

# GLOBALSAT GPS Engine Board

Hardware Data Sheet

Product No : MT-5608C

Version 1.1



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Issue Date	APPR	CHECK	PREPARE
2014/2/20	Ray		Mason

# Product Description

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## Product Description

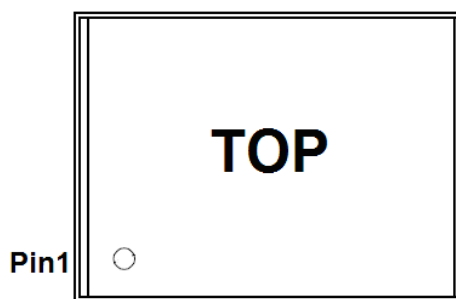
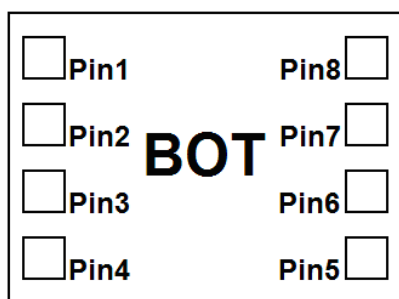
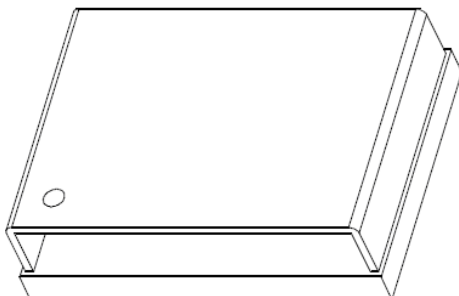
MT-5608C is a compact, high performance, and low power consumption GPS engine board. The chipset is powered by MediaTek, it can provide you with superior sensitivity and performance even in urban canyon and dense foliage environment. The miniature size makes the module easy and the best choice to integrate into portable applications such as DSC, cellular phone, PMP, and gaming devices. MT-5608C is suitable for the following applications:

- Automotive navigation
- Personal positioning
- Fleet management
- Mobile phone navigation
- Marine navigation
- Camera Positioning
- Health and fitness device
- Tablet computer

## Product Features

- MediaTek high sensitivity solution
- Support 22tracking / 66 acquisition-channel GPS receiver.
- Very high sensitivity (Tracking Sensitivity: -165dBm )
- Extremely fast TTFF (Time To First Fix) at low signal level
- Support UART interface, baud rate 4800/9600/38400/115200 depends on internal setting.
- Built-in LNA
- Compact size (8.8mm x 6.5mm x 2.4mm) suitable for space-sensitive application
- One size component, easy to mount on another PCB board
- Support NMEA 0183 V4.0 (GGA, GSA, GSV, RMC)
- Supports GPS, SBAS ranging(WASS/EGNOS/MSAS/GAGAN),QZSS.

## Product Pin Description



PIN Number(s)	Name	Type	Description	Note
1	TIMEMARK	O	This pin provides one pulse-per-second output from the board, which is synchronized to GPS time. If do not use it, Just NC.	
2	RESERVED		MT-5608C reserved pin, just NC.	
3	GND	P	Ground	
4	RF_IN	I	This pin receives signal of GPS analog via external antenna. It has to be a controlled impedance trace at 50ohm. Do not have RF traces closed the other signal path and routing it on the top layer. Keep the RF traces as short as possible.	
5	TXD	O	This is the main transmits channel for outputting navigation and measurement data to user's navigation software or user written software. Baud rate depends on hardware setting, Output TTL level 2.8V.	

6	RXD	I	This is the main receive channel for receiving software commands to the engine board from MTK software or from user written software. Baud rate depends on hardware setting.	
7	VBAT	P	This is the power input for the SRAM and RTC. To achieve the faster start-up offered by a hot or warm start, a backup power must be connected. The power voltage should be between 2.5V and 4.3V.	
8	VCC	P	This is the main power supply to the engine board. (3.1Vdc to 4.3Vdc)	

## Electrical Specification

### Absolute Maximums Ratings

Parameter	Min.	Typ.	Max.	Conditions	Unit
<b>Power</b>					
Power supply voltage(VCC)	3.1	3.3	4.3		V
Backup battery supply	2.5		4.3		V
Main power supply Current		25		3.3V, No Fixed	mA
		24		3.3V, Fixed	mA
Backup battery supply Current	5.5	6	6.5	3.3V	uA
<b>RF Input</b>					
Input Impedance		50			$\Omega$
Operating Frequency		1.575			GHz

### DC Electrical characteristics

Parameter	Symbol	Min.	Typ.	Max.	Conditions	Units
I/O Low Level Output Voltage	$V_{OL}$			0.42		V
I/O High Level Output Voltage	$V_{OH}$	2.38				V
I/O Low Level Input Voltage	$V_{IL}$	-0.3		0.7		V
I/O High Level Input Voltage	$V_{IH}$	2.1		3.6		V
TXD Output Voltage	$V_{TO}$	2.52	2.8	3.08		V
RXD Input Voltage	$V_{RI}$			3.6		V
High Level Output Current	$I_{OH}$		2			mA
Low Level Output Current	$I_{OL}$		2			mA

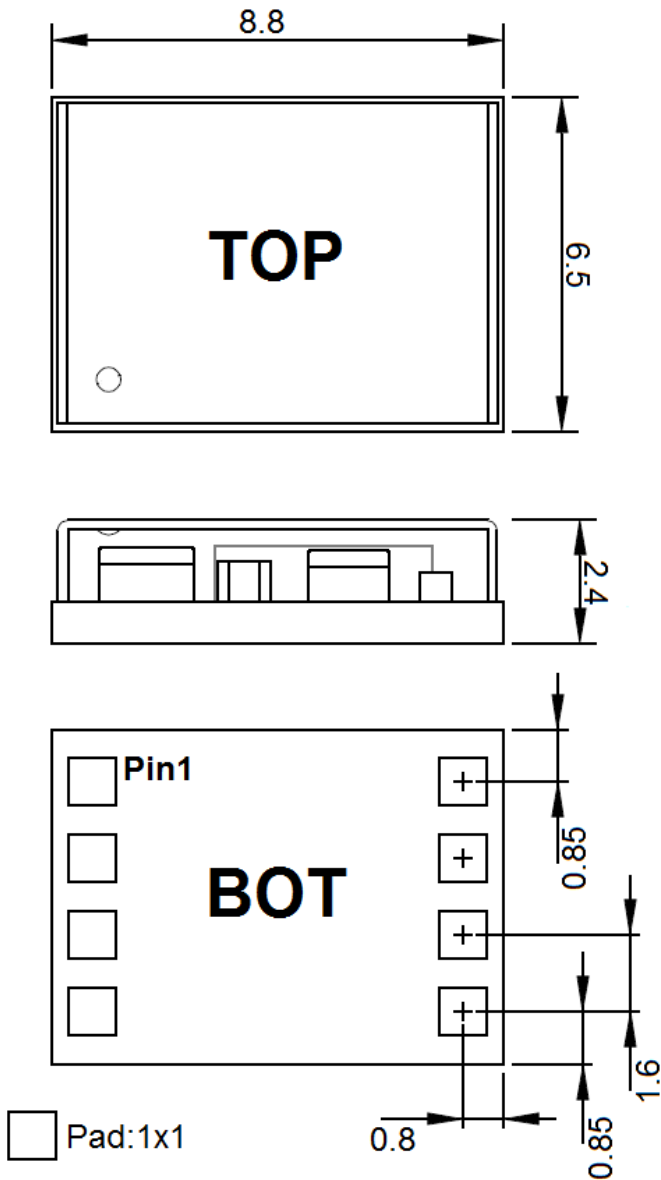
### Environmental Characteristics

Parameter	Min	Typ	Max	Unit
Humidity Range	5		95	% non-condensing
Operation Temperature	-40	25	85	$^{\circ}\text{C}$
Storage Temperature	-40		85	$^{\circ}\text{C}$

## Receiver Performance

Sensitivity <sup>1</sup>	Chipset Tracking : Chipset Autonomous acquisition :	-165dBm -148 dBm
Time-To-First-Fix <sup>2</sup>	Cold Start – Autonomous	< 35s
	Warm Start – Autonomous	< 35s
	Hot Start – Autonomous	< 1s
Horizontal Position Accuracy <sup>3</sup>	Autonomous	< 3m (2D RMS)
	SBAS	< 2.0m
Velocity Accuracy <sup>4</sup>	Speed	< 0.01 m/s
	Heading	< 0.01 degrees
Reacquisition	0.1 second, average	
NMEA Update Rate	Output data format based on firmware setting	
Maximum Altitude	< 18,000 meter	
Maximum Velocity	< 515 meter/ second	
Maximum Acceleration	< 4G	

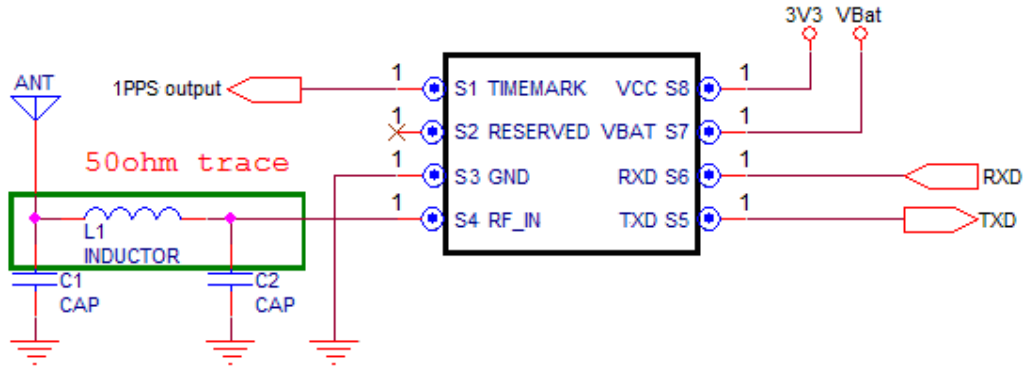
### Package Dimensions



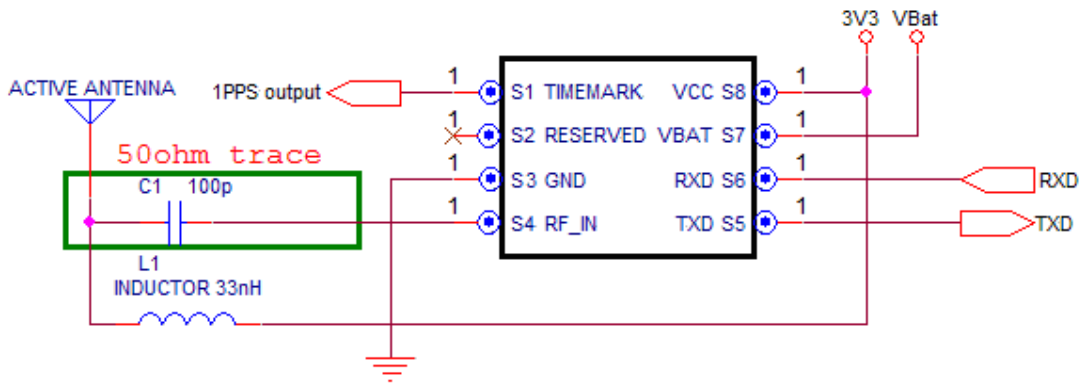
<b>Type</b>	8-pin stamp holes
<b>Dimensions</b>	8.8 mm * 6.5 mm * 2.4 mm ±0.2mm

# Application

## Application circuit with passive antenna



## Application circuit with active antenna

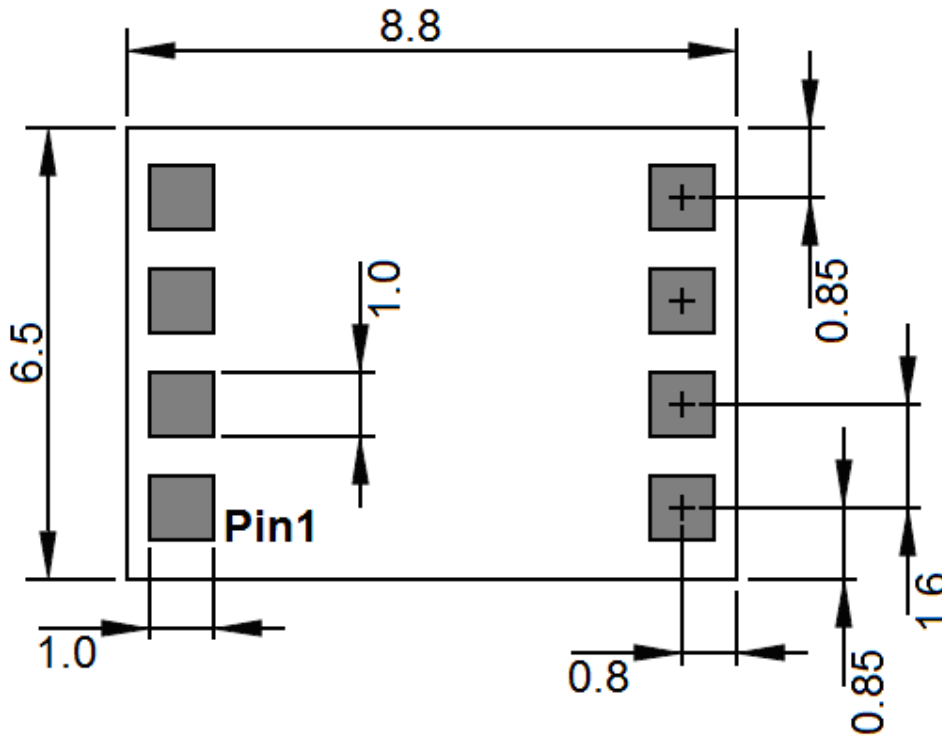


### GPS/BDS Active Antenna Specifications (Recommendation)

Frequency:	1575.42 + 2MHz	Amplifier Gain:	18~22dB Typical
Axial Ratio:	3 dB Typical	Output VSWR:	2.0 Max.
Output Impedance:	50Ω	Noise Figure:	2.0 dB Max
Polarization:	RHCP	Antenna Input Voltage:	3.0V (Typ.)



## Recommended Layout PAD



Unit: mm  
Tolerance: 0.1mm

## PCB Layout Recommend

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.

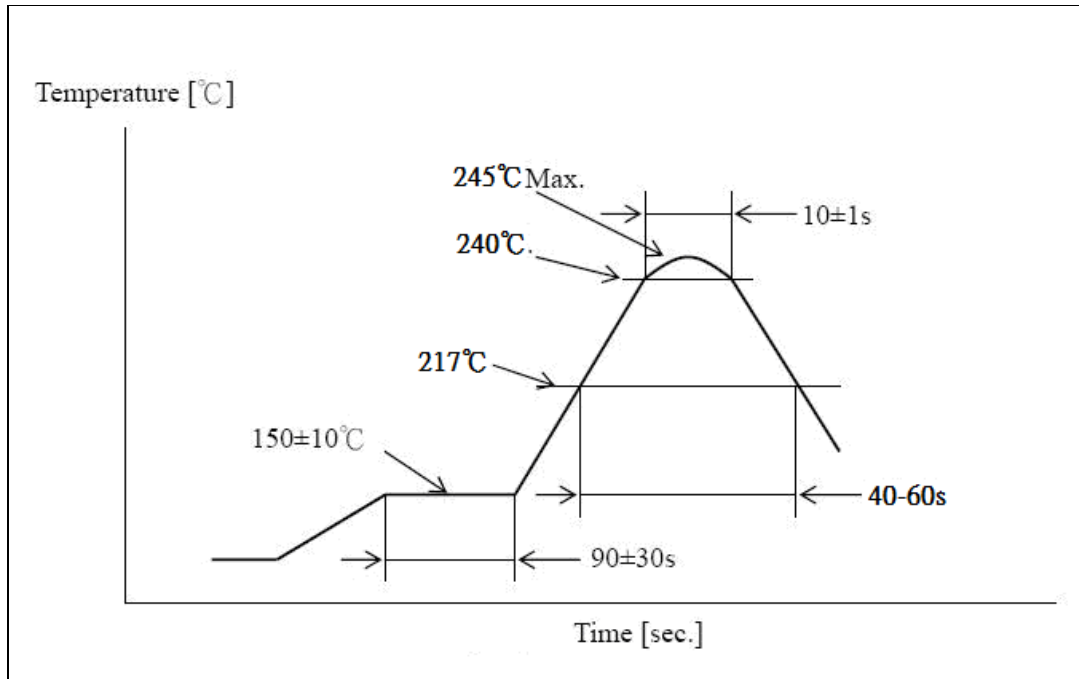
Do not place the RF traces close to the other signal path and not routing it on the top layer.

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.

### Recommended Reflow Profile:



Pre heating temperature: 150±10[°C]      Pre heating time: 90±30[sec.]

Heating temperature: 240±5[°C]      Heating time: 10±1[sec.]

Peak temperature must not exceed 245°C and the duration of over 217°C should be 40 - 60 Seconds.

# Appendix

## Label Artwork (TBD)

A: GLOBALSAT

B: Module Info

XX

SX = SiRF

MX = MTK

XG =GPS+GLONASS

XB =GPS+BDS

XC & XS=GPS

XXXX : IC Type & Date code

C: Bar code

D: Serial Number

E: First pin Mark



## Reversion history

Reversion	Date	Name	Status / Comments
V1.0	2014/1/15	Mason	Initial Version
V1.1	2014/2/20	Mason	Modify Product Pin Description