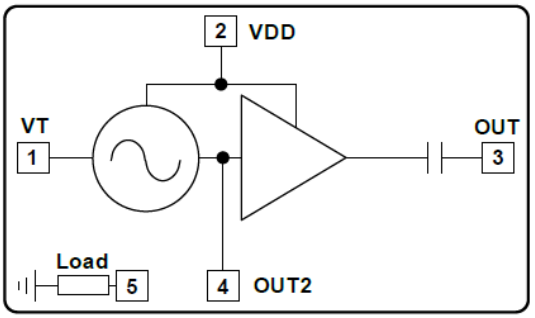
Features

- Output Power: +11dBm
- Phase Noise: -95dBc/Hz @100kHz
- Single Power Supply: +5V @ 60mA
- Buffer Isolation Amplifier integrated on chip, two channel RF output, ESD function at power supply port
- Die Size: 2.1 x 2 x 0.1 mm

Functional Block Diagram



Typical Applications

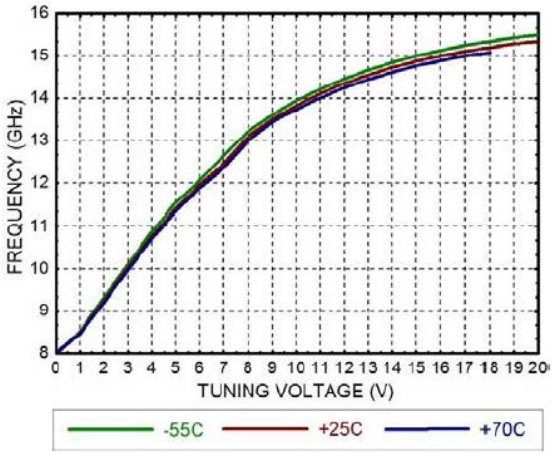
- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

Electrical Specifications

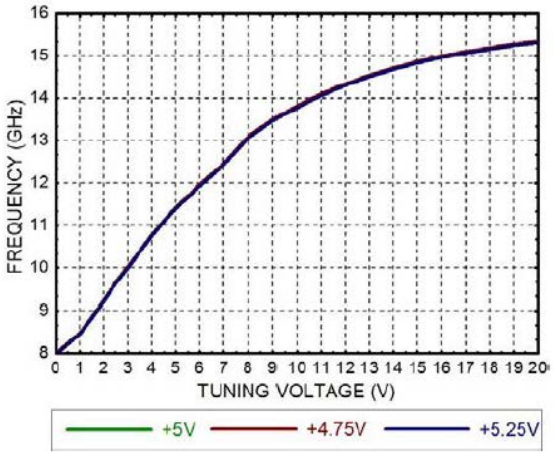
TA = +25ºC, VDD=+5V, IDD=60mA

Parameters	Min.	Typ.	Max.	Units
Frequency		8-13		GHz
Output Power (OUT)		11		dBm
Output Power (OUT2)		1		dBm
SSB phase noise @ 100kHz, VT=+5V@RF output		-95		dBc/Hz
Tuning Voltage(VT)	1		16	V
Tuning Sensitivity(KVCO)	100		680	MHz/V
Operating Current(IDD) (VDD=+5V)		60		mA
Tuning Port Leakage Current (VT=13V)			10	uA
Output Return Loss		10		dB
Second Harmonic		-20		dBc
Pull (to 2.0:1 VSWR)		4		MHz pp
Frequency Pushing Factor @VT=+5V		40		MHz/V
Frequency Drift		1.5		MHz/℃

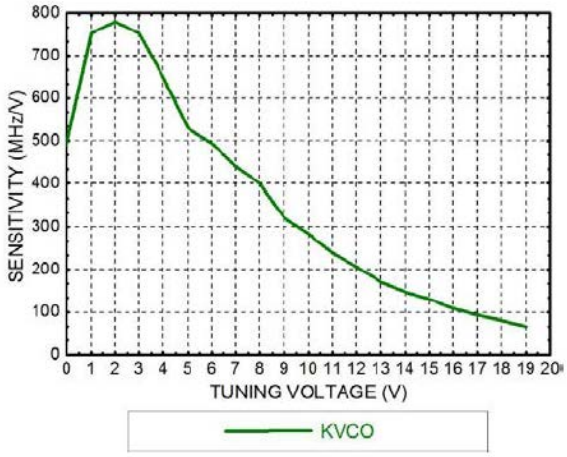
Frequency vs. Tuning Voltage VDD=+5V



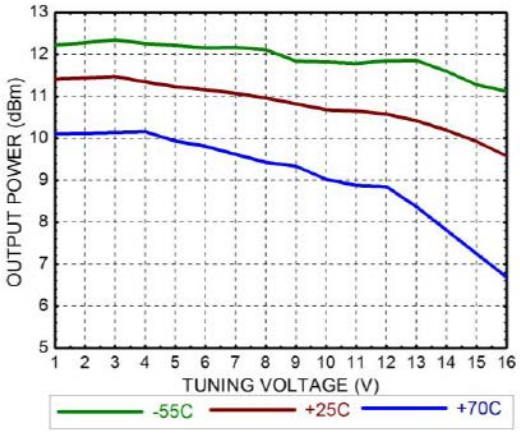
Frequency vs. Tuning Voltage T=25℃



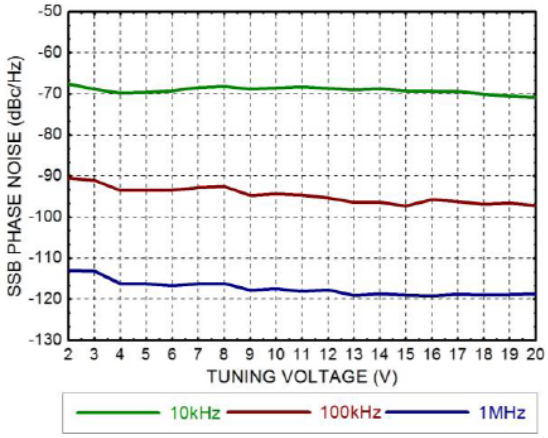
Tuning Sensitivity vs. Tuning Voltage, T=25℃



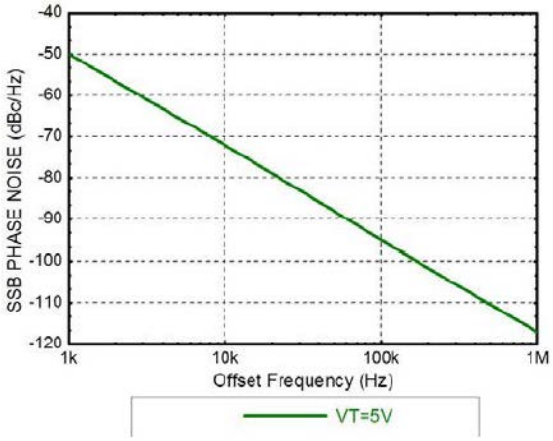
Output Power vs. Tuning Voltage, VDD=+5V



Phase Noise vs. Tuning Voltage, T=25℃

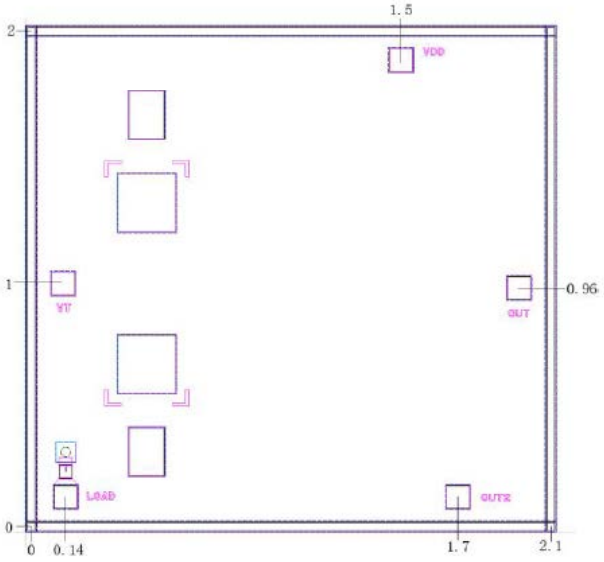


Typical Phase Noise Curve, VT=+5V



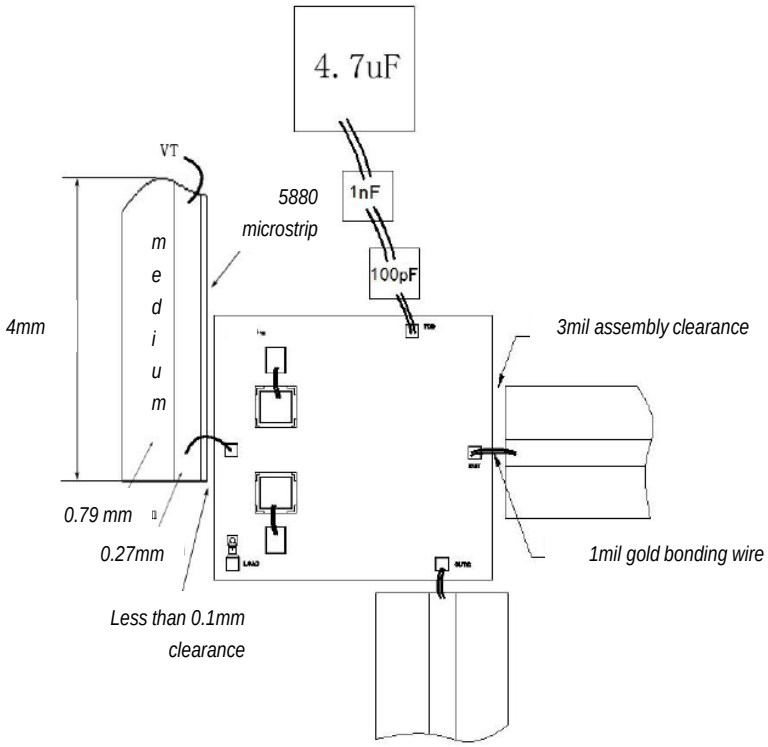
Outline Drawing:

All Dimensions in mm

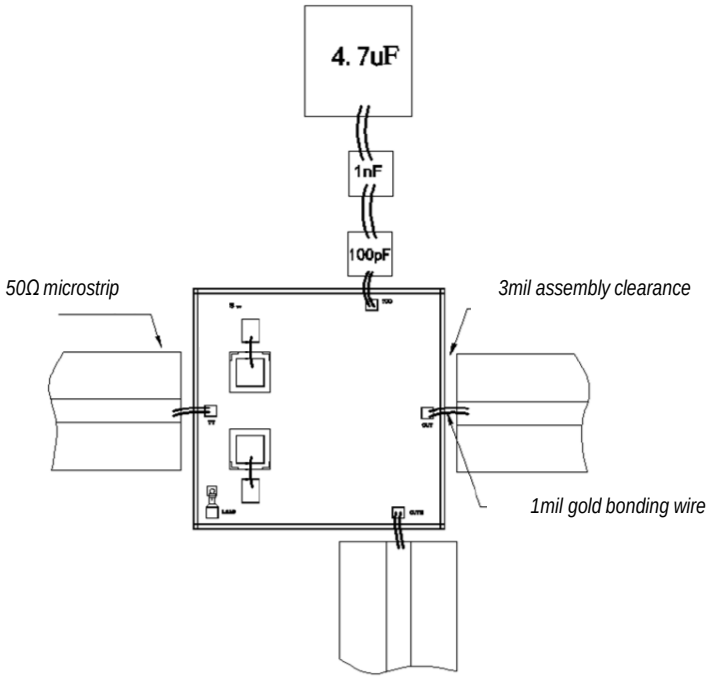


Assembly Drawing

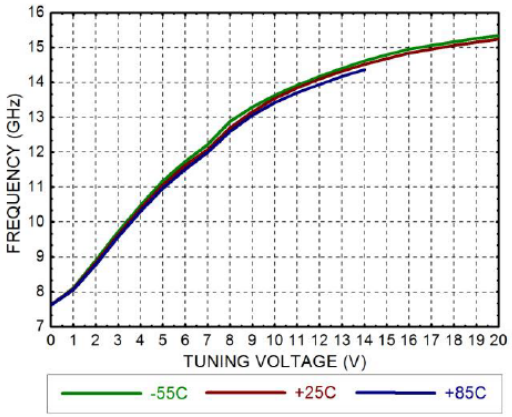
Mode 1: use 4mm microstrip at VT port to expand output frequency range, single bonding wire between varactor and pad is recommended. All above test data got at Mode 1.



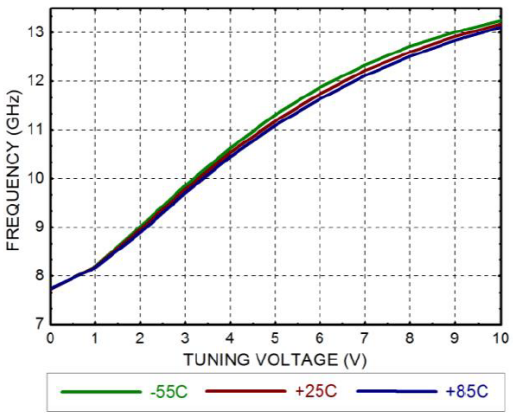
Mode 2: no microstrip at VT, connect VT to loop filter directly, single bonding wire between varactor and pad is recommended.



Output Frequency Curve at Mode1

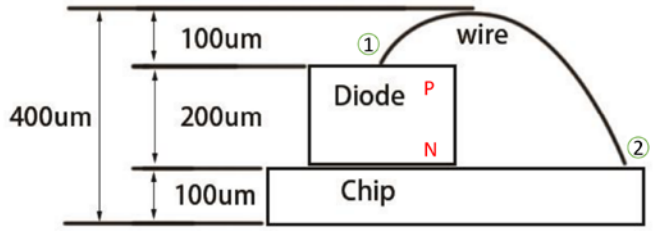


Output Frequency Curve at Mode2



VCO and Diode Assembly Instructions:

1. Attach the VCO die to the carrier, cavity or PCB.
2. Apply epoxy to the diode attachment pad on top of the VCO MMIC.
3. Attach the diode (N side) on top of the VCO, and make sure the epoxy does not overflow, short out, or allow any air voids underneath.
4. Bond the P side diode making sure to start from point #1 with 200-300um length of wire and end up at point #2.
5. The length of the wire will affect the frequency of oscillation. The longer the wire, the lower the frequency. The shorter the wire, the higher the frequency.
6. In order to increase the frequency, consider doubling the bonding wire to reduce the inductance.
7. In order to decrease the frequency, you can increase the length of the wire. Starting from point #1, then running the bonding wire to the die capacitor, then from the die capacitor bond back to the VCO MMIC Pad.



Pad Description

Pad	Function	Description
1	VT	Input control voltage
2	VDD	Power supply, external 100pF/1nF/4.7uF bypass capacitor required
3	OUT	RF output, AC coupling, 50**Ω matched on chip**
4	OUT2	RF output2, AC coupling, if not used, connect it to LOAD on chip
5	LOAD	50**Ω load** on chip, connect it to OUT2 if it is not used
Die bottom	GND	Die bottom must be connected to RF/DC ground.

Notes:
1. Die thickness: 100um
2. Typical bond pad is 100*100 μm²
3. Bond pad metalization: Gold
4. Backside metalization: Gold
5. Backside of the die (GND)
6. No connection required for unlabeled bond pads

Maximum Ratings:
1. Power supply voltage: +6V
2. Tuning voltage: +22V
3. Operating temperature: -55℃ to +70℃
4. Storage temperature: -65℃ to +150℃

For mode 1, when VDD=+6V, operating temperature can be expanded to -55℃ to +85℃.
When VDD=+5V, operating temperature at +85℃, during VT=7.4V~7.9V, output power of VCO is very low, even no oscillation.