

# CRYSTAL CLOCK OSCILLATORS

## WARRANTY CLAUSE

### 1300 Series

No.	Item	Condition	Specification
1	Vibration Test	MIL-STD-202F, TM204D, condition B	Please see below note. (*)
2	Shock Test	MIL-STD-202F, TM213B, condition 9,800m/s <sup>2</sup> 0.5 ms	Please see below note. (*)
3	Drop Test	3 times natural drops on to hard wooden board from the height (see 4 )	Please see below note. (*)
4	Humidity Test	MIL-STD-202F, TM103B, condition A	Please see below note. (*)
5	Solder Heat Test	MIL-STD-202F, TM210A, condition B (260°C ± 5°C for 10 ± 1 seconds)	Please see below note. (*)
6	Thermal Shock Test	Expose to 100 cycles of extreme temperatures, that is, -40°C for 30 minutes then +85°C for 30 minutes.	Please see below note. (*)
7	Terminal Strength Test	MIL-STD-202F, TM211A, condition A (Pull Weighting 0.907 kg) and condition C (Bend Weighting 0.45 kg)	
8	Soldering Test	Soaking in the soldering bath at +235±5°C for 5±1 seconds More than 90% of lead should be covered by solder.	
9	Solvent Resistance	After soaking in alcohol for 30 minutes. The markings are not faded out.	

(\*) After the tests mentioned above, the electrical specifications are satisfied. Also frequency deviation before and after test should be  $\Delta F/F \leq \pm 10 \times 10^{-6}$   
The electrical specifications are frequency tolerance, Lcc, Tr/Tf, V<sub>OL</sub>/V<sub>OH</sub>, duty cycle.

Model	Height
1300	50 cm

### 1600 Series

No.	Item	Condition	Specification
1.	P.C Test	Temperature: +121±2°C, Pressure: 2 Atmospheric pressure, Time: 48 Hours	Please see below note.(*)
2.	Thermal Shock Test	1Cycle: -55°C (30minutes)~+125°C (30minutes) Number of Cycle: 15 cycles is gas phase	Please see below note.(*)
3.	Heat Cycle Test	1Cycle: -55°C ~ +25°C ~ +125°C ~ +25°C (30 minutes) (10 minutes) (30 minutes) (10 minutes) Number of Cycle: 10 cycles	Please see below note.(*)
4.	High Temperature High Humidity Test	Temperature: +85°C, Humidity: 85%, Time: 250 Hours	Please see below note.(*)
5.	+85°C Aging (non operated)	Temperature: +85°C, Time: 720 Hours	Please see below note.(*)
6.	Vibration Test	MIL-STD-202F Test Method: 204D, Test Condition: D (196m/s <sup>2</sup> Peak)	Please see below note.(*)
7.	Shock Test	MIL-STD-202F Test Method: 213B Test Condition: Half Sinusoidal Wave 29,400m/s <sup>2</sup> 0.5 ms 3 Directions 3 times each	Please see below note.(*)
8.	Drop Test	Fall Height: 75 cm, 3 Drops on to Hard Wooden board	Please see below note.(*)
9.	Soldering Test	MIL-STD-202F Test Method: 208E Test Condition: Soaking in the soldering bath at +245±5°C for 5±1 seconds	More than 90% of lead or Pad should be covered by solder.
10.	Soldering Resistance	MIL-STD-202F Test Method: 210A Test Condition: Soaking in the soldering bath at +260±5°C for 10±1 seconds	Please see below note.(*)
11.	Solvent Resistance	After soaking in each solvent, Freon, tri-chloro-ethane and alcohol for 30 minutes.	The markings are not faded out. Also (*)

(\*) After the tests mentioned above, the electrical specifications are satisfied. Also frequency deviation before and after test should be  $\Delta F/F \leq \pm 10 \times 10^{-6}$   
The electrical specifications are frequency tolerance, Lcc, Tr/Tf, V<sub>OL</sub>/V<sub>OH</sub>, duty cycle.

## WARRANTY CLAUSE

### ■ 1700 Series

No.	Item	Condition	Specification	
			Frequency Tolerance	Electrical Spec.
1	P.C. Test	Temperature: +121°C ±2°C, Pressure: 2 Atmospheric pressure, Time: 96 Hours (NONE operative)	±50 × 10 <sup>-6</sup>	Please see below note. (*)
2	Heat Cycle Test	-55~+100°C (NONE operative) 15 minutes at each temp. stage, 100 cycles.	±20 × 10 <sup>-6</sup>	Please see below note. (*)
3	High Temperature High Humidity Test	Temperature: +85°C, Humidity: 85% Time: 1000 Hours (5.5V operative)	±50 × 10 <sup>-6</sup>	Please see below note. (*)
4	Low Temp. Resistance Test	+100°C, 1000 Hours (NONE Operative)	±50 × 10 <sup>-6</sup>	Please see below note. (*)
5	High Temp. Resistance Test	-55°C, 1000 Hours (NONE operative)	±10 × 10 <sup>-6</sup>	Please see below note. (*)
6	Vibration Test	10~500Hz, 1.5 mm (Peak to Peak) or 98m/s <sup>2</sup> 10Hz~500Hz~10Hz Approx. 15 minutes/cycle Sweep time 6 Hours (3 directions, 2H each)	±10 × 10 <sup>-6</sup>	Please see below note. (*)
7	Shock Test	Test Condition: Half Sinusoidal Wave 29,400m/s <sup>2</sup> 0.1 ms 3 Directions 3 times each	±20 × 10 <sup>-6</sup>	Please see below note. (*)
8	Drop Test	Drop Height: 75 cm, 3 drops on to Hard Wooden board	±20 × 10 <sup>-6</sup>	Please see below note. (*)
9	Soldering Test	Test Condition: Soaking in the soldering bath at +230°C for 5 seconds (use rosin frux)	More than 90% of lead should be wet by solderer.	—
10	Soldering Resistance	Test Condition: Soaking in the soldering bath at +260±5°C for 20 seconds	±10 × 10 <sup>-6</sup>	Please see below note. (*)
11	Terminal Strength Test	500g load is weighed on lead tip for 10 seconds.	No damage on lead	—

(\*) After the tests mentioned above, the electrical specifications are satisfied.  
The electrical specifications are Current Consumption, Tr/Tf, V<sub>OL</sub>/V<sub>OH</sub>, Duty Cycle.

### ■ 1800 Series

No.	Item	Condition	Specification	
			Frequency Tolerance	Electrical Spec.
1	Heat Cycle Test	-55~+125°C (NONE operative) 30 minutes at each temp. stage, 100 cycles.	±20 × 10 <sup>-6</sup>	Please see below note. (*)
2	High Temperature High Humidity Test	Temperature: +85°C, Humidity: 85% Time: 1000 Hours (Energizing at the upper limit of V <sub>DD</sub> )	±20 × 10 <sup>-6</sup>	Please see below note. (*)
3	Low Temp. Resistance Test	+125°C, 1000 Hours (NONE Operative)	±50 × 10 <sup>-6</sup>	Please see below note. (*)
4	High Temp. Resistance Test	-55°C, 1000 Hours (NONE operative)	±10 × 10 <sup>-6</sup>	Please see below note. (*)
5	Vibration Test	10~500Hz, 1.5 mm (Peak to Peak) or 98m/s <sup>2</sup> 10Hz~500Hz~10Hz Approx. 15 minutes/cycle Sweep time 6 Hours (3 directions, 2H each)	±10 × 10 <sup>-6</sup>	Please see below note. (*)
6	Drop Test	Drop Height: 75 cm, 3 drops on to Hard Wooden board	±20 × 10 <sup>-6</sup>	Please see below note. (*)
7	Soldering Test	Test Condition: Soaking in the soldering bath at +230°C for 5 seconds (use rosin frux)	More than 90% of lead should be wet by solderer.	—
8	Soldering Resistance	Test Condition: Soaking in the soldering bath at +260±5°C for 10 seconds 2times each	±10 × 10 <sup>-6</sup>	Please see below note. (*)
9	Terminal Strength Test	500g load is weighed on lead tip for 10 seconds.	No damage on lead	—

(\*) After the tests mentioned above, the electrical specifications are satisfied.  
The electrical specifications are Current Consumption, Tr/Tf, V<sub>OL</sub>/V<sub>OH</sub>, Duty Cycle.

# CRYSTAL CLOCK OSCILLATORS

## WARRANTY CLAUSE

### ■ 2500 Series

No.	Item	Condition	Specification
1	Thermal Shock Test	1 Cycle: -55°C (15minutes)~+125°C (15minutes) Number of Cycle : 5 cycles is gas phase	(1)
2	Vibration Test	10~55Hz, 1.5mm (Peak to Peak) 55~2000Hz, 196m/s <sup>2</sup> Sweep time 6 Hours (3 directions, 2H each)	(1)
3	Drop Test	Drop Height: 75 cm, 3 drop on to hard wooden board	(1)
4	Soldering. Resistance	Test Condition Soaking in the soldering bath at +260°C±5°C for 20 seconds 2 times each or Soaking in the soldering bath at +230°C±5°C for 180 seconds 2times each	(1)
5	Soldering Test	Test Condition: Soaking in the soldering bath at +230°C for 2±0.5 seconds	(2)
6	Air Tightness	5minutes immersion in Fluorinert at 125°C±5°C	(3)
7	Solvent Resistance	After soaking in each solvent, Freon, trichloroethane and alcohol for 30 minutes	(4)
<p>(1) After the tests mentioned above, the electrical specifications are satisfied. The electrical specifications are Tr/Tf, Vol/Voh, Duty Cycle.</p> <p>(2) More than 90% of Lead or Pad should be covered by solder.</p> <p>(3) No bubbles should be observed.</p> <p>(4) The markings are not faded out.</p>			

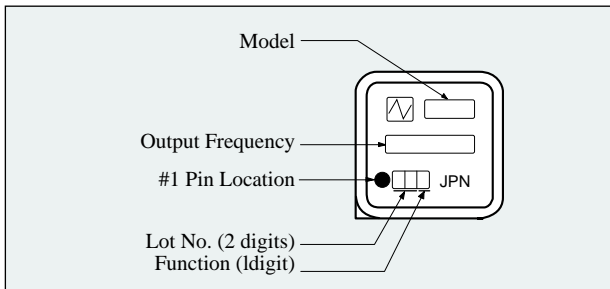
### ■ 2700 Series

No.	Item	Condition	Specification
1	Thermal Shock Test	1 Cycle: -40°C (30minutes)~+85°C (30minutes) Number of Cycle : 100 cycles is gas phase	(1)
2	High Temperature High Humidity Test	Temperature: +85°C, Humidity: 80~85% Time: 250 Hours	(2)
3	+85°C Aging (non operated)	Temperature: +85°C, Time: 720 Hours	(1)
4	Vibration Test	10~2000Hz, 1.52mm (Peak to Peak) or 196m/s <sup>2</sup> 20minutes/cycle Sweep time 4 Hours (3 directions, 12H each)	(1)
5	Shock Test	Test Condition: Half sinusoidal wave 29,400m/s <sup>2</sup> 0.3ms 3 directions 3 times each	(1)
6	Drop Test	Drop Height: 75 cm, 3 drop on to hard wooden board	(1)
7	Soldering Test	Test Condition: Soaking in the soldering bath at 230°C for 3.5±1 seconds	
8	Soldering Resistance	Pre-heat: 150°C 60~120 seconds, Peak temperature 245°CΔ, 215°C min 10~30 seconds 3times each	(1)
<p>(1) After the tests mentioned above, the electrical specifications are satisfied. Also frequency deviation before and after test should be <math>\Delta F/F \leq \pm 10 \times 10^{-6}</math>.</p> <p>(2) After the tests mentioned above, the electrical specifications are satisfied. Also frequency deviation before and after test should be <math>\Delta F/F \leq \pm 20 \times 10^{-6}</math>.</p> <p>The electrical specifications are frequency tolerance, current consumption, Tr/Tf, Vol/Voh, Duty Cycle, current consumption (stand-by), stand-by function.</p>			

## MARKING

Marking frequency digits differs according to marking space available.  
Please refer to below.

### 1300 Series

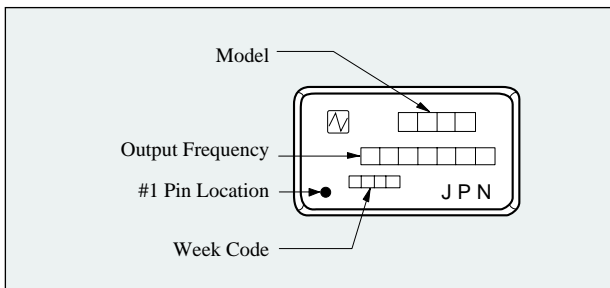


#### 1300 Series:

- Including decimal point, maximum 7 digits are marked when frequency unit is MHz.  
When kHz, maximum digits are marked with initial "k".

[EX] 14.3181818MHz → 14.3181  
900kHz → 900.00<sup>k</sup>

### 1600 Series

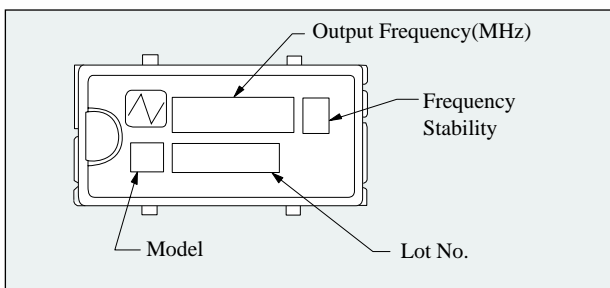


#### 1600 Series:

- Including decimal point, 7 digits are marked.

[EX] 4.9152MHz → 4.91520

### 1700 Series

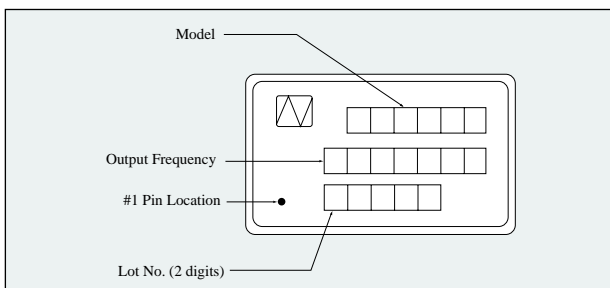


#### 1700 Series:

- Including decimal point, 7 digits are marked.

[EX] 14.31818MHz → 14.3181

### 1800 Series



#### 1800 Series:

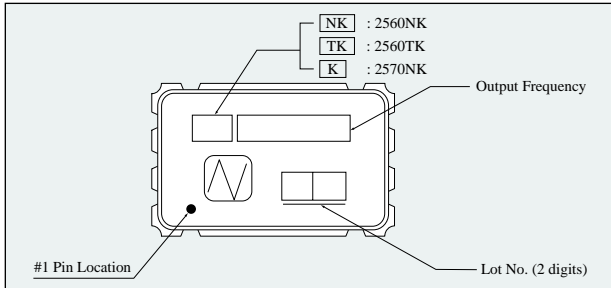
- Including decimal point, 7 digits are marked.

[EX] 14.31818MHz → 14.3181

# CRYSTAL CLOCK OSCILLATORS

## MARKING

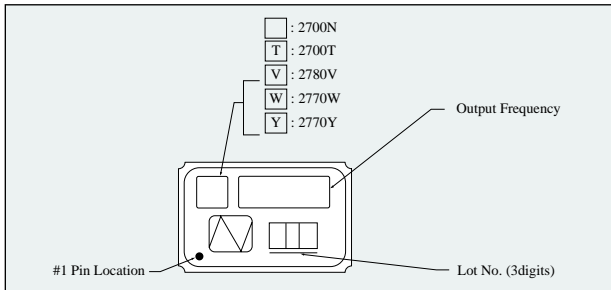
### 2500 Series



#### 2500 Series:

- Including decimal point, 6 digits are marked.  
[EX] 14.31818<sup>MHz</sup> → 14.318

### 2700 Series



#### 2700 Series:

- Including decimal point, 6 digits are marked.  
[EX] 14.31818<sup>MHz</sup> → 14.318