

## C Series



- Ultrathin thickness 0.6mm
- Excellent stability
- Reflow is possible
- RoHS compliant and lead free

### PART NUMBER GUIDE

**C-20 - 32.768 - 20 - J - 125**

#### PACKAGE TYPE

- C-45** : SMD type - 4.5x1.5x0.9mm
- C-32** : SMD type - 3.2x1.5x0.9mm
- C-20** : SMD type - 2.0x1.2x0.6mm
- C-20S** : SMD type - 2.0x1.2x0.38mm
- C-16** : SMD type - 1.6x1.0x0.5mm

#### FREQUENCY

32.768KHz  
30.720KHz~153.600KHz

#### LOAD CAPACITANCE

12.5 : 12.5pF

#### OPERATING TEMPERATURE TABLE 1

FREQUENCY TOLERANCE AT 25°C  
±20 ppm

### ELECTRICAL SPECIFICATIONS

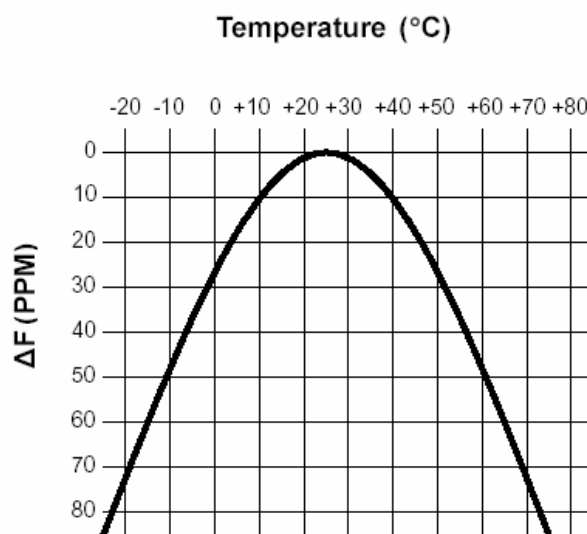
MODEL	C-20
Nominal Frequency	32.768KHz
Operating Temperature Range	-40°C ~ +85°C
Storage Temperature Range	-55°C ~ +125°C
Frequency Tolerance (at 25°C)	±20ppm
Temperature Coefficient	-0.03x10 <sup>-6</sup> /°C <sup>2</sup> Typ.
Turnover temperature	25°C ±5°C
Load Capacitance (CL)	12.5pF
Drive Level	0.1 μW
Series Resistance	70kΩ Max
Shunt Capacitance (Co)	2.0pF max.
Insulation Resistance	500 MΩ Min//DC 100V
Aging (at 25°C)	±3.0ppm/year Max

SPECIFICATION OF CRYSTAL

TABLE 1

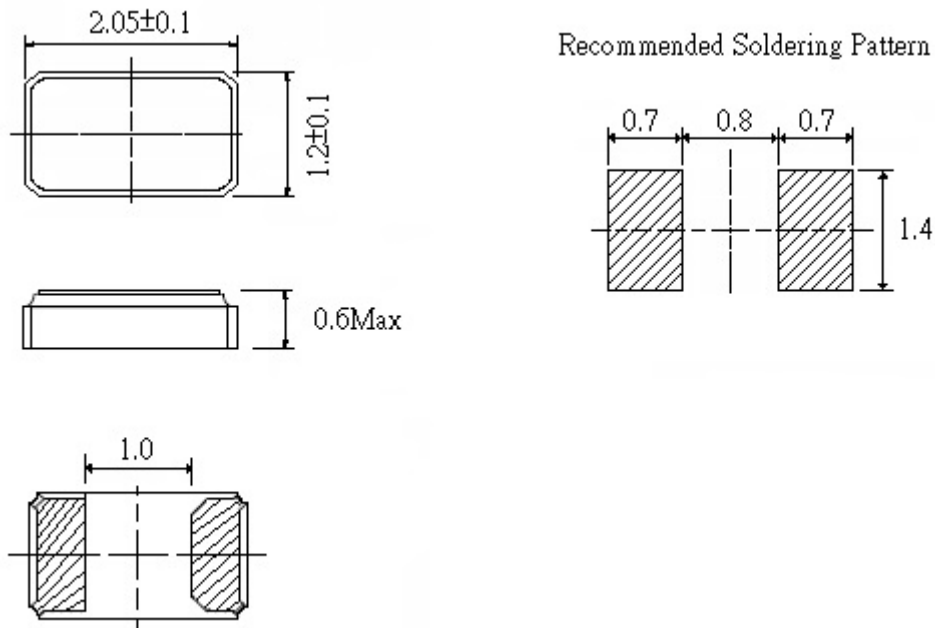
OPERATING TEMPERATURE RANGE	
-10~+60°C	A
-20~+60°C	B
0~+70°C	C
-10~+70°C	D
-20~+70°C	E
-30~+60°C	F
-20~+85°C	G
-30~+70°C	H
-30~+85°C	I
-40~+85°C	J
-40~+125°C	K

TEMPERATURE CHARACTERISTIC

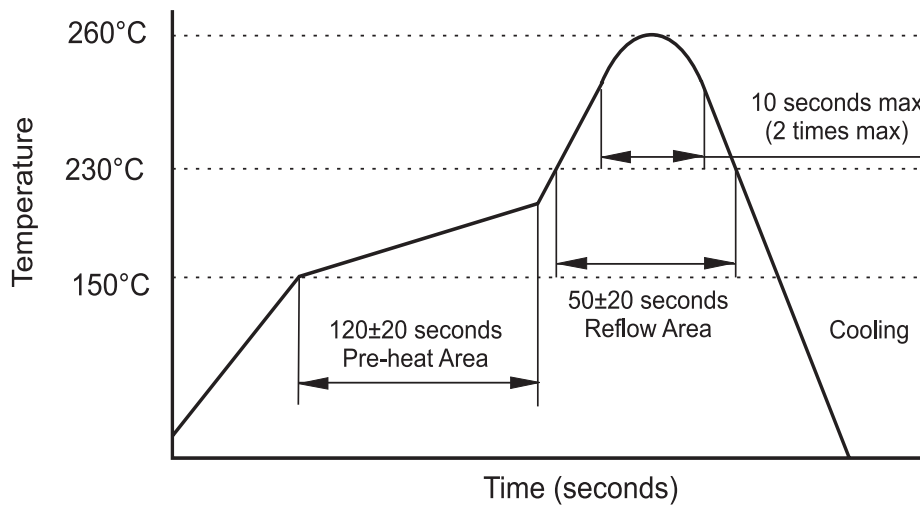


**MECHANICAL DIMENSION**

**C-20**



**SOLDERING REFLOW**



**Pb-free compliance**

Component and Assembly Pb content shall be less than 0.1% by weight of the device (in accordance with RoHS directive 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

## 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.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$
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.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$
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	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$
	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.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$
8. Low Temp. Exposure Test	-40±3°C , 240±12 hrs	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$
9. Aging Test	125±3°C , 240±12hrs	$\Delta F \leq \pm 10\text{PPM}$ , Duty within spec.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$
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.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$
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.	$\Delta F \leq \pm 10\text{PPM}$ , $\Delta \text{C.I.} \leq \pm 10\text{ohms}$

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 " $\Delta F \leq \pm 5\text{ PPM}$ ,  $\Delta \text{C.I.} \leq \pm 5\text{ ohms}$ " .