Customer Code : A008

DATASHEET

DAPU P/N: **O22S-0804-10.00MHz**

Customer P/N:

DAPU			Customer Approval
Drew	Audited	Approved	
Amway.wei	Tony · Wang	James.Liu	
Date: 2019.09.27			Stamp, please! Thanks!

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Table of amendment

Version	Revision contents	Prepared by	Revised date
1.0	The first issued	Amway	2018.04.03
1.1	The "DIGITAL THERMOMETER" changed	Amway	2018.04.10
1.2	The "Output" "Frequency Stabilities" "Power Supply" "Phase Noise" "Jitter" "Environmental Conditions" "Mechanical Structure" "I2C Devices Address" changed	Amway	2019.09.27

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1. Electrical Parameters

MODEL： O22S-0804-10.00MHz						
Item	Description	Parameters			Unit	Test Condition
		Min.	Typ.	Max.		
Output	Frequency		10.00		MHz	
	Output Waveform		LVTTL			
	Output Overshoot			10	%	
	Output Low Voltage			0.4	V	Vcc=3.3V, load=15pF
	Output High Voltage	2.7			V	Vcc=3.3V, load=15pF
	Duty Cycle	45		55	%	
	Rise / Fall Time (10%~90%)			4	ns	
	Load	13.5	15	16.5	pF	
	Start-up time			0.8	s	
	Sprious			-90	dBc	
Frequency Stabilities	Frequency Tolerance vs. Operating Temperature Range			0.6	$\times 10^{-9}$	TA varied from-40℃ to 85℃, measurement referenced to frequency observed with pk-pk, Vcc=3.3V, load=15pF, temperature variable speed less than 2℃per minute.
	Initial Frequency Tolerance	-1		+1	$\times 10^{-6}$	Measurement referenced to frequency observed with TA=25℃, Vcc=3.3V, and after 15 minutes of operation, within 90 days after ex-works
	Frequency Tolerance vs. Supply Voltage	-0.1		+0.1	$\times 10^{-9}$	measurement referenced to frequency observed TA=25℃, Vcc varied from 3.234V to 3.366V, and Load=15pF.
	Frequency Tolerance vs. Load	-0.2		+0.2	$\times 10^{-9}$	10% load change measurement referenced to frequency observed with TA=25℃, Vcc=3.3V, and Load=15pF.
	Micro jump	-0.02		+0.02	$\times 10^{-9}$	Continuous testing for 7 days, temperature Fluctuations< ±5℃,one sampling/10s.see note 2.
	Temperature hysteresis effect	-0.1		+0.1	$\times 10^{-9}$	Over temperature range(10℃/hour)
	Reflow shift	-0.1		+0.1	$\times 10^{-6}$	within 90 days after ex-works, put 2 hours after reflow soldering and power on for 5 minutes, relative to the frequency deviation after ex-works
		1		1	$\times 10^{-6}$	within 90 days after ex-works, put 2 hours after reflow soldering and power on for 5 minutes, relative to standard frequency deviation
	Retrace	-0.01		+0.01	$\times 10^{-6}$	After 24 hour off at 25℃ 15min power on

	Short-Term Stability Allan Variance			0.005	$\times 10^{-9}$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 1s, using PN9000 equipment.
				0.015	$\times 10^{-9}$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 10s, using PN9000 equipment.
				0.03	$\times 10^{-9}$	Temperature stability, no EMI\EMC or other interference，test after power for 1hour ref. to 25℃; 100s, using PN9000 equipment.
	Aging Tolerance Per Day	-0.2		+0.2	$\times 10^{-9}$	Vcc,TA constant measurement referenced to frequency observed with TA=25℃,Vcc=3.3V, and after 30 days of operation.
	Aging Tolerance 1 Year	-0.03		+0.03	$\times 10^{-6}$	
	Aging Tolerance 10 Year	-0.25		+0.25	$\times 10^{-6}$	
	Aging Tolerance 15 Year	-0.3		+0.3	$\times 10^{-6}$	
Power Supply	Supply Voltage	3.135	3.3	3.465	V	
	Steady Consumption			400	mA	@25℃
	Warm up current			1000	mA	
	Warm-Up Time			10	minutes	@25℃within $\pm 0.01\times 10^{-6}$ of final frequency with reference after 1 hour on.
Phase Noise	Phase Noise			-90	dBc/Hz	1Hz
				-120		10Hz
				-140		100Hz
				-150		1KHz
				-150		10KHz
				-150		100KHz
				-155		1MHz
Jitter	Jitter		0.9	1.8	ps	RMS (12KHz ~5MHz)
Acceleration sensitivity	Acceleration sensitivity			4	ppb/g	Gamma vector,3-axes,30-1500Hz,typically less than

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Environmental Conditions	Operating environmental condition	-40		+85	℃	
	Operable Temperature range	-40		+90	℃	$<\pm 100.0\times 10^{-9}$
	Storage Temperature	-55		+105	℃	
	Relative Humidity	5		85	%	
	Air-tightness			0.02	$\times 10^{-6}$ pa.m3/s	Leak detection by He mass spectrometry: 2hrs@4 atmospheric pressure, no more than 1H static time.
	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	Sweep frequency sine wave, frequency: 10-55 Hz, maximum amplitude 1.5 mm (peak value), 55-1 KHz, maximum acceleration 10 g. Each axis 1H (3 axes 6 directions), sweep rate 1 octave/min.				
	Shock	100g; 6ms; half sine wave (3 times for each 3 directions X, Y, Z).				
Full Package Storage	Relative humidity (%)	20%～70%				
	Temperature (℃)	-10~35℃				

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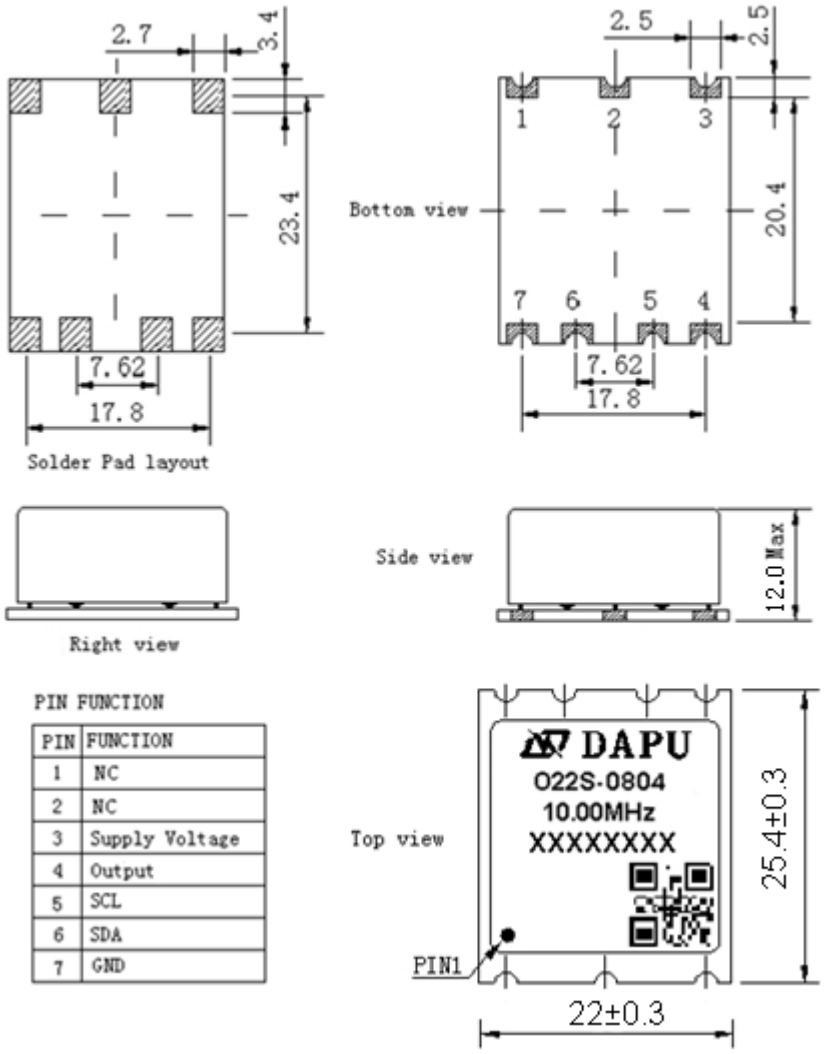
2. Mechanical Structure (mm)



Note1: Tolerance ±0.2mm without mark

Note2: The first two xx representative: week
After two xx representative: year
At last four xxxx representative: serial number

Note3: Referential weight 8.0g

Note4: NC is not connect

Note5: Bar-code should include supplier code (20004800),
batch No, week and year code, serial No.
For example, the 200th part produced in the 48th week in 2017,
bar-code is 2000480048170200.

2. I2C Devices Address

3. 3.1. 2kbit I^2C SERIAL EEPROM

4. Device name : AT24C02

5. Device supplier : Atmel

6. Device address : 1010 100

Memory map

Address	Size bytes	Parameter	Format	Value
0000h~0000h	1	EEPROM map version	unsigned byte	01h
0001h~0001h	1	Reserved		00h
0002h~0004h	3	Vendor ID(3 characters)	ASCII	DP
0005h~0024h	32	Vendor Product ID	ASCII	O22S-0804-10.00MHz
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~003Fh	13	Reserved		00h
0040h~0047h	8	Initial frequency note1	64-bit floating point	64-bit floating-point type, refer to IEEE754
0048h~004Fh	8	Aging note2	64-bit floating point	
0050h~0057h	8	Frequency stability vs.temp note 3	64-bit floating point	
0058h~006Fh	24	Reserved		00h
0070h~0077h	8	B_0	64-bit floating point	
0078h~007Fh	8	B_1	64-bit floating point	
0080h~009Fh	32	Reserved		00h
00A0h~00A1h	2	P_{min}	16-bit unsigned integer	16 bit integer
00A2h~00A3h	2	P_{max}	16-bit unsigned integer	16 bit integer
00A4h~00FFh	2	Vendor Reserved		

Note1: Initial frequency after ex-works, unit: ppb

Note2: Aging per day after ex-works, unit: ppb

Note3: Frequency stabilities&Operating Temperature Range (pk-pk) after ex-works, unit: ppb

3.2. Analog-to-Digital Converter

Device name : ADC081C027

Device supplier : TI

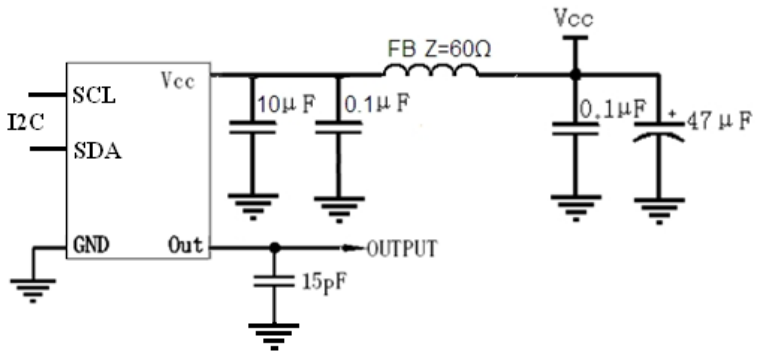
Device address : 1010 000

Initialize the register address：0000 0010,

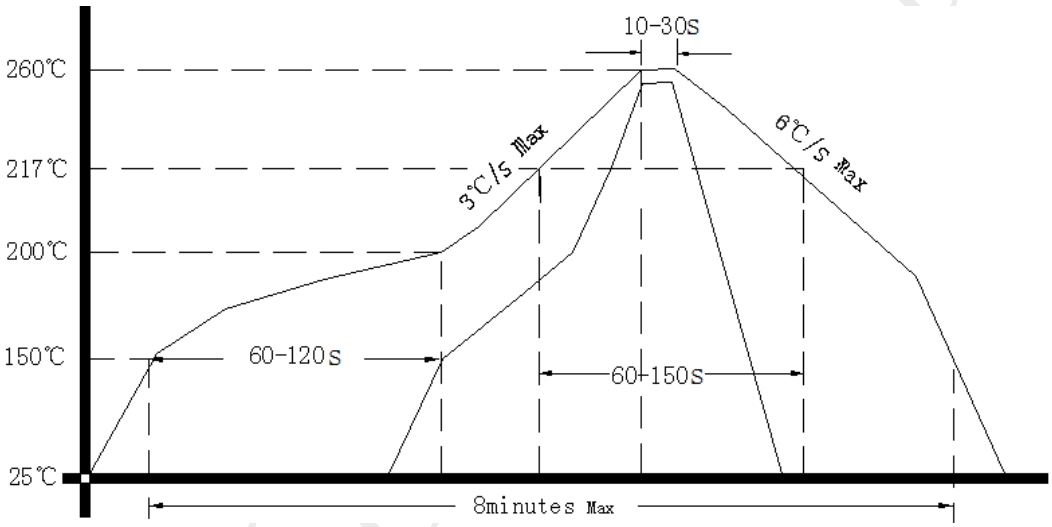
The initialization value：0010 0000

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

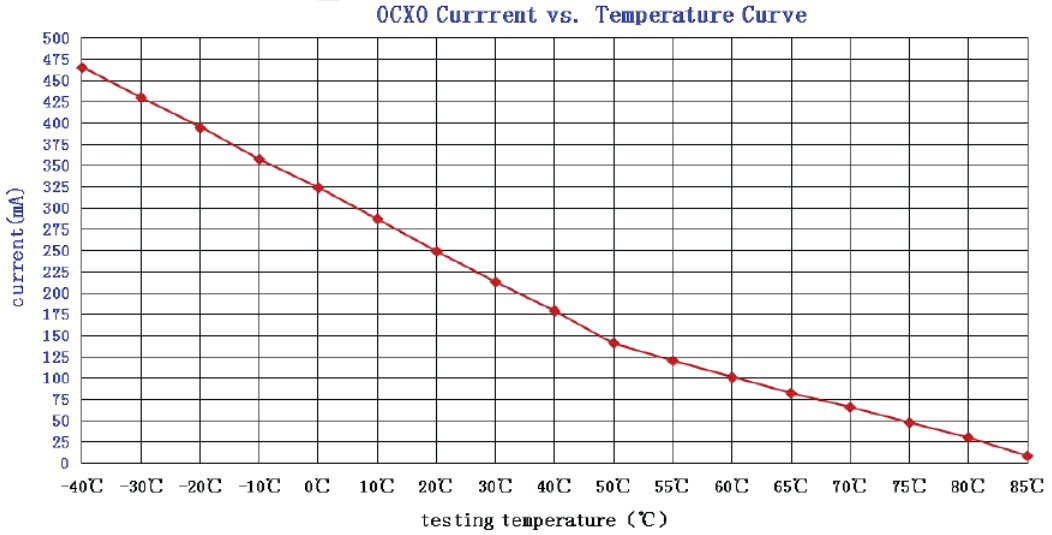
4. Test Circuit



5. Reflow Soldering Curve (RoHS)



6. Current vs. Temperature Curve



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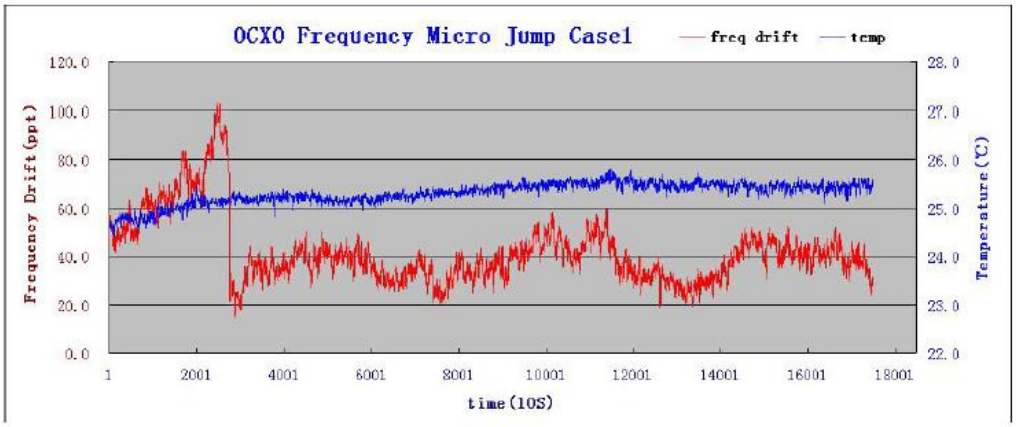
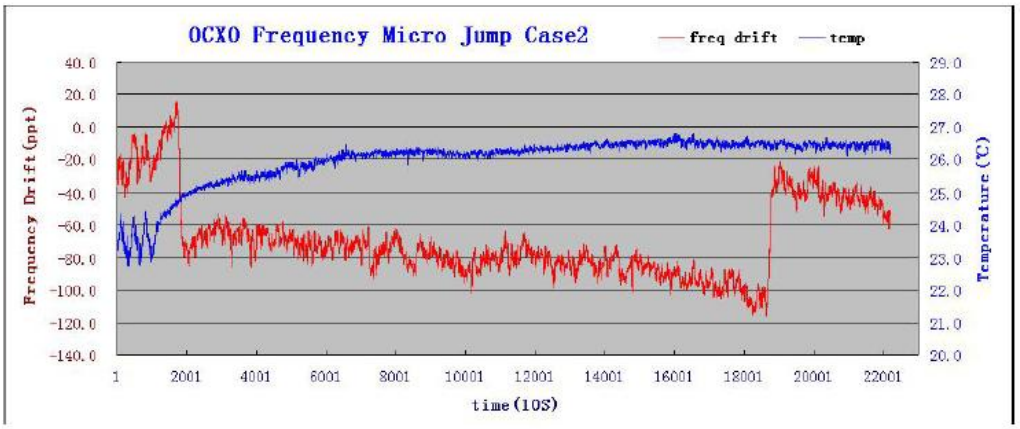
7. Mirco Jump

Case1:



Case2:



8. Package: Tape & Reel (mm)