

Travelling Merchant: \_\_\_\_\_

# DATASHEET

Standard: CM66F-M129-10.00MHzP/N: CM-0004

Plot			The Label
Drew	Audited	Approved	Stamp, please! Thanks!
Date: 2011.10.10			

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**1、 Electrical Parameters**

Internal Receiver Characteristics	PARAMETERS					NOTES
	Type	Auto Position Lock				
Number Of Channels	50					
Frequency Band	L1 (1575.42 MHz)					
Tracking Code	C/A Code					
Tracking Capability	12 Satellites					
Sensitivity	Tracking & Navigation			-160dBm		
	Reacquisition			-160dBm		
	Cold Start (Autonomous)			-143dBm		
Antenna INPUT	SMA-KE				CN1	
State Input	Parameters	Min.	Typ.	Max.	Unit.	
	Lock	2.4			Vdc	<5mA Load
	Unlock			0.5	Vdc	<5mA Load
	Connector	Pin 8				
GPS 1PPS Output	Parameters	Min.	Typ.	Max.	Unit.	Test Condition
	Waveform	LVCMOS				
	High-Level Output Voltage (V <sub>IH</sub> )	2.4			Vdc	
	Low-Level Output Voltage (V <sub>IL</sub> )			0.5	Vdc	
	Pulse Width	10			uSec	
	Connector	Pin 10				
State Output	Parameters	Min.	Typ.	Max.	Unit.	
	Lock	2.4			Vdc	<5mA Load
	Unlock			0.5	Vdc	<5mA Load
	Connector	Pin 5				
RF Output	Parameters	Min.	Typ.	Max.	Unit.	Test Condition
	Nominal Frequency		10.00		MHz	
	Waveform	LVCMOS				
	High-level Output voltage (V <sub>OH</sub> )	2.4			Vdc	< -0.5mA Load/LVCMOS



	Low-level Output voltage ( $V_{OL}$ )			0.5	Vdc	< 0.5mA Load/LVCMOS
	Rise/Fall Time			6	nSec	Load 15pF/LVCMOS
	Duty Cycle	45	50	55	%	Load 15pF/LVCMOS
	Accuracy	-2		2	E-12	24 hour average when locked to GPS
	Short-term stability			2	E-11	Temperature stability, no EMI/EMC or other interference, test after power for 1 hour ref. to 25°C; 1s, using PN9000 equipment.
	Phase noise (All conditions)		-150	-145	dBc/Hz	@ 1KHz offset
	Connector	Pin 2				
Holdover Capability	Holdover Time	Min.	Typ.	Max.	Unit.	
	24 hours			3	uSec	$\Delta T = \pm 5^\circ C$ , 24 hours holdover after turn on 7days and GPS lock 3days
Supply Voltage	Parameters	Min.	Typ.	Max.	Unit.	
	Supply voltage	4.75	5.0	5.25	Vdc	
	Current consumption			2000	mA	During Warm-up
				1000	mA	During steady state operation @25°C
	AC ripple			50	mVpk-pk	10Hz to 1MHz
Connector	Pin 12					
1 PPS Output Waveform Characteristics	Parameters	Min.	Typ.	Max.	Unit.	
	Waveform	LVCMOS				
	High-Level Output Voltage( $V_{OH}$ )	2.4			Vdc	50 Ohms
	Low-level Output voltage ( $V_{OL}$ )			0.5	Vdc	
	Pulse width	10			uSec	
Connector	Pin 3					
Serial Interfaces	Parameters	Min.	Typ.	Max.	Unit.	
	Rx high-level input voltage ( $V_H$ )	2.9		3.7	Vdc	
	Rx low-level input voltage ( $V_L$ )	-0.4	0.0	0.4	Vdc	
	Tx high-level output voltage ( $V_H$ )	2.9	3.3		Vdc	
	Tx low-level output voltage ( $V_L$ )		0.0	0.4	Vdc	

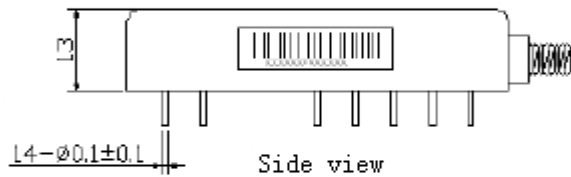
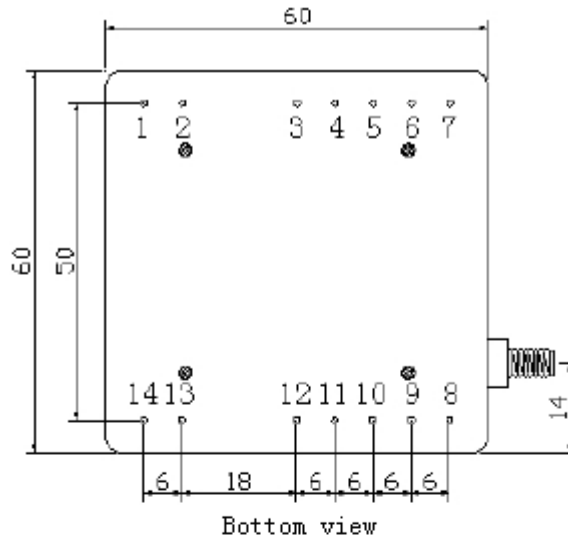


	Data format	NMEA-0183, see Appendix 1 for more details
	Serial protocol	9600-N-8-1
	Connector	Pin6 and Pin7
Environmental Conditions	Parameter	Conditions
	Operating temperature	-20°C to +75°C
	Humidity @ 40°C	90%
	Storage Temperature	-40°C to +85°C
Environmental Compliance	Parameter	Conditions
	Mechanical shock	MIL-STD-2002, Method 213 condition B
	Mechanical vibration	MIL-STD-2002, Method 204 condition A
	Resistance to solvents	MIL-STD-2002, Method 215

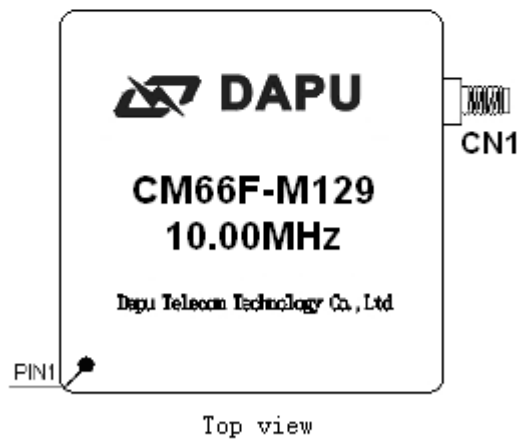
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## 2、Mechanical Structure(mm)



PIN DEFINITION		
Number	Name	
2	10MHz OUTPUT	
3	1 PPS OUTPUT	
5	State OUTPUT	
6	RX INPUT	
7	TX OUTPUT	
8	State INPUT	H: Lock
		L: Unlock
10	GPS 1 PPS OUTPUT	
12	Vcc +5.0Vdc	
1, 14	NC	
4, 9, 11, 13	GND	



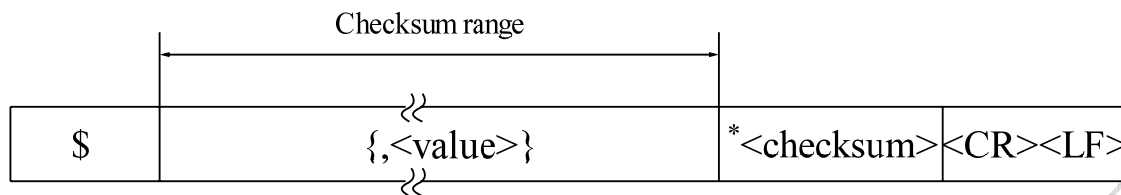
**Note1:** Tolerance ±0.5mm without mark

**Note2:** The bottom view means that the stitches are against the people



**Appendix 1: Output Message Data Format**

NMEA Protocol Frame



**Start character**  
Always '\$'

**Data field(s)**  
Delimited by a ','. Length can vary,  
even for a certain field

**Checksum field**  
Starts with a '\*' and  
consists of 2 characters  
representing a hex  
number. The checksum  
is the exclusive OR of  
all characters between  
'\$' and '\*'

**End sequence**  
Always <CR><LF>

**RMC**

Description: Recommended Minimum data

Field Number: 15

Message Structure:

\$GPRMC,hhmmss,status,latitude,N,longitude,E,spd,cog,ddmmyy,mv,mvE,mode\*cs<CR><LF>

Example:

\$GPRMC,083559.00,A,4717.11437,N,00833.91522,E,0.004,77.52,091202,,A\*57

Field No.	Example	Format	Name	Unit	Description
0	\$GPRMC	string	\$GPRMC	-	Message ID, RMC protocol header
1	083559.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Time of position fix
2	A	character	Status	-	Status, V=Navigation receiver warning, A = Data valid
3	4717.11437	ddmm.mmmm	Latitude	-	Latitude, Degrees + minutes
4	N	character	N	-	N/S Indicator, hemisphere N=north or S=south
5	00833.91522	dddmm.mmmm	Longitude	-	Longitude, Degrees + minutes
6	E	character	E	-	E/W indicator, E=east or W=west
7	0.004	numeric	Spd	knots	Speed over ground
8	77.52	numeric	Cog	degrees	Course over ground
9	091202	ddmmyy	date	-	Date in day, month, year format
10	-	numeric	mv	degrees	Magnetic variation value, not being output by receiver
11	-	character	mvE	-	Magnetic variation E/W indicator, not being output by receiver
12	-	character	mode	-	Mode Indicator, N=No Fix, A=Autonomous fix, D=Differential fix,



					E=Estimated/Dead Reckoning Fix
13	*57	hexadecimal	cs	-	Checksum
14	-	character	<CR><LF>	-	Carriage Return and Line Feed

**VTG**

Description: Course over ground and Ground speed

Field Number: 12

Message Structure:

\$GPVTG,cogt,T,cogm,M,sog,N,kph,K,mode\*cs<CR><LF>

Example:

\$GPVTG,77.52,T,,M,0.004,N,0.008,K,A\*06

Field No.	Example	Format	Name	Unit	Description
0	\$GPVTG	string	\$GPVTG	-	Message ID, VTG protocol header
1	77.52	numeric	cogt	degrees	Course over ground (true)
2	T	character	T	-	Fixed field: true
3	-	numeric	cogm	degrees	Course over ground (magnetic), not output
4	M	character	M	-	Fixed field: magnetic
5	0.004	numeric	sog	knots	Speed over ground
6	N	character	N	-	Fixed field: knots
7	0.008	numeric	kph	km/h	Speed over ground
8	K	character	K	-	Fixed field: kilometers per hour
9	A	character	mode	-	Mode Indicator, N=No Fix, A=Autonomous fix, D=Differential fix, E=Estimated/Dead Reckoning Fix
10	*06	hexadecimal	cs	-	Checksum
11	-	character	<CR><LF>	-	Carriage Return and Line Feed

**GGA**

Description: Global positioning system fix data. Time and position, together with GPS fixing related data (number of satellites in use, and the resulting HDOP, age of differential data if in use, etc.).

Field Number: 17

Message Structure:

\$GPGGA,hhmmss.ss,Latitude,N,Longitude,E,FS,NoSV,HDOP,m,msl,m,Altref,m,DiffAge,DiffStation\*cs<CR><LF>

Example:

\$GPGGA,092725.00,4717.11399,N,00833.91590,E,1,8,1.01,499.6,M,48.0,M,,0\*5B

Field No.	Example	Format	Name	Unit	Description
0	\$GPGGA	string	\$GPGGA	-	Message ID, GGA protocol header





1	092725.00	hhmmss.sss	hhmmss.ss	-	UTC Time, Current time
2	4717.11399	ddmm.mmmm	Latitude	-	Latitude, Degrees + minutes
3	N	character	N	-	N/S Indicator, N=north or S=south
4	00833.91590	dddmm.mmmm	Longitude	-	Longitude, Degrees + minutes
5	E	character	E	-	E/W indicator, E=east or W=west
6	1	digit	FS	-	Position Fix Status Indicator, 0= No Fix / Invalid,1= Standard GPS (2D/3D),2= Differential GPS,6= Estimated (DR) Fix
7	8	numeric	NoSV	-	Satellites Used, Range 0 to 12
8	1.01	numeric	HDOP	-	HDOP, Horizontal Dilution of Precision(0.5~99.9)
9	499.6	numeric	mSl	m	MSL Altitude
10	M	numeric	uMsl	-	Units, Meters (fixed field)
11	48.0	numeric	Altref	m	Geoid Separation
12	M	character	uSep	-	Units, Meters (fixed field)
13	-	numeric	DiffAge	s	Age of Differential Corrections, Blank (Null) fields when DGPS is not used
14	0	numeric	DiffStation	-	Diff. Reference Station ID
15	*57	hexadecimal	cs	-	Checksum
16	-	character	<CR><LF>	-	Carriage Return and Line Feed

**GSA**

Description: GNSS DOP and Active Satellites.

- If less than 12 SVs are used for navigation, the remaining fields are left empty. If more than 12 SVs are used for navigation, only the IDs of the first 12 are output.
- The SV Numbers (Fields 'Sv') are in the range of 1 to 32 for GPS satellites, and 33 to 64 for SBAS satellites (33 = SBAS PRN 120, 34 = SBAS PRN 121, and so on)

Field Number:20

Message Structure:

\$GPGSA,Smode,FS{,sv},PDOP,HDOP,VDOP\*cs<CR><LF>

Example:

\$GPGSA,A,3,23,29,07,08,09,18,26,28,,,,,1.94,1.18,1.54\*0D

Field No.	Example	Format	Name	Unit	Description
0	\$GPGSA	string	\$GPGSA	-	Message ID, GSA protocol header
1	A	character	Smode	-	Smode, see first table below
2	3	digit	FS	-	Fix status,1= Fix not available,2= 2D Fix,3= 3D Fix
Start of repeated block (12 times)					
3+1*N	29	character	M	-	Satellite number



End of repeated block					
15	1.94	numeric	PDOP	-	Position dilution of precision
16	1.18	numeric	HDOP	-	Horizontal dilution of precision
17	1.54	numeric	VDOP	-	Vertical dilution of precision
18	*0D	hexadecimal	cs	-	Checksum
19	-	character	<CR><LF>	-	Carriage Return and Line Feed

**GSV**

Description: GNSS Satellites in View.

The number of satellites in view, together with each PRN (SV ID), elevation and azimuth, and C/No (Signal/Noise Ratio) value. Only four satellite details are transmitted in one message.

Field Number: 7..16

Message Structure:

\$GPGSV,NoMsg,MsgNo,NoSv,{,sv,elv,az,cno}\*cs<CR><LF>

Example:

\$GPGSV,3,1,10,23,38,230,44,29,71,156,47,07,29,116,41,08,09,081,36\*7F

\$GPGSV,3,2,10,10,07,189,,05,05,220,,09,34,274,42,18,25,309,44\*72

\$GPGSV,3,3,10,26,82,187,47,28,43,056,46\*77

Field No.	Example	Format	Name	Unit	Description
0	\$GPGSV	string	\$GPGSV	-	Message ID, GSV protocol header
1	3	digit	NoMsg	-	Number of messages, total number of GPGSV messages being output
2	1	digit	MsgNo	-	Number of this message
3	10	numeric	NoSv	-	Satellites in View
Start of repeated block (1..4 times)					
4+4*N	23	numeric	sv	-	Satellite ID
5+4*N	38	numeric	elv	degrees	Elevation, range 0..90
6+4*N	230	numeric	az	degrees	Azimuth, range 0..359
7+4*N	44	numeric	cno	dBHz	C/N0, range 0..99, null when not tracking
End of repeated block					
18	*0D	hexadecimal	cs	-	Checksum
19	-	character	<CR><LF>	-	Carriage Return and Line Feed

**GLL**

Description: Latitude and longitude, with time of position fix and status

Field Number: (9) or (10)

Message Structure:

\$GPGLL,Latitude,N,Longitude,E,hhmmss.ss,Valid,Mode\*cs<CR><LF>

Example:

\$GPGLL,4717.11364,N,00833.91565,E,092321.00,A,A\*60



Field No.	Example	Format	Name	Unit	Description
0	\$GPGLL	string	\$GPGLL	-	Message ID, GLL protocol header
1	4717.11364	ddmm.mmmm	Latitude	-	Latitude, Degrees + minutes
2	N	character	N	-	N/S Indicator, hemisphere N=north or S=south
3	00833.91565	dddmm.mmm m	Longitude	-	Longitude, Degrees + minutes
4	E	character	E	-	E/W indicator, E=east or W=west
5	092321.00	hhmmss.sss	hhmmss.ss		UTC Time, Current time
6	A	character	Valid		V = Data invalid or receiver warning, A = Data valid.
Start of optional block					
7	A	character	Mode	-	Positioning Mode, N=No Fix, A=Autonomous fix, D=Differential fix, E=Estimated/Dead Reckoning Fix
End of optional block					
7	*60	hexadecimal	cs	-	Checksum
8	-	character	<CR><LF>	-	Carriage Return and Line Feed

**ZDA**

Description: Time and Date

Field Number:9

Message Structure:

\$GPZDA, hhmmss.ss, day, month, year, ltzh, ltzn\*cs&lt;CR&gt;&lt;LF&gt;

Example:

\$GPZDA,082710.00,16,09,2002,00,00\*64

Field No.	Example	Format	Name	Unit	Description
0	\$GPZDA	string	\$GPZDA	-	Message ID, ZDA protocol header
1	082710.00	hhmmss.sss	hhmmss.ss	-	UTC Time
2	16	dd	day	-	UTC time: day, 01..31
3	09	mm	month	-	UTC time: month, 01..12
4	2002	yyyy	year	-	UTC time: 4 digit year
5	00	-xx	ltzh	-	Local zone hours, not supported (fixed to 00)
6	00	zz	ltzn	-	Local zone minutes, not supported (fixed to 00)
7	*64	hexadecimal	cs	-	Checksum
8	-	character	<CR><LF>	-	Carriage Return and Line Feed