

Customer Code:

DATASHEET

DAPU P/N: CM23B-G428-10.00MHz

Customer P/N: _____

DAPU			Customer Approval
Drew	Audited	Approved	Stamp, please! Thanks!
Date: 2024.07.25			

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Table of Content

1. General Description.....	4
2. Pin Definition	5
3. Electrical Parameters.....	5
4. Performance.....	6
5. UART.....	7-8
6. Control and Status Pins	9
7. Environmental Conditions.....	9
8. Typical Application	10
9. Mechanical Structure (mm).....	11
10. Reflow Soldering Curve (RoHS)	12
11. Package (mm)	12



1. General Description

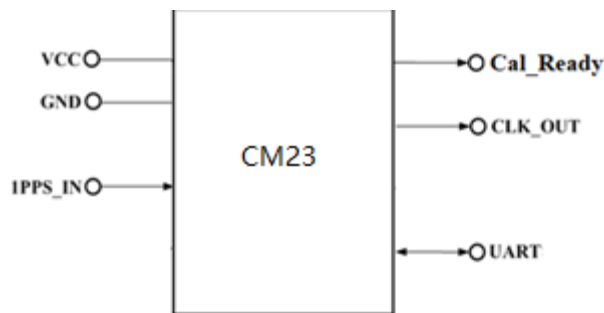


Figure 1 CM23

Figure 1 is the basic diagram of CM23. CM23 is a high-performance clock module designed to provide precise frequency and can be calibrated automatically via a high-level reference 1PPS input.

Key features:

- **Reference:** 1PPS from GNSS receiver, IEEE1588 etc. to calibrate the 10.0MHz CLK_OUT accuracy;
- **Temperature Stability:** ± 0.5 ppb;
- **Frequency accuracy:** $5E-8$, power on 5 minutes;
- **Clocks Input and Output:** 1*1PPS input and 1*10.0MHz output;
- **Serial Interface:** 1*UART for management;
- **Mechanical Size:** 36.2mm*27.2mm*13mm.



2. Pin Definition

Table 1 Pin Definition

Pin group	Pin#	Pin Name	Type	Description
Input Clock	3	1PPS_IN	I	1PPS Reference Input.
Supply Voltage	1	VCC	PWR	Power Supply
UART	7	RXD	I	Asynchronous Serial Data Output/Input
	6	TXD	O	
Supply Voltage	4	GND	GND	Ground.
Output Clock	5	CLK_OUT	O	10.0MHz output
	2	1PPS_OUT	O	1PPS output

3. Electrical Parameters

Table 2 Electrical Parameters

Parameter	Symbol	Minimum	Typical	Maximum	Units
LVC MOS Input					
High Level Input Voltage	V_{IH}	2.4			V
Low Level Input Voltage	V_{IL}			0.4	V
LVC MOS Output					
High Level Output Voltage	V_{OH}	2.4			V
Low Level Output Voltage	V_{OL}			0.4	V



4. Performance

Table 3 Performance

Item	Parameter	Minimum	Typical	Maximum	Units	Test Condition	
Clock Output	Nominal Frequency	10.0			MHz	Synchronizing with 1PPS reference.	
	Wave	HCMOS					
	Duty Cycle	45		55	%	Load 15pF	
	Frequency vs. Temperature	-0.5		+0.5	$\times 10^{-9}$	$V_{CC}=5.0V$; $O_{load}=50\Omega$, T_A varies from $-40^\circ C$ to $85^\circ C$, temperature slope less than $2^\circ C$ per minute.	
	Accuracy	-5		+5	$\times 10^{-10}$	power on 5 minutes after calibrated.	
	Short-term Stability			0.005	$\times 10^{-9}$	$V_{CC}=5.0V$; $T_A=25^\circ C$; 1s;	
	Daily Aging	-0.5		+0.5	$\times 10^{-9}$	power on 30 day, $V_{CC}=5.0V$; $T_A=25^\circ C$.	
	Yearly Aging	-0.3		+0.3	$\times 10^{-6}$		
	Phase Noise				-98	dBc/Hz	1Hz
					-133		10Hz
					-155		100Hz
					-160		1KHz
					-162		10KHz
				-163		100KHz	
Holdover	-2.0		+2.0	us	$\Delta = \pm 5^\circ C$ Holdover 8 hours, after lock 1PPS 72 hours		
Supply Voltage	Supply Voltage	4.75	5.0	5.25	V		
	Warm Up Current			1000	mA		
	Steady Current			450	mA	@25°C	



5. UART

UART interface is used for management, which has a fixed baud rate (115200) using 1 stop bit and no parity. It is a LVTTTL-compatible port and needs an external translator to work with other signal types (such as RS-232C or RS-485).

a) TOD input sentence format

\$GPZDA, <1>,<2>,<3>,<4>,<5>,<6>*HH<CR><LF>

Parameter Number	Parameter Name	Format	Description
<1>	UTC time	hhmmss.ss	Hour,minute,second,9 characters
<2>	day	dd	Range: 01~31, 2 characters
<3>	month	mm	Range: 01~12, 2 characters
<4>	year	yyyy	4 characters
<5>	NA	00	Filled with 00
<6>	NA	00	Filled with 00
<p>Note: All sentences begin with "\$" , end with<CR><LF></p> <p>* HH represents the bitwise XOR result of all characters between "\$" and "**"</p> <p><CR><LF>: Carriage Return and Line Feed.</p> <p>Example: \$GPZDA,010516.00,26,11,2008,00,00*6B</p>			

b) TOD output sentence format

\$DPZDA, <1>,<2>,<3>,<4>,<5>,<6>,<7>,<8>,<9>,<10>,<11>,<12>,<13>,<14>*HH<CR><LF>

Parameter Number	Parameter Name	Format	Description
<1>	UTCtime	hhmmss	Hour,minute,second, 6 characters
<2>	Day	dd	Range: 01~31, 2 characters
<3>	Month	mm	Range: 01~12, 2 characters
<4>	Year	yyyy	4 characters
<5>	System state	xx	00-Freerun, 01-fast track, 10-lock, 11-holdover
<6>	Lock indicator	x	0-unlock, 1-locked
<7>	temperature	xxx	Unit: 0.1℃。 e.g.234means23.4℃
<8>	Input identifier	x	1-1PPS Input, 0-no1PPS Input.
<9>	GPZDA input identifier	x	1 means GPZDA Input, 0 means no GPZDA Input.
<10>	reserve	0	--
<11>	T1	xxxxxx	Test parameter1: range +8192~-8192, 5 parameters
<12>	T2	xxxxxxxxxx	Test parameter2: range 65535.0000~00000.0000, 10 parameters
<13>	T3	xxxxxxxxxx	Test parameter3: 10 parameters
<14>	reserve	xxxxxxx	7 characters



Note: All sentences begin with "\$" , end with<CR><LF>
 * HH represents the bitwise XOR result of all characters between "\$" and "*"
 <CR><LF>: Carriage Return and Line Feed.
 Example:
 \$DPZDA,010517,26,11,2008,10,1,315,1,1,0,-0000,31945.0000,-0000.1146,0000000*78

6. Environmental Conditions

Table 5 Environmental Conditions

Parameter	Conditions	
Operating Temperature	-40°C to 85°C	
Storage Temperature	-55°C to 105°C	
Storage Humidity	30%~80%	
ESD Level	Human Body Model, class2: 2000V to 4000V; ANSI/ESDA/JEDEC JS-001-2010.	
	Machine Model, class B: 200V to 400V; JEDEC JESD22-A115C.	
Moisture Sensitivity Level	Not humidity sensitive.	
Vibration	Test Condition: 0.75mm ;acceleration:10g;10Hz~500Hz, one cycle per 30 min, test 2 hour. (3 times for each 3 directions X,Y, Z), IEC 68-2-06 Test Fc.	
Shock	50g; 11ms; half sine wave (3 times for each 3 directions X,Y, Z),IEC 68-2-27 Test Ea/Severity 50A.	
Relative Humidity	20%~70%	Full Package Storage
Temperature	-10°C~35°C	



7. Typical Application

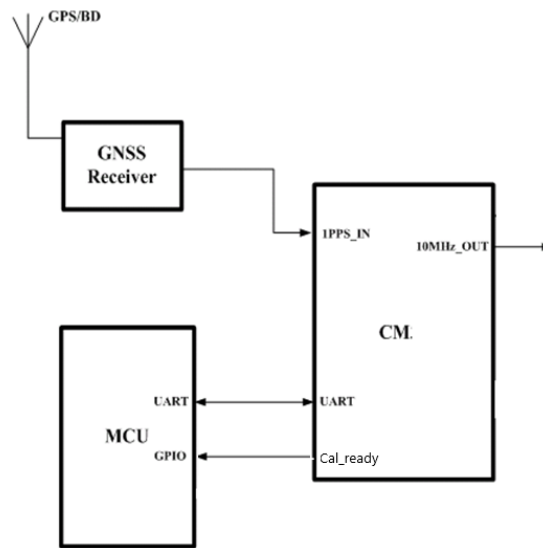


Figure 2Typical application

GNSS Receiver offers 1PPS signal to CM23.

The MCU monitors the work state of CM23.



8. Mechanical Structure (mm)

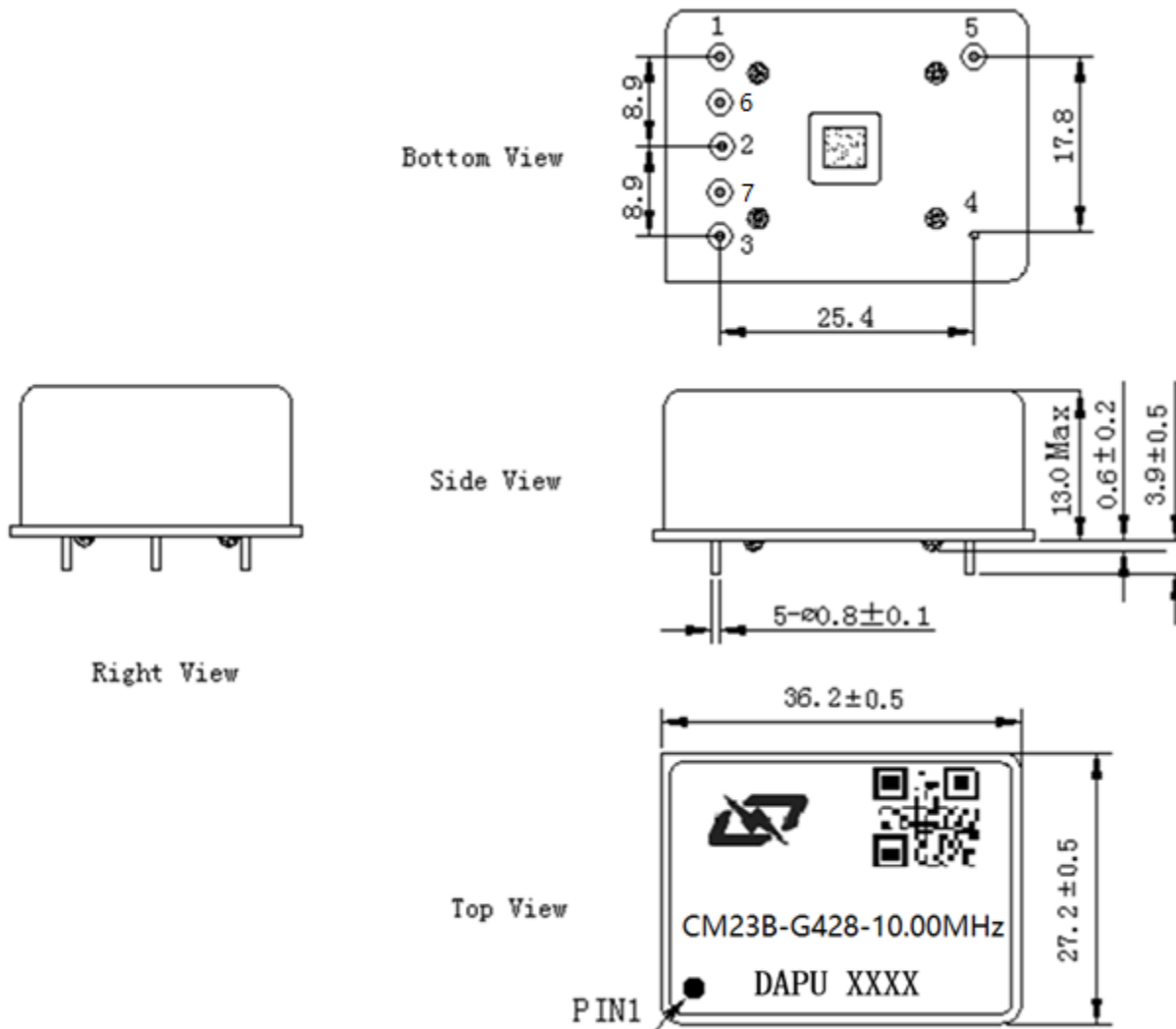


Figure 3 Mechanical structure

Note1: Tolerance ± 0.3 mm without mark.

Note2: The first two xx representative: year
After two xx representative: week



9. Wave Soldering Curve(RoHS)

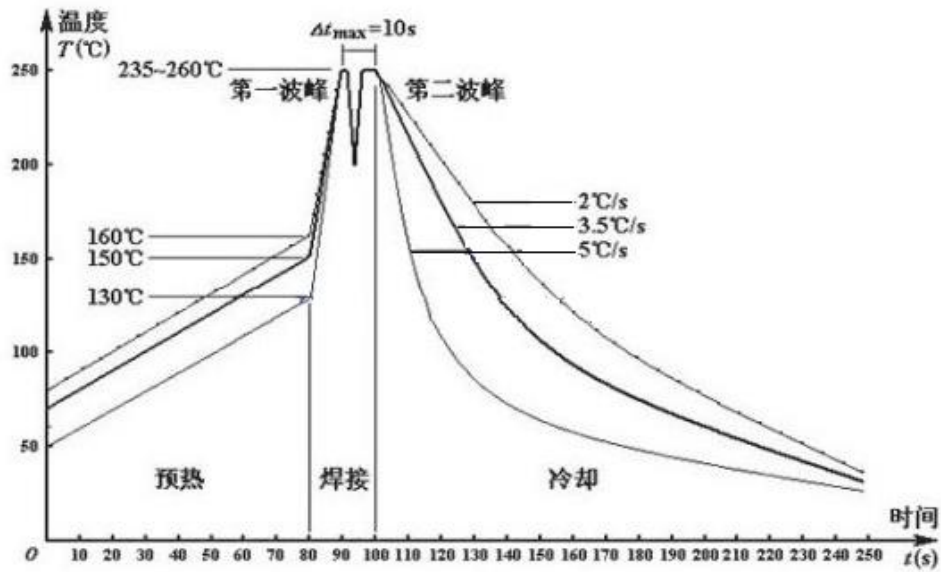


Figure 4 Wave soldering curve

10. Package (mm)

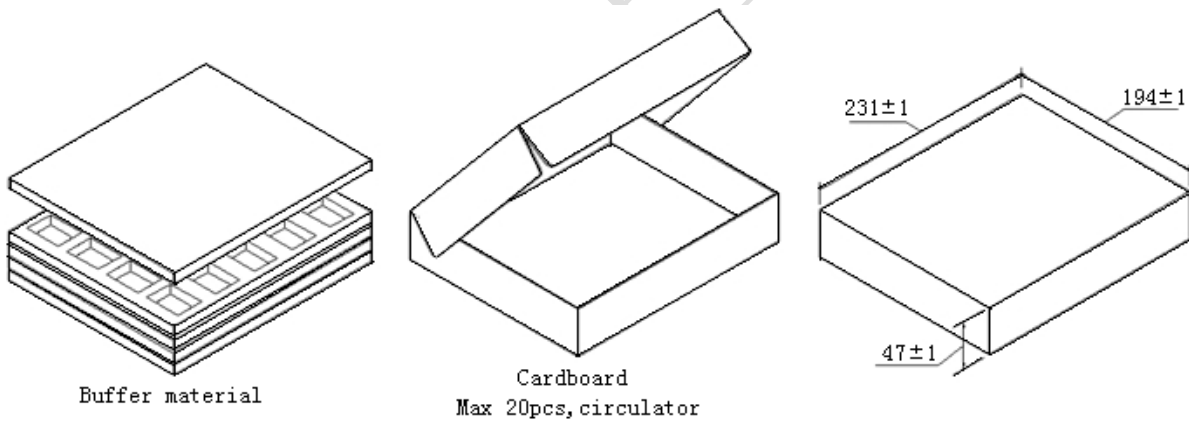


Figure 5 Package