Multifunctional Chip 多功能芯片

MKR-9296BF-4R （short form datasheet）

4-Channel Beamforming Receiver Chip

Feature:

- Freq：92GHz~96GHz
- NF: ≤7dB
- Phase shift step: 22.5°@94GHz
- Phase control: 4-bit
- LO freq:28GHz
- IF freq:8-12GHz
- Power supply: 5V (130mA single channel)
  3.3V (40mA)
- Control mode: 3.3V TTL
- Footprint: 2.7mm×2.7mm×0.1mm
- Made in China

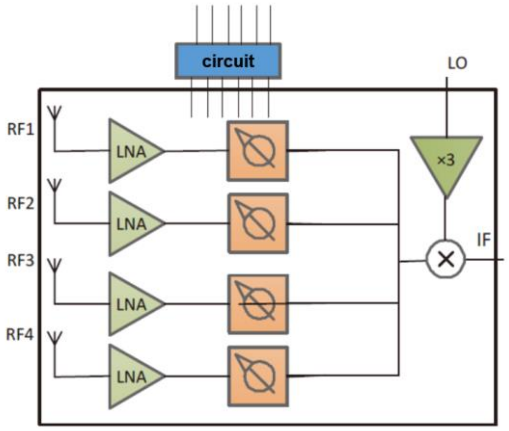
General Description

MKR-9296BF-4R is a 4-channe receiver downconverter. bare die on W Band. Each channel contains a RF input with a low noise amplifier (LNA) and a downconverter mixer with x3 LO Chain. Control of the on-chip registers is 4 bit.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
Freq	92		96	GHz
Small signal gain		22		dB
NF		7		dB
Input P1dB		-20		dBm
Input VSWR		2		-
Output VSWR		2		-
Current@5V		130		mA
Current@3.3V		40		mA
Phase shift resolution		5		degree

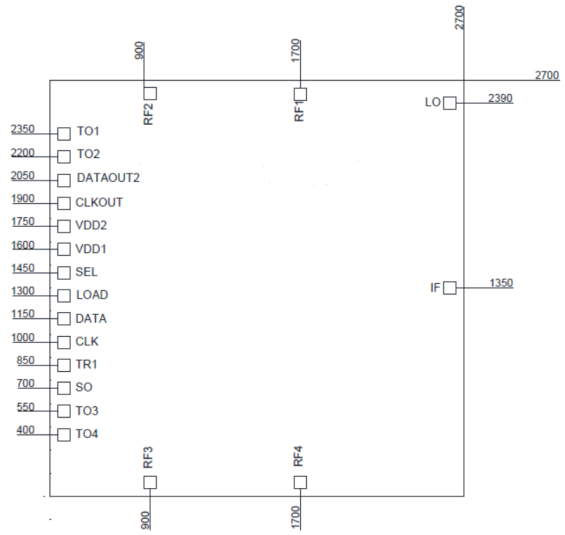
Function Diagram



Maximum Ratings:

Power supply, VDD2	5.5V
Power supply, VDD1	4V
Control voltage, CLK/DATA/LOAD/SEL/TR1	4V
Trench operating temperature, Tch	150℃
Electro-Static discharge, ESD	200V
Storage temperature, Tstg	-65℃~150℃
Mount temperature	300℃ (1min, N2 protection)

Outline Drawing:

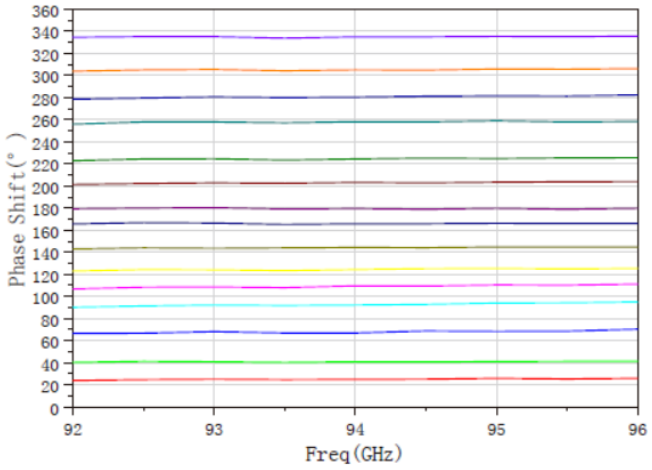


Notes： 1) All dimensions are in μm

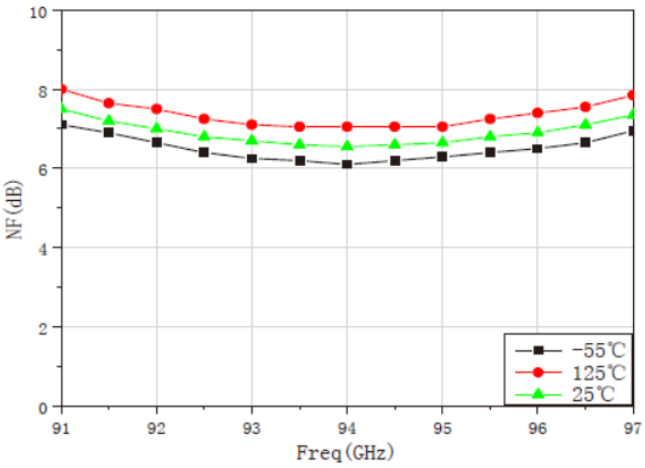
2) Substrate Thickness:100μm

Measured Performance（RF power: -40dBm; LO:28GHz, LO power:10dBm, T_A=+25℃）

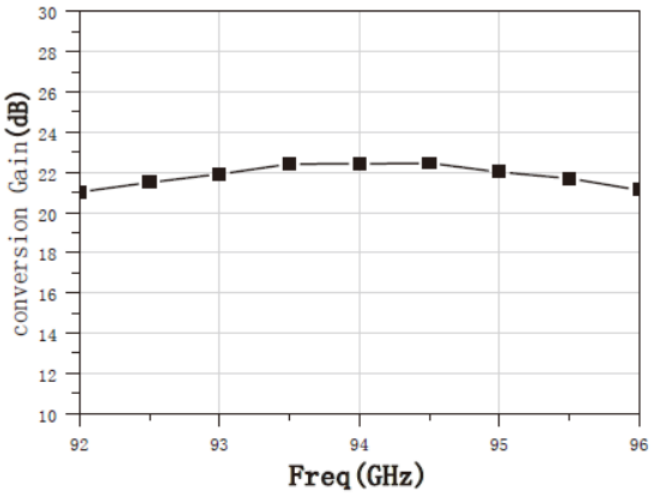
Phase-shift vs.Freq



NF vs.Freq



Conversion gain vs.Freq



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.

MKR-9296BF-4T （short form datasheet）

4-Channel Beamforming Transmitter Chip

Feature:

- Freq：92GHz~96GHz
- Psat: 14dBm
- Small signal gain: 25dB
- Phase shift step: 22.5°@94GHz
- Phase control: 4-bit
- LO freq:28GHz
- IF freq:8-12GHz
- Power supply: 5V (210mA single channel)
  3.3V (30mA)
- Control mode: 3.3V TTL
- Footprint: 2.7mm×2.7mm×0.1mm
- Made in China

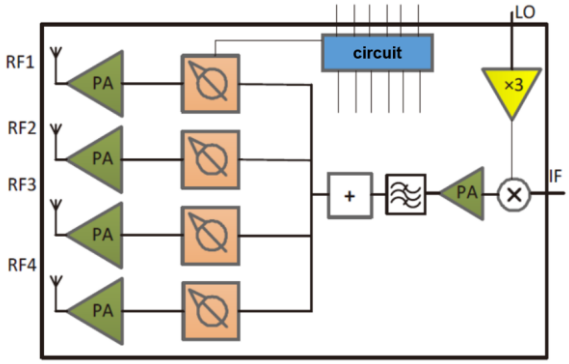
General Description

MKR9296BF-4T is a 4-channe receiver upconverter. bare die on W Band. Each channel contains a RF input with a low noise amplifier (LNA) and a downconverter mixer with x3 LO Chain. Control of the on-chip registers is 4 bit.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
Freq	92		96	GHz
Small signal gain		25		dB
Psat		14		dBm
Input VSWR		2		-
Output VSWR		2		-
Current@5V		210		mA
Current@3.3V		30		mA
Phase shift resolution		5		degree

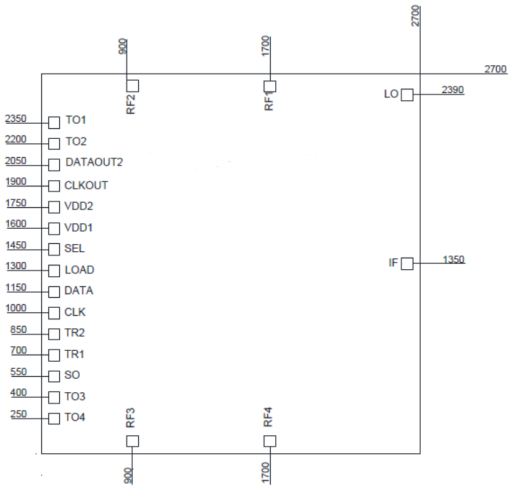
Function Diagram



Maximum Ratings:

Power supply, VDD2	5.5V
Power supply, VDD1	4V
Control voltage, CLK/DATA/LOAD/SEL/TR1	4V
Trench operating temperature, Tch	150℃
Electro-Static discharge, ESD	200V
Storage temperature, Tstg	-65℃~150℃
Mount temperature	300℃ (1min, N2 protection)

Outline Drawing:

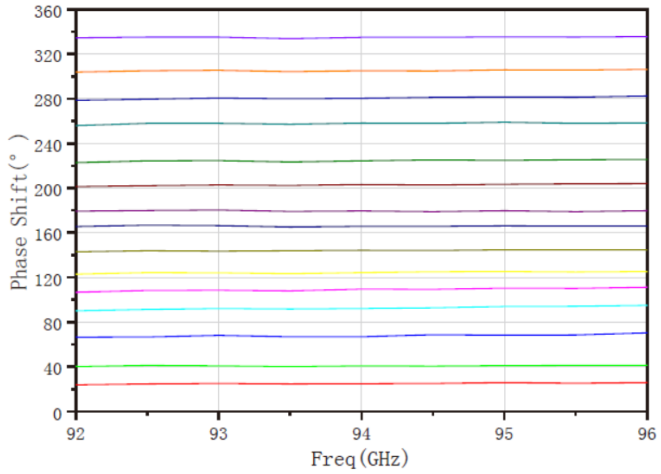


Notes：1) All dimensions are in μm

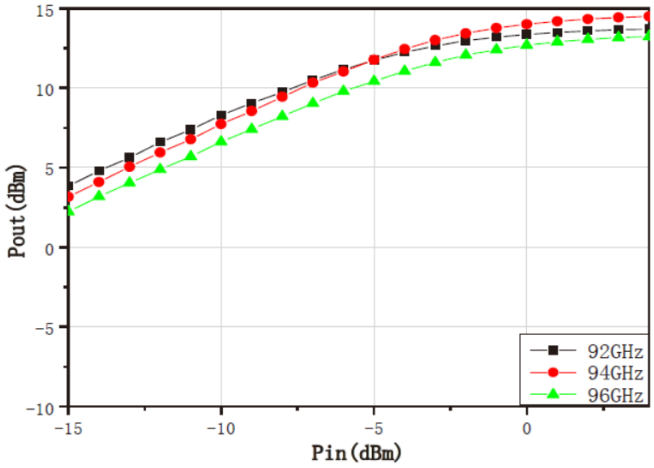
2) Substrate Thickness:100μm

Measured Performance（LO power: 10dBm; LO:28GHz, IF power:-9dBm, T_A=+25℃）

Phase-shift vs.Freq



Output power vs.Pin



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.

MKR-9498BF-4R （short form datasheet）

4-Channel Beamforming Receiver Chip

Feature:

- Freq：94GHz~98GHz
- NF: 7dB
- Gain: 22dB
- Phase shift step: 11.25°@96GHz
- Phase control: 5-bit
- LO freq:20GHz
- IF freq:14-18GHz
- Power supply: 5V (130mA single channel)
  3.3V (40mA)
- Control mode: 3.3V TTL
- Footprint: 2.7mm×3.9mm×0.1mm
- Made in China

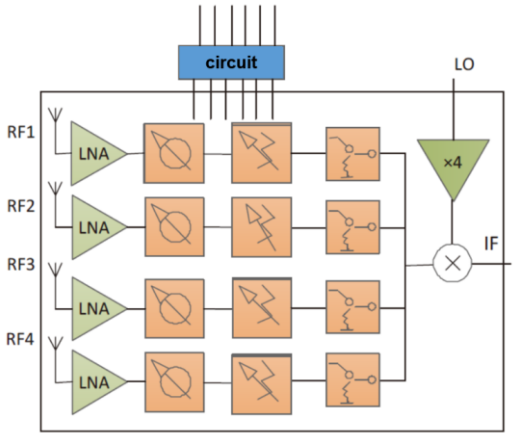
General Description

MKR-9498BF-4R is a 4-channe receiver downconverter. bare die on W Band. Each channel contains a RF input with a low noise amplifier (LNA) and a downconverter mixer with x4 LO Chain. Control of the on-chip registers is 4 bit.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
Freq	94		98	GHz
Small signal gain		22		dB
NF			7	dB
Input P1dB		-20		dBm
Input VSWR		2		-
Output VSWR		2		-
Current@5V		130		mA
Current@3.3V		40		mA
Phase shift resolution		3		degree

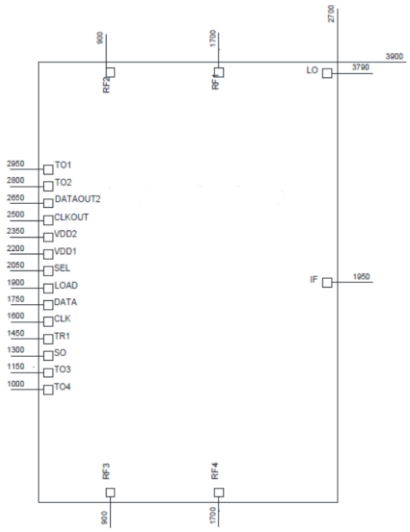
Function Diagram



Maximum Ratings:

Power supply, VDD2	5.5V
Power supply, VDD1	4V
Control voltage, CLK/DATA/LOAD/SEL/TR1	4V
Trench operating temperature, Tch	150℃
Electro-Static discharge, ESD	200V
Storage temperature, Tstg	-65℃~150℃
Mount temperature	300℃ (1min, N2 protection)

Outline Drawing:

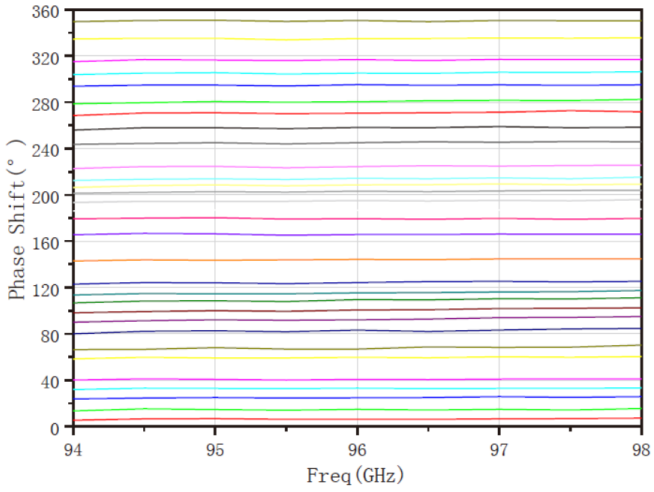


Notes： 1) All dimensions are in μm

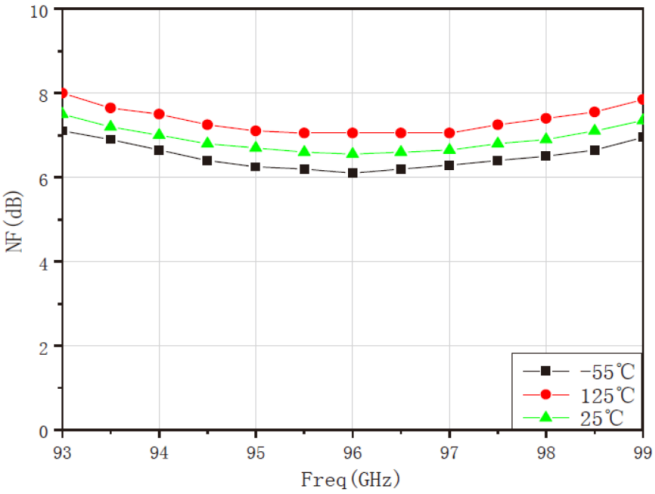
2) Substrate Thickness:100μm

Measured Performance（RF power: -40dBm; LO:20GHz, LO power:0dBm, T_A=+25℃）

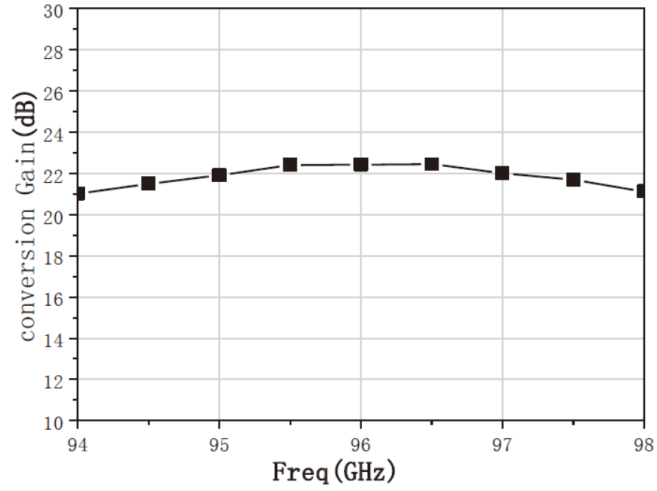
Phase-shift vs.Freq



NF vs.Freq



Conversion gain vs.Freq



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.

MKR-9498BF-4T （short form datasheet）

4-Channel Beamforming Transmitter Chip

Feature:

- Freq：94GHz~98GHz
- Psat: 14dBm
- Small signal gain: 25dB
- Phase shift step: 11.25°@96GHz
- Phase shift resolution: 3°
- Phase control: 5-bit
- LO freq:20GHz
- IF freq:14-18GHz
- Power supply: 5V (210mA single channel)
  3.3V (30mA)
- Control mode: 3.3V TTL
- Footprint: 2.7mm×3.3mm×0.1mm
- Made in China

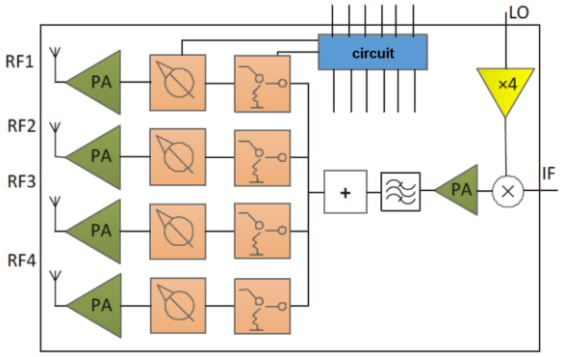
General Description

MKR-9498BF-4T is a 4-channe receiver upconverter. bare die on W Band. Each channel contains a RF input with a low noise amplifier (LNA) and a downconverter mixer with x4 LO Chain. Control of the on-chip registers is 4 bit.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
Freq	94		98	GHz
Small signal gain		25		dB
Psat		14		dBm
Input VSWR		2		-
Current@5V		210		mA
Current@3.3V		30		mA
Phase shift resolution		3		degree

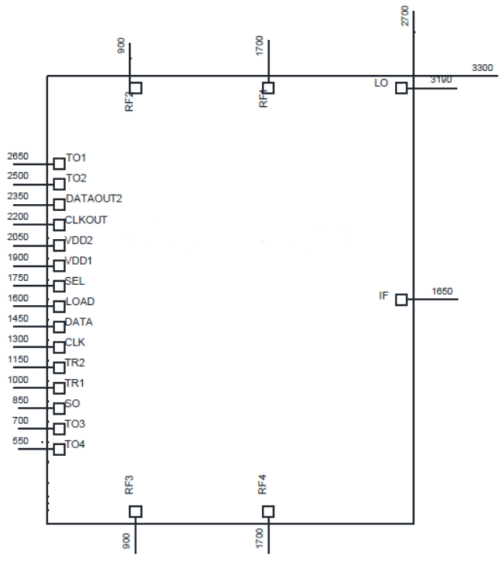
Function Diagram



Maximum Ratings:

Power supply, VDD2	5.5V
Power supply, VDD1	4V
Control voltage, CLK/DATA/LOAD/SEL/TR1	4V
Trench operating temperature, Tch	150℃
Electro-Static discharge, ESD	200V
Storage temperature, Tstg	-65℃~150℃
Mount temperature	300℃ (1min, N2 protection)

Outline Drawing:

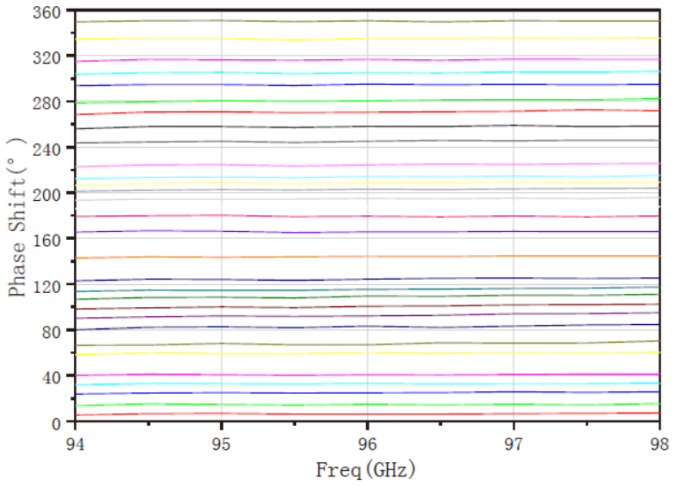


Notes： 1) All dimensions are in μm

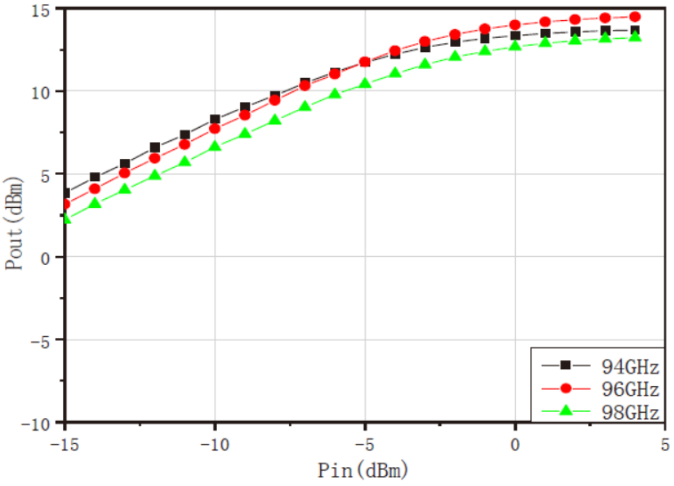
2) Substrate Thickness:100μm

Measured Performance（LO power: 0dBm; LO:20GHz, IF power:-15dBm, T_A=+25℃）

Phase-shift vs.Freq



Output power vs.Pin



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.

MKR-90100UP3 （short form datasheet）

Up Converter Multifunction Chip

Feature:

- RF freq：90GHz~100GHz
- LO: 28GHz
- LO power: 10dBm
- IF: 6GHz～16GHz
- Conversion gain:-1dB
- DC: 5V/30mA
- Footprint: 1.05mm×0.7mm×0.1mm
- Made in China

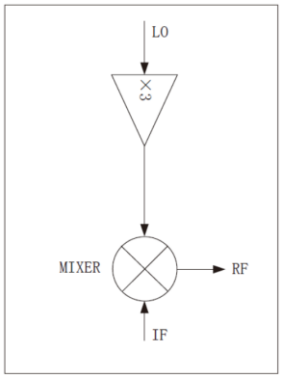
General Description

MKR-90100UP3 is a W band upconverter MMIC. Each chip contains an upconverter mixer with x3 LO Chain. All chips are RF measured, can be used for radar, communications etc. transceiver systems.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
RF Freq	90		100	GHz
LO		28		GHz
IF	6		16	GHz
Pout		-13		dBm
Conversion gain		-1		dB
3LO-RF Isolation		32		dB
Dynamic current		30		mA

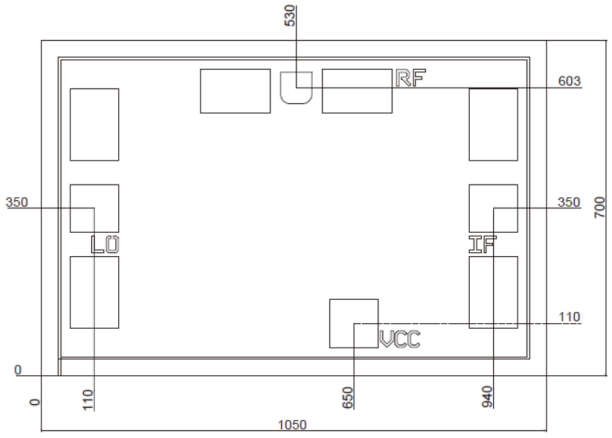
Function Diagram



Maximum Ratings:

Power supply, Vcc	5.5V
LO power	15dBm
IF power	10dBm
Trench operating temperature, Tch	175℃
Storage temperature, Tstg	-65℃~150℃
Mount temperature	310℃ (1min, N2 protection)

Outline Drawing:

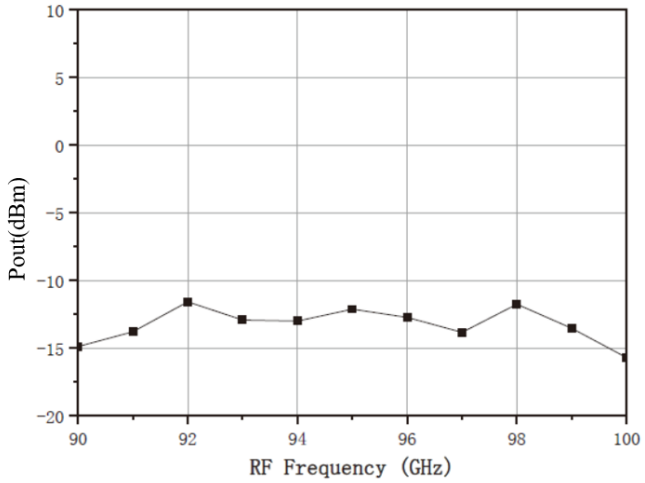


Notes：1) All dimensions are in μm

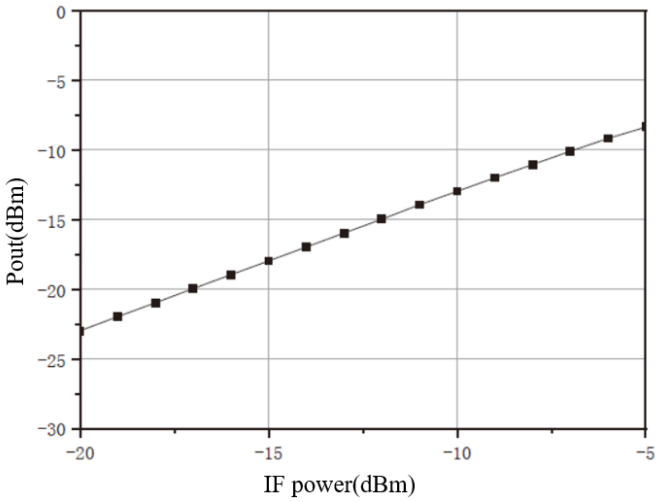
2) Substrate Thickness:100μm

Measured Performance（Vcc=5V，LO Freq=28GHz，LO Power=10dBm，IF Power=-12dBm, T_A=+25℃）

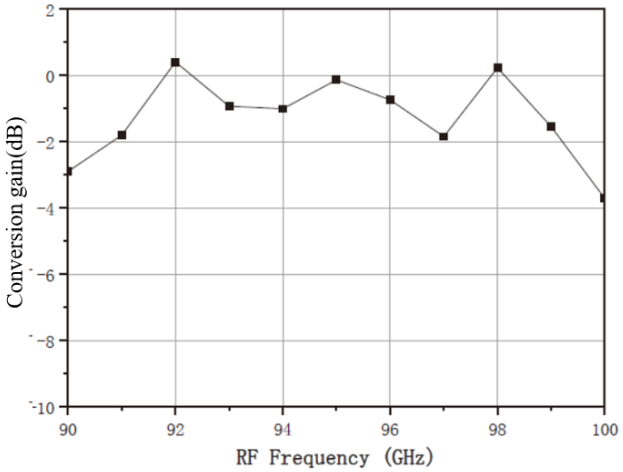
Output power vs.Freq



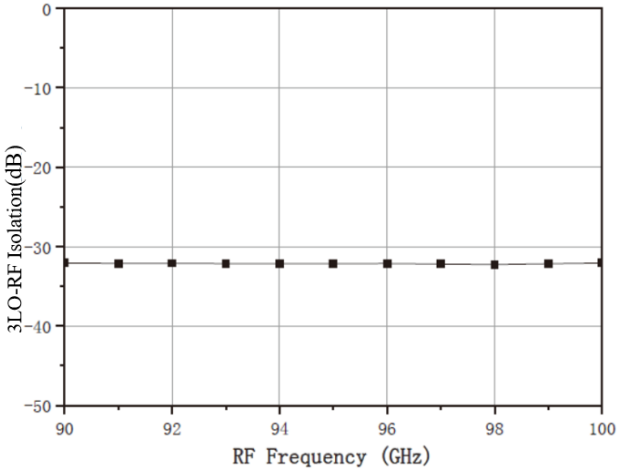
RF Output power vs.IF input power@Freq_IF=10GHz



Conversion gain vs. Freq



3LO-RF Isolation vs. Freq



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.

MKR-90100DW3（short form datasheet）

Down Converter Multifunction Chip

Feature:

- RF freq：90GHz~100GHz
- LO: 28GHz
- LO power: 10dBm
- IF: 6GHz～16GHz
- Conversion gain:3dB
- DC: 5V/30mA
- Footprint: 1.05mm×0.7mm×0.1mm
- Made in China

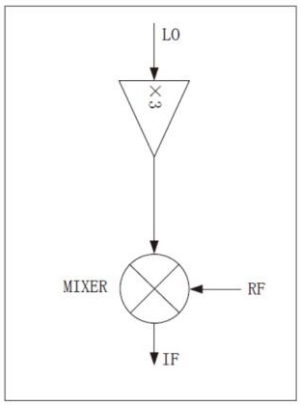
General Description

MKR-90100DW3 is a W band downconverter MMIC. Each chip contains a downconverter mixer with x3 LO Chain. All chips are RF measured, can be used for radar, communications etc. transceiver systems.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
RF Freq	90		100	GHz
LO		28		GHz
IF	6		16	GHz
IF Pout		-17		dBm
Conversion gain		3		dB
LO-RF Isolation		63		dB
Dynamic current		30		mA

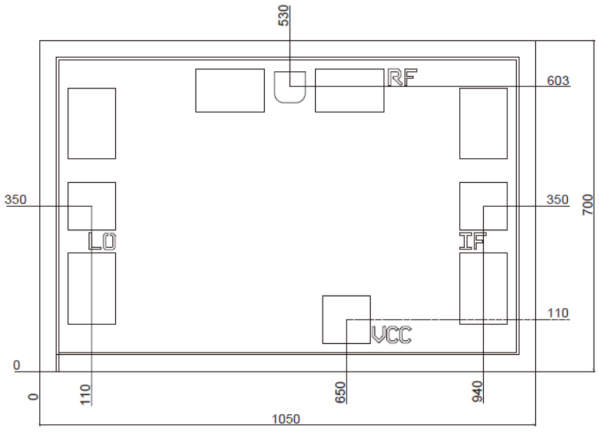
Function Diagram



Maximum Ratings:

Power supply, Vcc	6V
LO power	15dBm
RF power	10dBm
Trench operating temperature, Tch	175℃
Storage temperature, Tstg	-65℃~150℃
Mount temperature	310℃ (1min, N2 protection)

Outline Drawing:

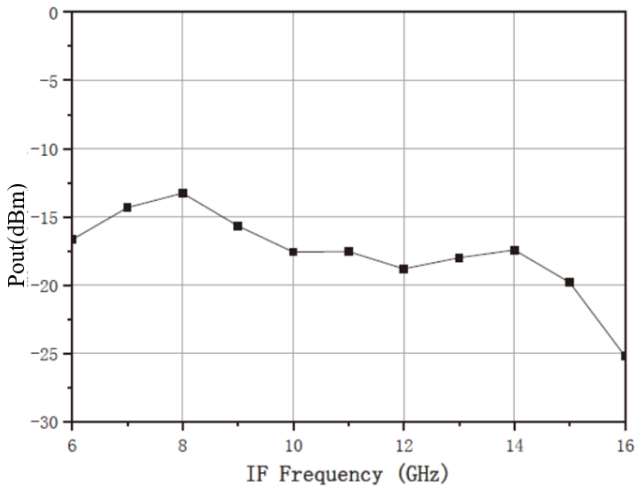


Notes：1) All dimensions are in μm

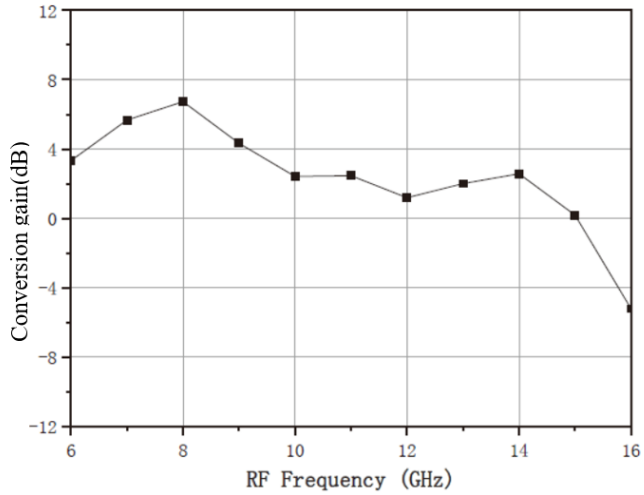
2) Substrate Thickness:100μm

Measured Performance（Vcc=5V，LO Freq=28GHz，LO Power=10dBm，RF Power=-20dBm, T_A=+25℃）

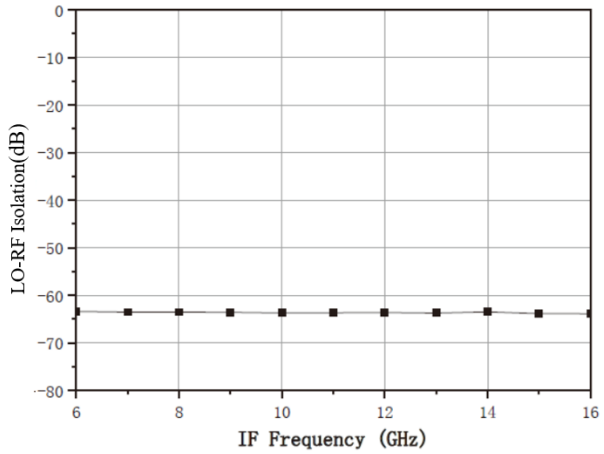
Output power vs.Freq



Conversion gain vs. Freq



LO-RF Isolation vs. Freq



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.

MKR-9498DW4（short form datasheet）

Down Converter Multifunction Chip

Feature:

- RF freq：94GHz~98GHz
- LO: 20GHz
- LO power: 3dBm
- IF: 14GHz～18GHz
- Conversion gain:-2dB
- DC: 3.3V/36mA
- Footprint: 0.7mm×1.35mm×0.1mm
- Made in China

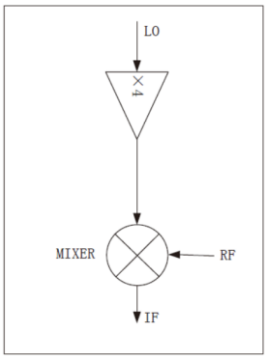
General Description

MKR-9498DW4 is a W band downconverter MMIC. Each chip contains a downconverter mixer with x4 LO Chain. All chips are RF measured, can be used for radar, communications etc. transceiver systems.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
RF Freq	94		98	GHz
LO		20		GHz
IF	14		18	GHz
IF Pout		-17		dBm
Conversion gain		-2		dB
LO-RF Isolation		52		dB
Output P1dB		3		dBm
Dynamic current		36		mA

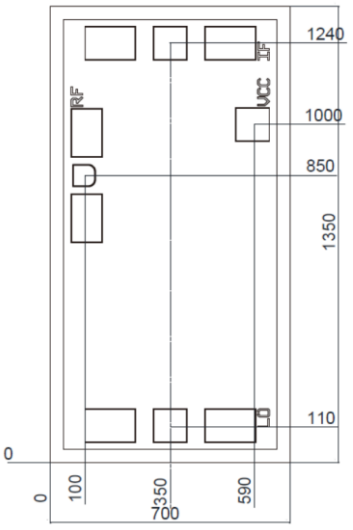
Function Diagram



Maximum Ratings:

Power supply, Vcc	4V
LO power	15dBm
RF power	10dBm
Trench operating temperature, Tch	175℃
Storage temperature, Tstg	-65℃~150℃
Mount temperature	310℃ (1min, N2 protection)

Outline Drawing:

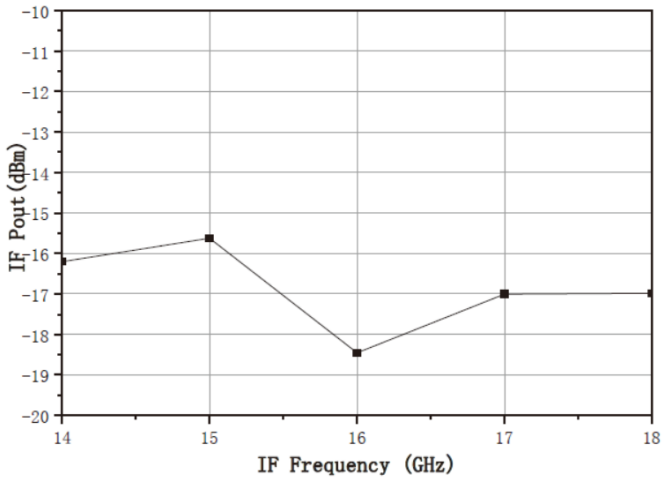


Notes：1) All dimensions are in μm

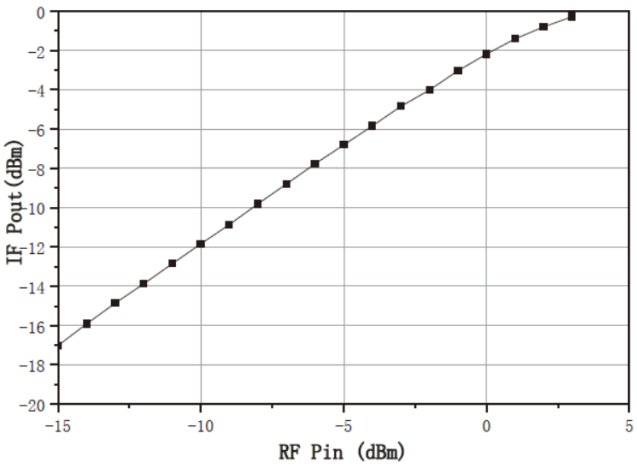
2) Substrate Thickness:100μm

Measured Performance（Vcc=3.3V，LO Freq=20GHz，LO Power=3dBm，RF Power=-15dBm, T_A=+25℃）

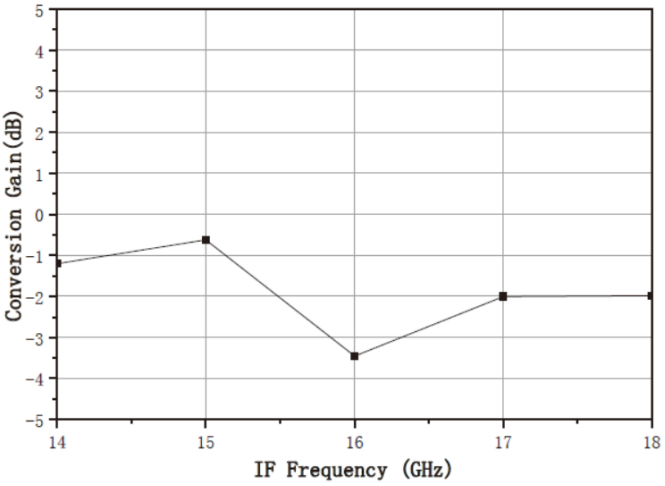
IF Output power vs.Freq



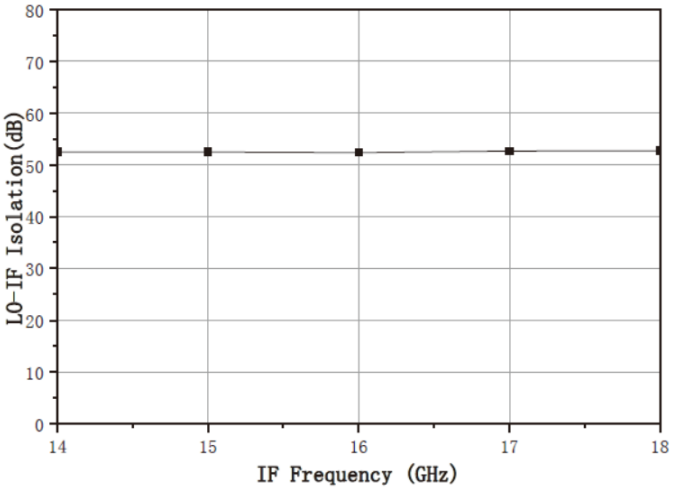
IF Output power vs.RF input power@ Freq_IF =17GHz



Conversion gain vs. Freq



LO-RF Isolation vs. Freq



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.

MKR-92100UP4 （short form datasheet）

Up Converter Multifunction Chip

Feature:

- RF freq：92GHz~100GHz
- LO: 20GHz
- LO power: 3dBm
- IF: 12GHz～20GHz
- Conversion gain:-1dB
- DC: 3.3V/45mA
- Footprint: 0.7mm×1.35mm×0.1mm
- Made in China

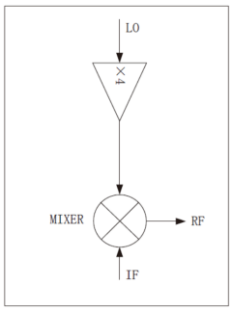
General Description

MKR-92100UP4 is a W band upconverter MMIC. Each chip contains an upconverter mixer with x4 LO Chain. All chips are RF measured, can be used for radar, communications etc. transceiver systems.

Electrical Characteristics : (T_A=+25℃)

Item	Min	Typ	Max	Unit
RF Freq	92		100	GHz
LO		20		GHz
IF	12		20	GHz
Pout		-11		dBm
Conversion gain		-1		dB
4LO-RF Isolation		25		dB
Output P1dB		-1		dBm
Dynamic current		45		mA

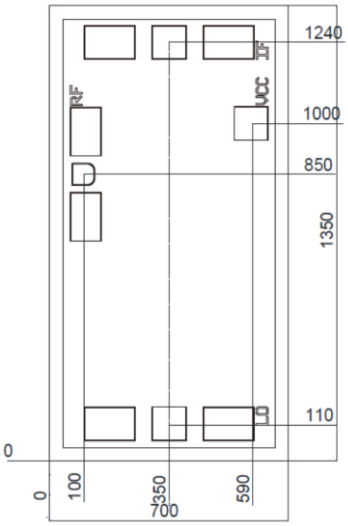
Function Diagram



Maximum Ratings:

Power supply, Vcc	4V
LO power	15dBm
IF power	15dBm
Trench operating temperature, Tch	175℃
Storage temperature, Tstg	-65℃~150℃
Mount temperature	310℃ (1min, N2 protection)

Outline Drawing:

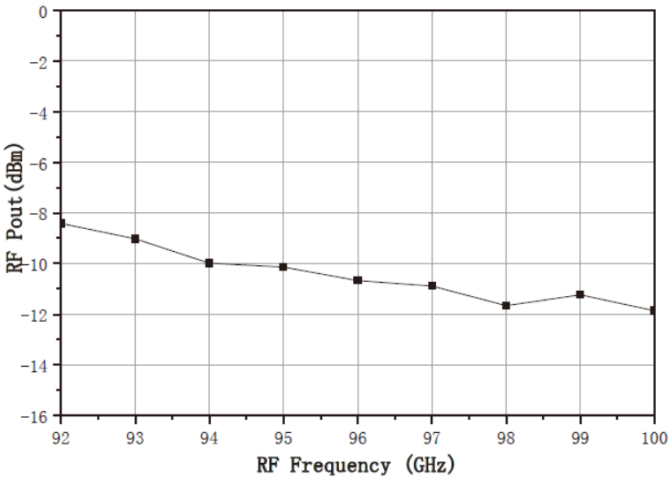


Notes：1) All dimensions are in μm

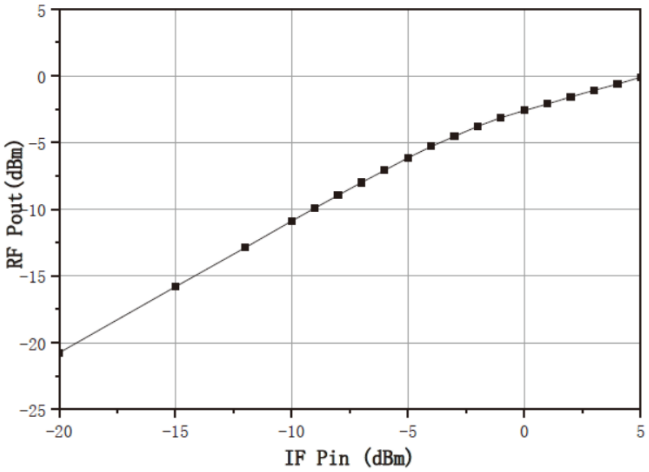
2) Substrate Thickness:100μm

Measured Performance（Vcc=3.3V，LO Freq=20GHz，LO Power=3dBm，IF Power=-10dBm, T_A=+25℃）

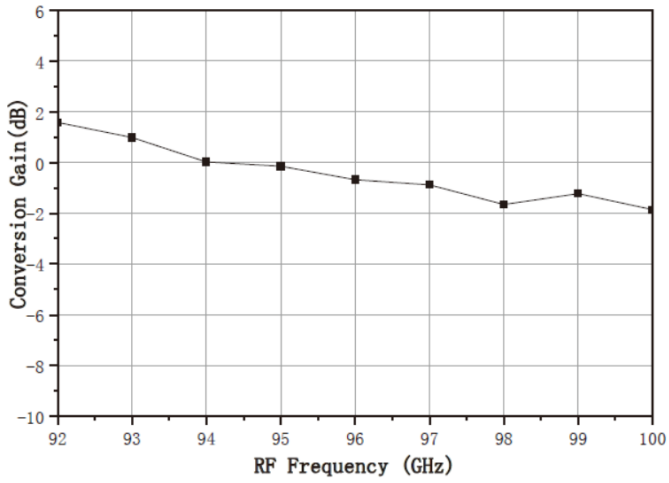
Output power vs.Freq



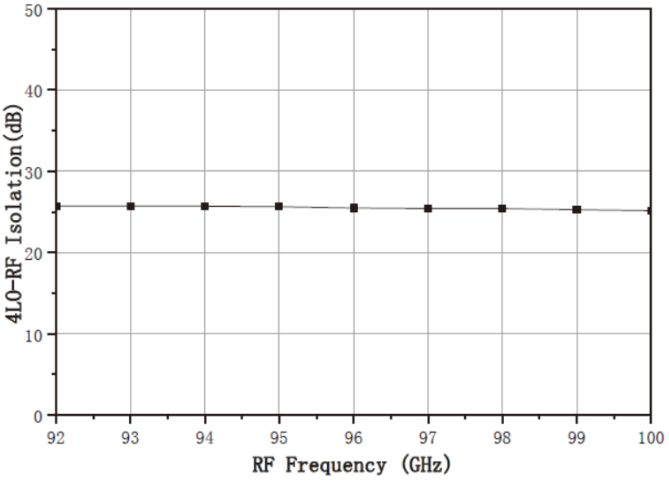
RF Output power vs.IF input power@Freq_IF=97GHz



Conversion gain vs. Freq



3LO-RF Isolation vs. Freq



Tips:

1) Good grounding and heat dissipation are required during use. MoCu with thermal expansion coefficient close to InP substrate(4.6×10^{-6}/K) is recommended as carrier.

2)The chips are electrostatic sensitive devices. Anti-static devices should be paid attention to during use, transportation and operation, and severe collisions and drops should be avoided to avoid damaging the product.

3) It is recommended to install decoupling capacitors according to the recommended assembly drawing when using;

4) It is recommended to use the diameter of 25um gold wire as feed, input and output interconnection of chips;

5) This chip is a hydrogen sensitive device with a hydrogen resistance of 2000 ppm. It is recommended to control the hydrogen concentration in the sealed chamber when using.