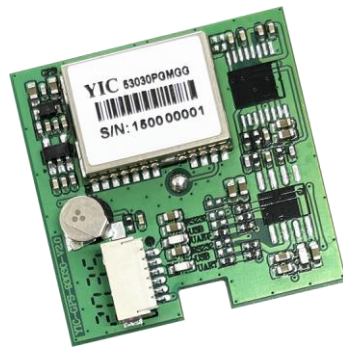


YIC



GPS & GLONASS Antenna Module YIC53030PGMGG-33

Datasheet

www.yic.com.tw

Revision History

Date	Reversion	Description
2021/6/21	1.0	First Draft, Based on YIC53030PGMGG

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1. Product Information

1.1 Product Description

YIC53030PGMGG-33 is a compact, high performance, and low power consumption GNSS Antenna Module.

It uses the chipset which can track up to 99 channels at a time and perform fast TTFF in weak signal environments.

Applications

- Automotive Navigation
- Personal Positioning
- Fleet Management
- Marine Navigation

1.2 Product Features

- Build on high performance, low-power MediaTek chip set
- Low power consumption: Max 45mA@3.3V
- Ultra High Track Sensitivity: -165dBm
- Built in high gain LNA
- Green LED Indicating Light for GPS Status
- Extremely Fast TTFF at Low Signal Level
- Communication type: UART/TTL
- NMEA-0183 Compliant Protocol or Custom Protocol
- RoHS Compliant

1.3 Product Specifications

GPS Receiver		
Chip	MediaTek	
Frequency	Support 99 channels (33 Tracking, 99 Acquisition) GPS&, QZSS, GALILEO: L1 1575.42MHz C/A GLONASS: L1OF 1602MHz BeiDou: B1 1561.098MHz SBAS: WAAS, EGNOS, MSAS, GAGAN	
Update Rate	1Hz (default) , up to 10Hz	
Position Accuracy	Position	<2.5m CEP @-130dBm
	Accuracy of 1PPS Signal	Typical accuracy: ±30ns
	Acceleration Accuracy	Without aid: 0.1m/s ²
Startup Time	Cold start	35s typ @-130dBm
	Warm start	30s typ @-130dBm
	Hot start	1s typ @-130dBm
Sensitivity	Acquisition	-148dBm
	Re-acquisition	-156dBm
	Tracking	-165dBm
GNSS Operating limit	Altitude	18,000m
	Velocity	515m/s
	Acceleration	4G
Protocol Support	UART Port: TXD and RXD 9600bps (default), Supports baud rate 4800bps to 460800bps NMEA 0183 Protocol	
Environment	Operation temperature	-40°C ~ +85°C
	Storage temperature	-45°C ~ +125°C
Physical	Size	30±0.20(L) ×30±0.20(W) ×8.4±0.20(H)mm
Characteristics	Weight	Approx. 12.6g

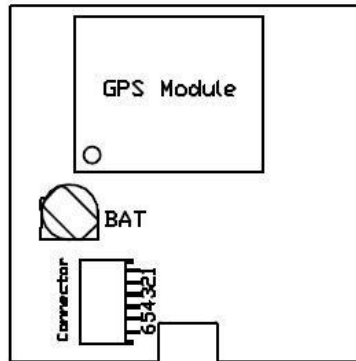
1.4 DC Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Input Voltage	VCC		3.0	3.3	5.5	V
Input Backup Battery Voltage	V_BCKP		2.0		4.3	V
Supply Current	Iss	VCC = 3.3V			150	mA
		Peak		32		mA
		Acquisition		25		mA
		Tracking		600		uA
Standby						
Backup Battery Current	Ibat	VCC = 0V		7		uA
High Level Input Voltage	VIH		2.0			V
Low Level Input Voltage	VIL				0.8	V
High Level Output Voltage	VOH		2.4			V
Low Level Output Voltage	VOL				0.4	V
High Level Output Current	IOH			2		mA
Low Level Output Current	IOL			2		mA

Note 1: Measured when position fix (1Hz) is available, input voltage is 3.3V and the function of self-generated ephemeris prediction is inactive.

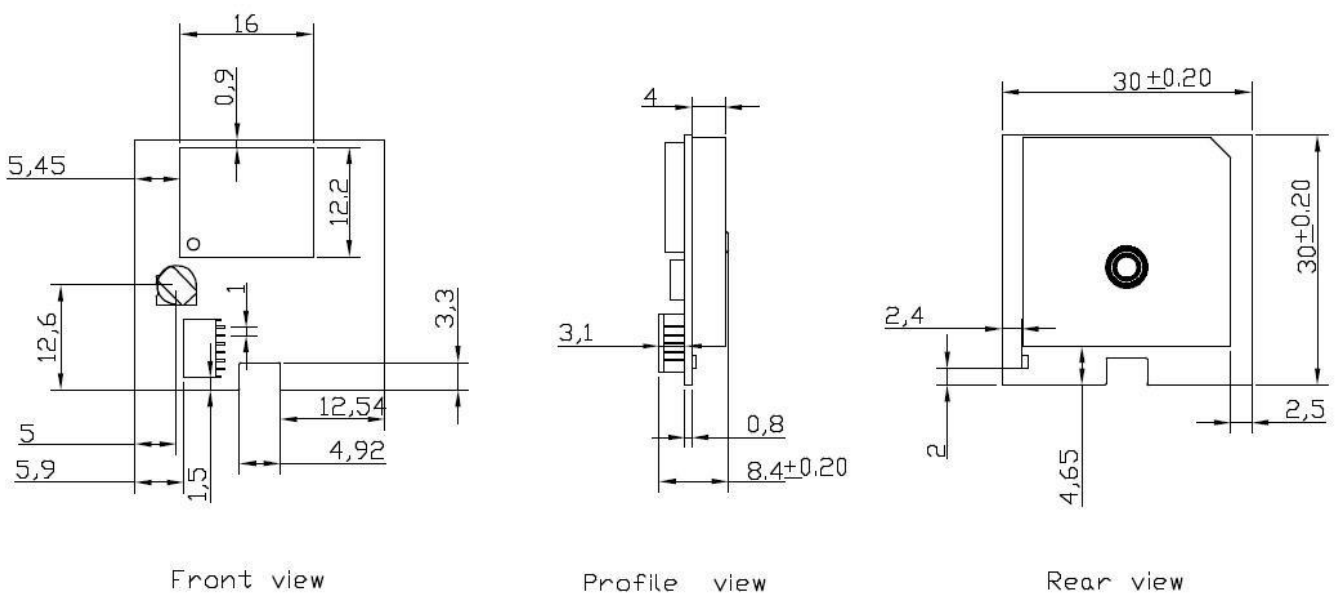
2. Technical Information

2.1 Module Pin Assignment



Pin NO.	Pin Name	I/O	Remark
1.	VCC	I	Module Power Supply
2.	AGND	G	Ground
3.	GND	G	Ground
4.	RXD	I	RS232 Serial Data Input
5.	TXD	O	RS232 Serial Data Output
6.	PPS	O	Time Pulse(1PPS)
LED	GPS Status	O	LED On : Searching for GPS Signals LED Blinking : Position fixed

2.2 Dimensions



3. Additional ordering options

(Different cables & connectors can be specified according to requirements)

3.1 Modules include Cable & Connector



Code	Connector 1 (Module)	Cable Length	Connector 2 (Host)
N	JST	1500 mm	Non-Connector



I/O Interface	Voltage level
5 Wire Open End	UART(TTL level)

CN1 Pin	Color	Pin define	Level
1	Red	VCC	3.0 - 5.0V DC
2	Black	GND	Ground
3	Orange	TXD	TTL output
4	Green	RXD	TTL input
5	Brown	PPS	Time Pulse(1PPS)

4. Software Protocol

NMEA output message

Table 4.1 NMEA output message

NMEA	Description
GGA	Global positioning system fixed data
GLL	Geographic position - latitude/longitude
GSA	GNSS DOP and active satellites
GSV	GNSS satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course over ground and ground speed

4.1 GGA--- Global Positioning System Fixed Data

Table 4.1-1 contains the values for the following example:

\$xxGGA, 161229.487,3723.2475,N, 12158.3416,W, 1,07,1.0,9.0,M.0000*18

Table4.1-1 GGA Data Format

Name	Example	Units	Description
Message ID	\$xxGGA		GGA protocol header
UTC Time	161229.487		hhmmss.sss
Latitude	3723.2457		ddmm.mmmm
N/S indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	w		E=east or W=west
Position Fix Indicator	1		See Table 4.1-2
Satellites Used	07		Range 0 to 12
HDOP	1.0		Horizontal Dilution of Precision
MSL Altitude	9.0	mters	
Units	M	mters	
Geoid Separation		mters	
Units	M	mters	
Age of Diff. Corr.		second	Null fields when DGPS is not used
Diff. Ref. Station ID	0000		
Checksum	*18		
<CR> <LF>			End of message termination

Table4.1-2 Position Fix Indicators

Value	Description
0	Fix not available or invalid
1	GPS&GLONASS SPS Mode, fix valid
2	Differential GPS&GLONASS, SPS Mode, fix valid
3	GPS&GLONASS PPS Mode, fix valid

4.2 GLL--- Geographic Position – Latitude/Longitude

Table4.2 contains the values for the following example:

\$xxGLL , 3723.2475, N,12158.3416, W,161229.487, A*2C

Table4.2 GLL Data Format

Name	Example	Units	Description
Message ID	\$xxGLL		GLL protocol header
Latitude	3723.2475		ddmm.mmmm
N/S indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W indicator	w		E=east or W=west
UTC Time	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Checksum	*2C		
<CR> <LF>			End of message termination

4.3 GSA---GNSS DOP and Active Satellites

Table 4.3 contains the values for the following example:

\$xxGSA , A, 3, 07, 02, 26,27, 09, 04,15, , , , , 1.8,1.0,1.5*33

Table4. 3 GSA Data Format

Name	Example	Units	Description
Message ID	\$xxGSA		GSA protocol header
Mode 1	A		See Table 4.3-1
Mode 2	3		See Table 4.3-2
ID of satellite used	07		Sv on Channel 1
ID of satellite used	02		Sv on Channel 2
....
ID of satellite used			Sv on Channel 12
PDOP	1.8		Position Dilution of Precision
HDOP	1.0		Horizontal Dilution of Precision
VDOP	1.5		Vertical Dilution of Precision
Checksum	*33		
<CR> <LF>			End of message termination

Table 4.3-1 Mode 1

Value	Description
M	Manual- forced to operate in 2D or 3D mode
A	Automatic-allowed to automatically switch 2D/3D

Table 4.3-2 Mode 2

Value	Description
1	Fix not available
2	2D
3	3D

4.4 GSV---GNSS Satellites in View

Table 4.4 contains the values for the following example:

\$xxGSV , 2, 1, 07, 07, 79,048, 42, 02, 51,062, 43, 26, 36,256, 42, 27, 27, 138,42*71

\$xxGSV, 2, 2, 07, 09, 23,313, 42, 04, 19, 159, 41, 15,12,041, 42*41

Table 4.4 GSV Data Format

Name	Example	Units	Description
Message ID	\$xxGSV		GSV protocol header
Total number of messages1	2		Range 1 to 3
Message number1	1		Range 1 to 3
Satellites in view	07		
Satellite ID	07		Channel 1(Range 1 to 66)
Elevation	79	degrees	Channel 1(Maximum 90)
Azimuth	048	degrees	Channel 1(True, Range 0 to 359)
SNR (C/No)	42	dB-Hz	Range 00 to 99, null when not tracking
...			...
Satellite ID	27		Channel 4 (Range 1 to 66)
Elevation	27	degrees	Channel 4(Maximum 90)
Azimuth	128	degrees	Channel 4(True, Range 0 to 359)
SNR (C/No)	42	dB-Hz	(Range 00 to 99, null when not tracking)
Checksum	*71		
<CR> <LF>			End of message termination

Depending on the number of satellites tracked multiple messages of GSV data may be required.

4.5 RMC---Recommended Minimum Specific GNSS Data

Table 4.5 contains the values for the following example:

\$xxRMC, 161229.487, A, 3723.2475, N, 12158.3416, W, 0.13,309.62, 120598,, *10

Table 4.5 RMC Data Format

Name	Example	Units	Description
Message ID	\$xxRMC		RMC protocol header
UTC Time	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
Speed over ground	0.1.3	knots	
Course over ground	309.62	degrees	True
Ground			
Date	120598		ddmmyy
Magnetic variation		degrees	
Checksum	*10		
<CR> <LF>			End of message termination

4.6 VTG---Course Over Ground and Ground Speed

Table 4.6 contains the values for the following example:

\$xxVTG, 309.62, T, M, 0.13, N, 0.2, K*6E

Table 4.6 VTG Data Format

Name	Example	Units	Description
Message ID	\$xxVTG		VTG protocol header
Course over ground	309.62	degrees	Measured heading
Reference	T		True
Course over ground		degrees	Measured heading
Reference	M		Magnetic
Speed over ground	0.13	knots	Measured speed
Units	N		Knots
Speed over ground	0.2	km/hr	Measured speed
Units	K		Kilometer per hour
Checksum	*6E		
<CR> <LF>			End of message termination