

PROGRAMMABLE OSCILLATOR
MODEL PCK3GF-1
USER'S MANUAL



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1. General Description

As a signal source, desired clock signals can be generated with 1KHz resolution in an extremely wide band of 50MHz to 3000MHz.

The frequency is set with asynchronous serial data. Also, the frequency can be set by SPI serial data.

Once frequency is successfully set, the frequency is automatically memorized into EEPROM. At the next power on, the last entered frequency is retrieved. Frequency stability and accuracy depends on external clock source.

2. Specification

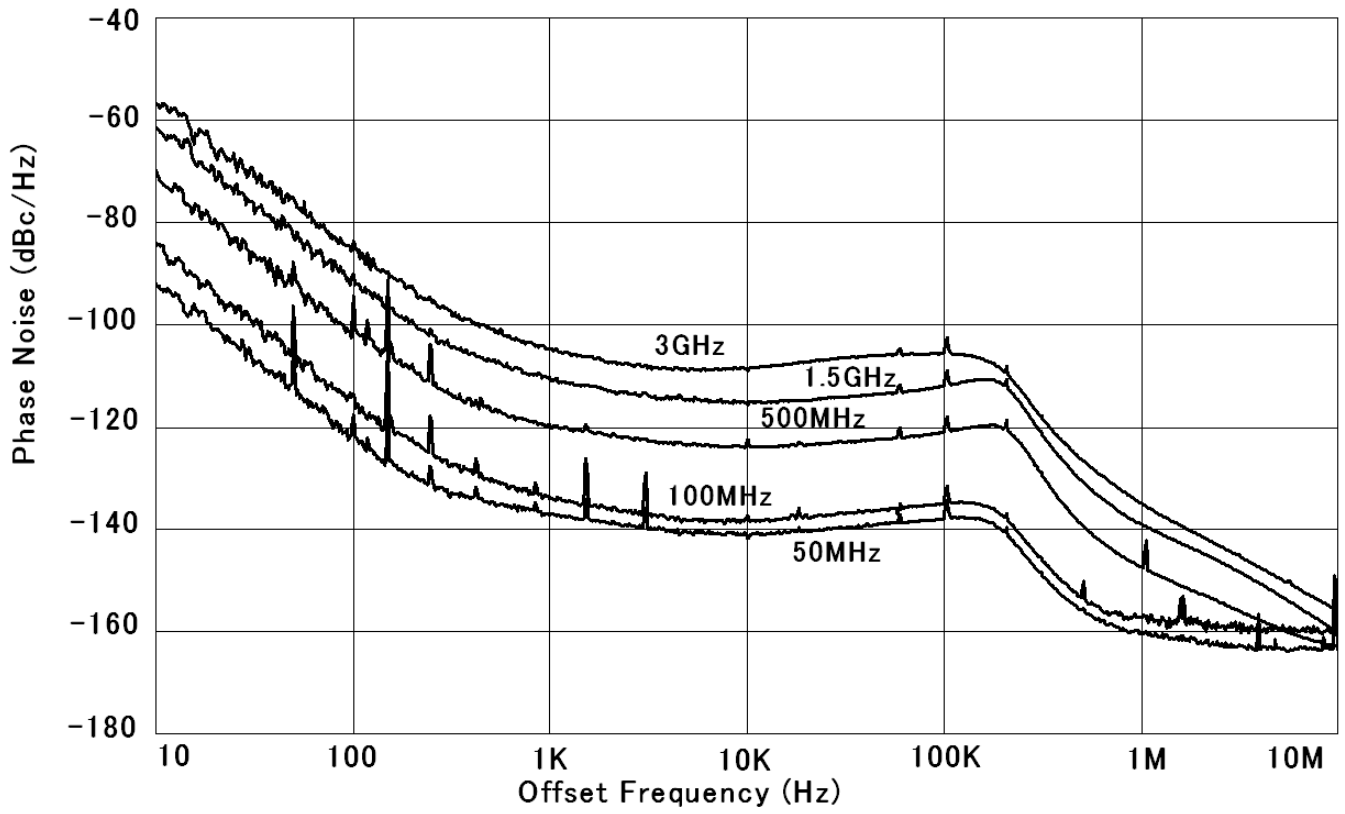
2-1. Electrical Specification

| | |
|----------------------------|---|
| 1) Frequency Range | 50~3000MHz |
| 2) Frequency Resolution | 1KHz |
| 3) Phase Noise | @3GHz 10 Hz offset : -55 dBc/Hz Typ. 100 Hz offset : -85 dBc/Hz Typ. 1 kHz offset : -104 dBc/Hz Typ. 10 kHz offset : -105 dBc/Hz Typ. 100 kHz offset : -105 dBc/Hz Typ. 1MHz offset : -132 dBc/Hz Typ. 10MHz offset -155 dBc/Hz Typ. |
| 4) Spurious | -65 dBc Max (except harmonics) |
| 5) Output Level | >+3dBm @50ohm |
| 6) Ext Ref Requirement | 50MHz or 100MHz Level : +6dBm~+10dBm @1k ohm |
| 7) Ext Ref Input Impedance | 1Kohm//5pf sine or square wave |
| 8) Unlock Output | Locked: High Level Unlocked: Low Level 3.3V CMOS Level |
| 9) Lock Time | 40m sec Max |
| 10) Controls | (1) Asynchronous Serial Communication 9600bps, 8bits, one stop bits, non-parity (2) SPI serial communication 3 bytes data (24bits) |
| 11) Power Supply | +5V+/-5% 500mA |
| 12) Dimensions | 20.3x25.4x7.6mm |

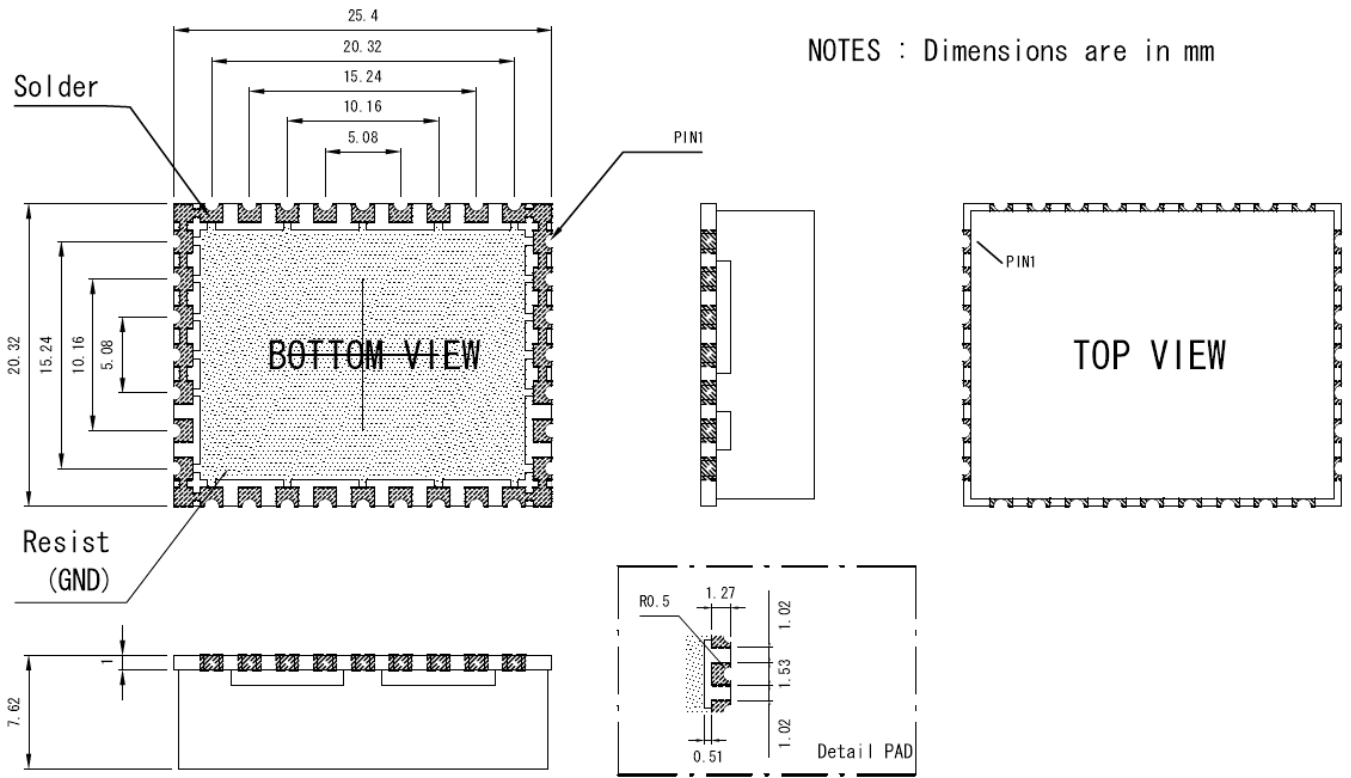
2-2. Environmental Condition

| | |
|--------------------------------|-------------------|
| 1) Operating Temperature Range | 0 to +60 Deg. C |
| 2) Storage Temperature Range | -30 to +70 Deg. C |

2-3. Phase noise performance

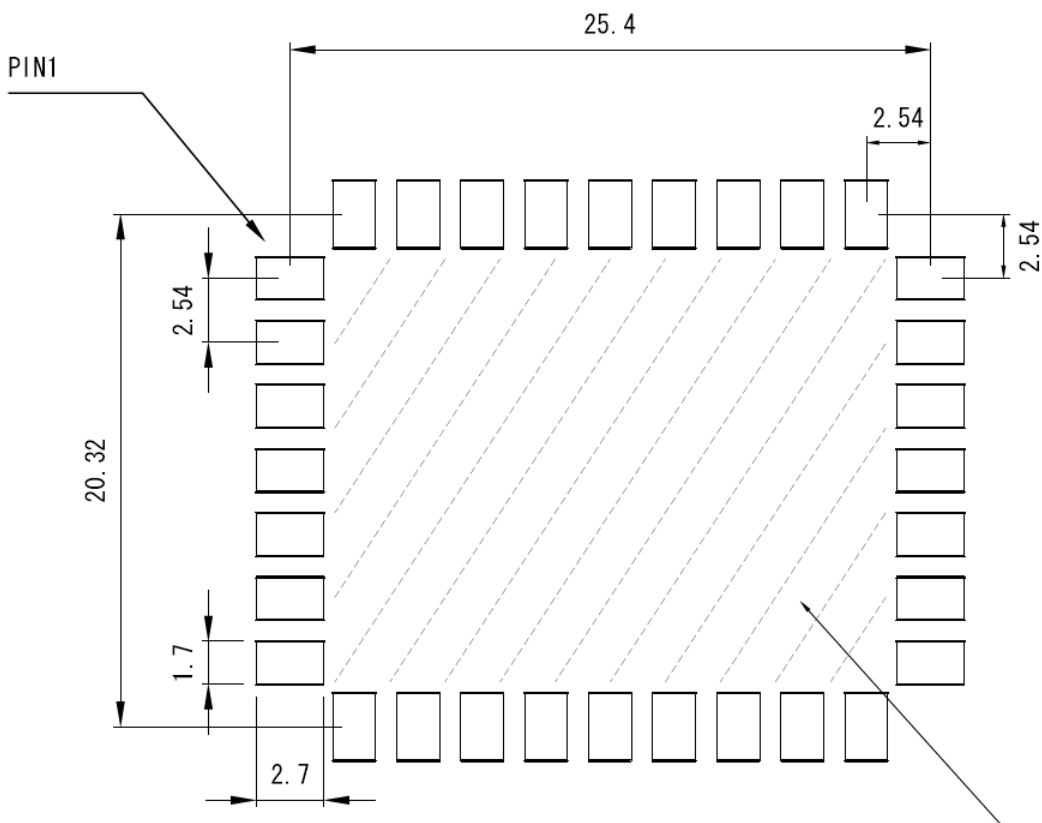


3. Outer Dimension



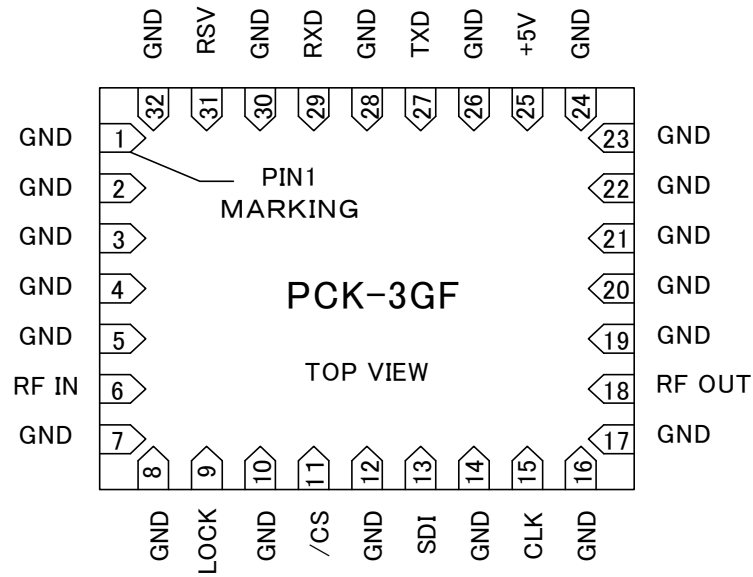
CAUTION : Bottom surface is resisted GND pattern.

4. Recommended Pad



Note: It is recommended to restrict any pattern except GND.

5. Pin Assignment



6. Pin names and description

| Pin No. | Name | Description |
|---------|--------|--|
| 6 | REF IN | 50MHz or 100MHz reference 1Kohm |
| 9 | LOCK | PLL Lock status output 3.3V CMOS High: locked low: unlocked |
| 11 | /CS | In SPI mode, chip select input low active. 3.3V CMOS Internally pulled up |
| 13 | SDI | In SPI mode, serial data input. 3.3V CMOS |
| 15 | CLK | In SPI mode, serial clock input. 3.3V CMOS |
| 18 | RF OUT | Output pin,50ohm |
| 25 | +5V | Power input +5V |
| 27 | TXD | Asynchronous_serial TX data 3.3V CMOS |
| 29 | RXD | Asynchronous_serial RX data 3.3V CMOS Internally pulled up |
| 31 | RSV | Reserved pin. This pin must be opened. |

Other pins are all GND

pin1-5,7,8,10,10,12,14,16,17,19-24,26,28,30,32.

7. Control by Asynchronous serial data

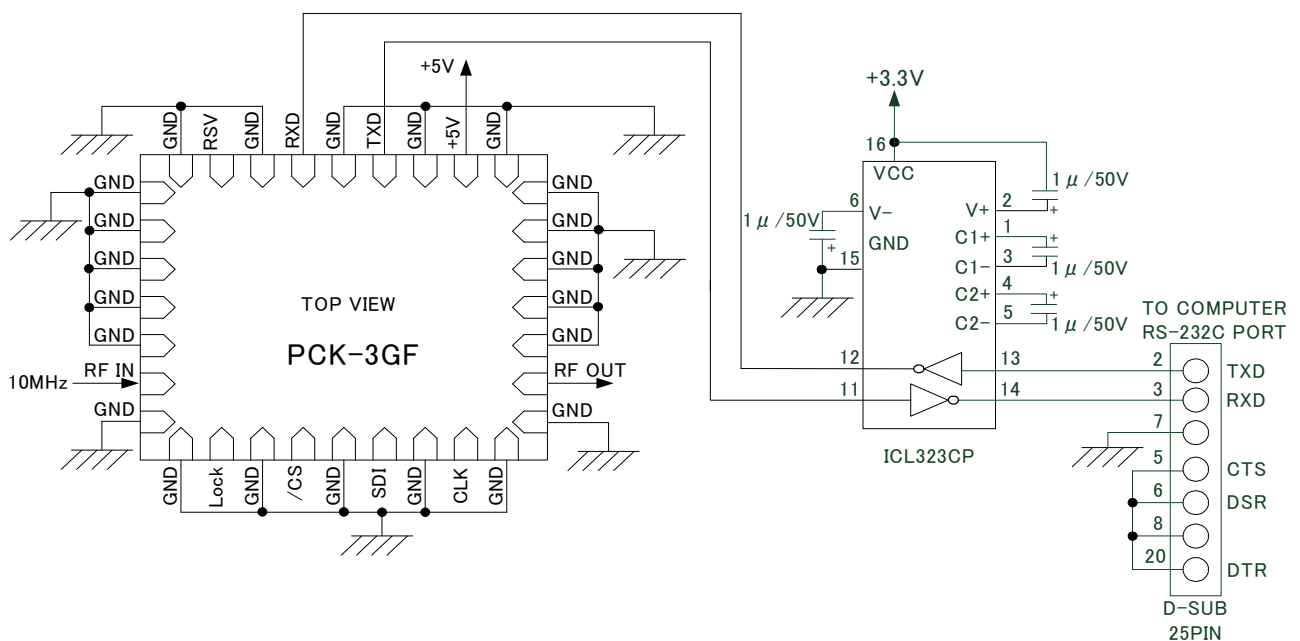
How to set from a PC serial port (RS-232C) is explained below.

7-1. Communication specification

| | |
|--------------|-----------|
| Speed | 9600bps |
| Data bits | 8 bits |
| Stop bits | 1 bit |
| Parity | None |
| Flow Control | None |
| Logic Level | 3.3V CMOS |

7-2. RS-232C connection

The logic level of PCK3GF-1 serial communication is 3.3V CMOS, which cannot be directly connected to RS-232C level such as PC serial port. Level conversion between RS-232C and 3.3V CMOS are made via the level convertor as shown in the following figure.



Note: The level convertor IC is ICL3232CP manufactured by INTERSIL.
The other ICL32xx series of level convertor ICs are also used.

7-3. Command definitions

Character strings enclosed in double quotation marks "" means ASCII code, and CR and LF, which are control codes, means 0D(hex) and 0A(hex).

If any invalid command is entered, "INVALID DATA"CR LF "" is returned.

All characters used for input should be uppercase. If a normal command is entered, "" is returned. Also the entered data is echoed back.

7-3-1. Frequency setting command

For frequency setting, input can be made in MHz, KHz unit.

(1) Setting in MHz

For setting 2450MHz, input the following data.

“2456M”CR

In this case, all the data below 100KHz is set to “0”.

(2) Setting in KHz

For setting 2450002KHz, input the following data.

“2456002K”CR

Also the following expression is allowed.

“2456002”CR

7-3-2. READ command

By entering “READ”CR, the currently set frequency is output.

“READ”CR is entered, the response is as shown below.

“ffffffKHz”CR LF

“ffffff” is the frequency of currently outputting in KHz unit.

7-3-3. Caution for setting data consecutively

In case of switching frequency at high speed, data may drop out because the PCK3GF-1 does not perform flow control. Upon completion of processing by sending a frequency setting command in 6-3-1, the prompt “*” is returned; therefore, confirm the receiving of this prompt, and then send the next frequency setting command.

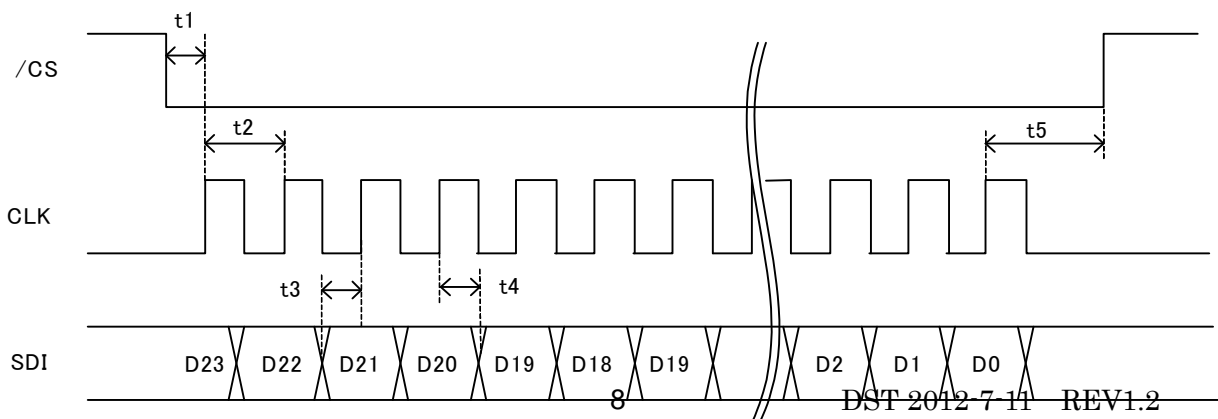
8. Control by SPI serial data

How to set using SPI interface is explained below.

8-1. SPI specification

| | |
|------------------|--|
| Max. clock speed | 500KHz |
| Data bits width | 24bits (22bits frequency data bits, 2bits reserved) |
| Logic Level | 3.3V CMOS |

8-2. Timing chart



| Parameter | Timing characteristic | | Min. | Unit |
|-----------|----------------------------------|--|------|------|
| | Condition | | | |
| t1 | CLK setup time to /CS | | 50 | ns |
| t2 | CLK period | | 2 | us |
| t3 | SDI setup time to CLK rise edge | | 100 | ns |
| t4 | SDI hold time to CLK rise edge | | 100 | ns |
| t5 | /CS set up time to CLK rise edge | | 50 | ns |

8-3. Command definitions

24bits frequency data is transferred by SPI.

Actual frequency data bits are 21bits among 24 bits, the remaining 3bits are not used.

Bit definition is as follows.

| Bits | Name | Width | Description |
|-------------|-----------|---------|--|
| bit [23:22] | Reserved | 2 bits | Not used, do not care |
| bit [21:0] | Frequency | 22 bits | Frequency data in 1KHz resolution in binary. |

For example, if you set 2456000KHz, frequency data of KHz unit must be converted to binary data.

2456000KHz is converted to 2579C0 hex in 22 bits binary data.

9. Shipping inspection

100%inspection shall be performed for the electrical specification in 2-1.

10. Soldering Conditions

Peak Temperature: 240degC

Soldering time: Less than 10 second at the peak temperature.

11. Warranty

If any defect is found due to the manufacture's improper production or design within one year after delivery, repair or replacement shall be performed at the manufacturer's responsibility. DS Technology, Inc assumes no liability for damages that may occur as a result of handling by users even though the warranty period.

12. Others

12-1. This product, which employs a CMOS device, may be easily damaged by static electricity. DS Technology, Inc assumes no liability for damages that may occur as the result of handling by users even though the above warranty period.

12-2. Do not supply over voltage power supply, module may be damaged. DS Technology, Inc assumes no liability for damages that may occur as the result of handling by users even though the above warranty period.

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