

FEATURES	APPLICATIONS
<ul style="list-style-type: none"> <li>- ±20ppm (Tolerance) Available</li> <li>- Ultra-Miniature Package</li> <li>- RoHS Compliant</li> <li>- Tape and Reel</li> </ul>	<ul style="list-style-type: none"> <li>- Real Time Clock</li> <li>- Measurement Instruments</li> <li>- Wireless Applications</li> </ul>



**PART NUMBERING GUIDE**

**SUNTSU WATCH CRYSTAL SMT** → **SWS 21 2 12 D 48 - 32.768kHz** ← **FREQUENCY (kHz)**

**2.0mm x 1.2mm** → (points to '21')

**2 PAD** → (points to '2')

**LOAD CAPACITANCE**  
 12: 12.5pF  
 9: 9.0pF  
 7: 7.0pF → (points to '12')

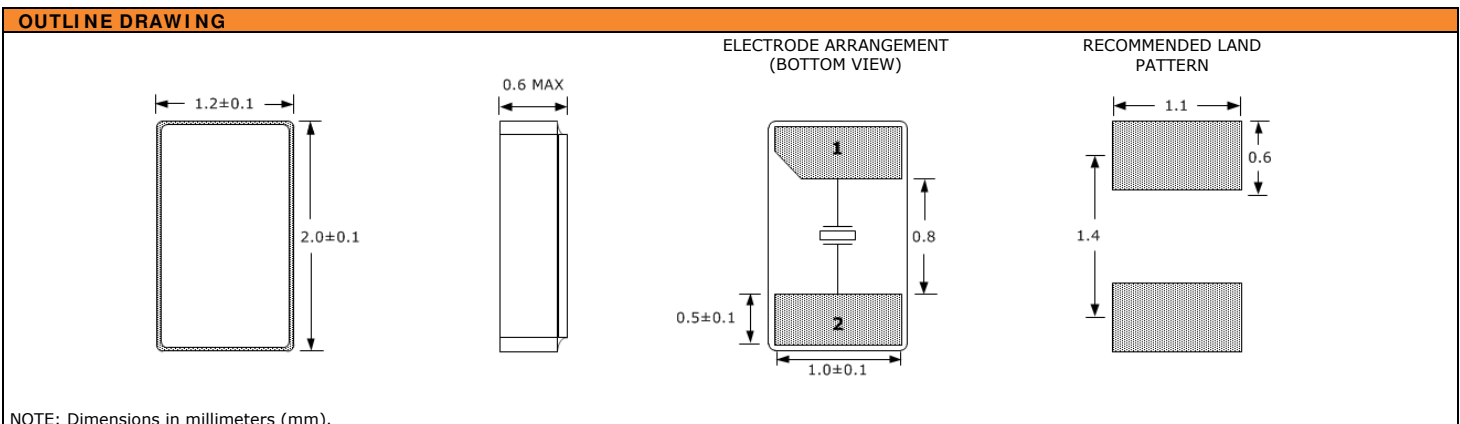
**OPERATING TEMPERATURE RANGE**  
 16: -10°C to + 60°C  
 27: -20°C to + 70°C  
 48: -40°C to + 85°C → (points to '48')

**FREQUENCY TOLERANCE**  
 D: ±20ppm  
 F: ±10ppm → (points to 'D')

Cage Code: 4GUT4  
 To customize your parameters contact a Suntsu representative.

ELECTRICAL PARAMETERS	UNITS	MIN.	TYP.	MAX.	REMARKS
Frequency	kHz		32.768		
Frequency Tolerance at +25°C	ppm	-20		+20	
Frequency Stability vs. Aging	ppm	-3		+3	First year @ +25°C.
Frequency Coefficient (β)	ppm/T <sup>2</sup>	-0.04	-0.03	-0.02	
Operating Temperature	°C	-40		+85	See part numbering guide for options.
Turnover Temperature	°C	+20	+25	+30	
Storage Temperature	°C	-55		+125	
Load Capacitance	pF			12.5	See part numbering guide for options.
Shunt Capacitance	pF		1.3		
Drive Level	μW			0.5	
Insulation Resistance	MΩ	500			@ 100V <sub>DC</sub> ± 15V.
Equivalent Series Resistance	kΩ			90	

**OUTLINE DRAWING**



**ELECTRODE ARRANGEMENT (BOTTOM VIEW)**

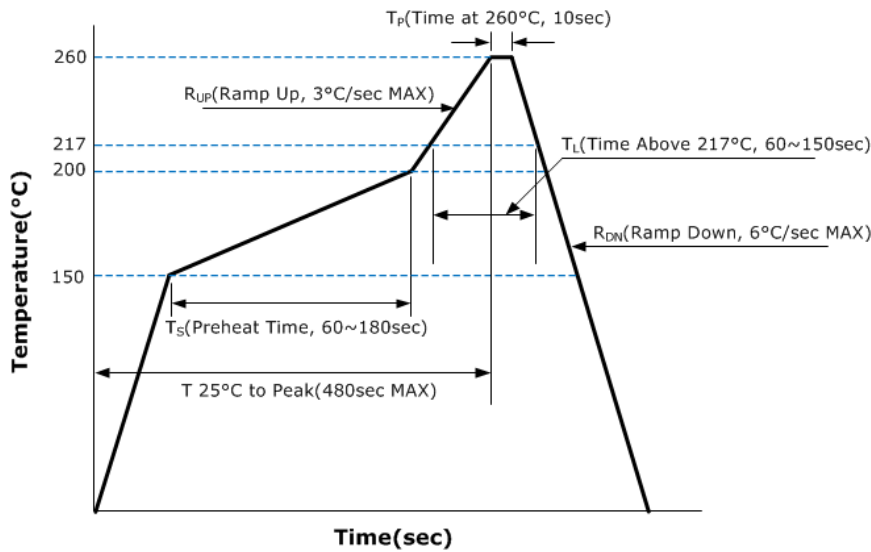
**RECOMMENDED LAND PATTERN**

NOTE: Dimensions in millimeters (mm).

### ENVIRONMENTAL & MECHANICAL SPECIFICATIONS

Temperature Cycling	MIL-STD-883, Method 1010, Condition B
Fine Leak Test	MIL-STD-883, Method 1014, Condition A
Gross Leak Test	MIL-STD-883, Method 1014, Condition C
Mechanical Shock	MIL-STD-202, Method 213, Condition B
Vibration	MIL-STD-883, Method 2007, Condition A
Moisture Resistance	MIL-STD-883, Method 1004
Moisture Sensitivity	J-STD-020, MSL 1
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition K
Resistance to Solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-883, Method 2003

### REFLOW PROFILE

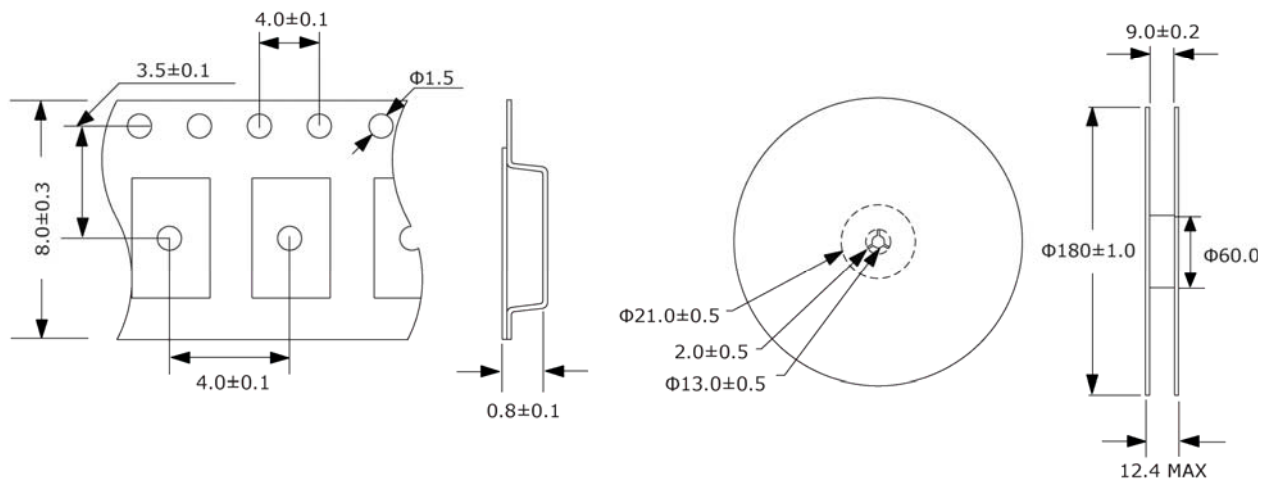


### MARKING

Line 1: XXXXXX  
 ↑  
 Lot Code

### TAPE AND REEL DIMENSIONS

3,000pcs/reel



NOTE: Dimensions in millimeters (mm); drawing is not to scale.