**MECVOKU2**

**Ku-Band GaAs HBT VCO**

**Product Description**

MECVOKU2 is a monolithic microwave integrated circuit (MMIC) voltage controlled oscillator (VCO) designed and tested by MEC for Ku-Band applications.

In addition to the Ku band RF output (RFout), this VCO provides a half frequency output (RFout/2).

To improve the output power flatness, the tuning voltage Vt1, normally swept as Vt, can be set to a fixed value.

In the frequency range from 11 GHz to 12.56 GHz MECVCOKU2 provides more than 7 dBm of output power and a noise phase of about -75 dBc/Hz at 10 KHz offset with 5 V supply voltage.

**Main Features**

- GaAs HBT Technology
- Dual output frequency range: f\text{out} and f\text{out}/2
  - MOD1: Vt=Vt1 from 1 to 11 V
    - f\text{out} = 10.77 to 13.08 GHz
    - Phase Noise = -75 dBc/Hz @10 kHz
  - MOD2: Vt from 1 to 11 V, Vt1=3.5 V
    - f\text{out} = 11 to 12.81 GHz
    - Phase Noise = -75 dBc/Hz @10 kHz
- No external resonator needed
- Chip size: 2.6 x 3 mm

**Typical Applications**

- Point to point and multipoint radios
- Test equipment and industrial controls

**Measured Data**

- Frequency vs. Tuning Voltage
- Output Power vs. Frequency

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**Preliminary Data Sheet**

*MEC – Microwave Electronics for Communications*

[www.mec- mmic.com](http://www.mec- mmic.com)
### Main Characteristics

Test Conditions: $T_{\text{base_plate}} = 25 \, ^{\circ}\text{C}$, MOD1 (sweeping Vt=Vt1)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
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<tbody>
<tr>
<td>Frequency Range</td>
<td></td>
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<tr>
<td>Output Frequency (fout)</td>
<td>11</td>
<td>5.5</td>
<td>12.56</td>
<td>GHz</td>
</tr>
<tr>
<td>Half Output Frequency (fout/2)</td>
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<td></td>
<td>6.28</td>
<td>GHz</td>
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<tr>
<td>Output Power</td>
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<td>RFout</td>
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<td>dBm</td>
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<td>RFout/2</td>
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<tr>
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<tr>
<td>@ 10 kHz Offset</td>
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<td></td>
<td>dBc/Hz</td>
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<td>@ 100 kHz Offset</td>
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<td>dBc/Hz</td>
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<tr>
<td>@ 1 MHz Offset</td>
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<td>dBc/Hz</td>
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<td>Tuning Voltage (Vt=Vt1)</td>
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<td>V</td>
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<td>Supply Voltage (Vcc)</td>
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<td>V</td>
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<td>mA</td>
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<tr>
<td>1/2</td>
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<td>3/2</td>
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<td>2nd</td>
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<td>Pulling (into a 2.0:1 VSWR)</td>
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<td>Pushing @ Vtune=5V</td>
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<td>Sensitivity</td>
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<td>DC Power Consumption</td>
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Main Characteristics

Test Conditions: $T_{\text{base\_plate}} = 25 \, ^\circ\text{C}$, MOD2 (sweeping Vt, Vt1=3.5 V)

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<td>RFout</td>
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MECVOKU2
Ku-Band GaAs HBT VCO

Measurement Performances

Test Conditions: $T_{\text{base_plate}} = 25$ °C, $V_{\text{cc}} = 5$ V, $I_{\text{cc}} = 145$ mA, MOD1 (sweeping $V_t=V_{t1}$)

- Frequency Vs. Tuning Voltage
- Sensitivity Vs. Tuning Voltage
- Phase Noise Vs. Tuning Voltage
- Output Power @ $f/2$ Vs. Tuning Voltage
- Output Power Vs. Tuning Voltage
- Harmonic Attenuation Vs. Tuning Voltage
**MECVCOKU2**

**Ku-Band GaAs HBT VCO**

Measurement Performances

Test Conditions: $T_{\text{base,plate}} = 25^\circ \text{C}$, $Vcc = 5 \text{ V}$, $Icc = 145 \text{ mA}$, MOD2 (sweeping $Vt$, $Vt1 = 3.5 \text{ V}$)

![Graphs showing measurement performances](image)

- Frequency Vs. Tuning Voltage
- Sensitivity Vs. Tuning Voltage
- Phase Noise Vs. Tuning Voltage
- Output Power @ f/2 Vs. Tuning Voltage
- Output Power Vs. Tuning Voltage
Eutectic Die bond using AuSn (80/20) solder is recommended.

The backside of the die is the Source (ground) contact.

Thermosonic ball or wedge bonding are the preferred connection methods.

Gold wire must be used for connections.
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Thermosonic ball or wedge bonding are the preferred connection methods.

Gold wire must be used for connections.
### Bias Procedure (MOD1)

#### Bias-Up
1. Set VT and Vt1 to 5 V and turn on.
2. Set VBU to 0 V and turn on.
3. Set VP to 0 V and turn on.
4. Increase VBU to 5 V (IBU ≈ 18 mA).
5. Increase VP to 5 V (IP ≈ 25 mA).
6. Set VB to 0 V and turn on.
7. Set VC to 0 V and turn on.
8. Increase VC to 5 V.
9. Increase VB to 5 V (IB ≈ 26 mA, IC = 76 mA).
10. Sweep VT and Vt1 from 0.5 V to 11 V.

#### Bias-Down
1. Set VB to 0 V and turn off.
2. Set VC to 0 V and turn off.
3. Set VP to 0 V and turn off.
4. Set VBU to 0 V and turn off.
5. Turn off VT and Vt1.

### Bias Procedure (MOD2)

#### Bias-Up
1. Set VT and VT1 to 5 V and turn on.
2. Set VT1 to 3.5 V and turn on.
3. Set VBU to 0 V and turn on.
4. Set VP to 0 V and turn on.
5. Increase VBU to 5 V (IBU ≈ 18 mA).
6. Increase VP to 5 V (IP ≈ 25 mA).
7. Set VB to 0 V and turn on.
8. Set VC to 0 V and turn on.
9. Increase VB to 5 V (IB ≈ 26 mA, IC = 76 mA).
10. Sweep VT and VT1 from 0.5 V to 11 V.

#### Bias-Down
1. Set VB to 0 V and turn off.
2. Set VC to 0 V and turn off.
3. Set VP to 0 V and turn off.
4. Set VBU to 0 V and turn off.
5. Turn off VT and VT1.
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Notice

The furnished information is believed to be reliable. However, performances and specifications contained herein are based on preliminary characterizations and then susceptible to possible variations. On the basis of customer requirements the product can be tested and characterized in specific operating conditions and, if needed, tuned to meet custom specifications.

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