Customer Code : A037

DATASHEET

DAPU P/N: **O22S-3703-10.00MHz**

Customer P/N:

DAPU			Customer Approval
Drew	Audited	Approved	
Amway.wei	Tony · Wang	James.Liu	
Date: 2019.12.09			Stamp, please! Thanks!

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Table of amendment

Version	Revision contents	Prepared by	Revised date
1.0	The first issued	Amway	2019.09.10
1.1	The “Frequency Stability vs. Supply Voltage” “Frequency Tolerance vs Load” “Micro jump” “Mechanical Structure” changed	Amway	2019.10.10
1.2	The “Frequency Accuracy” “Short-Term Stability: Allan Variance” “Temperature Resolution” changed	Amway	2019.10.15
1.3	The “Mechanical Structure” “I2C Devices Address” “Temperature measurement and compensation scheme” “Test Circuit” changed	Amway	2019.12.09
1.4	The “Memory map” changed	Amway	2019.12.12
1.5	The “Memory map” changed	Amway	2019.12.19

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1. Electrical Parameters

MODEL： O22S-3703-10.00MHz

Item	Description	Parameters			Unit	Test Condition
		Min.	Typ.	Max.		
Output	Frequency		10.00		MHz	
	Output Waveform		LVCOMS			
	Output Low Voltage			0.4	V	V_{cc}=3.3V, Load =15pF
	Output High Voltage	2.4			V	V_{cc}=3.3V, 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	$\times 10^{-6}$	Measurement referenced to initial frequency (after 2 hours and 5 minutes warm up time after reflow), Within 90 days after shipment and 5 minutes warm up time (before 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	-0.2		+0.2	$\times 10^{-9}$	T_A varied from-40℃ to 85℃, measurement referenced to frequency observed with $f_{ref}=(f_{max}+f_{min})/2$,$V_{cc}$=3.3V,$O_{load}$=15pF, temperature variable speed less than 2℃per minute.

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.
				0.015	$\times 10^{-9}$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 10s.
				0.05	$\times 10^{-9}$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 100s.
	Frequency Stability vs. Supply Voltage	-0.2		+0.2	$\times 10^{-9}$	TA =25℃, Vcc varied from 3.13 to 3.47V and Load =15pF. Measurement referenced to frequency observed with TA = 25℃, V_{cc}=3.3V.
	Frequency Tolerance vs Load	-0.2		+0.2	$\times 10^{-9}$	10% Load Change Measurement referenced to frequency observed with TA = 25℃, V_{cc}=3.3V.
	Temperature Resolution			1	℃	TA varied from -40 to 85℃,V_{cc}=3.3V, and Load = 15pF. Measurement TA
	Micro jump	-0.05		+0.05	$\times 10^{-9}$	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}=3.3V. 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	3.13	3.3	3.47	V	
	Steady Consumption			400	mA	@25℃
	Warm up current			1000	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}=3.3V and after 24 hour of operation.

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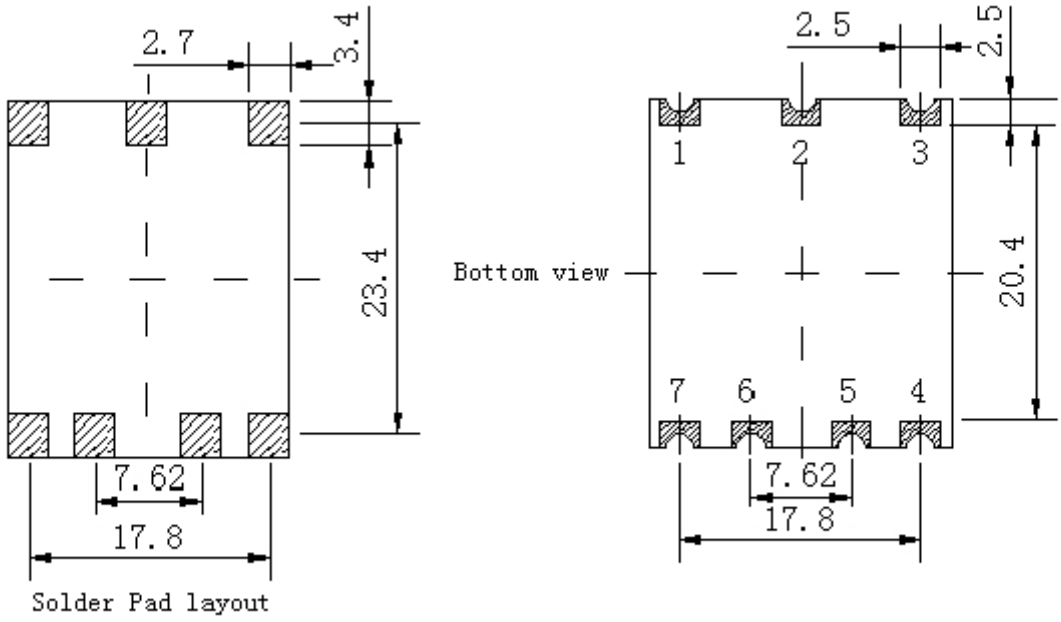
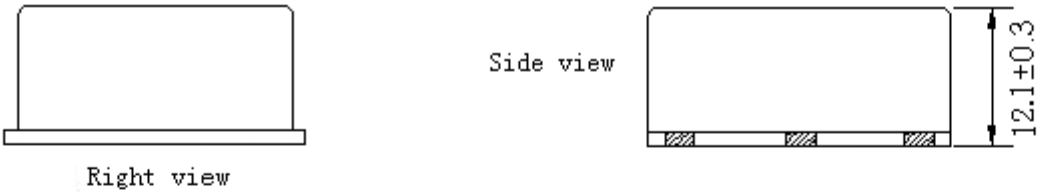
Phase Noise	Phase Noise			-80	dBc/Hz	1Hz
				-120		10Hz
				-140		100Hz
				-145		1KHz
				-150		10KHz
				-150		100KHz
Environmental Conditions	Operable Temperature range	-40		+85	℃	
	Operating Temperature	-40		+85	℃	
	Storage Temperature	-55		+105	℃	
	Temperature Rate of Change			1	℃/min	
	Jitter			1.6	ps-rms	12kHz-5MHz
	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 3.				
	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℃				

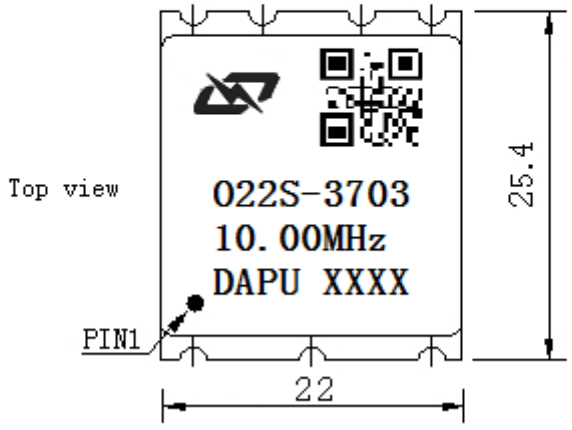
2. Mechanical Structure (mm)





PIN FUNCTION

PIN	FUNCTION
1	NC
2	Reset
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

Note5: The PIN2 function is: Input by low level voltage, the OCXO internal MCU will reset (reset MCU only).

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3. I²C Devices Address

Device name: **PIC16F1704**
Device supplier: MICROCHIP
Device address: 1110 000

Memory map

Address	Size bytes	Parameter	Format	Value
0000h~0004h	5	Vendor ID	ASCII	DP
0005h~0024h	32	Vendor Product ID	ASCII	O22S-3703-10.00MHz
0025h~0028h	4	Nominal frequency in Hertz	32-bit unsigned integer	10000000
0029h~002Ch	4	Device serial number	32-bit unsigned integer	001
002Dh~0032h	6	Date code of manufacture	ASCII	"YYMMDD"
0033h~003dh	11	PxxxxxxYYWW P:Vedor code, xxxxxx: OCXO serial number(Insert a null marker at the end when a digit is left.) YY : Production Year, ex)19 => 2019 WW : Production Week, ex) 45, 45weeks	ASCII	"PxxxxxxYYWW"
003Eh~003Fh	2	SAMSUNG Reserved		00h
0040h~0047h	8	A_0	64-bit floating point	1.33E-01
0048h~004Fh	8	A_1	64-bit floating point	-5.23E-03
0050h~0057h	8	A_2	64-bit floating point	3.77E-05
0058h~005Fh	8	A_3	64-bit floating point	-9.08E-07
0060h~0067h	8	A_4	64-bit floating point	1.99E-10
0068h~006Fh	8	A_5	64-bit floating point	-1.85E-12
0070h~0077h	8	B_0	64-bit floating point	-1.02E+02
0078h~007Fh	8	B_1	64-bit floating point	7.40E-01
0080h~0087h	8	C_0	64-bit floating point	7.40E-01
0088h~008Fh	8	C_1	64-bit floating point	-5.23E-03

0090h~0097h	8	C_2	64-bit floating point	3.77E-05
0098h~009Fh	8	C_3	64-bit floating point	-9.08E-07
00A0h~00BFh	32	SAMSUNG Reserved		00h
00C0h~00EFh	48	Vendor Reserved		
00F0h~00F1h	2	OCXO Temperature 10-bit ADC Value	16-bit unsigned integer	528
00F2h~00FFh	14	Vendor Reserved		

Note：All numerical values are stored in little endian format

ADC bit map:

BIT	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10 bit ADC	0x000 - 0x3FF											0	0	0	0	0	0

4. Temperature measurement and compensation scheme

Temperature compensation formula(five functions)：

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

Temperature compensation formula(three functions)：

$$C_3P^3 + C_2P^2 + C_1P + C_0 = \frac{f(P) - f(P_{ref})}{f(P_{ref})}$$

A_x: Temperature compensation parameters (see register list)

C_x: Temperature compensation parameters (see register list)

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

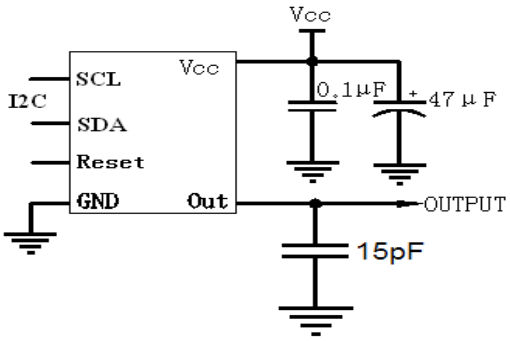
f(P): measured frequency.

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

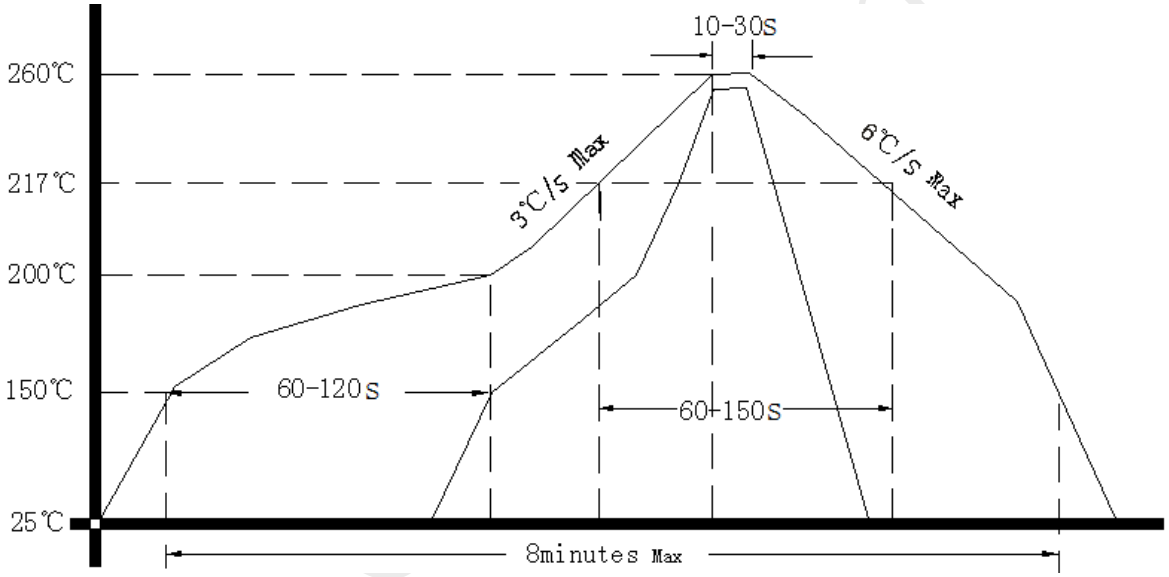
OCXO Ambient temperature calculation formula：

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

5. Test Circuit



6. Reflow Soldering Curve (RoHS)



7. Package: Tape & Reel (mm)