

GS-215m

GPS Engine Board

Gstar—GS- 216m



N 23.13044.
E 113.32230.

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Revision history

Rev. No.	Revision DATE	Issue	Note
1	15.NOV.2007	Document Drawing	PCB : GS-216m
2	19.JAN.2008	Draft 1.0	PCB : GS-216m
3	20.FEB.2008	Draft 2.0	PCB : GS-216m
4	11.APR.2008	Draft 2.0	PCB : GS-216m
5	28.AUG.2008	Draft 3.0 Include RS-232 & USB model	PCB : GS-216m
6	27,JULY,2009	GPS module change(MT1316A → ME1316A) PCB change (G2530A2 → G2530A3) Spec change <ul style="list-style-type: none"> 2. Block Diagram 5. Pin Description 6. Absolute Maximum Ratings 7. DC Characteristics 8. AC Characteristics 9. Active Antenna Selection Guide Recommend 10. Performance Specification 11. Mechanical Specification 13. Application note → Order Information Sheet 	PCB : GS-216m
7	04,AUG,2009	Change <ul style="list-style-type: none"> 9. Active Antenna Selection Guide Recommend → Output option select point 	PCB : GS-216m

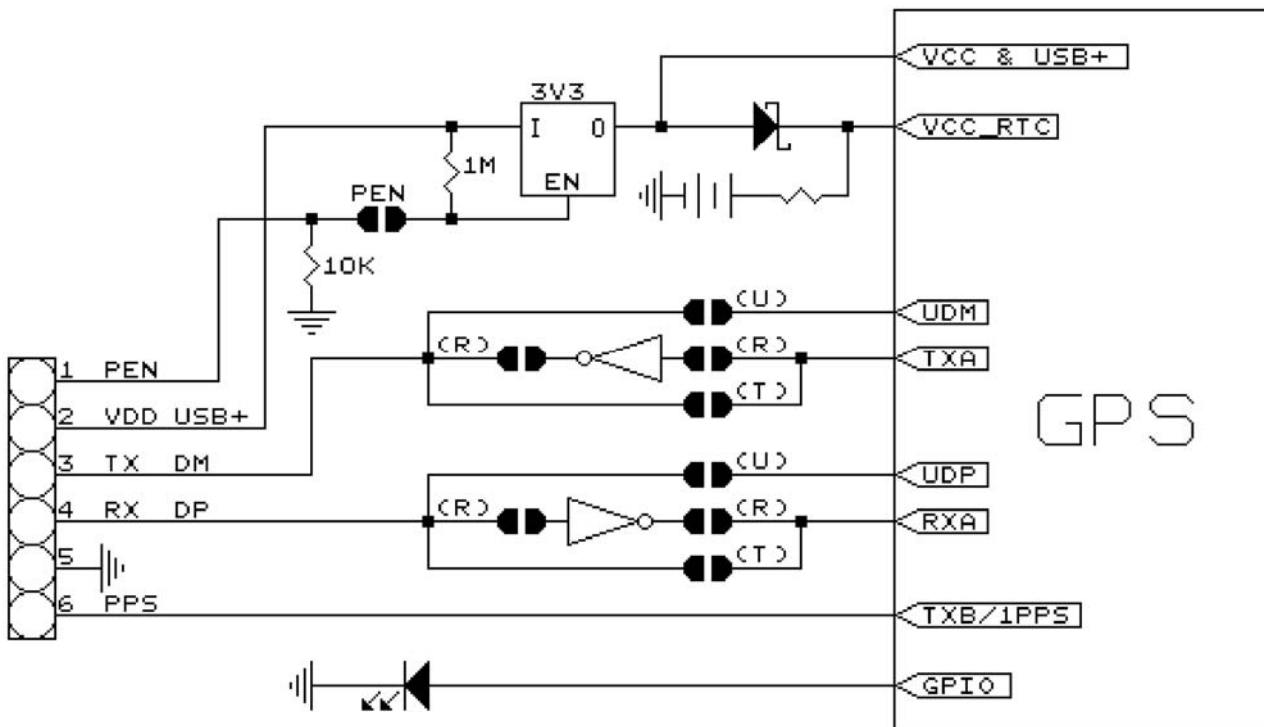
1. Functional Description

Full self-contained GPS receiver

Fully shielded design

- High Performance GPS Single Chip
GPS DSP with integrated real time clock(RTC) ARM7EJ-S CPU
- 4Mbit FLASH memory
- Low noise amplifier
- SAW filter
- Built-in regulators (LDO)
- GPS receiver With Patch Antenna
- Patch Antenna Size : 25(L)mm X 25(W)mm X 4(T)mm
- Size : 30mm(L) X 25mm(W) X 9mm(T)
- Weight : 14 grams

2. Block Diagram



Output type hardware select option (short)

U : USB, R : RS232, T : TTL

3. Output Protocols

Data format : WGS-84 NMEA 0183
Activated message : GGA, GSA, GSV, RMC all with checksum enabled
Signal format : Buad rate:9600, Byte:8, Parity:none, stop bit:1
Up-date rate : 1 sec

4. Input Start Commands

MESSAGE	COMMANDS
COLD START	\$PSRF101,0,0,0,000,0,0,12,4*10
WARM START	\$PSRF101,0,0,0,000,0,0,12,2*16
HOT START	\$PSRF101,0,0,0,000,0,0,12,1*15

Time To First Fix (TTFF)

a) Cold Start 48sec (typical)

In a 'Cold Start' scenario, the receiver has no knowledge of position, time or the satellite constellation. The receiver starts to search for signals blindly. Cold start time is the longest startup for this module

b) Warm Start 38sec (typical)

In a 'Warm Start' scenario, due to a backup battery the receiver knows its last position, the approximate time and the constellation almanac. Thanks to this it can quickly acquire satellites and get a position fix faster than in 'Cold Start' mode.

c) Hot Start < 1sec (typical)

In a 'Hot Start' scenario, the receiver has been powered off for less than 2 hours since the last valid navigation solution. The GPS uses its last Ephemeris data to calculate a position fix.

5. Pin Description

Pin no	Name			Pin Description	I/O	Note
	RS232	TTL	USB			
1	PEN			Regulator enable	I	ON: 1.5~VDD OFF: 0V~0.3V
2	VDD			Supply Voltage	I	
3	TXA	TXA	DM		I/O	
4	RXA	RXA	DP		I/O	
5	GND			Ground		
6	PPS			Precise Positioning Service	O	PPS or TXB by S/W option

6. Absolute Maximum Ratings

Parameter		Min			Max			Unit
		RS232	TTL	USB	RS232	TTL	USB	
Power supply voltage(VDD)		-0.3			5.5			V
Input pin voltage	Pin no "1"	-0.3			VDD			V
I/O port voltage	Pin no "3"	-15	-0.3	-0.3	15	3.0	3.3	V
	Pin no "4"	-0.3	-0.3	-0.3	5.0	3.0	3.3	
I/O port current					±10			mA
Storage temperature		-40			85			℃

Warning – Stressing the device beyond the “Absolute Maximum Ratings” may cause permanent damage. These are stress ratings only. Operation beyond “Operating conditions” is not recommended and extended exposure beyond the “Operating condition” may affect device reliability.

7. DC Characteristics (Test Temperature : 25°C)

Parameter		Condition	Min.	TYP	Max.	Unit	
Operating supply voltage		VDD port	3.6	5.0	5.5	V	
Operating supply ripple voltage		VDD port			50	mV	
Sustained supply current at 3D Fixed	RS232	VDD=3.6V~5.5V	46	48	50	mA	
	TTL		39	41	45		
	USB		39	41	45		
Peak supply current at GPS START operation	RS232	VDD=3.6V~5.5V	46	48	50	mA	
	TTL		36	38	40		
	USB		36	38	40		
Standby Backup input current		V_BAT=3.0V	5.0	6.5	15	uA	
I/O INPUT level	High	RS232	VDD=3.6V~5.5V	1.0		15.0	V
		TTL		1.96	2.8	3.0	
		USB		2.7		3.3	
	Low	RS232	VDD=3.6V~5.5V	-15		0.4	
		TTL		-0.2		0.84	
		USB		0.1		0.4	
I/O OUTPUT level	High	RS232	Ioh=2mA VDD=5.0V	3.7		VDD-0.5	V
		TTL		2.4		2.8	
		USB		2.7		3.3	
	Low	RS232	Iol=2mA VDD=5.0V	0.2		0.5	
		TTL		0.1		0.4	
		USB		0.1		0.4	
Power Enable ON/OFF Control Voltage	ON	VDD=3.6V~5.5V	1.5		VDD	V	
	OFF		0		0.3		
Back-up Time		24h charging	20	30	40	Days	
Operating temperature		VDD=3.6V~5.5V	-10	25	+60	°C	

* Operating Temperature

Electronics device : -30°C ~ +80°C

Back-up Battery : -10°C ~ +60°C

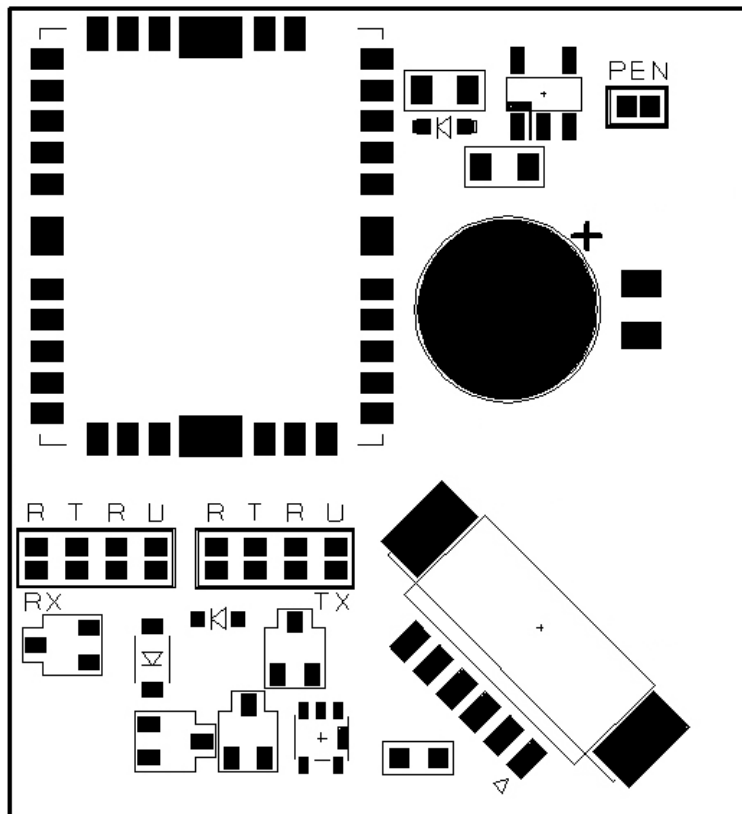
(Lithium-Ion Rechargeable Battery)

8. AC Characteristics

(Test Temperature : 25°C VCC = 5.0V RF Input : Conducted)

Parameter	Condition	Min	Typical	Max	Unit
RF_IN Input level				-40	dBm
RF_IN Input Impedance	Fo=1575.42MHz		50		Ω
Tracking Sensitivity (C/N)	3D (C/N avg. 15dB-Hz)		-164		dBm
Re- Tracking Sensitivity (C/N)	3D (C/N avg. 18dB-Hz)		-155		dBm
Cold start Sensitivity (C/N)	3D (SV 9EA in view)		-148		dBm
Cold start time(TTFF)	-130 dBm(2D) (SV 9EA)		50		sec
Hot start time	-130 dBm(2D) (SV 9EA)		1		sec
Re-acquisition time (5 sec)	-130 dBm(3D) (SV 9EA)		3		sec
Re-acquisition time (60 sec)	-130 dBm(3D) (SV 9EA)		3		sec
Position error (Latitude, Longitude)	-130 dBm(SV 9EA in View)		10		m
Position error (Elevation)	-130 dBm(SV 9EA in View)		50		m
Operational Limits	Altitude			18	Km
	Velocity			1,800	Km/h

9. Output option select point

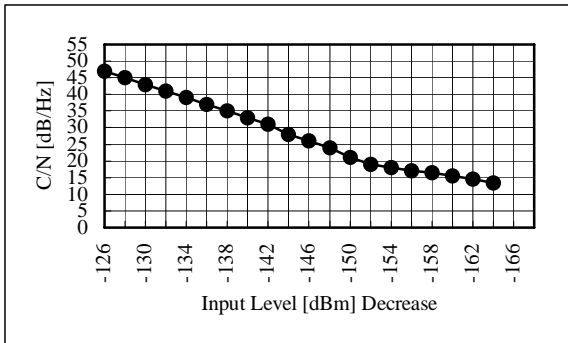


Power Enable

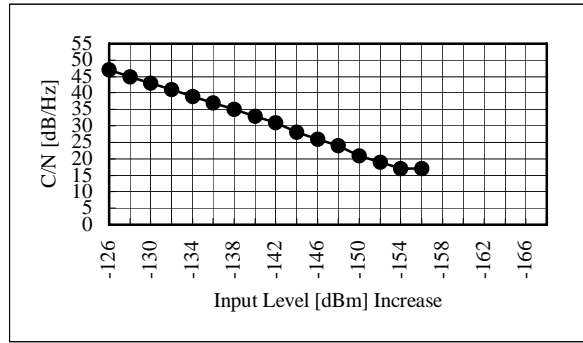
R : RS232
 T : TTL
 U : USB

10. Performance Specification

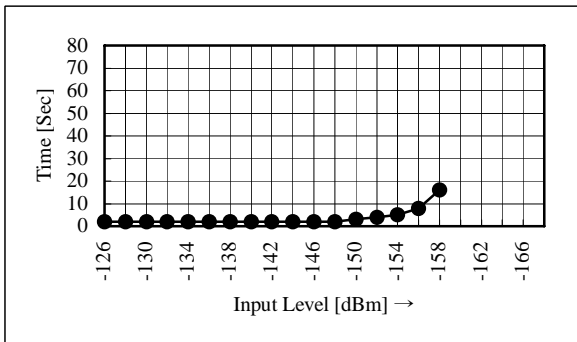
3D Tracking Sensitivity



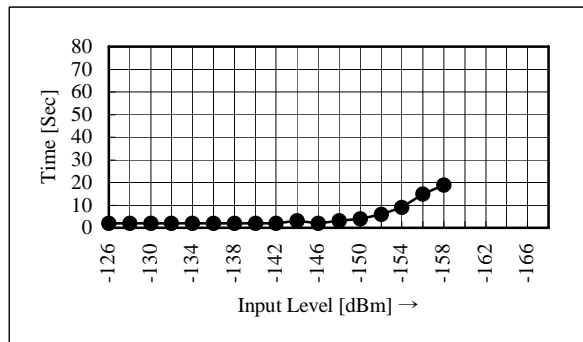
3D Re-Tracking Sensitivity



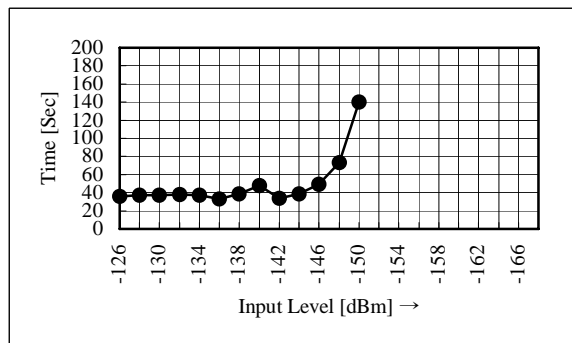
Re-Acquisition Time (After 5Sec)



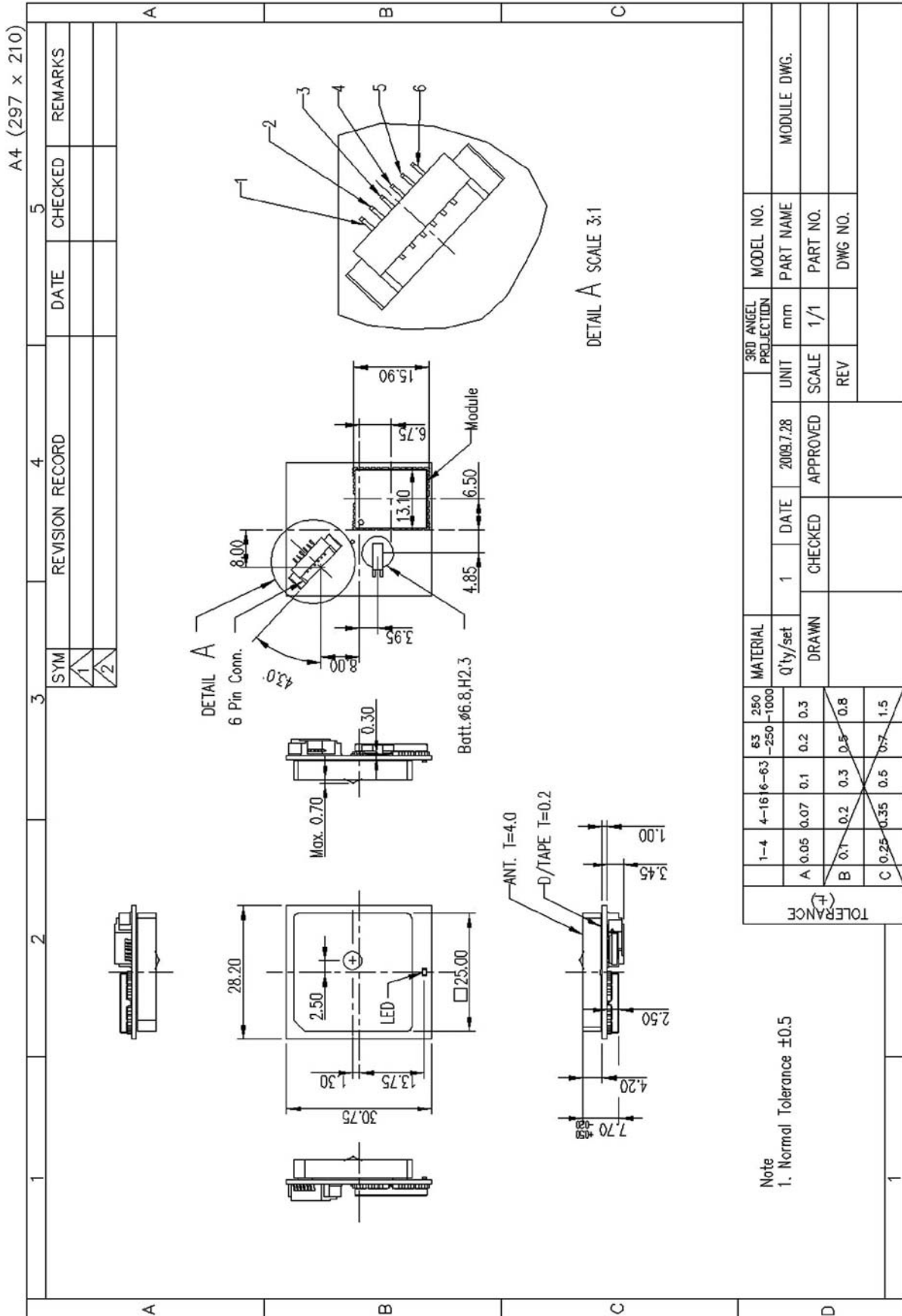
Re-Acquisition Time (After 60Sec)



Cold Start Time (TTFF)



11. Mechanical Specification



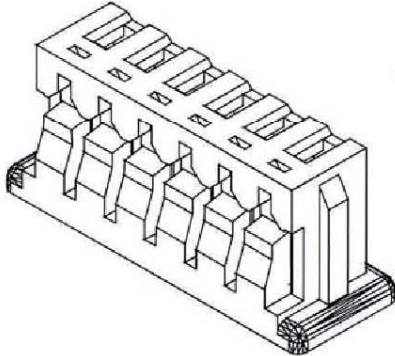
12. I/F Connector Specification (Wire_to_Board_Wafer)

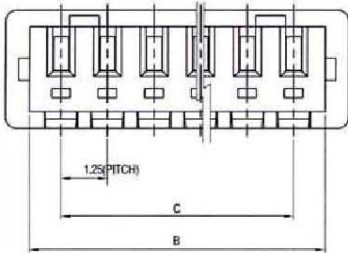
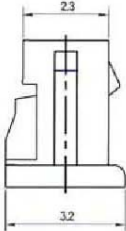
Wire to Board Wafer: <http://yeonho.com/pdf/12505WR.pdf> 12505WR-06A00

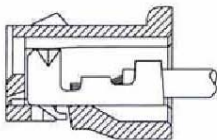
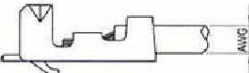
Wire to Board Housing: <http://yeonho.com/pdf/12505HS.pdf> 12505HS-06000

1.25mm (0.049") PITCH CONNECTOR

Wire-to-Board Housing	12505HS Series
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TERMINAL ASSEMBLY DRAWING

AWG : #28 ~ #32

Material

INO	DESCRIPTION	TITLE	MATERIAL
1	HOUSING	12505HS	PA66, UL 94V Grade

Available Pin

PARTS NO.	A	B	C
12505HS-02000	4.25	2.95	1.25
12505HS-03000	6.50	4.20	2.50
12505HS-04000	6.75	5.45	3.75
12505HS-05000	8.00	6.70	5.00
12505HS-06000	9.25	7.95	6.25
12505HS-07000	10.50	9.20	7.50
12505HS-08000	11.75	10.45	8.75
12505HS-09000	13.00	11.70	10.00
12505HS-10000	14.25	12.95	11.25
12505HS-11000	15.50	14.20	12.50
12505HS-12000	16.75	15.45	13.75
12505HS-13000	18.00	16.70	15.00
12505HS-14000	19.25	17.95	16.25
12505HS-15000	20.50	19.20	17.50

Specification

ITEM	SPEC
Voltage Rating	AC/DC 125V
Current Rating	AC/DC 1A
Operating Temperature	-25°C ~ +85°C
Contact Resistance	30mΩ MAX
Withstanding Voltage	AC250V/1min
Insulation Resistance	100MΩ MIN
Applicable Wire	AWG #28~#32
Applicable P.C.B	-
Applicable FPC/FFC	-
Solder Height	-
Crimp Tensile Strength	-
UL FILE NO	E108706

Application Terminal : 12505TS (32 Page)

13. Order Information Sheet

Model name : GS-216m
Buyer name : _____
Order Date : _____
Quantity : _____

USE Power Enable Pin : [_____] (ex) YES, NO

Buadrate COM_A : [_____] (ex) NONE,4800,9600,38400,57600,115200

Buadrate COM_B : [_____] (ex) NONE/PPS,4800,9600,38400,57600,115200

NMEA Massage : GGA[___], GLL[___], GSA[___], GSV[___], RMC[___], VTG[___]

(ex) 0: No Output Message, 1~10: Interval time(sec)

If buadrate is 4800bps that GSV Interval time is 5 sec

Output Type : [_____] (ex) TTL, RS232, USB

Special : _____

Default

USE Power Enable Pin: [NO]

Buadrate COM_A : [9600bps]

Buadrate COM_B : [NONE/PPS]

NMEA Massage : GGA[1], GLL[0], GSA[1], GSV[1], RMC[1], VTG[0]

Output Type : [RS232]