GLONASS/GPS Module
GNS1316
Data Sheet

GLONASS/GPS Module

Revision History

Title	GLONASS/GPS Module			
Model No	GNS1316			
Document No	GNS1316_20111114			
Revision	Date	Description	CHECK	APPR
Ver 1.0	2011.11.14	Original Draft	Camila	James

1. Product Information

■ Product Name: <u>GNS1316</u>

■ Product Description:

GNS1316 is a high-sensitivity and ultra-compact GPS/GLONASS engine board. It is uses STA8088FG IC from ST which can perform excellent signal reception capability and fast TTFF in weak signal environments. It is suitable for portable electronic devices such as automotive navigation devices, handheld navigation devices, mobile devices, and other navigation applications. GNS1316 supports St Microelectronics ST-AGPSTM Self Trained Assisted-GPS technology, able to provide both fully-autonomous Ephemeris prediction and server-based, predictive assistance using GPStreamTM Server technology provided by Rx Networks. The autonomous predictions are providing accurate fix for 5 days on observed satellites with no server needs. Using server-based GPStreamTM technology from Rx Networks, the access of a very compact information (2KB payload) ensures full-constellation predicted ephemeris valid for 7 days.

■ Product Features:

✓ STMicroelectronics STA8088FG chipset

✓ GPS L1 C/A Code, GLONASS L1 PR ranging code with All-in-view Processing.

✓ 32 tracking channels

✓ High sensitivity enabling deep indoor application, Autonomous tracking:-160dBm

✓ Fast TTFF at low signal environments

✓ UART/USB

✓ SMT type with stamp holes

✓ Small form factor (13.1 x 15.9 x 2.8 mm)

✓ NMEA 0183 v3.01

✓ AGPS support

✓ ROHS compliant

■ Product Specifications

Table 1 General Specifications

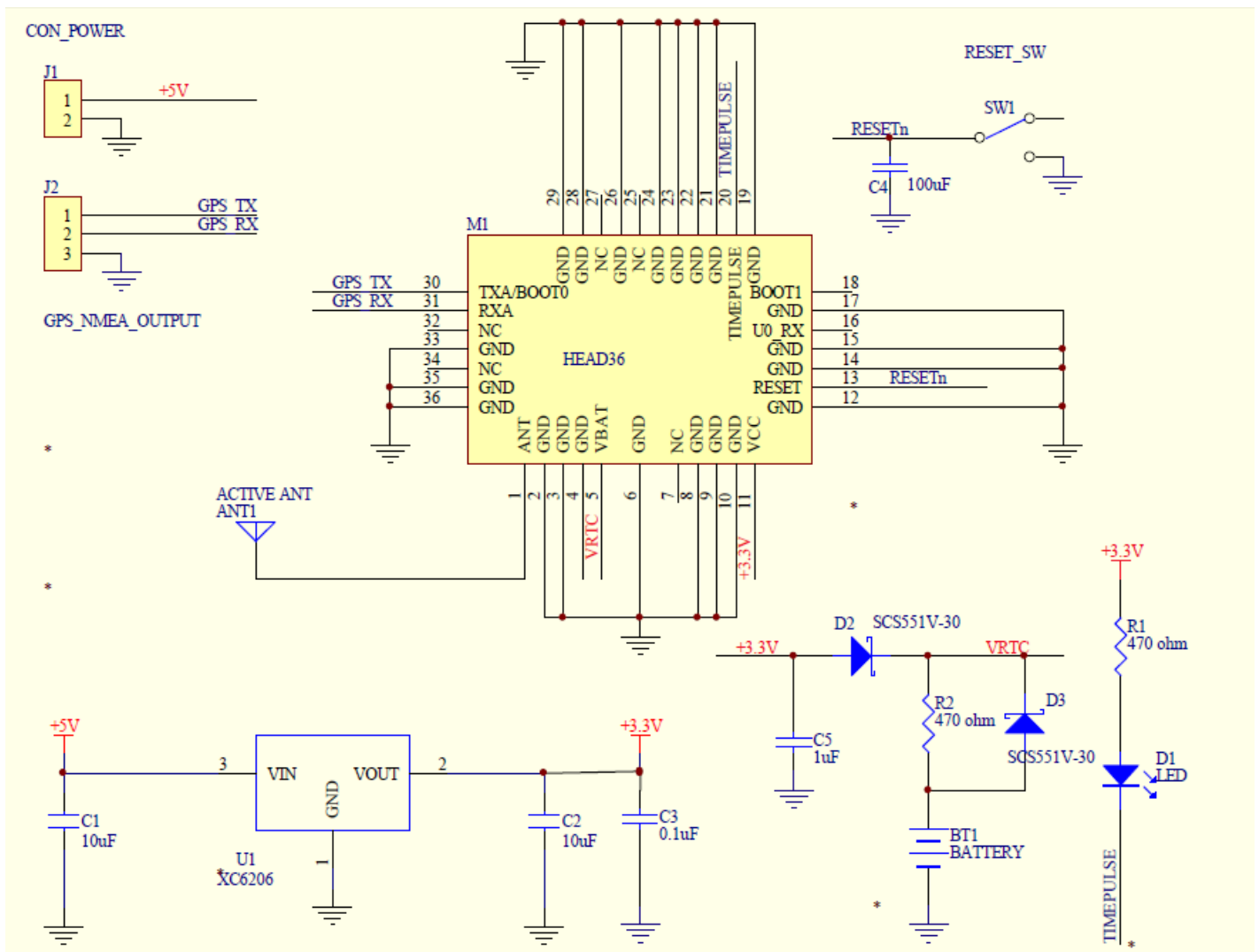| GPS / GLONASS Receiver	
Chip	STMicroelectronics STA8088FG
Microprocessor core	ARM946
Frequency	GPS L1 1575.42 MHz, GLONASS L1 1602MHZ
Tracking Channels	32 channels
Sensitivity	Tracking -160 dBm
	Navigation -157 dBm
Update rate	1 Hz (configurable w/ future FW 5 Hz max)
Mean time to the first position measurement, at signal level -130 dBm	35 sec cold start
	34 sec warm start
	1 sec hot start
Accuracy: GPS, or Hybrid GPS & GLONASS	1.5 m (*CEP 50%, 24hr static at -130dBm*)
Acceleration range	5 g max
Maximum Velocity range	515 m/s
Maximum Altitude range	18000 m
AGPS support	ST Self-Trained Assisted GPS (ST-AGPSTM) 5 days, GPStreamTM 7 days
Differential GPS support	RTCM104, SBAS (WAAS, Egnos)
Power consumption	23.5 mW
Serial port protocol	NMEA-0183 rev. 3.01
Serial data format (UART)	8 bits, no parity, 1 stop bit
Serial data speed (UART)	115200 baud rate
Interface	
I/O Pins	36-pin stamp holes
Physical Characteristic	
Dimensions	13.1 x 15.9 x 2.8 mm
DC Characteristics	
Power Supply	3.0 ~ 3.6V DC
Backup Voltage	1.62 ~ 3.6V DC
Power Consumption	2.35 mW
Environmental Range	
Humidity Range	5% to 95% non-condensing
Operation Temperature	-40℃ to 85℃
Storage Temperature	-40℃ to 125℃

2. Technical Information

■ Block Diagram
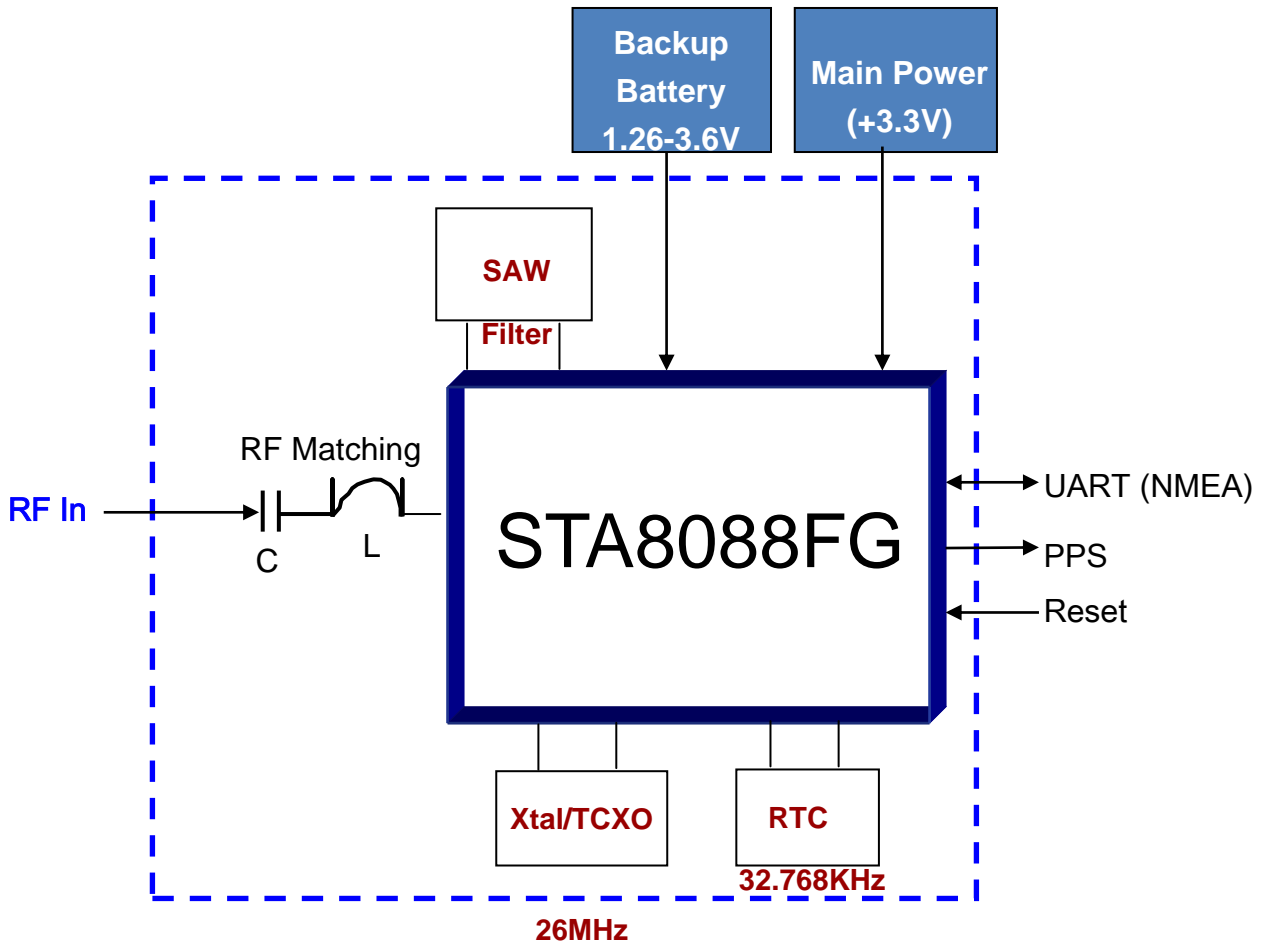
■ Module Pin Assignment:
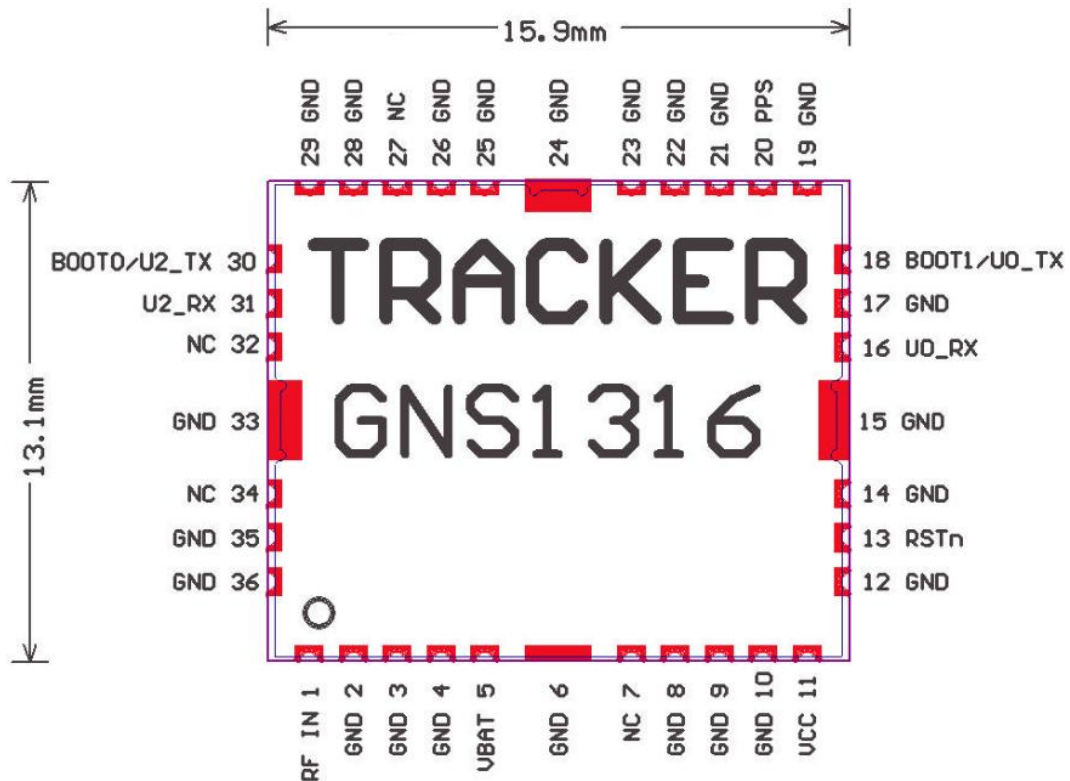
PIN	Signal Name	I/O	Description	Characteristics
1	RF IN	RF	GPS / GLONASS Antenna Input	50Ω@1.57542 &1602MHZ
2	GND	G	Ground	
3	GND	G	Ground	
4	GND	G	Ground	
5	VBAT	PWR	Backup battery supply	3V ± 0.3
6	GND	G	Ground	
7	NC	N	Not connected	
8	GND	G	Ground	
9	GND	G	Ground	
10	GND	G	Ground	
11	VCC	PWR	Main power supply to the engine board	DC 3.3V ± 5%
12	GND	G	Ground	
13	RSTn	I	Reset	Active Low
14	GND	G	Ground	
15	GND	G	Ground	

16	U0_RX	I	UART0 RX	
17	GND	G	Ground	
18	BOOT1/UO_TX	O	Boot Mode	Active High
19	GND	G	Ground	
20	PPS	O	One pulse per second	
21	GND	G	Ground	
22	GND	G	Ground	
23	GND	G	Ground	
24	GND	G	Ground	
25	GND	G	Ground	
26	GND	G	Ground	
27	NC	N	Not connected	
28	GND	G	Ground	
29	GND	G	Ground	
30	BOOT0/U2_TX	O	This is the main transmits channel for outputting navigation and measurement data to user's navigation software or user written software. Output TTL level,	
31	U2_RX	I	This is the main receive channel for receiving software commands to the engine board from demo software or from user written software	
32	NC	N	Not connected	
33	GND	G	Ground	
34	NC	N	Not connected	
35	GND	G	Ground	
36	GND	G	Ground	

■ Application Circuit

■ Application note

(1) Ground pins

Bigger ground planes and more ground vias around the module ground pins is important to minimize the interference.

(2) RF input

The GPS / GLONASS module input is optimized to connect to a 50 ohm antenna. The minimized noise figure is achieved by -10dB input return loss. Well controlled antenna impedance (as close to 50ohm as possible) remains the stable system sensitivity. Do not try to match the GPS module to 50ohm for lower return loss which might induce the noise figure increased.

The impedance of RF traces between GPS module, π matching network, and antenna has to be controlled in 50ohm +/-10%. More and tight ground vias surround the RF traces is benefit to isolate interference out.

(3) Power supply

3.0V ~ 3.6V is acceptable operation range of main power supply.

(4) RTC power backup

This is the battery backup input that powers the SRAM and RTC when main power is removed. Without an

external backup battery, the TMP will execute a cold start after every power on. To achieve the faster start-up

offered by a hot or warm start, either a battery backup must be connected or a super cap installed.

1.62 ~ 3.6V is acceptable operation range of main power supply. The DC power ripple is required for less than 50mVpp.

■ Dimensions
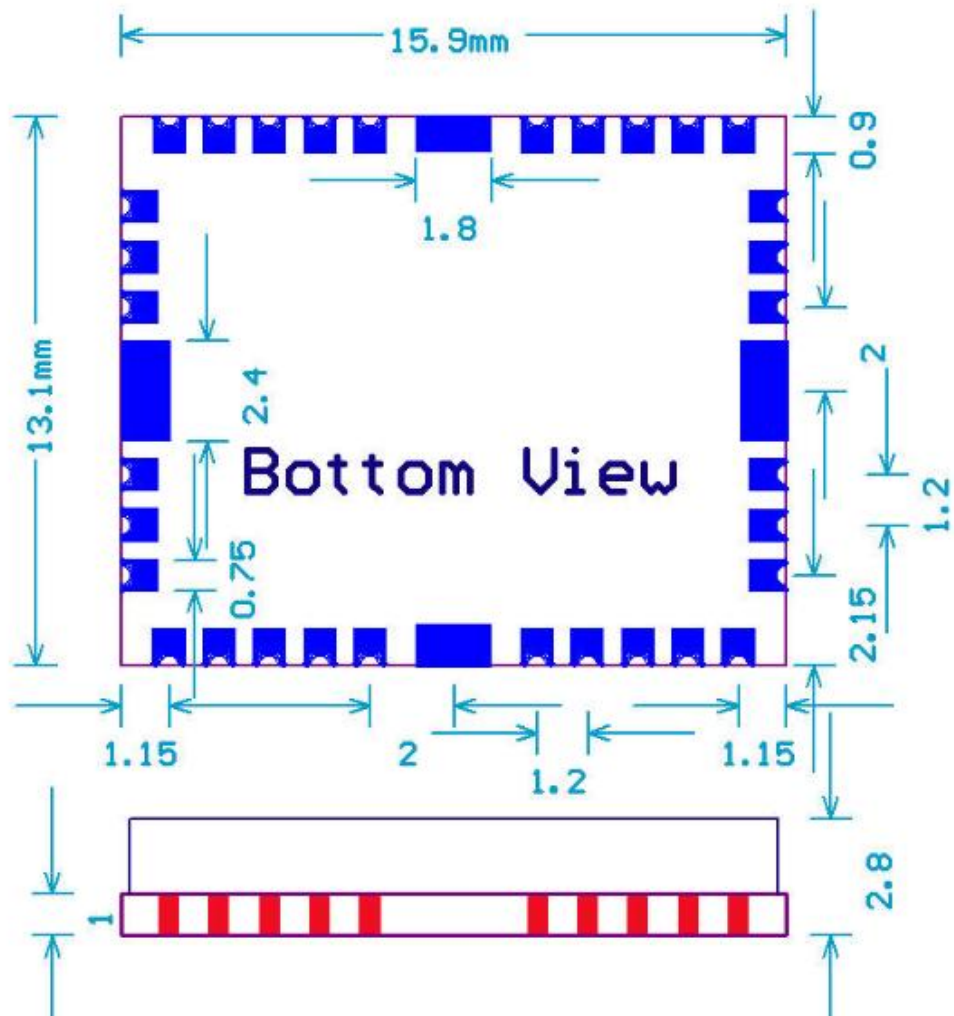
■ Recommend Layout PAD
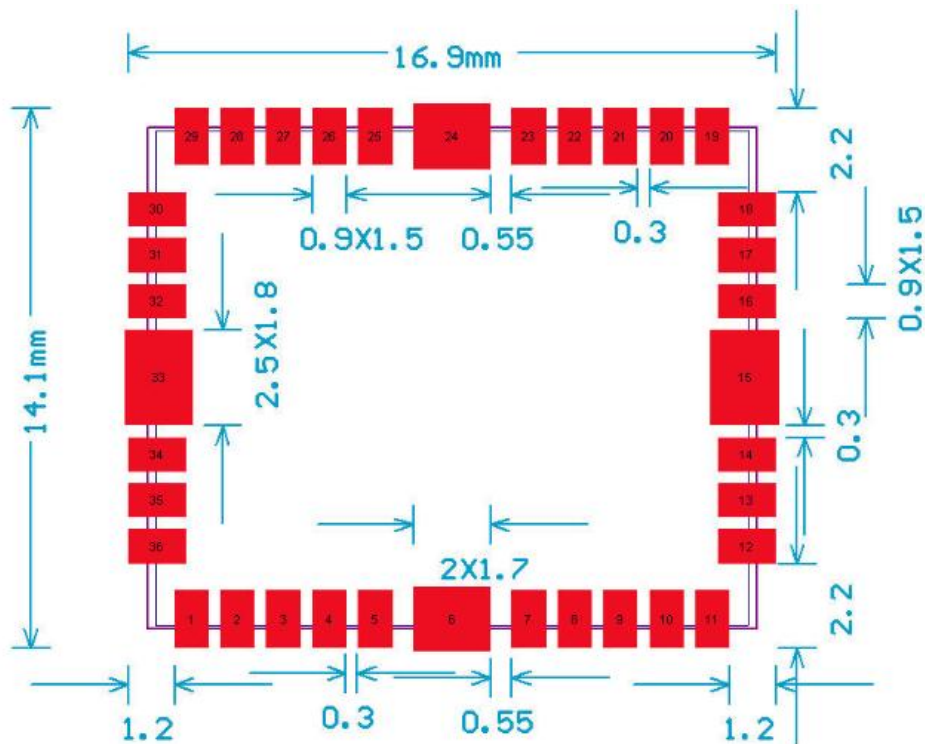
Layout PAD

PCB Layout Recommendations

Do not routing the other signal or power trace under the engine board.

RF:

This pin receives signal of GPS analog via external active antenna .It has to be a controlled impedance trace at 50ohm.

Do not place the RF traces close to the other signal path and not routing it on the top layer.
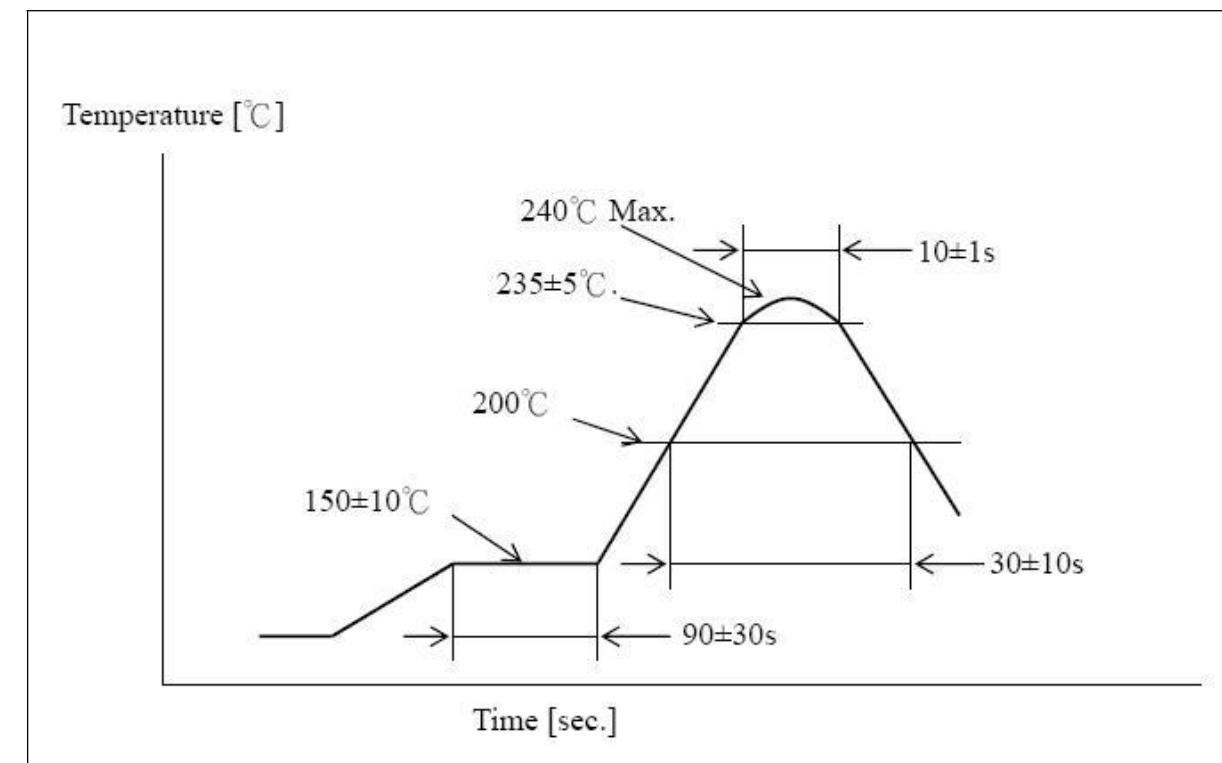
Keep the RF traces as short as possible.

Antenna:

Keep the active antenna on the top of your system and confirm the antenna radiation pattern、
axial ratio、power gain、noise figure、VSWR are correct when you Setup the antenna in your case.

3. Recommended Reflow Profile:

Pre heating	150±10[℃]	Pre heating time:	90±30[s
Heating temperature:	235±5[℃]	Heating time:	10±1[se

Peak temperature must not exceed 240℃ and the duration of over 200℃ should be 30±10 seconds.