

Performance Features

- Operating frequency band:
11.17GHz~12.02GHz
- Output Power: 12dBm
- Phase noise: -113dBc/Hz@100kHz
- Package size: 32-pin QFN,
5mmx5mm

Overview

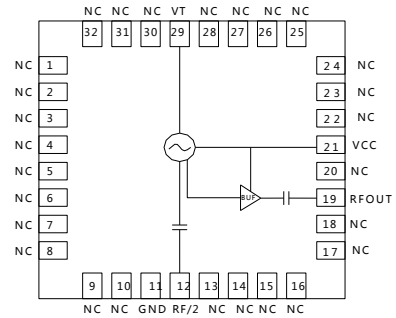
CWV099SP5 type monolithic microwave integrated circuit (MMIC) voltage controlled oscillator, integrated resonator, negative resistance devices and has RF/2 output. With low phase noise, flat output power characteristics.

The CWV099SP5 voltage controlled oscillator is available in a 32-pin 5mmx5mm surface mount leadless plastic package. The pin pads are coated with NiPdAuAg.

Typical Applications

- Point-to-point and multi-point radios
- Test equipment industrial control
- VSAT Radio

Functional Block Diagram



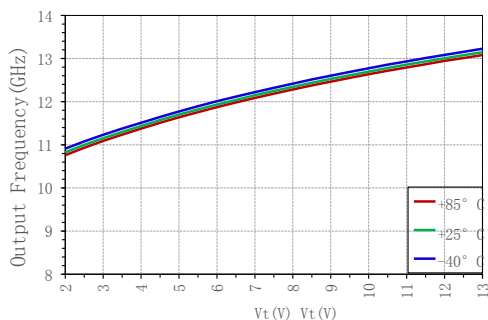
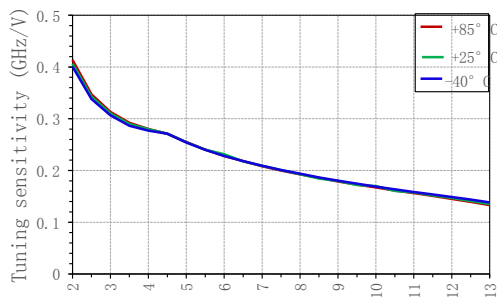
Electrical performance table (TA=-40°C~+85°C, VCC=5V)

Parameter Name	Port/symbol	Minimum value	Typical values	Maximum value	Unit
Frequency range		11.17		12.02	GHz
Output power	RFOUT	8	12	16	dBm
	RF/2	0		8	dBm
Single-sideband phase noise @ 10kHz frequency bias	RFOUT		-82		dBc/Hz
Single-sideband phase noise @ 100kHz frequency bias	RFOUT		-113		dBc/Hz
Single-sideband phase noise @ 1MHz frequency bias	RFOUT		-131		dBc/Hz
Single sideband phase noise @ 40MHz frequency bias	RFOUT			-150	dBc/Hz
Tuning voltage	VT	2		13	V
Bias voltage	VCC	4.75	5.0	5.25	V
Bias current	Icc		190	230	mA
Tuning sensitivity	Kv	100		600	MHz/V
Leakage current at the tuning end (VT=13V)				100	uA
RF-side harmonic suppression	1/2		23		dBc
	3/2		20		dBc
	2nd		16		dBc
	3rd		30		dBc
Output Return Loss			6		dB
Load Pull (@2:1 VSWR)			4		MHz pp
Push frequency factor			15		MHz/V
Frequency temperature drift			1		MHz/°C

Test Curve

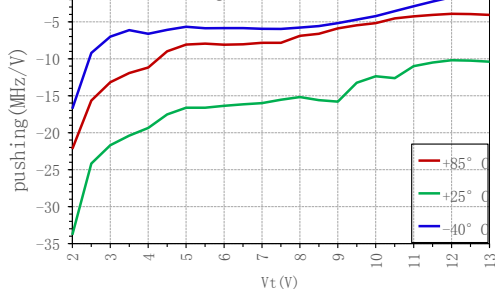
CWV

Voltage Controlled Oscillator Series

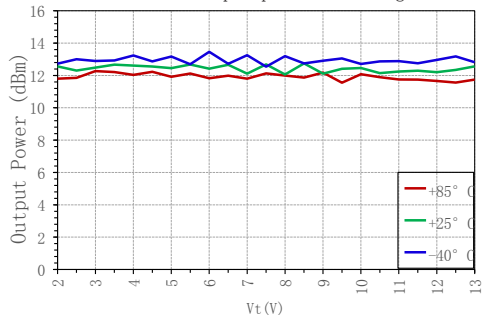
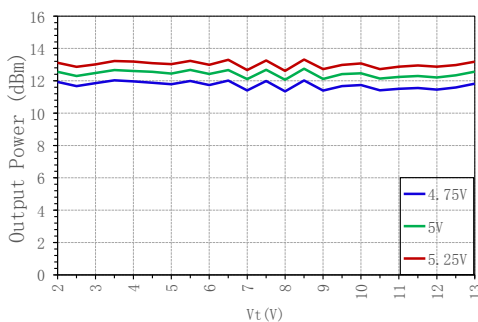
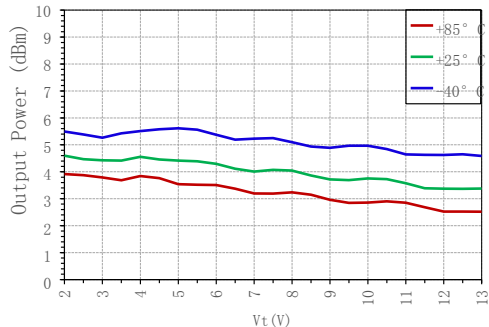
RFOUT output frequency
VS tuning voltage

Tuning sensitivity vs.
tuning voltage


Note: affected by the wafer batch fluctuations and other factors, the output frequency of different chips will fluctuate up and down within a certain range, the output frequency range guarantee value please refer to the product electrical performance table.

Push factor vs. tuning voltage

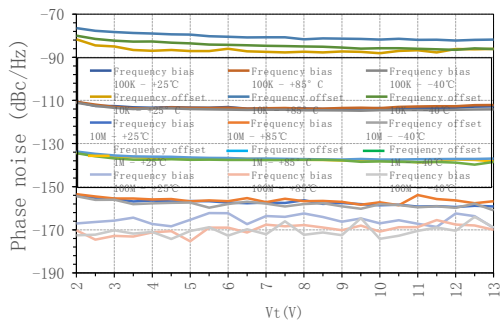


RFOUT output power vs. tuning

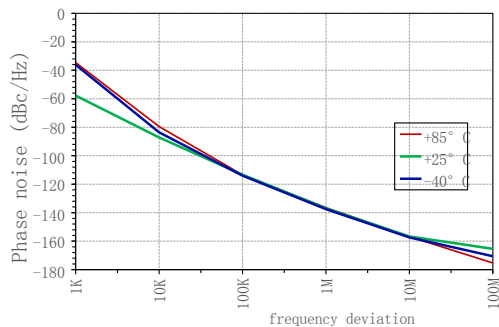

RFOUT Power VS
VCC
RF/2 output power vs.
tuning voltage

Test Curve

RFOUT phase noise vs. tuning voltage

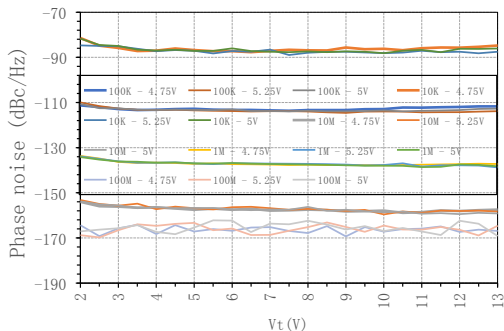


RFOUT phase noise vs. offset frequency @Vt=5V

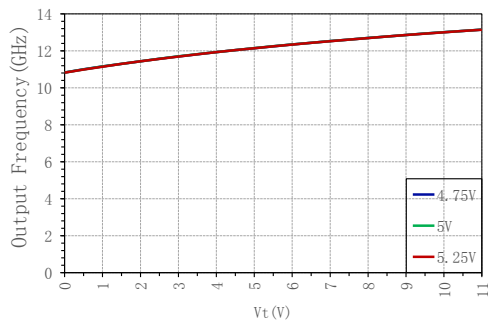


Note: High and low temperature frequency deviation 1K, 10K phase noise data by the test system error caused by inaccurate testing

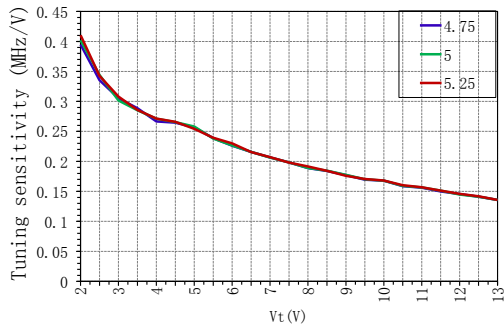
RFOUT phase noise VS VCC



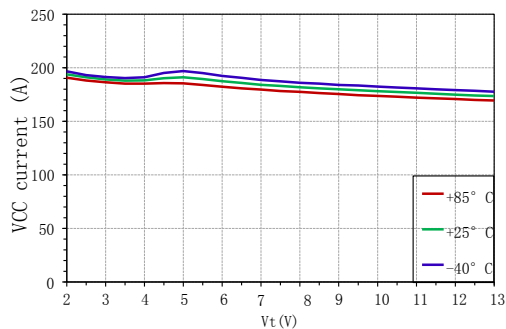
RFOUT output frequency VS VCC



Tuning sensitivity vs VCC



VCC current VS Vt



Extreme operating parameters

Bias voltage (VCC)	5.5V
Tuning Voltage (VT)	0V to 15V
Electrostatic protection level (HBM)	250V
Storage temperature range	-65°C~+150°C
Operating temperature range	-40°C~+85°C
Maximum junction temperature (T _{jmax})	135° C
Thermal resistance (θ _{jb}) Junction to GND Paddle	46°C/W

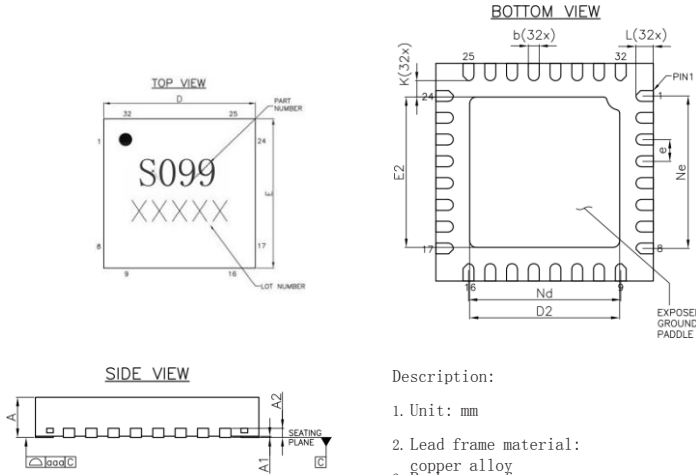
Package Information

Model	Packaging Materials	Solder plate plating	MSL level ^[1]	Package identification ^[2]	Environmental requirements
CWV099SP5	Green resin compounds	NiPdAu	MSL 3	S099 XXXXX	RoHS compliant

^[1] Maximum reflow temperature 260° C

^[2] XXXXX is the lot number

Dimension



Description:

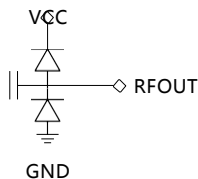
- Unit: mm
- Lead frame material:
copper alloy
- Package surface warpage:
not more than 0.05mm
- All ground pins should be
connected to PCB RF ground

Symbol	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.20Ref		
b	0.20	0.25	0.30
D	4.90	5.00	5.10
D2	3.35	3.45	3.55
e	0.50BSC		
Ne	3.50BSC		
Nd	3.50BSC		
E	4.90	5.00	5.10
E2	3.35	3.45	3.55
K	0.20	---	---
L	0.30	0.40	0.50
aaa	0.08		

Pin Definition

Pin Number	Function Symbols	Function Description	Pin Number	Function Symbols	Function Description
1	NC	Vacant	17	NC	Vacant
2	NC	Vacant	18	NC	Vacant
3	NC	Vacant	19	RFOUT	RF Output
4	NC	Vacant	20	NC	Vacant
5	NC	Vacant	21	VCC	DC Bias
6	NC	Vacant	22	NC	Vacant
7	NC	Vacant	23	NC	Vacant
8	NC	Vacant	24	NC	Vacant
9	NC	Vacant	25	NC	Vacant
10	NC	Vacant	26	NC	Vacant
11	GND	RF Ground	27	NC	Vacant
12	RF/2	RF/2 RF output	28	NC	Vacant
13	NC	Vacant	29	VT	DC Control
14	NC	Vacant	30	NC	Vacant
15	NC	Vacant	31	NC	Vacant
16	NC	Vacant	32	NC	Vacant

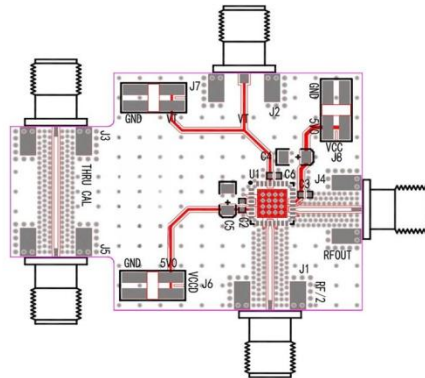
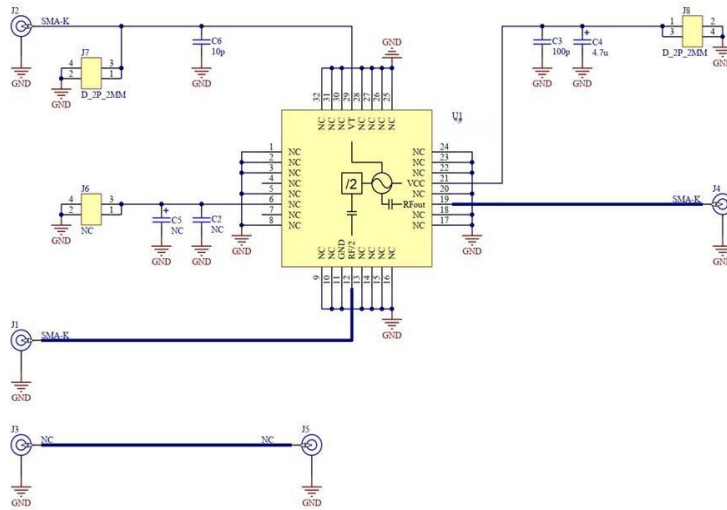
RFOUT port
definition:



Evaluation Boards

CWV

Voltage Controlled Oscillator Series

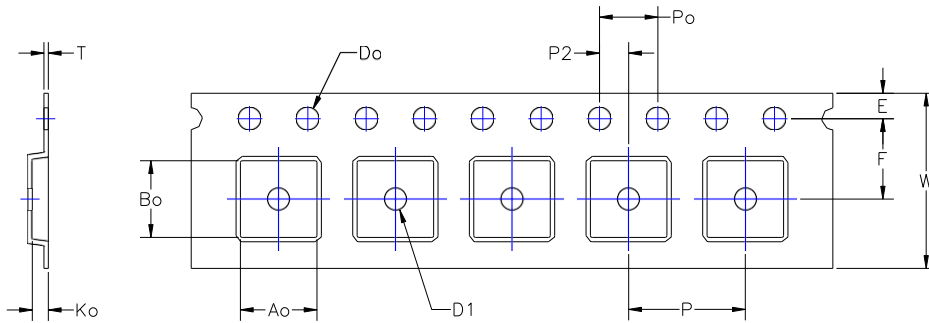


DeCWgnator	Description
C3	Multilayer Ceramic Capacitor 0402 100pF
C4	Tantalum capacitor 1206 4.7uF
C6	Multilayer Ceramic Capacitor 0402 10pF
J1, J2, J4	SMA-K PCB connectors
J7, J8	2.0mm DC pins
U1	CWV099SP5
J1, J2, J4 are recommended to use Nanjing Aowen D550B12E01-023 type SMA-K connector	

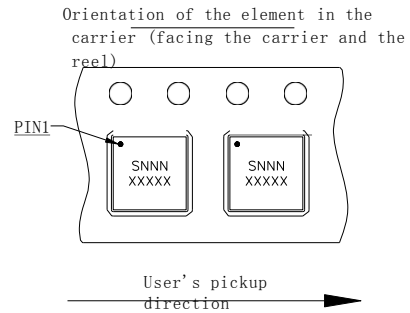
Circuit board material: Rogers 4350B

The circuit board of the device application should be designed according to the RF circuit design method, the signal line should be designed according to 50 ohm impedance, and the ground pin of the package housing should be grounded nearby (similar to the figure), and there should be enough ground holes to connect the top and bottom ground.

Packaging Information



DIMEN	CWON	SPEC
W		12.00 +/- 0.30
Do		Ø1.50 +0.10/-0.00
Po		4.00 +/- 0.10
E		1.75 +/- 0.10
D1		Ø1.50 MIN
Ao		5.30 +/- 0.10
Bo		5.30 +/- 0.10
P		8.00 +/- 0.10
P2		2.00 +/- 0.10
Ko		1.10 +/- 0.10
T		0.30 +/- 0.05
F		5.50 +/- 0.05



Description:

1. Unit: mm
2. Material: anti-static polyethylene
3. Color: Black
4. 10 positioning holes center distance (P0) cumulative tolerance ± 0.2

Cautions

1. Attempts to clean the chip surface with wet chemical methods are prohibited.
2. This product is an electrostatic sensitive device, so pay attention to anti-static when storing and using it.
3. Store in dry, nitrogen atmosphere.

