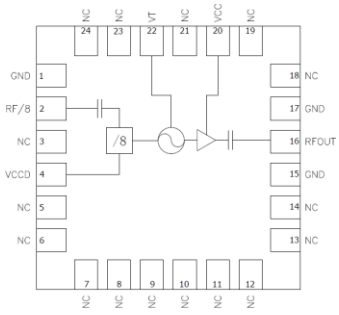
Performance Features

- Operating band: 23.8GHz～24.8GHz
- Output Power: 12dBm
- Phase noise: -96dBc/Hz@100kHz
- Package size: 24-pin QFN, 4mmx4mm

Typical Applications

- Point-to-point and multi-point radios
- Test equipment and industrial control
- Very Small Aperture Terminal (VSAT)
- Car Radar

Functional Block Diagram



Overview

The CWV092SP4 is a monolithic microwave integrated circuit (MMIC) voltage controlled oscillator with integrated resonator, negative resistance device and varactor diode, and RF/8 output. With low power consumption, flat output power characteristics.

The CWV092SP4 is a 24-pin 4mmx4mm surface mount leadless plastic package. The pin pads are coated with NiPdAu.

Electrical performance table (TA=25°C, VCC=VCCD=5V)

Parameter Name	Port/symbol	Minimum value	Typical values	Maximum value	Unit
Frequency range		23.8		24.8	GHz
Output power	RFOUT	7	12	15	dBm
	RF/8	-8	-4	0	dBm
Single-sideband phase noise @ 10kHz frequency bias	RFOUT		-68		dBc/Hz
Single-sideband phase noise @ 100kHz frequency bias	RFOUT		-96		dBc/Hz
Single sideband phase noise @ 1MHz frequency bias	RFOUT		-122		dBc/Hz
Single sideband phase noise @ 10MHz frequency bias	RFOUT		-142		dBc/Hz
Tuning voltage	VT	2		13	V
Bias voltage	VCC=VCCD	4.75	5.0	5.25	V
Bias current	Icc		125		mA
Tuning sensitivity	Kv	100		800	MHz/V
Leakage current at the tuning end (VT=13V)				10	uA
RF-side harmonic suppression	1/2		25		dBc
	3/2		35		dBc
	2nd		20		dBc
	3rd		25		dBc
Output Return Loss			6		dB
Push frequency factor			40		MHz/V
Frequency temperature drift			2		MHz/° C

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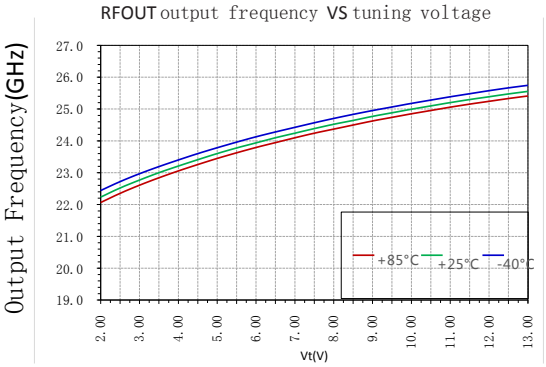
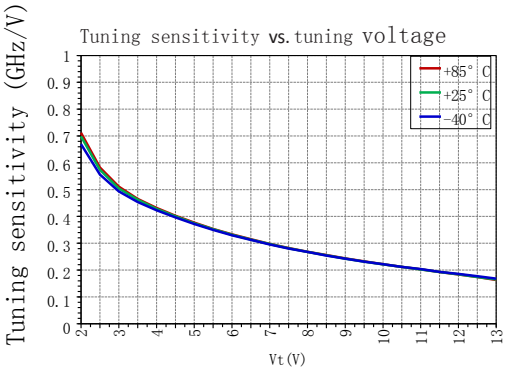
Address: No. 5, Gaopeng East Road, Gaoxin District, Chengdu, China
E-mail:sales@cdcwtec.com
Website: www.cdcwtec.com

Test Curve

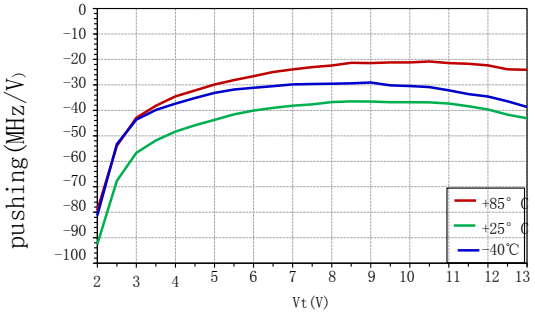
RFOUT output frequency VS tuning voltage



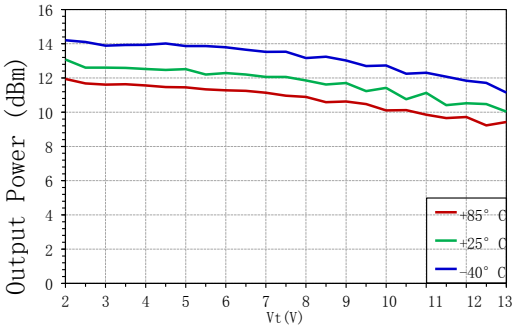
Tuning sensitivity vs. tuning voltage



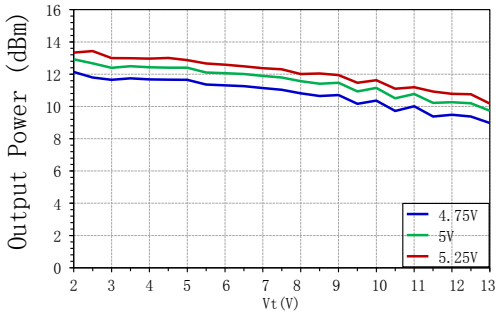
Pushover factor vs. tuning voltage



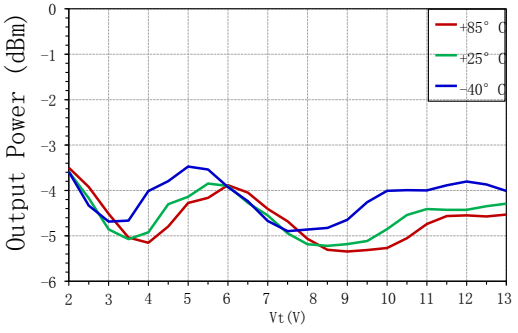
RFOUT output power vs. tuning voltage



RFOUT Power VS VCC



RF/8 output power vs. tuning voltage



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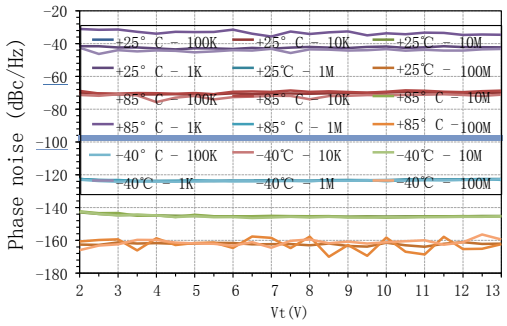
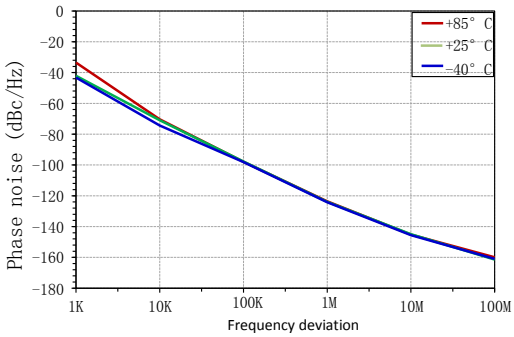
Test Curve

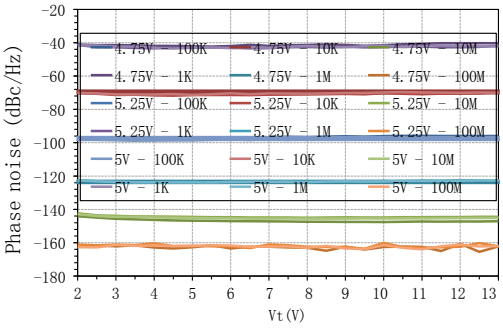
RFOUT phase noise vs. tuning voltage



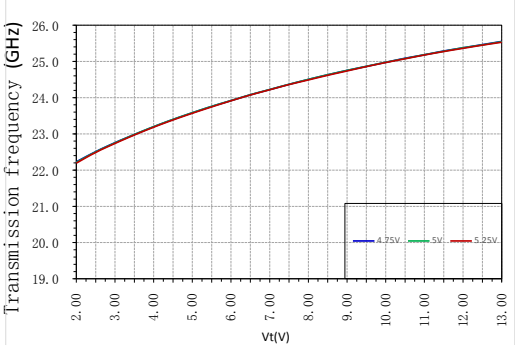
RFOUT phase noise vs. offset frequency @Vt=5V



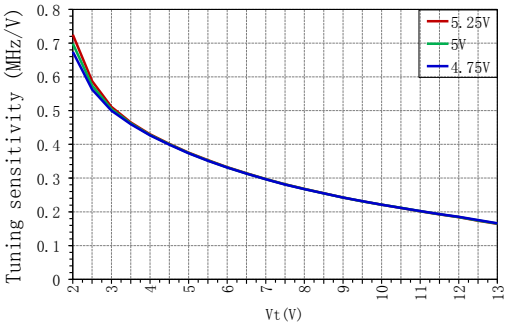
RFOUT phase noise VS VCC



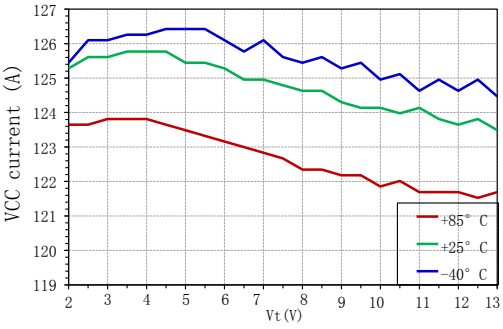
RFOUT output frequency VS VCC



Tuning sensitivity VS VCC



VCC current VS Vt



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Extreme operating parameters

Bias voltage (VCC)	5.5V
Tuning Voltage (VT)	0V to 15V
Electrostatic protection level (HBM)	250V
Storage temperature range	-65℃～+150℃
Operating temperature range	-40℃～+85℃
Maximum junction temperature (Tjmax)	135° C
Thermal resistance (θ jb) Junction to GND Paddle	28℃/W

Package Information

Model	Packaging materials	Solder plate plating	MSL level [1]	Package identification [2]	Environmental requirements
CWV092SP4	Green resin compounds	NiPdAu	MSL 3	S092 XXXXX	RoHS compliant

[1] Maximum reflow temperature 260° C
[2] XXXXX is the lot number

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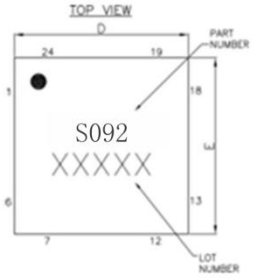
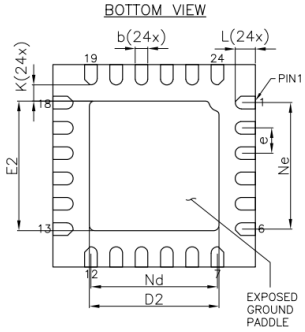
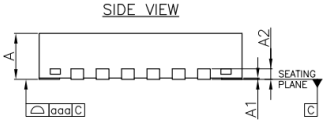
Dimension







Description:

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

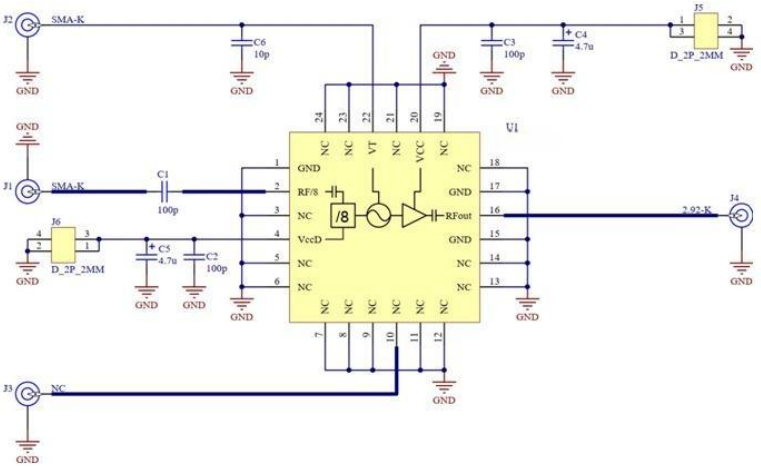
SP4 Dimension Table (unit:mm)

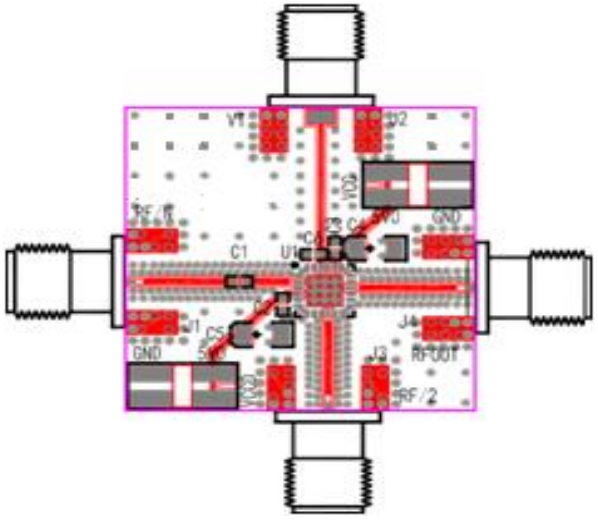
Symbol	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2		0.20Ref	
b	0.18	0.25	0.30
D	3.90	4.00	4.10
D2	2.41	2.56	2.66
e		0.50BSC	
Ne		2.50BSC	
Nd		2.50BSC	
E	3.90	4.00	4.10
E2	2.41	2.56	2.66
K	0.20	---	---
L	0.30	0.40	0.50
aaa		0.08	

Pin Definition

Pin number	Functional symbols	Function description	Pin number	Functional symbols	Function description
1	GND	RF's	13	NC	NC
2	RF/8	RF output	14	NC	NC
3	NC	NC	15	GND	RF's
4	VCCD	DC bias	16	RFOUT	RF output
5	NC	NC	17	GND	RF's
6	NC	NC	18	NC	NC
7	NC	NC	19	NC	NC
8	NC	NC	20	VCC	DC bias
9	NC	NC	21	NC	NC
10	NC	NC	22	Vt	DC control
11	NC	NC	23	NC	NC
12	NC	NC	24	NC	NC

Evaluation Boards





Designator	Description
C1, C2, C3	Multilayer Ceramic Capacitor 0402 100pF
C4, C5	Tantalum capacitor 1206 4.7uF
C6	Multilayer Ceramic Capacitor 0402 10pF
J1, J2	SMA-K PCB connectors
J4	2.92-K PCB connectors
VCCD, VCC	2.0mm DC pins
U1	CWV092SP4
J1,J2 recommended to use NJ Aowen D550B12E01-023 SMA-K connector, J4 recommended to use NJ Aowen D360B12E01-023 2.92-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 the 50 ohm impedance, and the ground pin of the package shell should be grounded nearby (similar to the figure), and there should be enough grounding holes to connect the top and bottom ground layers.

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