at the output (12.5 < 2Fin < 16.5GHz), for +12dBm input power		-10	3	dBm
Pout 3xFin	3Fin level at the output (18.75 < 3Fin < 24.75GHz), for +12dBm input power		0	12	dBm
Pout 5xFin	5Fin level at the output (31.25 < 5Fin < 41.25GHz), for +12dBm input power		0		dBm
VSWRin	Input VSWR		2.5:1		
VSWRout	Output VSWR		2.5:1		
Id	Bias current		75		mA

A wire bond of typically 0.1 to 0.15 nH will improve the input and output matching.

Absolute Maximum Ratings

Tamb=+25℃

Symbol	Parameter	Values	Unit
Vd	Supply voltage	*4.0*	V
Id	Supply current	*150*	mA
Pin	Input power	*20*	dBm
Ta	Operating temperature range	*-40 to +85*	℃
Tstg	Storage temperature range	*-55 to +125*	℃

(1) Operation of device above anyone of these parameters may cause permanent damage.

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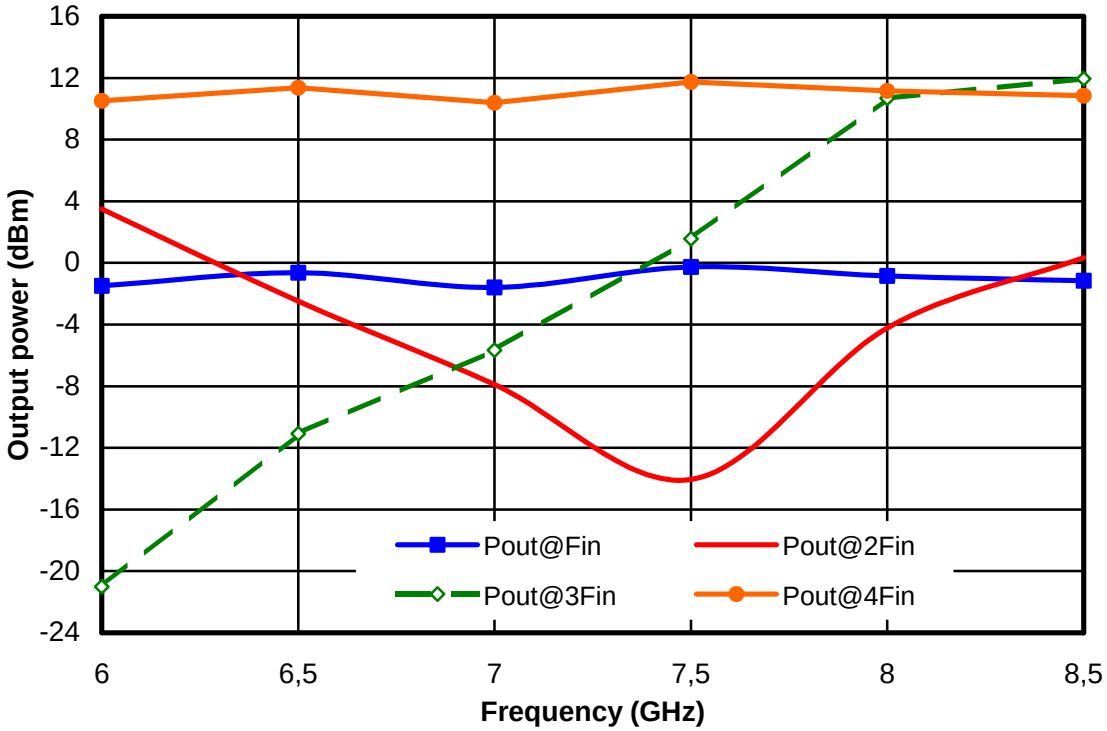
Typical on Wafer Measurements

Bias conditions: Tamb=+25℃, Vd=3.5V Vg1=Vg2=-0.9V Vg3 adjusted for Id=75mA under RF Pin=+12dBm



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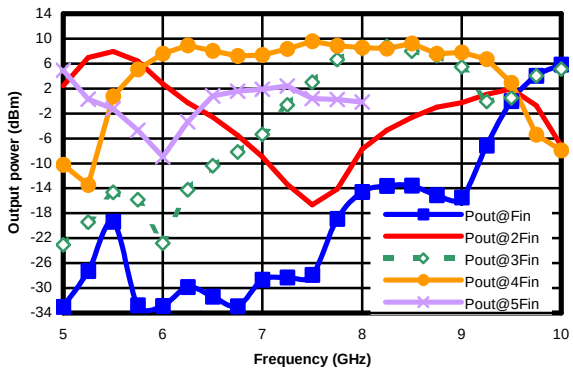
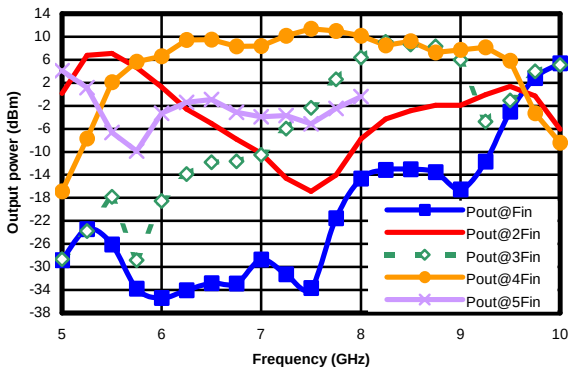
Typical In-Jig Measurements

Bias conditions: Tamb=+25°C, Vd=3.5V Pin=+11dBm (jig losses are not corrected and are evaluated to 1.5dB at 30GHz)

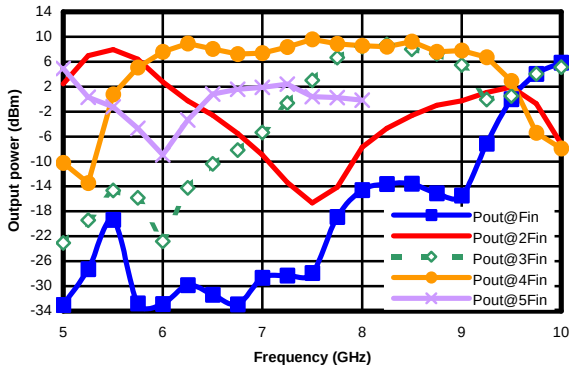
Gate voltage Vg1=Vg2=-0.8V Id=70mA



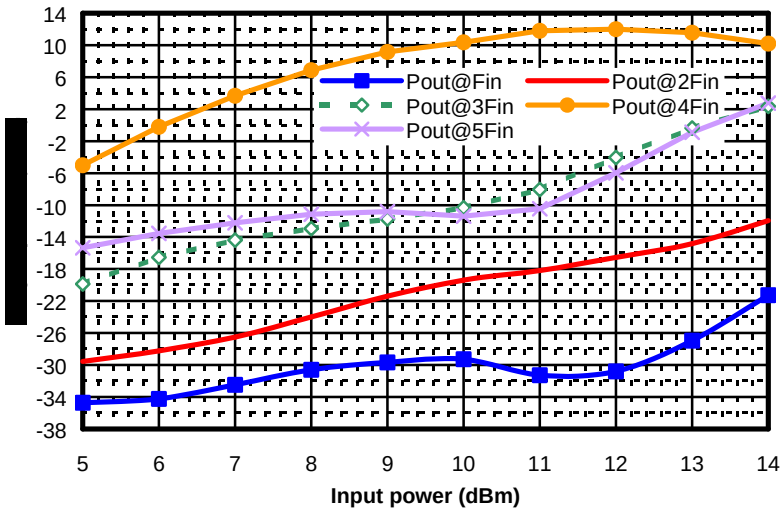
Gate voltage Vg1=Vg2=-0.95V Id=75mA



Gate voltage Vg1=Vg2=-1.1V Id=80mA



Bias conditions: Tamb=+25°C, Vd=3.5V Id=75mA under RF nominal Pin=+12dBm Fin=7.5GHz (jig losses are not corrected and are evaluated to 1.5dB at 30GHz)



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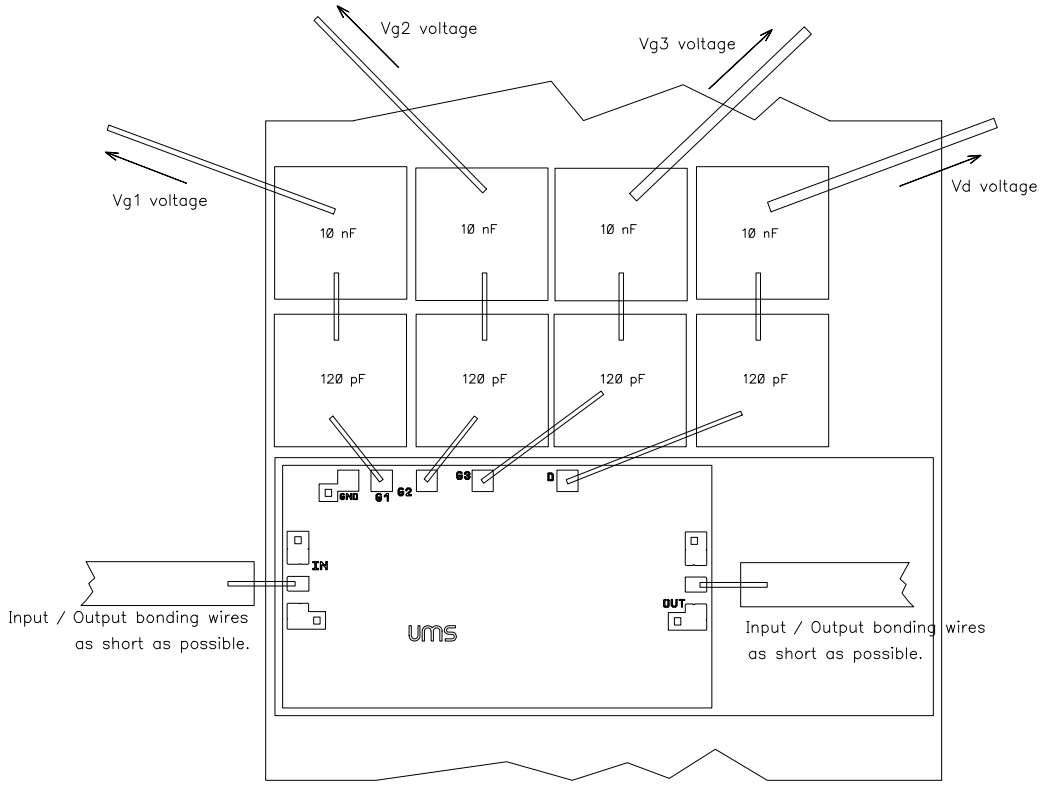
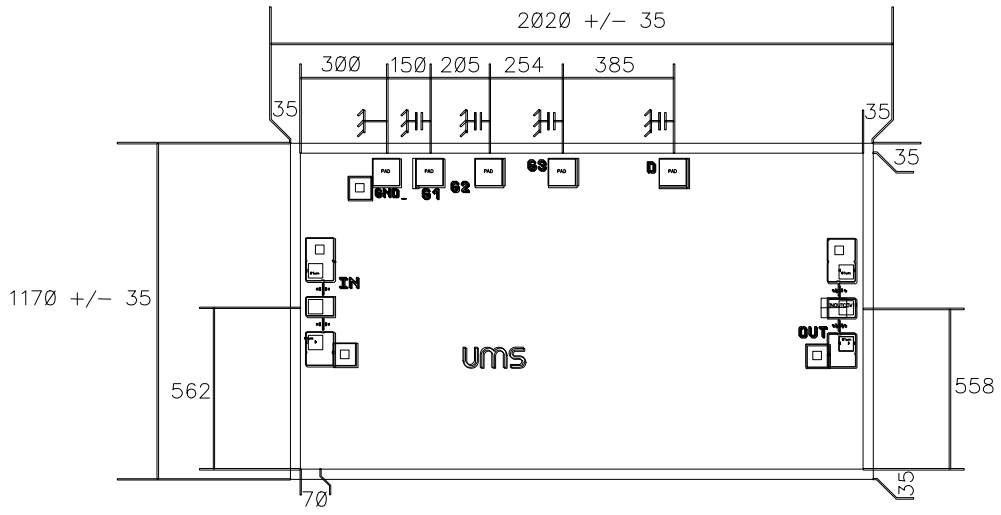
Chip Assembly and Mechanical Data



Note : Supply feed should be capacitively bypassed. 25µm diameter gold wire is to be prefered.



Bonding pad positions.

(Chip thickness : 100µm. All dimensions are in micrometers)

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Ordering Information

Chip form : MUX-PO9824-99F/00

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