



TLCO06981

K-Band MMIC Oscillator

Description

The TLCO06981 is a general purpose MMIC oscillator with an individually biased output buffer amplifier. A 0.15 μ m MMHEMT process was chosen to provide >10 dBm of output power from 11 to 30 GHz and low power consumption. The center frequency is mechanically tunable by plucking air bridges. Additional ports are provided for varactor tuning up to 1GHz.

Features

- ❑ 0.15 mm MMHEMT Process
- ❑ 11 to 30 GHz
- ❑ Up to 1 GHz (V_{Tuning})
- ❑ > 250 MHz fine tuning (V_{gate})
- ❑ $P_{\text{OUT}} \geq 10$ dBm
- ❑ Chip Dimension 2.17 x 1.3 x 0.1 mm



Absolute Maximum Ratings

Symbol	Parameter	Rating	Units
$V_{D1\&2}$	Positive Supply Voltages	6	V
$V_{G1\&2}$	Negative Supply Voltages	- 2	V
I_{D1+2}	Positive Supplies Current	250	mA
V_{DIODE}	Diode Supply Voltage	-20	V
T_C	Operating Temperature	-50 to 130	°C
T_{STG}	Storage Temperature	-65 to 150	°C

Performance Summary

(At 25 C, 50 ohm system)	Min	Typ	Max	Units
Frequency	11		30	(GHz)
P_o	10	16	20	(dBm)
$P_N@ 100$ KHz	-70	-80	-100	(offset)
Drain Supply Voltage	-2.0	4.5	6.0	(V)
Gate Supply Voltage	-0.5	-1	-1.5	(V)
Drain Supply Current	10	40	100	(mA)
Diode Supply Voltage	-18		0	(V)

TLC reserves the right to change performance data and specifications without notice (patent pending)



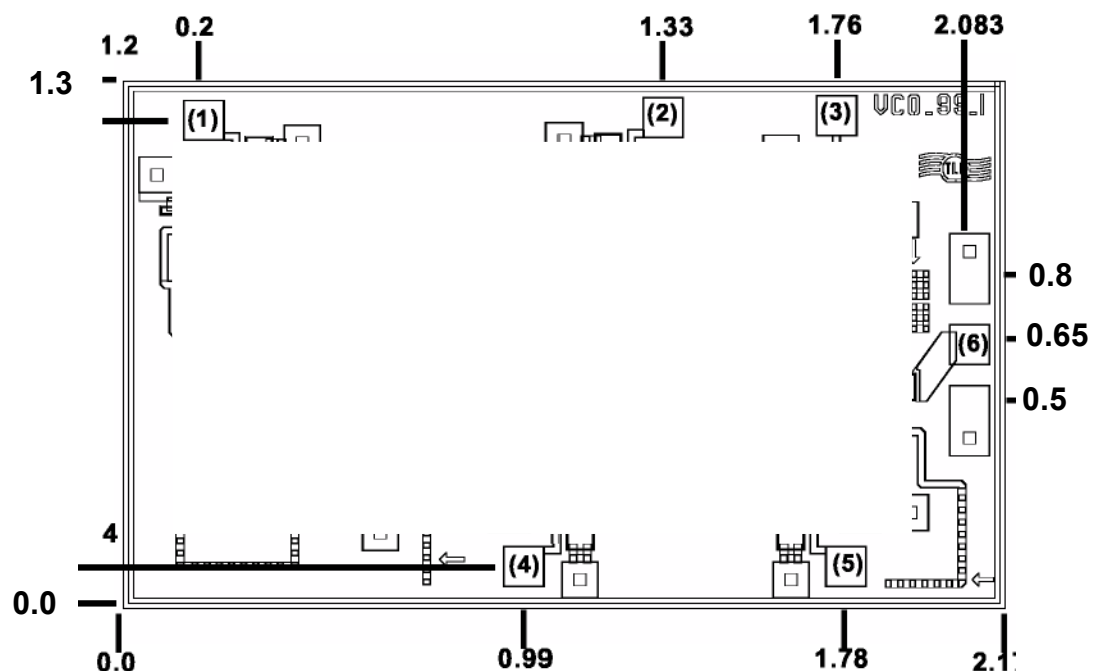
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Recommended Operating Procedure

1. Apply recommended gate supply voltage to VG1 &2.
2. Increase VD1 &2 to recommended operating voltage.
3. Vary VDIODE for VCO operation (optional).
4. Vary VG1 for voltage tuning.
5. Turn off in the following sequence:
 - i Turn off diode supply voltage (VDIODE)
 - ii Turn off drain supply voltage (VD1 &2)
 - iii Turn off gate supply voltage (VG1 &2)

MMIC Layout And Bond Pad Location



Units: millimeters

Bond Pad 1 (VDIODE) ₁	0.1x0.1
Bond Pad 2 (VG 1)	0.1x0.1
Bond Pad 3 (VD1)	0.1x0.1
Bond Pad 4 (VD2)	0.1x0.1
Bond Pad 5 (VG2)	0.1x0.1
Bond Pad 6 (RF Output)	0.1x0.1

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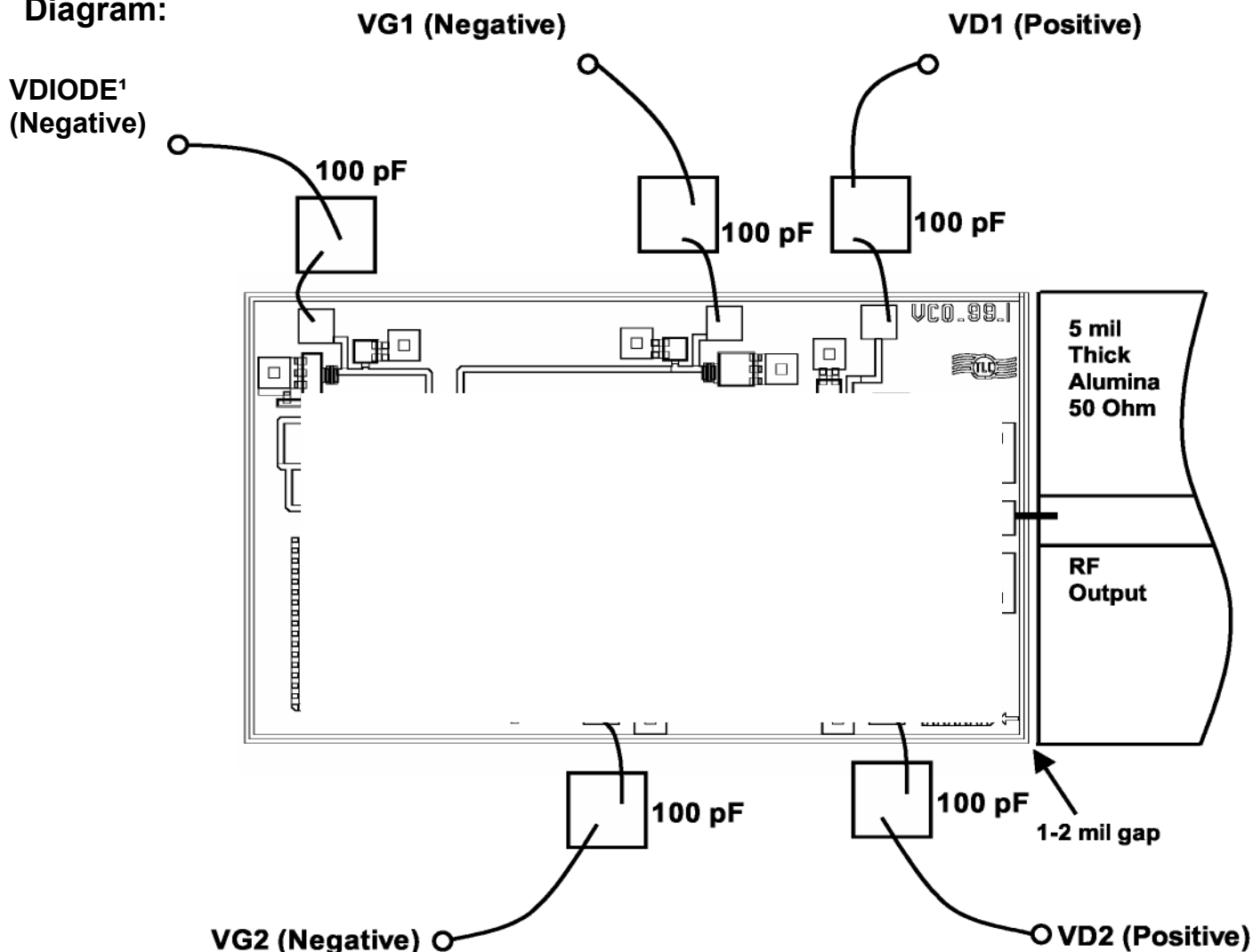


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Recommended
Diagram:

Assembly



Note: Use one (1) 0.003" by 0.0005" gold ribbon or two (2) 0.0007" wire for bonding the RF input. Mount chip using silver epoxy (e.g. Epo-Tek H32C) or Gold-Tin (AuSn: 80/20) solder. For best heat sinking, use either gold plated copper or composite matrix material, e.g. Thermocon.

1. V_{DIODE} pad is optional. For more information, please contact TLC.

(Contact TLC for flip-chip ready bonding @ volume quantities)

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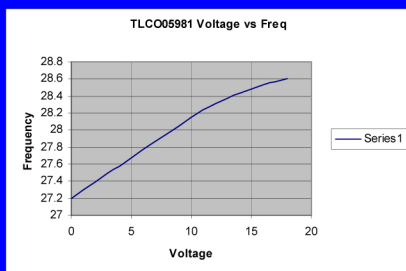
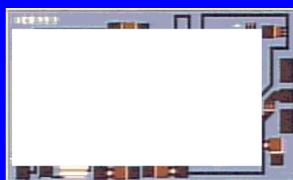
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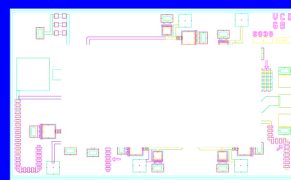
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Examples of MMW VCO MMICs

TLC WBW VCO TLC05981
24 to 35 GHz $V_{tune} > 1\text{GHz}$
 $PN < -85\text{ dBc/Hz @ }100\text{KHz}$



TLC VCO TLC06981 (w/ pos. V_t)
22 to 30 GHz $V_{tune} > 0.8\text{ GHz}$
 $PN < -85\text{ dBc/Hz @ }100\text{KHz}$



CHIP # (same)	V diode	P(out) dBm	Freq GHz	Type tuning
#124	0.00	16.71	25.666	no plucks
#124	0.00	14.00	30.280	Max pluck
#124	18.00	14.00	31.170	Vtune

TLC Proprietary

10/21/2004

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