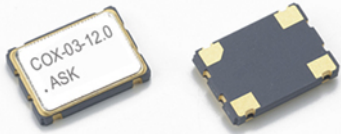


## COX Series Ceramic SMD Oscillator



- Ultra-thin thickness
- HCMOS/TTL Output
- Stability to  $\pm 20\text{ppm}$
- Tri-state function available
- Suitable for reflow soldering

### PART NUMBER GUIDE

#### COX-02A - 10.0 - 20 - A - S

##### PACKAGE TYPE

COX-01 : SMD – 7x5.0mm – 1.8V  
 COX-02 : SMD – 7x5.0mm – 2.5V  
 COX-02A : SMD – 7x5.0mm – 2.8V  
 COX-03 : SMD – 7x5.0mm – 3.3V  
 COX-05 : SMD – 7x5.0mm – 5.0V

##### FREQUENCY

1.000MHz~156.000MHz

##### PIN 1 CONNECTION

S : TRI-STATE, E/D

##### OPERATING TEMPERATURE

A : -40 to +85°C  
 B : -20 to +70°C  
 C : -10 to +70°C  
 D : 0 to +70°C

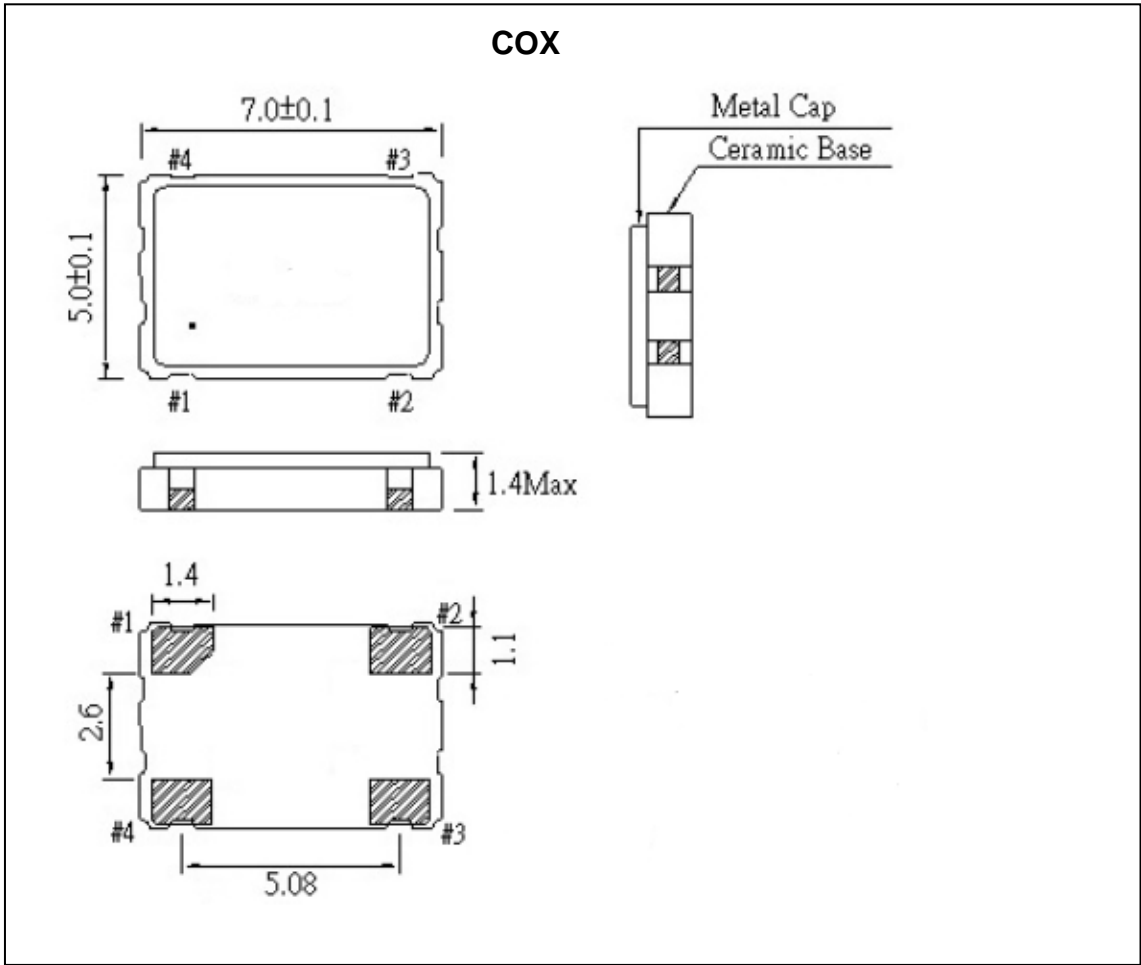
##### FREQUENCY STABILITY

20 :  $\pm 20\text{ppm}$

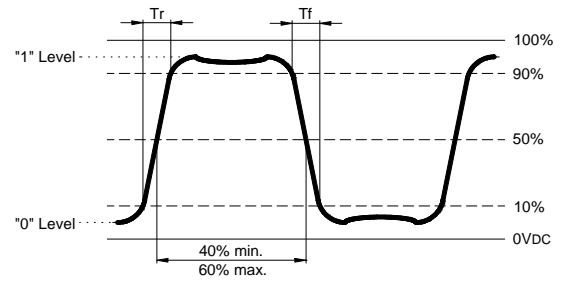
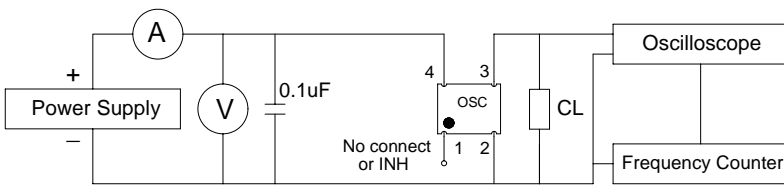
### ELECTRICAL SPECIFICATIONS

MODEL	COX-02A
Frequency Range	10.000MHz
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-55°C to +125°C
Supply Voltage (V <sub>DD</sub> )	2.8V <sub>DC</sub> $\pm 10\%$
Frequency Tolerance / Stability	$\pm 20$ ppm Max
Output level Load / Output Level	15pf / CMOS
Start up Time	10msec Max
Current Consumption	20mA Max
Aging (at 25°C)	3ppm / year Max
Output Voltage Logic High (V <sub>OH</sub> )	0.9V <sub>DD</sub> min
Output Voltage Logic Low (V <sub>OL</sub> )	0.1V <sub>DD</sub> max
Duty Cycle	45 to 55%
Rise / Fall Time	8ns max
PIN 1 Tri-State Input Voltage	No connection: Enables Output
	V <sub>IH</sub> $\geq 2.0\text{V}_{DC}$ : Enables Output    V <sub>IH</sub> $\leq 0.8\text{V}_{DC}$ : High impedance
Phase Jitter(integrated 10KHz ~ 20Mhz)	2ps RMS (1- $\sigma$ )
Phase Accumated	5ps RMS (20.000 adjacent periods)
Peak to Peak jitter	50ps (100.000 random periods)

MECHANICAL DIMENSION

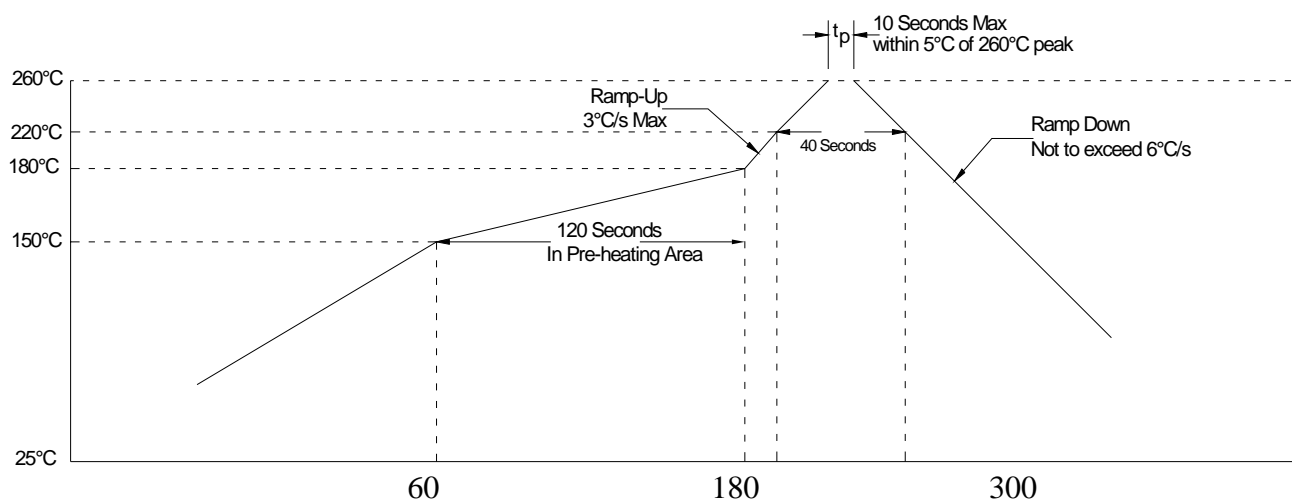


**Test circuit**



## SPECIFICATION OF CRYSTAL

### Soldering reflow



### RoHS and REACH Regulation



#### Pb-free compliance

Component and Assembly Pb content shall be less than 0.1% by weight of the device (in accordance with IPC/EIA J-STD-006) and shall not be intentionally introduced.

#### Product Information

For a product to be **RoHS** compliant, it must satisfy several conditions:

- Contain no more than the specified limits of the target hazardous substances set out in the RoHS Directive
- Able to withstand Pb-free 260°C solder reflow profile below
- External packaging and terminations are Pb-free
- Internal PCB, components, solders, and terminations are Pb-free

#### REACH Regulation (EC) 1907/2006

Above concerned part is compliant with all requirement in the REACH regulations EC No. 1907/2006.

## SPECIFICATION OF CRYSTAL

**Reliability Test** ( applicable to OSC and SMD type X'tal )

Test Items	Test Condition	Specification	
		General OSC (Note:1)	General X' tal (Note:2)
1. Gross Leak Test	FC-40 125°C/30sec	No continuous bubble	
2. Fine Leak Test	Bombing of He 5kg/cm <sup>2</sup> for 2 hours	Less than 1*10 <sup>-8</sup> atm.c.c./sec, Helium	
3. Drop Test	Free dropped a. ~19.999MHz(Fund.) →100 cm height b. 20~29.999MHz(Fund.) →50 cm height c. 30~ MHz(Fund.) →20 cm height on a hard wooden board for 3 times ( board is thickness more than 30 mm)	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$
4. Vibration Test	Freq. range: 10~55Hz Peak to peak amplitude:1.5mm Peak acceleration:10 G 3 direction(X,Y,Z) , each 60min.	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$
5. Resistance to Soldering Test	a. IR Reflow furnace with the condition 2 times. Peak temp. 260±3°C , 10sec( Min.)	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec. For SMD OSC only	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$
	b. Dip terminals in a 260±5°C solder bath for 5±0.5 sec.	At least 90% of each dipped area shall be covered by fresh solder. For DIP OSC only.	NA
6. Bending Test	Bending cycle : 1 cycle 0° -> 45° -> 0° -> 45° -> 0°	$\Delta F \leq \pm 5\text{PPM}$ , Duty within spec. For DIP OSC only.	NA
7. Share Test	Weight : 10N, Test duration : 10±1 sec	$\Delta F \leq \pm 5\text{PPM}$ , Duty within spec. For SMD OSC only.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$
8. Low Temp. Exposure Test	-40±3°C , 240±12 hrs	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$
9. Aging Test	125±3°C , 240±12hrs	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$
10. High Temp. & Humidity Test	+85°C±5°C & 85%±5% R.H. , 240±12 hrs	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$
11. Temperature Cycling Test	-40±3°C/15±3min ~ +85±3°C/15±3min 15cycles	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta C.I. \leq \pm 10\text{ohms}$

Note:1 → For communication application the spec. demanded " $\Delta F \leq \pm 5\text{ PPM}$ , Duty within spec." •

Note:2 → For communication application the spec. demanded " $\Delta F \leq \pm 5\text{ PPM}$ ,  $\Delta C.I. \leq \pm 5\text{ ohms}$ " •