Customer Code : A018

DATASHEET

DAPU P/N: **O22S-1803-10.00MHz**

Customer P/N:

DAPU			Customer Approval
Drew	Audited	Approved	
Amway.wei	Tony · Wang	James.Liu	
Date: 2018.04.20			Stamp, please! Thanks!

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Table of amendment

Version	Revision contents	Prepared by	Revised date
1.0	The first issued	Amway	2018.03.30
1.1	The “Frequency Accuracy” “Frequency Stability vs. Operating Temperature Range” “Frequency Tolerance after Temperature compensated vs Operating Temperature Range” “Short-Term Stability: Allan Variance” “Aging Tolerance per month” “Rise/Fall Time” “Warm Up Time” “Operating Temperature Jitter Air-tightness” “memory map” “Temperature compensation formula” is changed	Amway	2018.04.20

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1. Electrical Parameters

MODEL: O22S-1803-10.00MHz						
Item	Description	Parameters			Unit	Test Condition
		Min.	Typ.	Max.		
Output	Frequency		10.00		MHz	
	Output Waveform		LVTTL			
	Output Low Voltage			0.4	V	V_{cc}=5.0V, Load =15pF
	Output High Voltage	2.4			V	V_{cc}=5.0V, Load =15pF
	Duty Cycle	45		55	%	Measurement at -40~85℃
	Spurious Suppression			-90	dBc	
	Rise/Fall Time			4	ns	10%~90%VCC
	Load	13.5	15	16.5	pF	
	Start up time			1	s	90%V_{CC} to the correct frequency output time
Frequency Stabilities	Frequency Accuracy	-1.0		+1.0	$\times 10^{-6}$	Within 90 days after shipment and 15 minutes warm up time(before reflow), Measurement referenced to nominal frequency
		-0.1		+0.1	$\times 10^{-6}$	Within 90 days after shipment and 5 minutes warm up time(after reflow), Measurement referenced to initial frequency (after 2 hours and 5 minutes warm up time after reflow)
		-1.0		+1.0	$\times 10^{-6}$	After 2 hours and 5 minutes warm up time （after reflow), Measurement referenced to the frequency (before reflow）
	Frequency Stability vs. Operating Temperature Range	-0.5		+0.5	$\times 10^{-9}$	TA varied from -40 to 85℃,V_{cc}=5.0V, and Load = 15pF. Measurement referenced to frequency observed With TA = 25℃, V_{cc}=5.0V .
	Frequency Tolerance after Temperature compensated vs Operating Temperature Range	-0.3		+0.3	$\times 10^{-9}$	TA varied from -40 to 85℃, V_{cc}=5.0V, and Load = 15pF. Measurement referenced to frequency observed With TA = 25℃, V_{cc}=5.0V.

Frequency Stabilities	Short-Term Stability: Allan Variance			0.01	$\times 10^{-9}$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 1s, using PN9000 equipment.
				0.015	$\times 10$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 10, using PN9000 equipment.
				0.05	$\times 10$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 100 using PN9000 equipment.
	Frequency Stability vs. Supply Voltage	-0.5		0.5	$\times 10^{-9}$	TA =25℃, Vcc varied from 4.75 to 5.25V and Load =15pF. Measurement referenced to frequency observed with TA = 25℃, V_{cc}=5.0V.
	Frequency Tolerance vs Load	-1		1	$\times 10^{-9}$	10% Load Change Measurement referenced to frequency observed with TA = 25℃, V_{cc}=5.0V.
	Temperature Accuracy			1	℃	TA varied from -40 to 85℃,V_{cc}=5.0V, and Load = 15pF. Measurement TA
	Micro jump	-0.1		0.1	$\times 10^{-9}$	Continuous testing for 48 hours, temperature Fluctuations<3 ℃ ,one sampling/10s.
	Aging Tolerance per day	-0.5		+0.5	$\times 10^{-9}$	Vcc, TA constant Measurement referenced to frequency observed with TA=25 ℃ ,V_{cc}=5.0V. and after 30 days of operation
	Aging Tolerance per month	-12		+12	$\times 10^{-9}$	
	Aging Tolerance 1 Years	-0.08		+0.08	$\times 10^{-6}$	
	Aging Tolerance 10 Years	-0.5		+0.5	$\times 10^{-6}$	
Power Supply	Supply Voltage	4.75	5.0	5.25	V	
	Steady Consumption			300	mA	@25℃
	Warm up current			700	mA	When all temp range
	Warm Up Time			5	minute	
	Warm Up	-0.02		+0.02	$\times 10^{-6}$	After warm up 10 minute. Measurement referenced to frequency observed with TA = 25 ℃ ,V_{cc}=5.0V. and after 24 hour of operation.

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Phase Noise	Phase Noise			-80	dBc/Hz	1Hz
				-120		10Hz
				-140		100Hz
				-145		1KHz
				-150		10KHz
				-150		100KHz
Environmental Conditions	Operable Temperature range	-40		85	℃	
	Operating Temperature	-40		85	℃	
	Storage Temperature	-55		105	℃	
	Temperature Rate of Change			1	℃/min	
	Jitter			1.6	ps-rms	12kHz-5MHz
	Air-tightness			0.1	Pa.cm3/s	Not include PCB conversion board.
	ESD Level	Human Body Model, class2: 2000V to 4000V; ANSI/ESDA/JEDEC JS-001-2010.				
		Machine Model, class B: 200V to 400V; ANSI/ESDA/JEDEC JS-001-2010.				
	Moisture Sensitivity Level	Level 2.				
	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.				
Full Package Storage	Relative humidity (%)	20%～70%				
	Temperature (℃)	-10~35℃				

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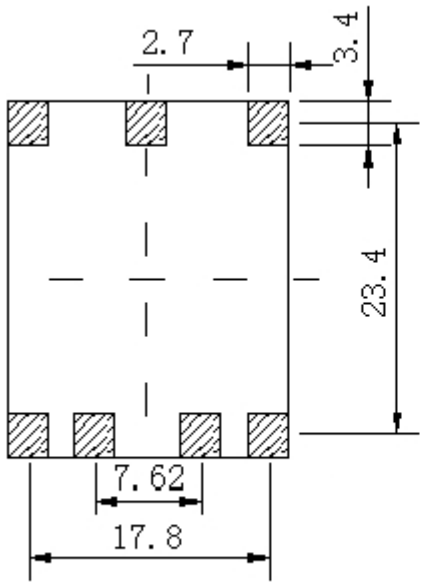
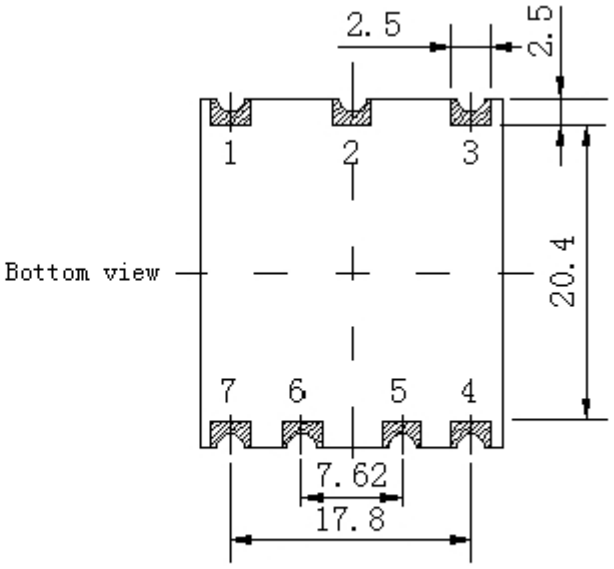
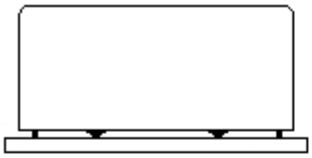
2. Mechanical Structure (mm)

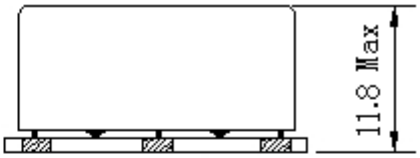


Solder Pad layout



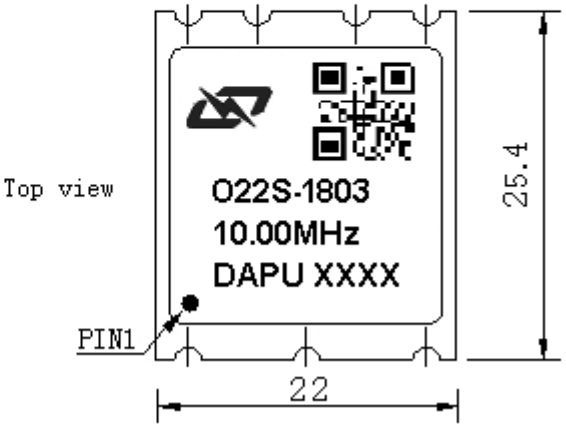


Right view



PIN FUNCTION

PIN	FUNCTION
1	NC
2	NC
3	Supply Voltage
4	RF Output
5	SCL
6	SDA
7	GND



Note1: Tolerance ±0.20mm without mark

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

Note3: Referential weight 10g

Note4: NC is not connect

3. I²C Devices Address

3.1. 2kbit I²C SERIAL EEPROM

Device name : AT24C02

Device supplier : Atmel

Device address : 1010 100

Memory map

Address	Size bytes	Parameter	Format	Value
0000h~0000h	1	EEPROM map version	unsigned byte	01h
0001h~0001h	1	Huawei Reserved		00h
0002h~0004h	3	Vendor ID(3 characters)	ASCII	
0005h~0024h	32	Vendor Product ID	ASCII	O22S-1803-10MHz
0025h~0028h	4	Nominal frequency in Hertz	2^8*f_1	9 999 990.95
0029h~002Ch	4	Device serial number	ASCII	
002Dh~0032h	6	Date code of manufacture	ASCII	"YYMMDD"
0033h~003Fh	13	Huawei Reserved		00h
0040h~0047h	8	A_0	$2^{32}*(A_0*10^6)$	0.1334
0048h~004Fh	8	A_1	$2^{32}*(2^{32}+A_1*10^6)$	-0.005225
0050h~0057h	8	A_2	$2^{32}*(A_2*10^6)$	3.77E-05
0058h~005Fh	8	A_3	$2^{32}*(2^{32}+A_3*10^6)$	-9.07E-07
0060h~0067h	8	A_4	$2^{32}*(A_4*10^6)$	1.99E-08
0068h~006Fh	8	A_5	$2^{32}*(2^{32}+A_5*10^6)$	-1.85E-10
0070h~0077h	8	B_0	$2^{32}*(2^{32}+B_0*10^6)$	-101.583
0078h~007Fh	8	B_1	$2^{32}*(B_1*10^6)$	0.740016
0080h~009Fh	32	Huawei Reserved		00h
00A0h~00FFh	96	Vendor Reserved		

Note：All numerical values are stored in little endian format

3.2. Analog-to-Digital Converter

Device name : ADC081C027

Device supplier : TI

Device address : 1010 000

Initialize the register address：0000 0010

The initialization value：0010 0000

Note: More detailed information see the datasheet provide by the TI.

4. Temperature measurement and compensation scheme

Temperature compensation formula:

$$A_5P^5 + A_4P^4 + A_3P^3 + A_2P^2 + A_1P + A_0 = \frac{f(P) - f(P_{ref})}{f(P_{ref})}$$

A_x: Temperature compensation parameters (see register list)

P: This parameter is read by ADC and is related to temperature.

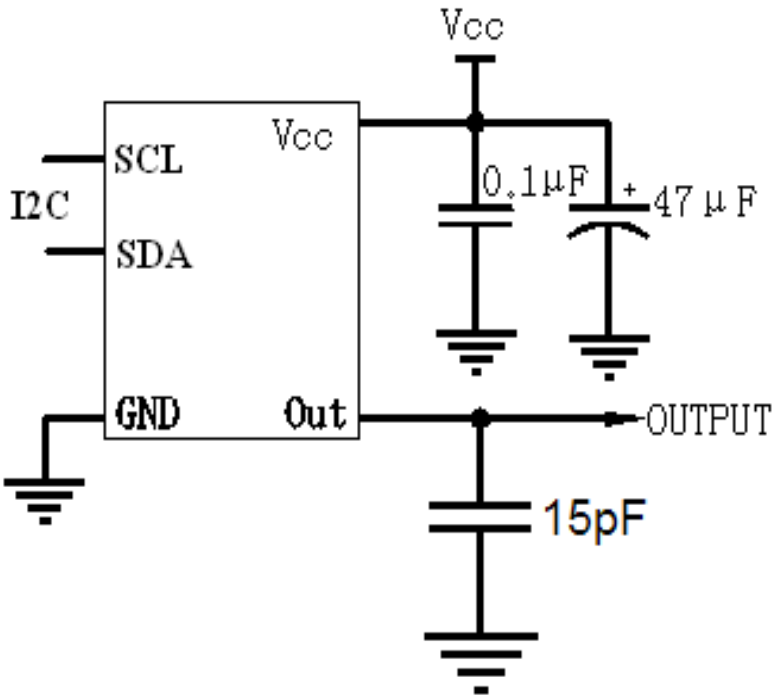
f(P): measured frequency.

P_{ref}: Parameter variables associated with the reference Temperature (25℃)

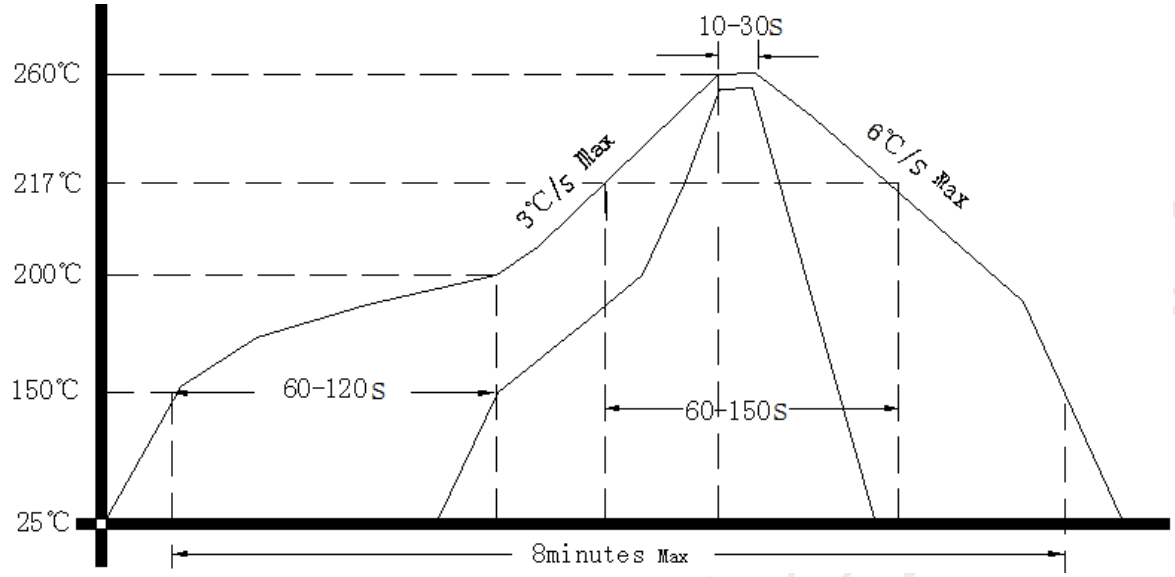
OCXO Ambient temperature calculation formula:

$$B_1P + B_0 = Ta[^\circ C]$$

5. Test Circuit



6. Reflow Soldering Curve (RoHS)



7. Package: Tape & Reel (mm)