MAOC-009259-PKG003

Voltage Controlled Oscillator
5.7 - 6.4 GHz

Preliminary: Rev. V2P

Features

- Low Phase Noise
- Wide Tuning Range
- Divide-by-Two Output
- Integrated Buffer Amplifier
- Excellent Temperature Stability
- +5V Bias Supply
- Lead-Free 5 mm 32-Lead PQFN Package
- 100% Matte Tin Plating over Copper
- Halogen-Free "Green" Mold Compound
- RoHS* Compliant and 260°C Reflow Compatible

Description

The MAOC-009259-PKG003 is an InGaP HBT-based voltage controlled oscillator for frequency generation. No external matching components are required. This VCO is easily integrated into a phase lock loop using the divide-by-two output. The extremely low phase noise makes this part ideal for many radio applications including high capacity digital radios.

The 5 mm PQFN package has a lead-free finish that is RoHS compliant and compatible with a 260ºC reflow temperature. The package also features low lead inductance and an excellent thermal path. The MTTF is 1,000,000 hours at a 150ºC junction temperature.

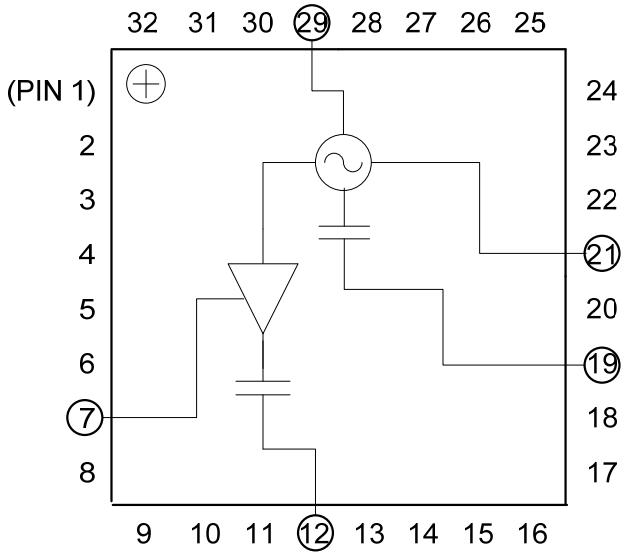
Primary Applications

- Point-to-Point Radio
- Point-to-Multipoint Radio
- Communications Systems
- Low Phase Noise Applications

Ordering Information

Part Number	Package
MAOC-009259-TR0500	Tape & Reel, 500 pieces
MAOC-009259-TR1000	Tape & Reel, 1000 pieces
MAOC-009259-SMB003	Sample Board

Block Diagram



Pin Designations [1]

Pin	Function	Pin	Function
1	N/C	17	N/C
2	N/C	18	N/C
3	N/C	19	Fo
4	N/C	20	N/C
5	N/C	21	V_{CC}
6	N/C	22	N/C
7	V_{BUFFER}	23	N/C
8	N/C	24	N/C
9	N/C	25	N/C
10	N/C	26	N/C
11	N/C	27	N/C
12	Fo/2	28	N/C
13	N/C	29	V_{TUNE}
14	N/C	30	N/C
15	N/C	31	N/C
16	N/C	32	N/C

1. The exposed pad centered on the package bottom must be connected to RF and DC ground.

* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

- **North America** Tel: 800.366.2266 / Fax: 978.366.2266
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Voltage Controlled Oscillator
5.7 - 6.4 GHz

Electrical Specifications: T_A=+25°C, V_{CC} = 5.0V, Z_L = 50 Ω

Parameter		Min.	Typ.	Max.	Units
Frequency Range	F_o		5.7 - 6.4		GHz
	$F_o/2$		2.85 - 3.2		
Output Power across operating frequency range	RF Port		12		dBm
	RF/2 Port		3.5		
SSB Phase Noise	RF Port, 10KHz Offset		-90		dBc/Hz
V_{CC}=V_{BUFFER}=V_{TUNE}=5V	RF Port, 100KHz Offset		-117		
Tune Voltage	V_{TUNE}	1		13	V
Supply Current	I_{CC} + I_{BUFFER}		200		mA
Control Current Leakage	V_{TUNE}=13V		-6		µA
Output Return Loss	RF Port		-5		dB
	RF/2 Port		-11		
Harmonics/Subharmonics V_{CC}=V_{BUFFER}=V_{TUNE}=5V	RF Port, $^1/_2$ F_o		27		dBc
	RF Port, $^3/_2$ F_o		54		
	RF Port, 2 F_o		20		
	RF Port, $^5/_2$ F_o		53		
	RF/2 Port, 2 F_o		1.3		
	RF/2 Port, 3 F_o		22		
	RF/2 Port, 4 F_o		24		
	RF/2 Port, 5 F_o		40		
Pulling (Sensitivity to Match)	RF Port, VSWR = 1.95:1 to 2.25:1 V_{CC}=V_{BUFFER}=V_{TUNE}=5V		6.7		MHz pk-pk
Pushing (Sensitivity to Supply Voltage)	RF Port		17.5		MHz/V
	RF/2 Port		1.5		
Frequency Drift Rate (Sensitivity to Temperature)	RF Port		.5		MHz/°C
	RF/2 Port		.25		

Absolute Maximum Ratings [2,3]

Parameter	Absolute Maximum
V_{CC} (VCO & Buffer)	+6V
Storage Temperature	-55ºC to +150ºC
Operating Temperature	-40ºC to +85ºC

2. Exceeding any one or combination of these limits may cause permanent damage to this device.
3. M/A-COM does not recommend sustained operation near these survivability limits.

Static Sensitivity

Gallium Arsenide Integrated Circuits are sensitive to **E**lectro**s**tatic **D**ischarge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

ESD Rating: 200 Volts

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Typical Performance Curves: V_{CC} = 5V, T_A = +25 °C (unless otherwise indicated)

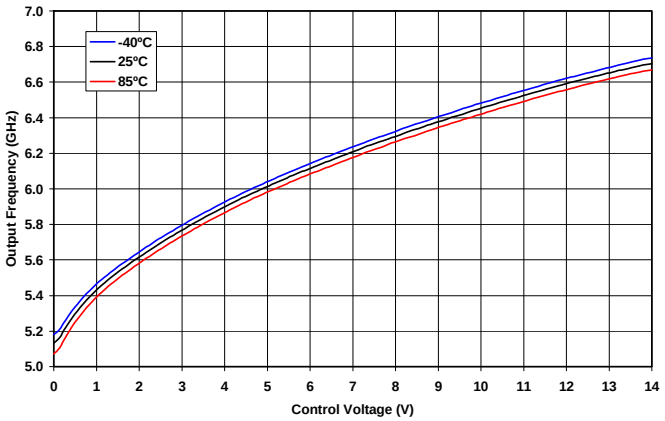

Figure 1: Frequency vs. Control Voltage and Temperature - RF Port

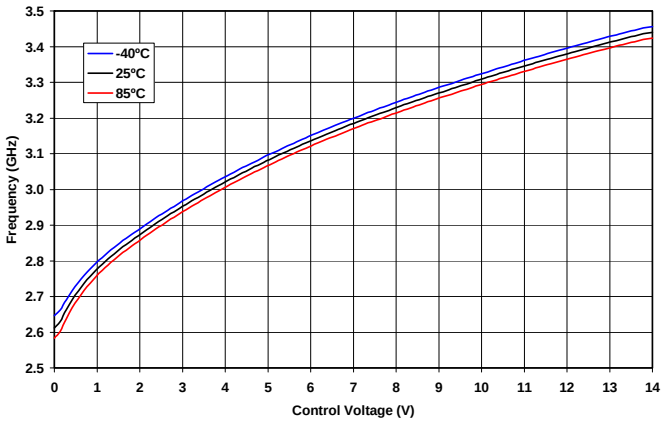

Figure 2: Frequency vs. Control Voltage and Temperature - RF/2 Port

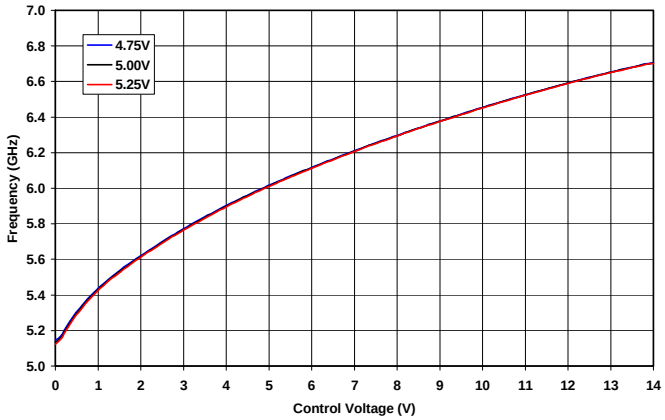

Figure 3: Frequency vs. Control Voltage and Supply Voltage - RF Port

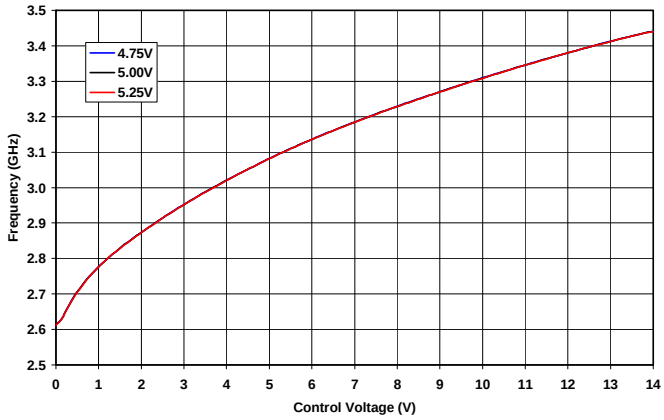

Figure 4: Frequency vs. Control Voltage and Supply Voltage - RF/2 Port

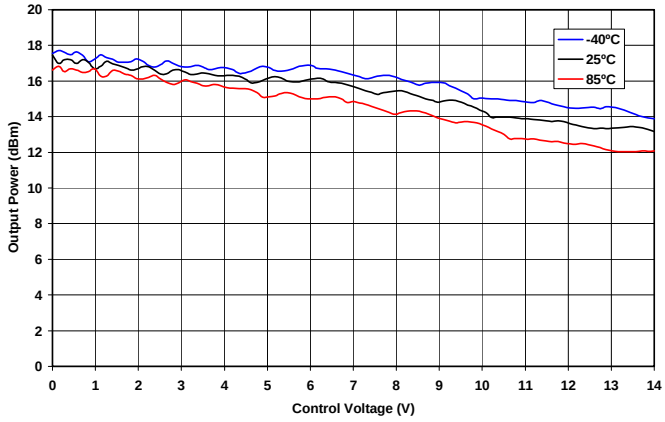

Figure 5: Output Power vs. Control Voltage and Temperature - RF Port

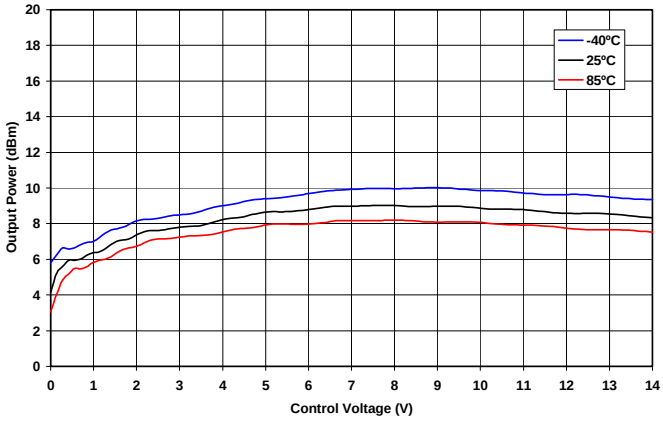

Figure 6: Output Power vs. Control Voltage and Temperature - RF/2 Port

Typical Performance Curves: V_{CC} = 5V, T_A = +25 °C (unless otherwise indicated)

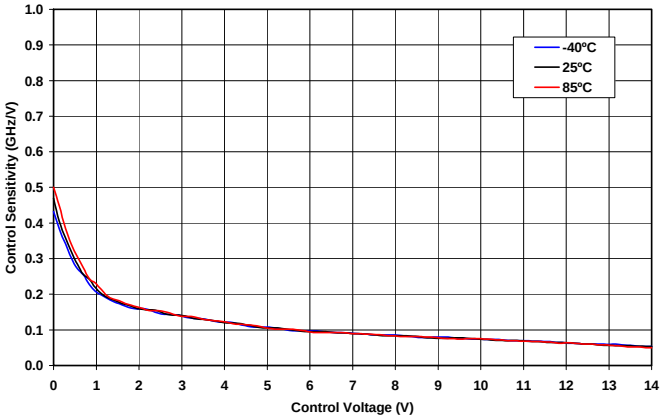

Figure 7: Frequency Sensitivity vs. Control Voltage and Temperature - RF Port

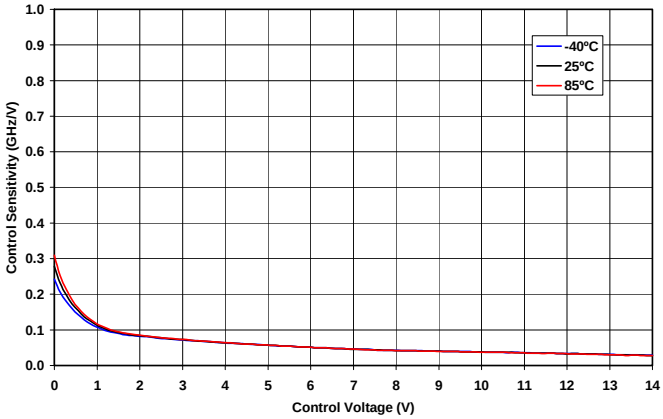

Figure 8: Frequency Sensitivity vs. Control Voltage and Temperature - RF/2 Port

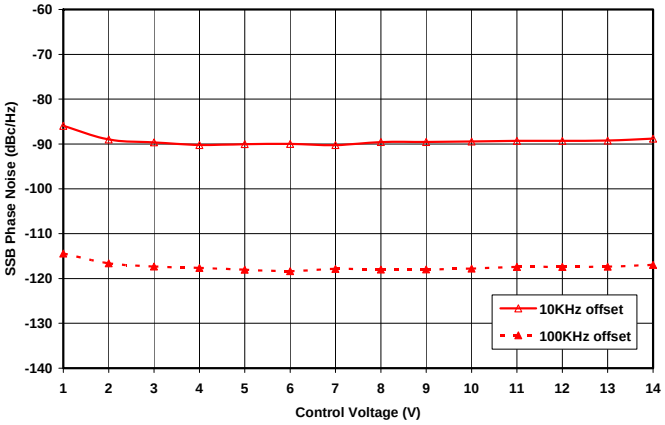

Figure 9: Single Side Band Phase Noise vs. Control Voltage and Offset Frequency

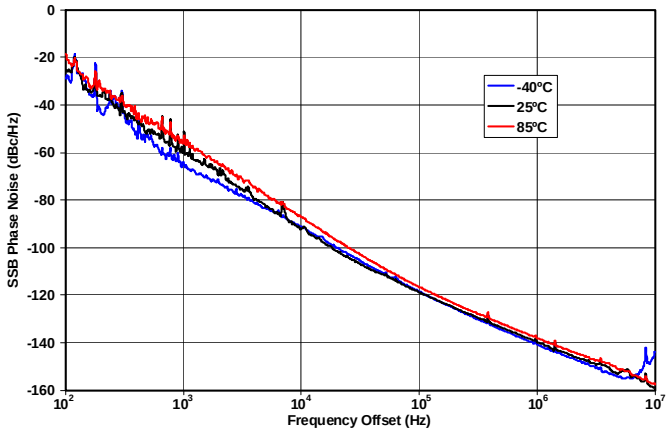

Figure 10: Single Side Band Phase Noise vs. Frequency Offset (Vctrl = 5V)

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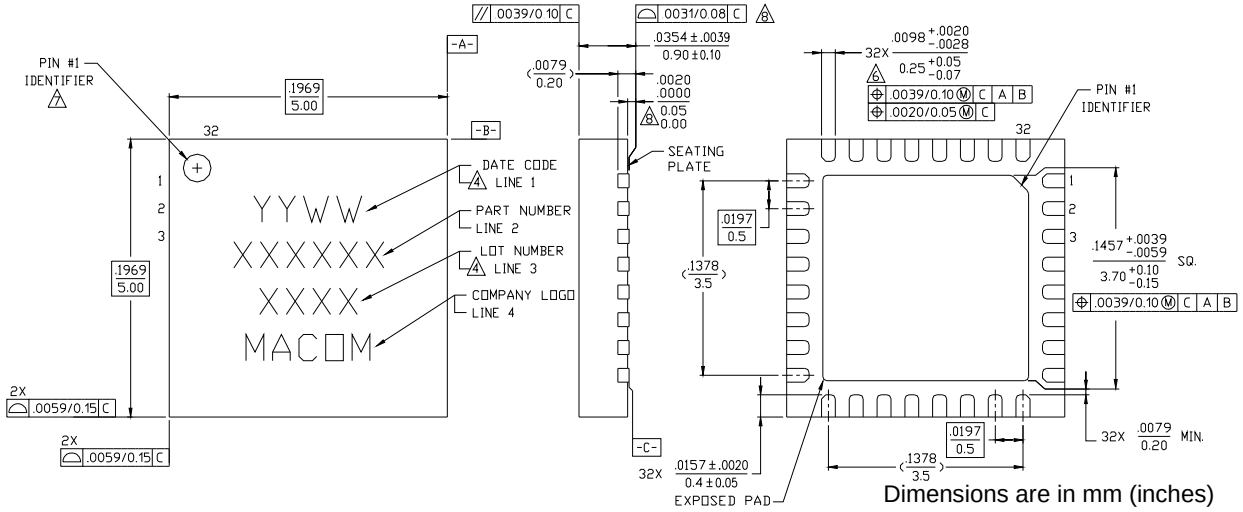
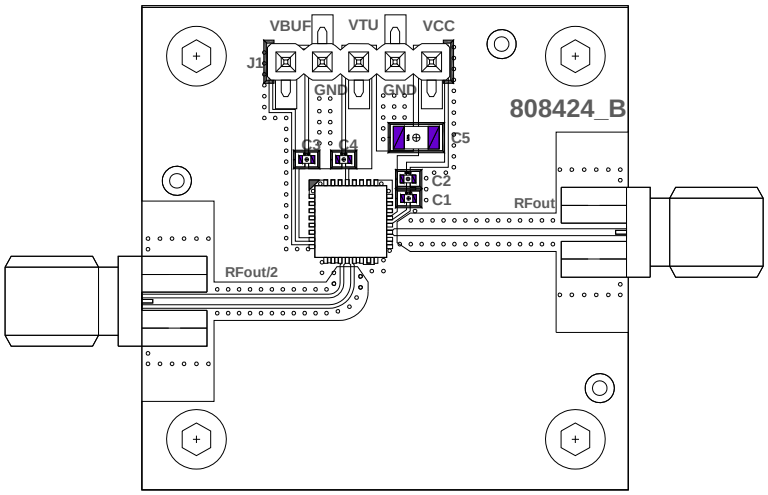
Lead Free 5mm 32-Lead PQFN



Dimensions are in mm (inches)

Sample Board



Component	Value	Case Size	Manufacturer
C1, C3, C4	100 pF	0402	Murata
C2	0.1 µF	0402	Murata
C5	10 µF	1206	AVX

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