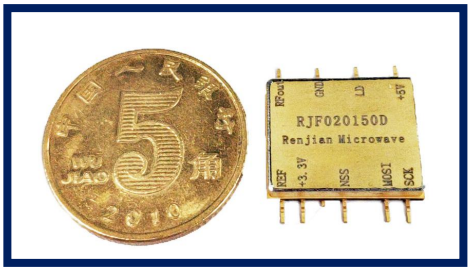
HTCC Miniaturized Frequency Synthesizer



Feature:

1. Compact SMT package: 15x12x3mm
2. High-Integrated, high reliability
3. Low Spurious, Low Phase Noise, Low Power Consumption
4. Cost-effective, in stock.

General Description

HTCC(High Temperature Co-fired Ceramic) process technology is used to the frequency synthesizer, make microwave layer and body are fired in a kiln at the same time at high temperature.The advantages of HTCC packaging technology includes mechanical rigidity and hermeticity, both of which are important in high-reliability and environmentally stressful applications. Also has advantages of high temp. resistant, corrosion resistant, long operating life, temp. uniformity and good thermal conductivity.

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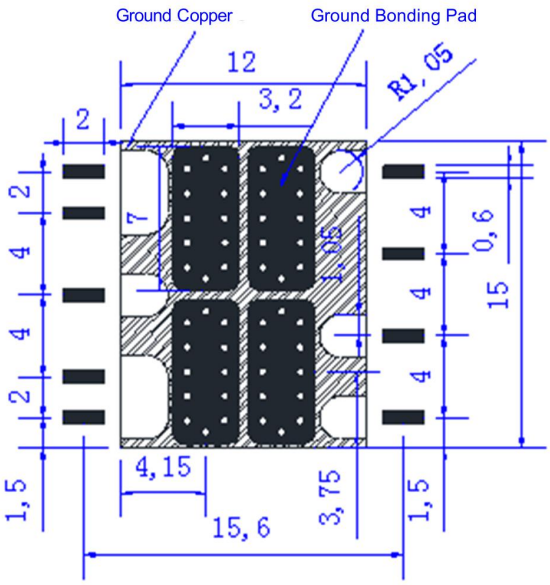
Recommend PCB Design



Dimension(unit：mm)

- For reference；
- Be sure PCB body be grounded great, and ground holes are needed on PCB
- PCB layer under package can not put high-frequency control line and RF line,that will cause unlock, Spurious.

Soldering

Temperature：Since components inside are soldiered by 220℃ soldering flux(SAC305), pls. assembly the synthesizer with 180℃ or 150℃ soldering flux.

- Recommend reflow soldering to ground paddle of package body, lead have to manual soldering, temperature of soldering iron 290±10℃, less than 2s.；
- Reflow soldering recommend to set as below：

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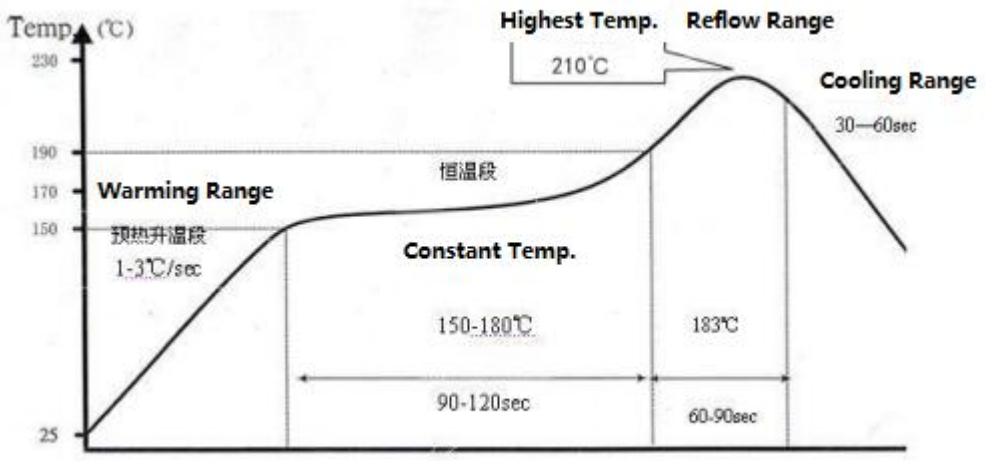

Communication Protocol

Below first timing sequence(CKPOL=0，CKPHA=0) is SPI writing clock,no MISO，LVTTL level,rate 1MHz.

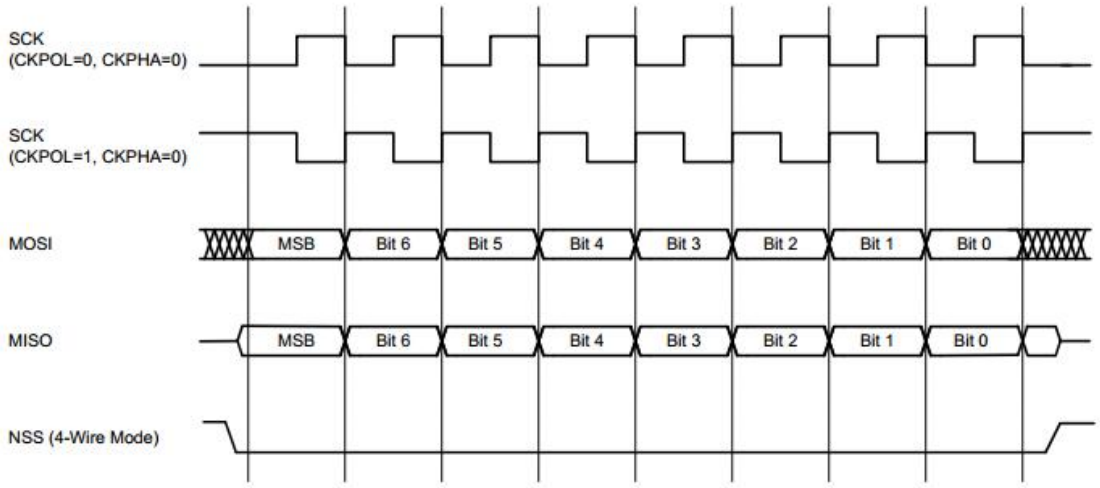

Figure 17.6. Slave Mode Data/Clock Timing (CKPHA = 0)

Example：at output frequency 10000MHz

No	Byte	Definition	Content	Note
1	2bytes	Frequency	0x2710	10000MHz
Note: when frequency out of specified frequency band,the output is recent frequency.				

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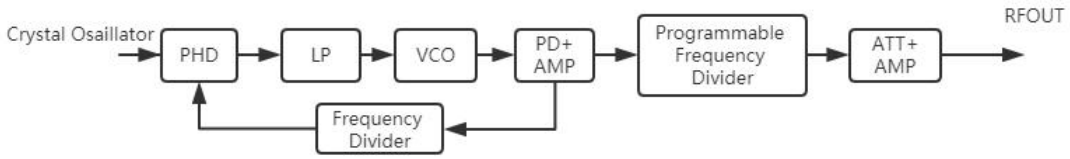
HTCC Miniaturized Frequency Synthesizer Series B

Product Feature：

1. Freq. Range: 4~20GHz
2. Compact SMT package: 15x12x3mm
3. Miniaturization, easy integration into various systems
4. Frequency Step：≥5MHz；
5. Low Spurious, Low Phase Noise, Low Power Consumption
6. External Reference
7. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference: 100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)	Harmonic Typ. (dBc)	Setting Time (us)	Power Supply
RJB040080C	4～8	5M	≥10	-94	-65	-10	≤150	
RJB040080D	4～8	10M	≥10	-98	-65	-10	≤100	
RJB040080E	4～8	20M	≥10	-98	-65	-10	≤80	+5V/300mA
RJB040080F	4～8	25M	≥10	-98	-65	-10	≤70	+18V/20mA
RJB040080G	4～8	50M	≥10	-98	-65	-10	≤60	
RJB040080H	4～8	100M	≥10	-98	-65	-10	≤50	
RJB100200C	10～20	5M	≥0	-85	-60	-10	≤150	
RJB100200D	10～20	10M	≥0	-90	-65	-10	≤100	
RJB100200E	10～20	20M	≥0	-90	-65	-10	≤80	+5V/300mA
RJB100200F	10～20	25M	≥0	-90	-65	-10	≤70	+12V/20mA
RJB100200G	10～20	50M	≥0	-90	-65	-10	≤60	
RJB100200H	10～20	100M	≥0	-90	-65	-10	≤50	

- Control Interface：SPI three lines；
- Hopping time no include communication time；
- Note：Reference, frequency, step can be customized.

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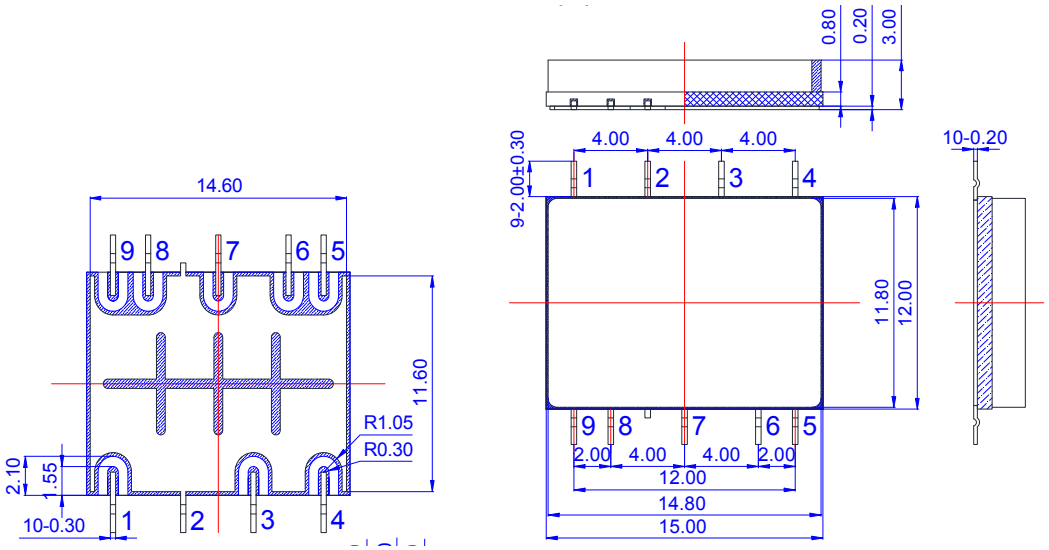
Outline Drawing(unit:mm)



Notes：

1．Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;

2．Make sure antistatic protection when shipping and using.

Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+12V/18V
5	SCK	Clock
6	MOSI	Data
7	NSS	Enable
8	VCC1	+5V
9	REF	REF Input

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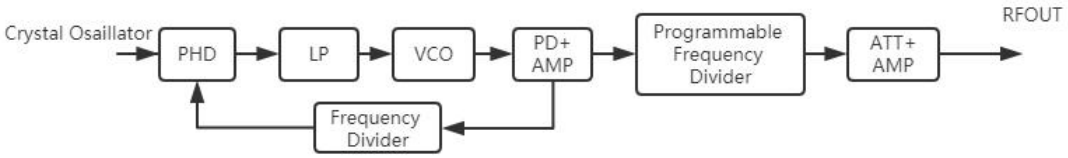
HTCC Miniaturized Frequency Synthesizer Series C

Product Feature：

1. Freq. Range: 2.5-17.5GHz
2. Compact SMT package: 15x12x3mm
2. Miniaturization, easy integration into various systems
3. Frequency Step：≥5MHz；
4. Low Spurious, Low Power Consumption
5. External Reference
6. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference: 100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)	Harmonic Typ. (dBc)	Setting Time (us)
RJC025033 *	2.5～3.3	5M～100M	≥5	-105	-65	-10	50～150
RJC030038 *	3～3.8	5M～100M	≥5	-104	-65	-10	50～150
RJC035045 *	3.5～4.5	5M～100M	≥5	-103	-65	-10	50～150
RJC043050 *	4.3～5	5M～100M	≥5	-102	-65	-10	50～150
RJC048060 *	4.8～6	5M～100M	≥5	-100	-65	-10	50～150
RJC058068*	5.8～6.8	5M～100M	≥5	-99	-65	-10	50～150
RJC065080 *	6.5～8	5M～100M	≥5	-98	-65	-10	50～150
RJC070085 *	7～8.5	5M～100M	≥5	-97	-65	-10	50～150
RJC075087 *	7.5～8.7	5M～100M	≥5	-97	-65	-10	50～150
RJC080100 *	8～10	5M～100M	≥5	-96	-65	-10	50～150
RJC097105 *	9.7～10.5	5M～100M	≥5	-95	-65	-10	50～150
RJC103108 *	10.3～10.8	5M～100M	≥5	-95	-65	-10	50～150
RJC085110 *	8.5～11	5M～100M	≥5	-95	-65	-10	50～150
RJC103110 *	10.3～11	5M～100M	≥5	-95	-65	-10	50～150
RJC092112 *	9.2～11.2	5M～100M	≥5	-95	-65	-10	50～150
RJC100115*	10～11.5	5M～100M	≥5	-95	-65	-10	50～150
RJC085120 *	8.5～12	5M～100M	≥5	-94	-65	-10	50～150
RJC105120 *	10.5～12	5M～100M	≥5	-94	-65	-10	50～150
RJC105125 *	10.5～12.5	5M～100M	≥5	-94	-65	-10	50～150

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HTCC Miniaturized Frequency Synthesizer

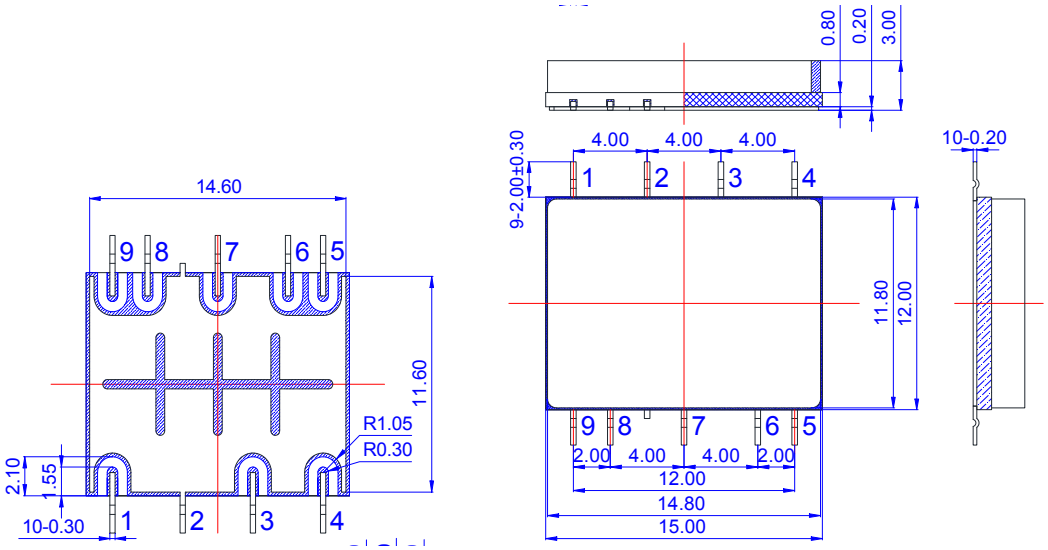
P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)	Harmonic Typ. (dBc)	Setting Time (us)
RJC105130 *	10.5～13	5M～100M	≥5	-93	-65	-10	50～150
RJC112130 *	11.2～13	5M～100M	≥5	-93	-60	-10	50～150
RJC130145 *	13～14.5	5M～100M	≥5	-92	-60	-10	50～150
RJC130155 *	13～15.5	5M～100M	≥5	-92	-60	-10	50～150
RJC155175 *	15.5～17.5	5M～100M	≥5	-91	-60	-10	50～150

- Control Interface：SPI three lines；
- Power Supply：+5V/300mA；
- Setting time don't include communication- time；
- Maximum Output power15dBm；
- Bigger Step, faster switching speed and better spurious;
- Note：Reference,step can be customized.

- Frequency step VS Switching speed

Freq. step	Switching speed	Freq. step	Switching speed
5MHz	≤150us	25MHz	≤70us
10MHz	≤100us	50MHz	≤60us
20MHz	≤80us	100MHz	≤50us

Outline Drawing (unit:mm)



1. Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;
2. Make sure antistatic protection when shipping and using.

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Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+5V
5	SCK	Clock
6	MOSI	Data
7	NSS	Enable
8	VCC1	+5V
9	REF	REF Input

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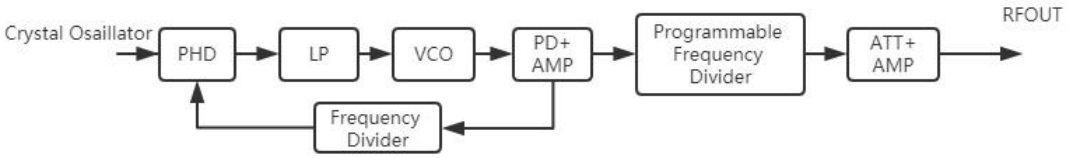
HTCC Miniaturized Frequency Synthesizer Series C

Product Feature：

1. Freq. Range: 2.5-24GHz
2. Compact SMT package: 15x12x3mm
3. Miniaturization, easy integration into various systems
4. Frequency Step：≥5MHz；
5. Low Spurious, Low Power Consumption
6. External Reference
7. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference:100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)	Harmonic Typ. (dBc)	Setting Time (us)
RJD025045 *	2.5～4.5	5M～100M	≥5	-106	-65	-10	50～150
RJD035063*	3.5～6.3	5M～100M	≥5	-100	-65	-10	50～150
RJD048075 *	4.8～7.5	5M～100M	≥5	-98	-65	-10	50～150
RJD075108 *	7.5～10.8	5M～100M	≥5	-95	-65	-10	50～150
RJD065110 *	6.5～11	5M～100M	≥5	-95	-65	-10	50～150
RJD070110 *	7～11	5M～100M	≥5	-95	-65	-10	50～150
RJD100120*	10～12	5M～100M	≥5	-94	-65	-10	50～150
RJD103120 *	10.3～12	5M～100M	≥5	-94	-65	-10	50～150
RJD080125*	8～12.5	5M～100M	≥5	-94	-65	-10	50～150
RJD103125 *	10.3～12.5	5M～100M	≥5	-94	-65	-10	50～150
RJD080130 *	8～13	5M～100M	≥5	-93	-65	-10	50～150
RJD105142*	10.5～14.2	5M～100M	≥5	-93	-65	-10	50～150
RJD100145 *	10～14.5	5M～100M	≥5	-92	-65	-10	50～150
RJD100150 *	10～15	5M～100M	≥5	-92	-65	-10	50～150
RJD112152 *	11.2～15.2	5M～100M	≥5	-92	-65	-10	50～150
RJD085153 *	8.5～15.3	5M～100M	≥5	-92	-65	-10	50～150
RJD100155 *	10～15.5	5M～100M	≥5	-92	-65	-10	50～150
RJD130162 *	13～16.2	10M～100M	≥5	-91	-65	-10	50～150
RJD130200 *	13～20	10M～100M	≥5	-90	-65	-10	50～150

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HTCC Miniaturized Frequency Synthesizer

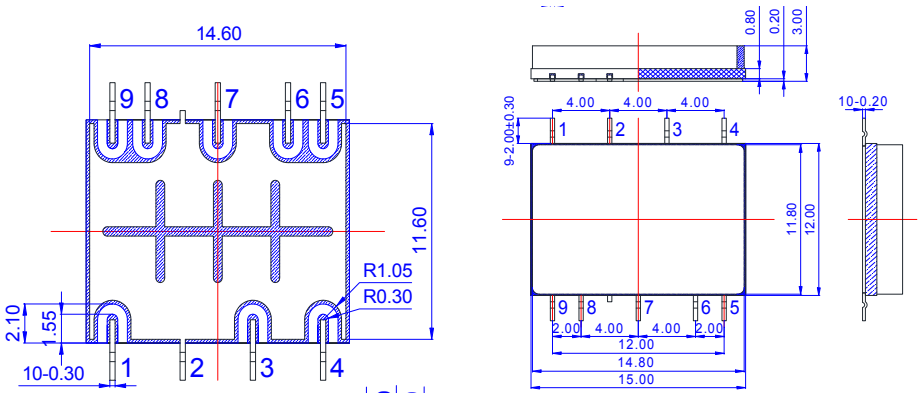
P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)	Harmonic Typ. (dBc)	Setting Time (us)
RJD155212 *	15.5～21.2	10M～100M	≥5	-88	-65	-10	50～150
RJD130230 *	13～23	10M～100M	≥5	-88	-65	-10	50～150
RJD153240 *	15.3～24	10M～100M	≥5	-88	-65	-10	50～150

- Control interface：SPI three lines；
- Power Supply：+5V/300mA,+12V/20mA,(note:13~23GHz and 15.3~24GHboth model needs +5V/300mA,+20V/20mA）；
- Setting time don't include communication- time：；
- Maximum Output power15dBm；
- Bigger Step, faster switching speed and better spurious;
- Note：Reference,step can be customized.

- Frequency step VS Switching speed

Freq. step	Switching speed	Freq. step	Switching speed
5MHz	≤150us	25MHz	≤70us
10MHz	≤100us	50MHz	≤60us
20MHz	≤80us	100MHz	≤50us

Outline Drawing (unit:mm)



1. Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;
2. Make sure antistatic protection when shipping and using.

Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+12V/20V
5	SCK	Clock
6	MOSI	Data
7	NSS	Enable
8	VCC1	+5V
9	REF	REF Input

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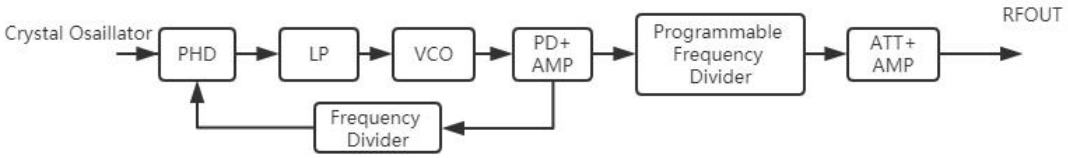
HTCC Miniaturized Frequency Synthesizer Series E

Product Feature：

1. Freq. Range: 2.3-24GHz
2. Compact SMT package: 15x12x3mm
3. Miniaturization, easy integration into various systems
4. Frequency Step：≥5MHz；
5. Low Spurious, Low Power Consumption
6. External Reference
7. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference: 100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)
RJE023	2.3	≥10	-108	-70	-10
RJE040	4	≥10	-104	-70	-10
RJE057	5.75	≥10	-101	-70	-10
RJE060	6	≥10	-100	-70	-10
RJE065	6.5	≥10	-100	-70	-10
RJE072	7.2	≥10	-99	-70	-10
RJE075	7.5	≥10	-99	-70	-10
……	……	……	……	……	……
RJE087	8.75	≥10	-97	-70	-10
RJE105	10.51	≥10	-96	-70	-10
RJE130	13	≥10	-94	-70	-10
RJE157	15.76	≥10	-92	-70	-10
RJE165	16.5	≥10	-92	-70	-10
RJE175	17.5	≥10	-91	-70	-10
RJE180	18	≥10	-90	-70	-10
RJE200	20	≥10	-90	-70	-10
RJE240	24	≥10	-90	-70	-10

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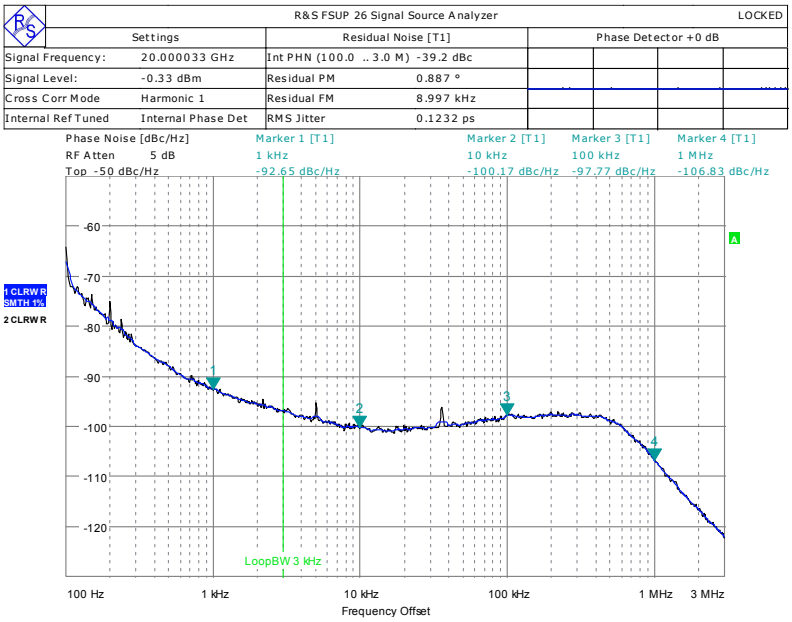
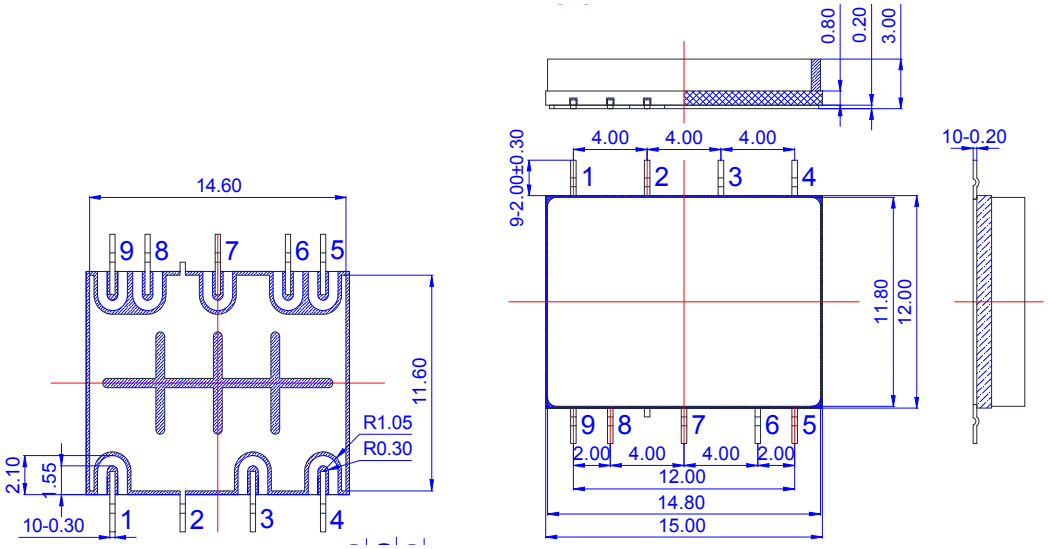
- Power Supply：+5V/260mA；+（5～20）V/20mA；
- Maximum Output power15dBm；
- Bigger Step, faster switching speed and better spurious;
- Note：Reference,output frequency between 2.3～ 24GH can be customized.

Typical Phase Noise



Outline Drawing(unit:mm)



1. Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;

2. Make sure antistatic protection when shipping and using.

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Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+(5~20)V
5	NC	The pin is not connected
6	NC	The pin is not connected
7	NC	The pin is not connected
8	VCC1	+5V
9	REF	REF Input

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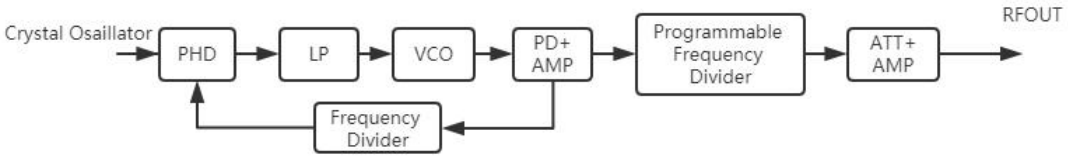
HTCC Miniaturized Frequency Synthesizer Series F

Product Feature：

1. Freq. Range: 0.1~15GHz
2. Compact SMT package: 15x12x3mm
3. Miniaturization, easy integration into various systems
4. Frequency Step：≥5MHz；
5. Low Spurious, Low Power Consumption
6. External Reference
7. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference:100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K dBc/Hz@10K	Spurious Typ. (dBc)	Harmonic Typ. (dBc)	Setting Time (us)
RJF001150C	0.1～15	5M	≥5	-91/-95	-60	-10	≤200
RJF001150D	0.1～15	10M	≥5	-91/-95	-63	-10	≤200
RJF001150E	0.1～15	20M	≥5	-91/-95	-65	-10	≤150
RJF001150F	0.1～15	25M	≥5	-91/-95	-65	-10	≤150
RJF001150G	0.1～15	50M	≥5	-91/-95	-65	-10	≤150
RJF001150H	0.1～15	100M	≥5	-91/-95	-68	-10	≤150

- Control interface：SPI three lines；
- Power Supply：+3.3V/400mA；+5V/100mA；
- Setting time don't include communication- time；
- Note：Reference, frequency, step can be customized.

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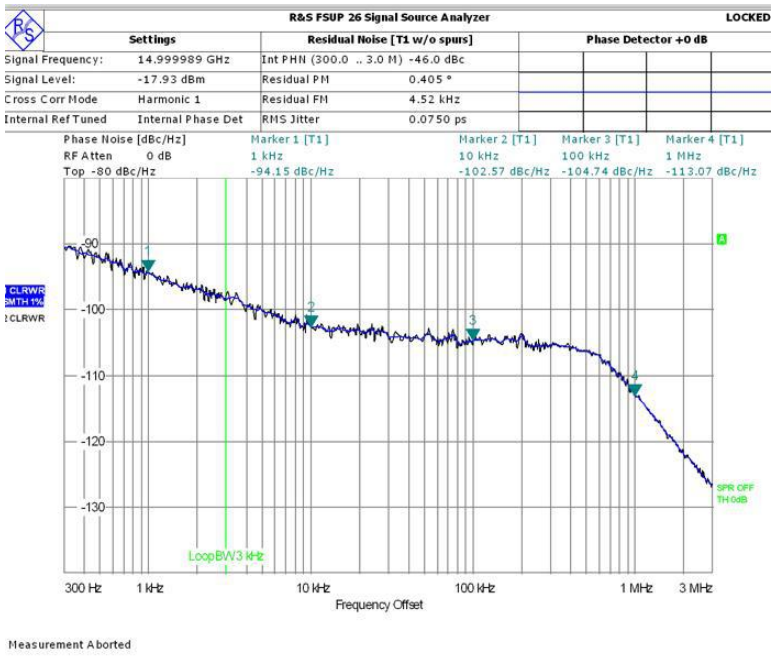
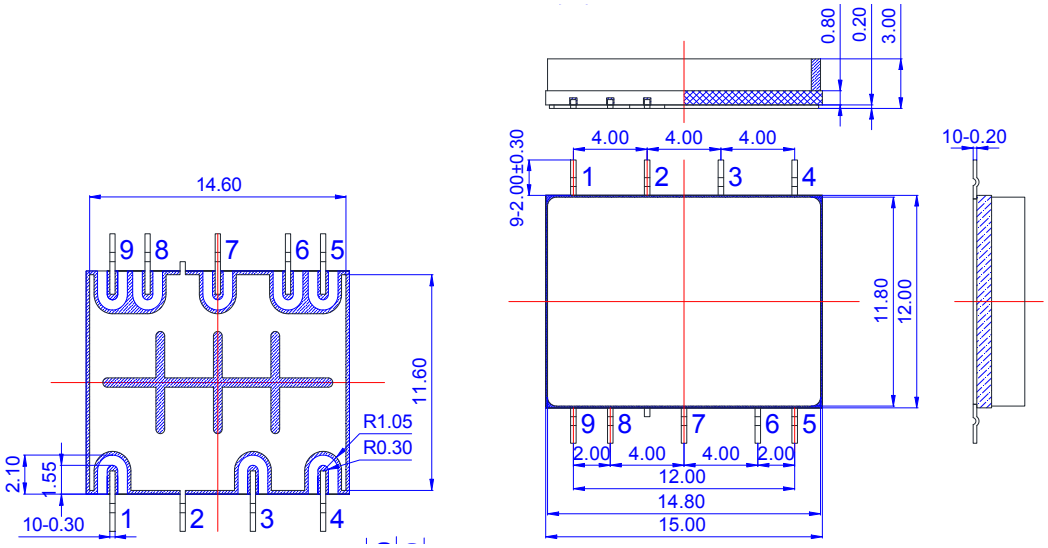
Typical Phase Noise



Outline Drawing (unit:mm)



3. Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;

4. Make sure antistatic protection when shipping and using.

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Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+5V
5	SCK	Clock
6	MOSI	Data
7	NSS	Enable
8	VCC1	+3.3V
9	REF	REF Input

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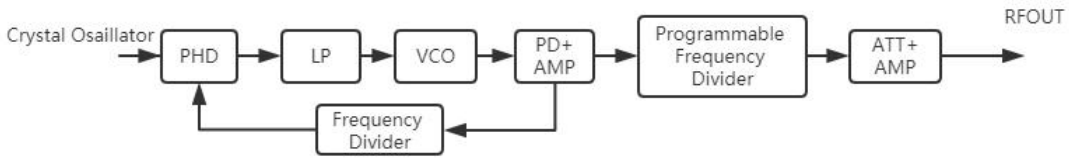
HTCC Miniaturized Frequency Synthesizer Series G

Product Feature：

1. Freq. Range: 0.1~6.2GHz
2. Compact SMT package: 15x12x3mm
3. Miniaturization, easy integration into various systems
4. Frequency Step：≥5MHz；
5. Low Spurious, Low Power Consumption
6. External Reference
7. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference:100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K dBc/Hz@10K	Spurious Typ. (dBc)	Harmonic Typ. (dBc)	Setting Time (us)
RJG001062C	0.1～6.2	5M	≥10	-93/-95	-60	-10	≤250
RJG001062D	0.1～6.2	10M	≥10	-93/-95	-63	-10	≤200
RJG001062E	0.1～6.2	20M	≥10	-93/-95	-65	-10	≤200
RJG001062F	0.1～6.2	25M	≥10	-93/-95	-65	-10	≤200
RJG001062G	0.1～6.2	50M	≥10	-93/-95	-65	-10	≤200
RJG001062H	0.1～6.2	100M	≥10	-93/-95	-65	-10	≤200

- Control interface：SPI three lines；；
- Power Supply：+3.3V/150mA；+5V/100mA；
- Setting time don't include communication- time；
- Note：Reference, frequency, step can be customized.

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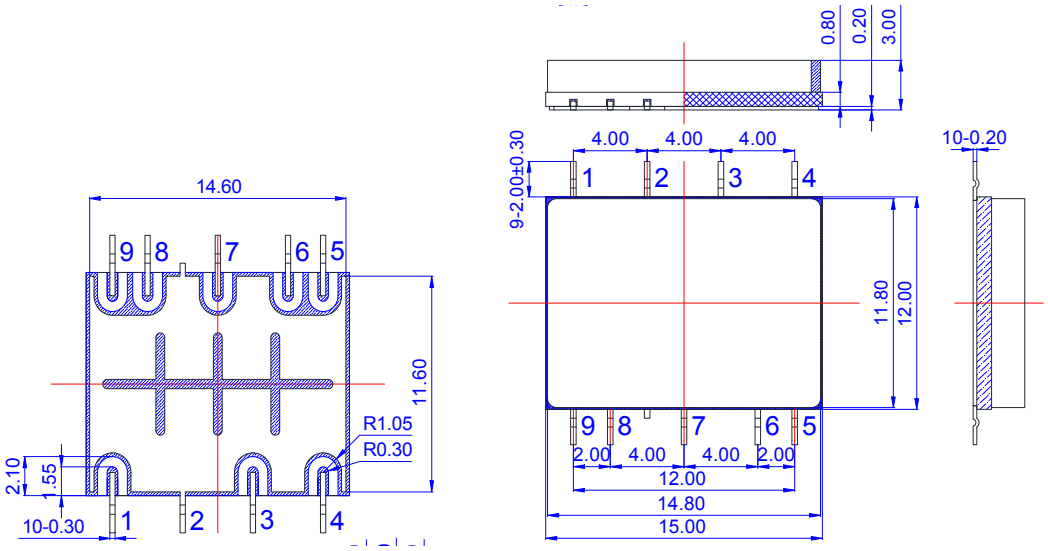
Outline Drawing(unit:mm)



1. Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;
2. Make sure antistatic protection when shipping and using.

Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+5V
5	SCK	Clock
6	MOSI	Data
7	NSS	Enable
8	VCC1	+3.3V
9	REF	REF Input

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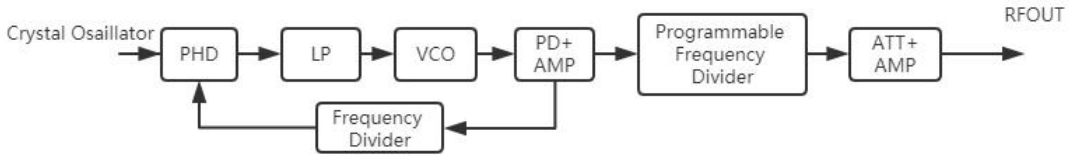
HTCC Miniaturized Frequency Synthesizer Series H

Product Feature:

1. Freq. Range: 0.1~15GHz
2. Compact SMT package: 15x12x3mm
3. Miniaturization, easy integration into various systems
4. Low Spurious, Low Power Consumption
5. External Reference
6. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference:100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)
RJH001	0.11	≥15	-135	-70	-10
RJH002	0.26	≥15	-125	-70	-10
RJH015	1.58	≥15	-110	-70	-10
RJH028	2.88	≥15	-106	-70	-10
RJH030	3	≥15	-105	-70	-10
RJH050	5	≥15	-102	-70	-10
……	……	……	……	……	……
RJH065	6.55	≥10	-99	-70	-10
RJH080	8	≥10	-97	-70	-10
RJH100	10	≥5	-95	-70	-10
RJH122	12.25	≥5	-93	-70	-10
RJH130	13	≥5	-93	-70	-10
RJH143	14.34	≥5	-92	-70	-10
RJH150	15	≥5	-92	-70	-10

- Power Supply：+3.3V/400mA；+5V/100mA；
- Note：Reference,output frequency between 0.1～ 15GH, output power can be customized.

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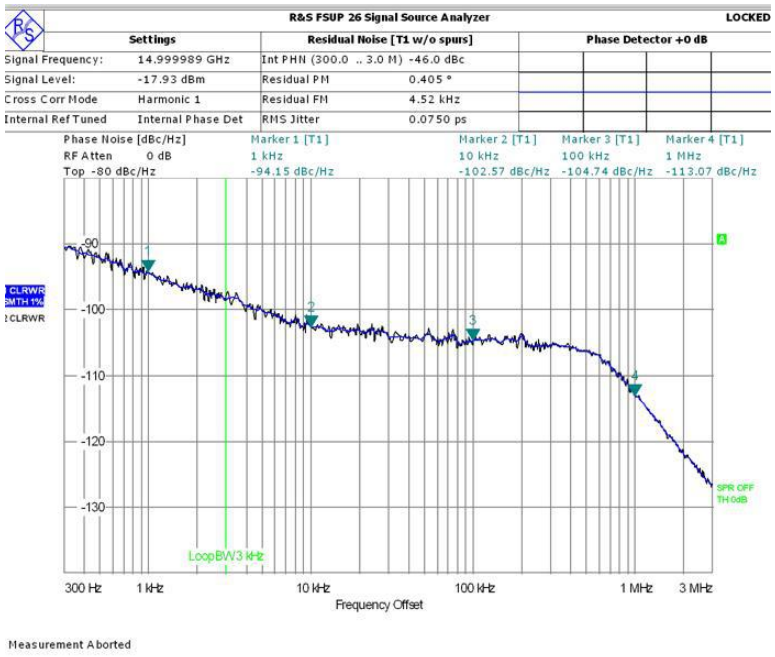
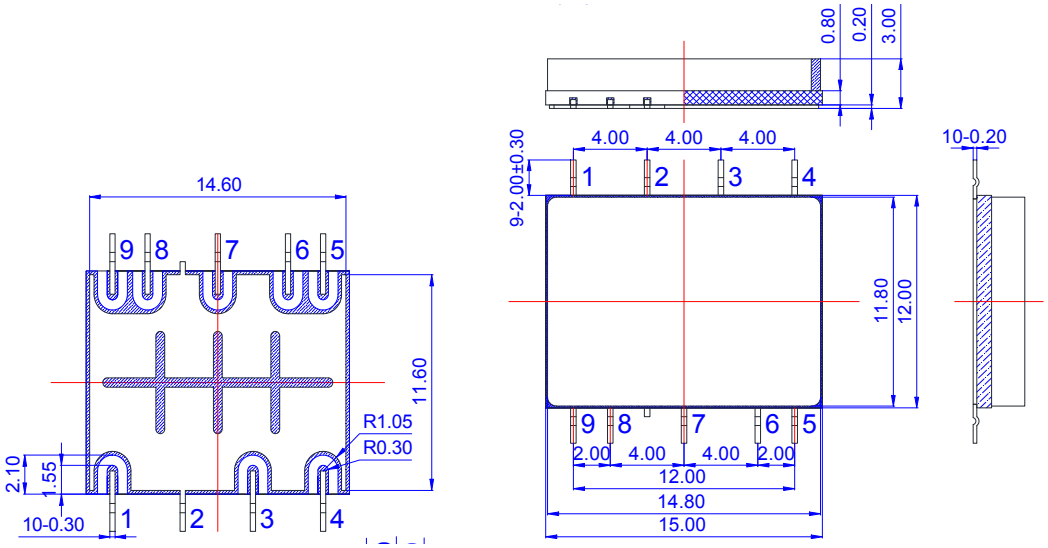
Typical Phase Noise



Outline Drawing(unit:mm)



1. Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;

2. Make sure antistatic protection when shipping and using.

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Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+5V
5	NC	The pin is not connected
6	NC	The pin is not connected
7	NC	The pin is not connected
8	VCC1	+3.3V
9	REF	REF Input

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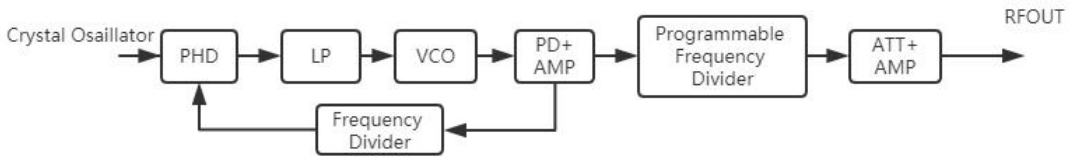
HTCC Miniaturized Frequency Synthesizer Series I

Product Feature：

1. Freq. Range: 0.1~6.2GHz
2. Compact SMT package: 15x12x3mm
3. Miniaturization, easy integration into various systems
4. Low Spurious, Low Power Consumption
5. External Reference
6. Operating Temperature: -40℃~ +85℃;

Functional Diagram



Electrical Specifications

At reference:100MHz (-155dBc/Hz@1KHz)

P/N	Freq. Range (GHz)	Freq. Step (Hz)	Output Power (dBm)	Phase Noise Typ. dBc/Hz@1K	Spurious Typ. (dBc)
RJI001	0.13	≥15	-123	-70	-10
RJI002	0.24	≥15	-118	-70	-10
RJI003	0.36	≥15	-115	-70	-10
RJI005	0.55	≥15	-110	-70	-10
RJI007	0.78	≥15	-108	-70	-10
RJI009	0.98	≥15	-106	-70	-10
RJI012	1.2	≥15	-104	-70	-10
……	……	……	……	……	……
RJI018	1.85	≥15	-102	-70	-10
RJI021	2.15	≥15	-100	-70	-10
RJI027	2.75	≥15	-98	-70	-10
RJI032	3.25	≥10	-96	-70	-10
RJI045	4.5	≥10	-95	-70	-10
RJI053	5.3	≥10	-93	-70	-10
RJI058	5.81	≥10	-92	-70	-10
RJI062	6.2	≥10	-91	-70	-10

- Power Supply： +3.3V/100mA；+5V/50mA
- Note：Reference,output frequency between 0.1～ 6.2GH, output power can be customized.

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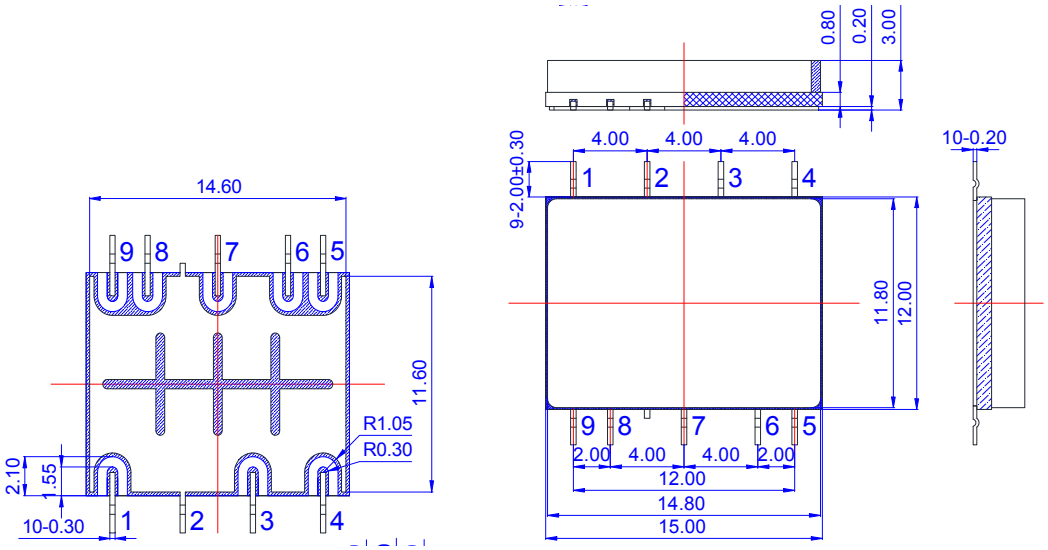
Outline Drawing(unit:mm)



5. Power supply need to be filtered to make sure that no interference from power ripple to the sensitive components;

6. Make sure antistatic protection when shipping and using.

Pin Descriptions

Pin Number	Function	Description
1	RFout	RF Output
2	GND	Ground
3	LD	Locked
4	VCC2	+8V
5	NC	The pin is not connected
6	NC	The pin is not connected
7	NC	The pin is not connected
8	VCC1	+3.3V
9	REF	REF Input

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