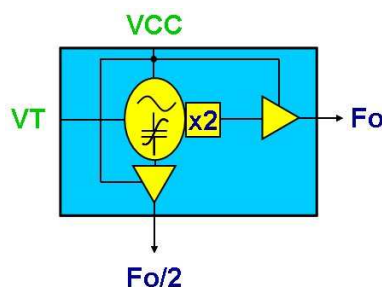


## Advanced Information

### QFN packaged 7.5GHz Integrated VCO

#### GaAs Monolithic Microwave IC



VCO's represents a key component for the Telecommunication ODU system. UMS decided to address this very specific function, based on our strong and successful experience on the VCO's for the very demanding automotive market.

One of the specificities of VCO for Telecommunication applications is the very low phase noise requirement, together with the wide tuning band-width. This led us to define a family of circuits, mainly around X-Band, that should address the main Telecommunication frequency bands, directly, or using external multipliers (already available from the UMS catalogue). All these circuits have been designed toward QFN packaging assembly. We kept in mind to offer the same package (32L-QFN5x5) and the same pin-out for the entire family in order to simplify the implementation in the ODU's.

This document introduce a packaged monolithic 7.0-7.9GHz fully integrated VCO with on chip times two multiplier, a buffer amplifier, and an additional buffer amplifier to provide an output signal at half the frequency to be used for an external loop control. The phase noise is typically of -105dB/Hz @100kHz offset. The overall power supply is of 5V/155mA. The circuit is dedicated to telecommunication and also well suited for military and ISM applications.

It is developed on a robust HBT process, and will be available both as a bare die, and in a standard surface mount 32 leads QFN5x5, compliant with the Restriction of Hazardous Substances (RoHS) European Union directive 2002/95/EC.



**Main Characteristics at room temperature** $V_{CC} = 5.0V$ 

Symbol	Parameter	Min	Typ	Max	Unit
$F_{RF}$	RF frequency range @ $F_o$	7.0		7.9	GHz
$F_{RF}$	RF frequency range @ $F_o/2$	3.5		3.95	GHz
Pout	Output Power @ $F_o$		+11		dBm
Pout	Output Power @ $F_o/2$		+3		dBm
VT	Tuning control voltage	1		14	V
Ts	Tuning sensitivity		150		MHz/V
PN	Phase Noise @10kHz offset @100kHz offset @1MHz offset		-75 -105 -130		dBc/Hz dBc/Hz dBc/Hz
Ic	Supply current		155		mA
It	Tune port current @VT = 14V		2		mA
Hn	Harmonics/Sub harmonics 1/2 2nd 3/2		40 20 30		dBc dBc dBc
Pulling	Pulling (into a 2.0:1 VSWR)		<10		MHz pp
Pushing	Frequency pushing @VT = 5V		25		MHz/V
Zc	Charge Impedance of ports		50		Ohm

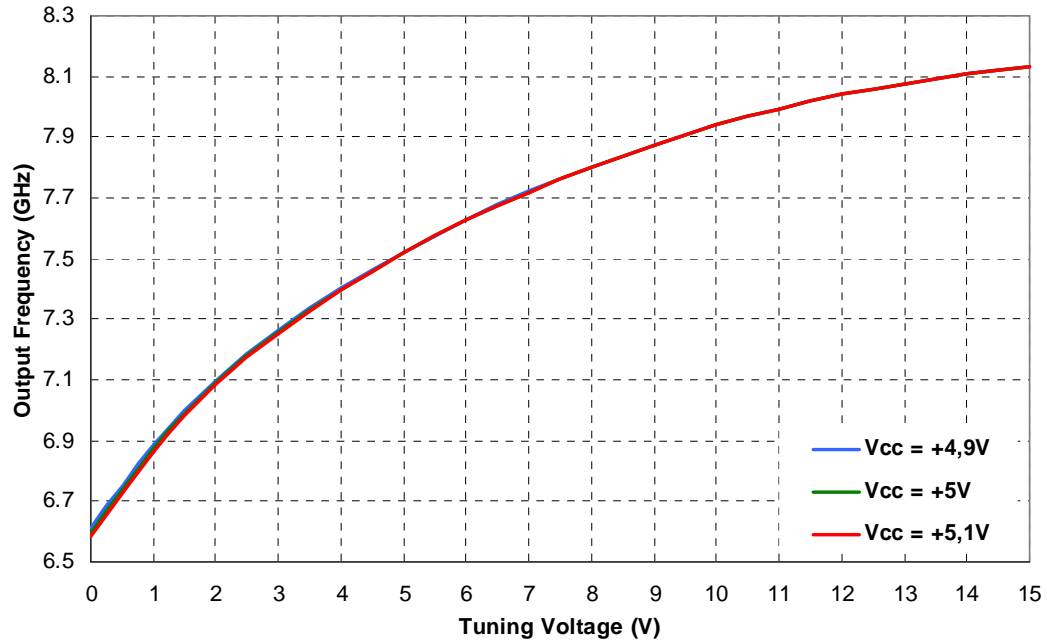
These values are representative of on-board measurements.

Electrostatic discharge sensitive device observe handling precautions!

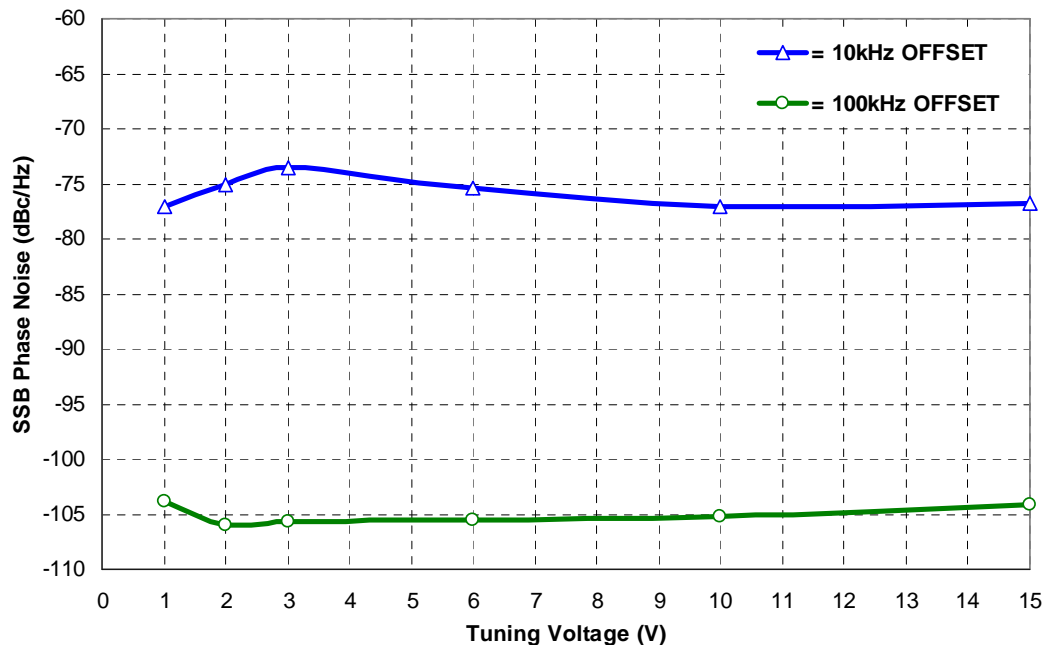
**Advanced Information**

## Typical Measurements at room temperature

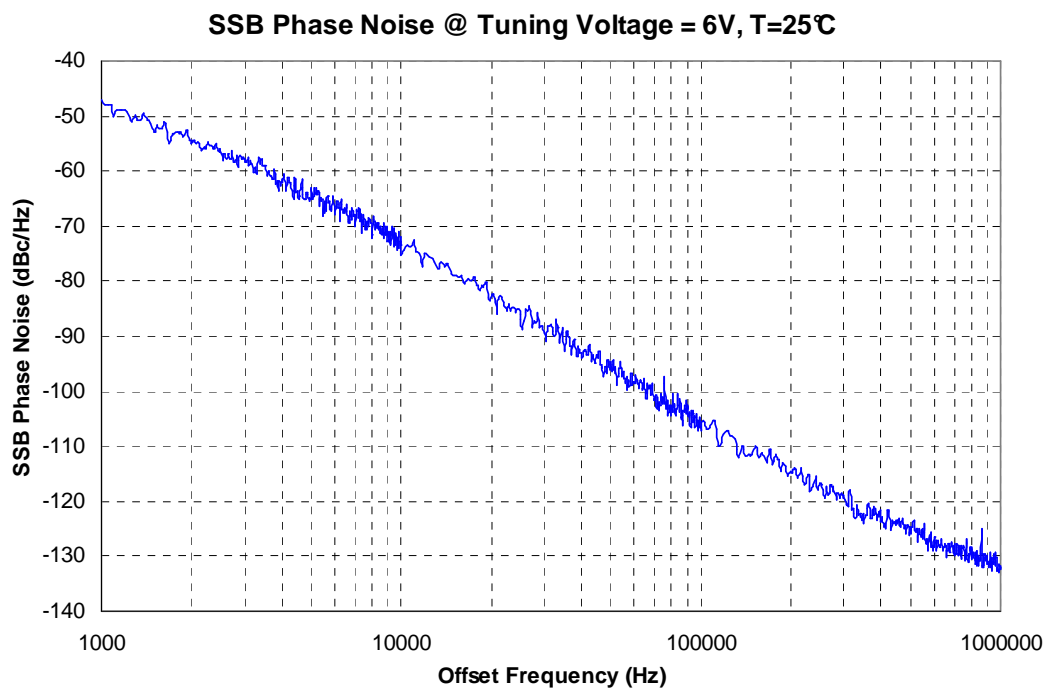
Fo Frequency vs. Tuning Voltage, T = 25°C



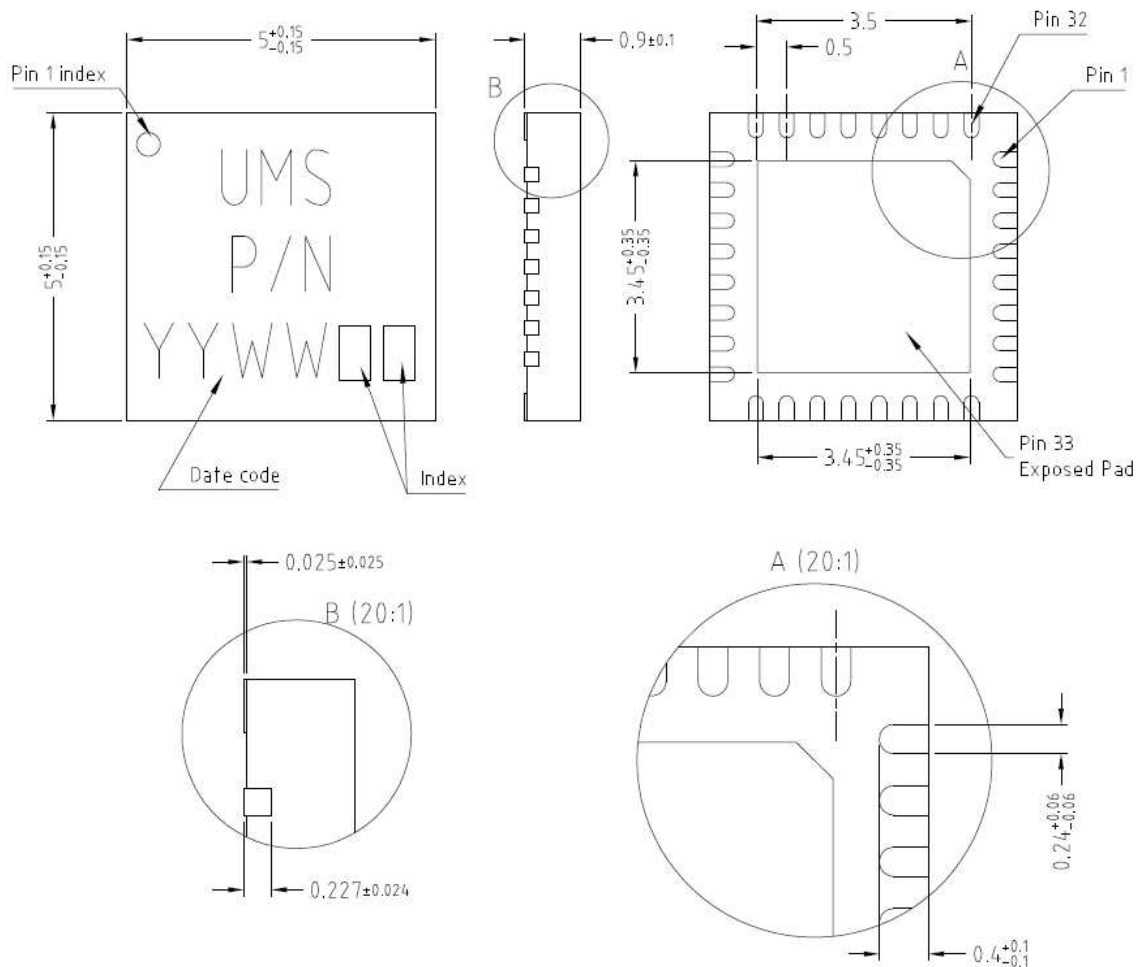
SSB Phase Noise vs. Tuning Voltage, T = 25°C



## Advanced Information



### Advanced Information

**Package outline**

Units : mm

From the standard : JEDEC MO-220 [ VHHD ]

Matt tin, Lead free (Green)

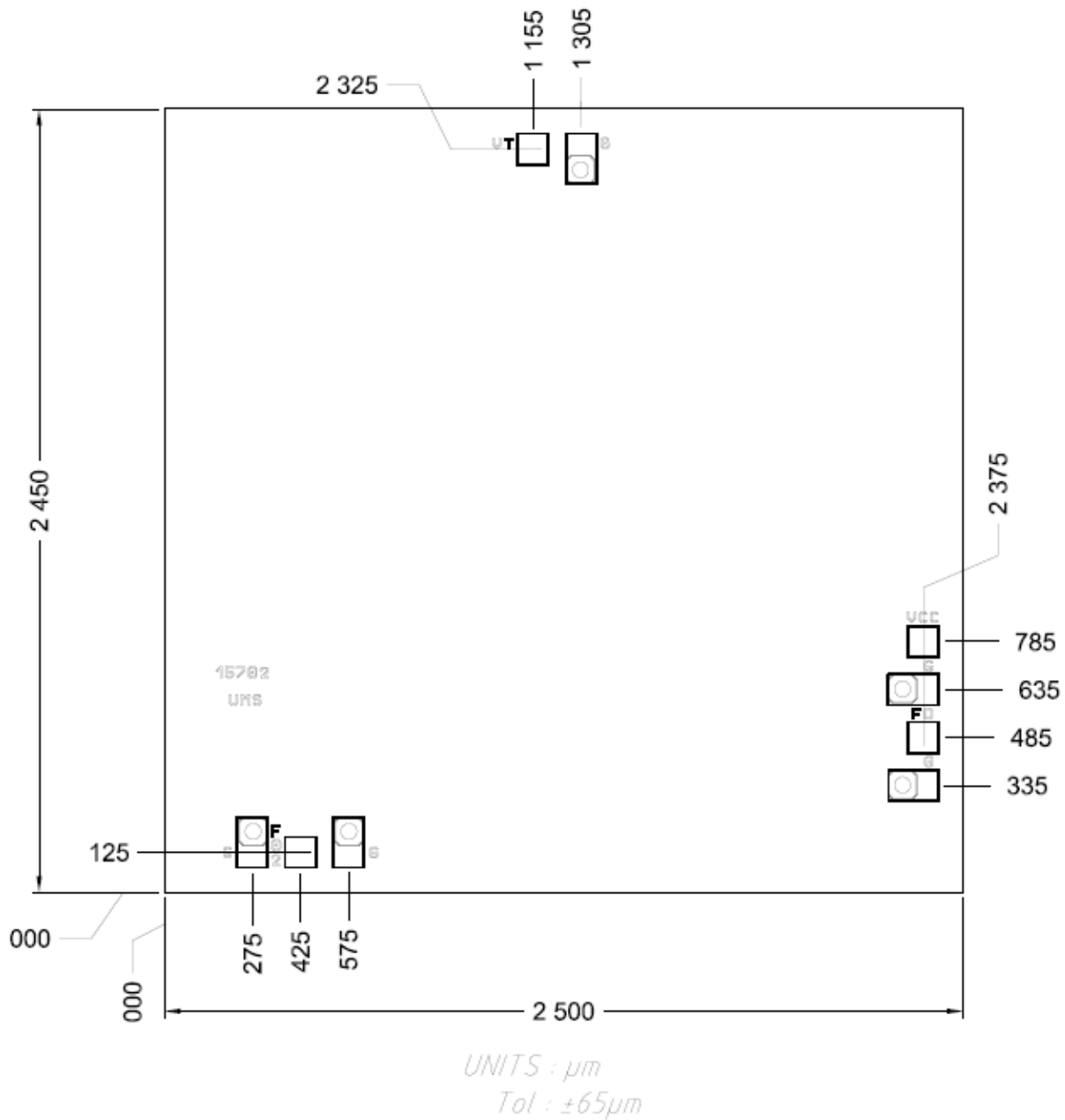
1- Nc	9- Nc	17- Nc	25- Nc
2- Nc	10- Nc	18- Gnd	26- Nc
3- Nc	11- Gnd	19- Fo	27- Nc
4- Nc	12- Fo/2	20- Gnd	28- Nc
5- Nc	13- Gnd	21- Vcc	29- VT
6- Nc	14- Nc	22- Nc	30- Nc
7- Nc	15- Nc	23- Nc	31- Nc
8- Nc	16- Nc	24- Nc	32- Nc

(1) The package outline drawing included to this document is given for indication.

(2) It is strongly recommended to ground on the PCB board all the pins referenced as GND.

**Advanced Information**

### Chip mechanical data



### Advanced Information

**Notes**

Advanced Information

Ref. : AI09109139 - 19 May 09

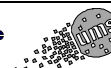
7/8

Subject to change without notice

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**Recommended package footprint**

Refer to the application note AN0017 available at <http://www.ums-gaas.com> for package foot print recommendations and exact package dimensions.

**SMD mounting procedure**

For the mounting process standard techniques involving solder paste and a suitable reflow process can be used. For further details, see application note AN0017.

**Recommended environmental management**

Refer to the application note AN0019 available at <http://www.ums-gaas.com> for environmental data on UMS package products.

**Recommended ESD management**

Refer to the application note AN0020 available at <http://www.ums-gaas.com> for ESD sensitivity and handling recommendations for the UMS package products.

**Sampling request reference**

CHV2061-98F (Die) or CHV2061-QGG (Package)

**Contact us**

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**Advanced Information**