

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 41 2 12 D 48 - 32.768kHz** ← *FREQUENCY (kHz)*

*4.1mm x 1.5mm* → **41**

*2 PAD* → **2**

*LOAD CAPACITANCE*  
12: 12.5pF → **12**

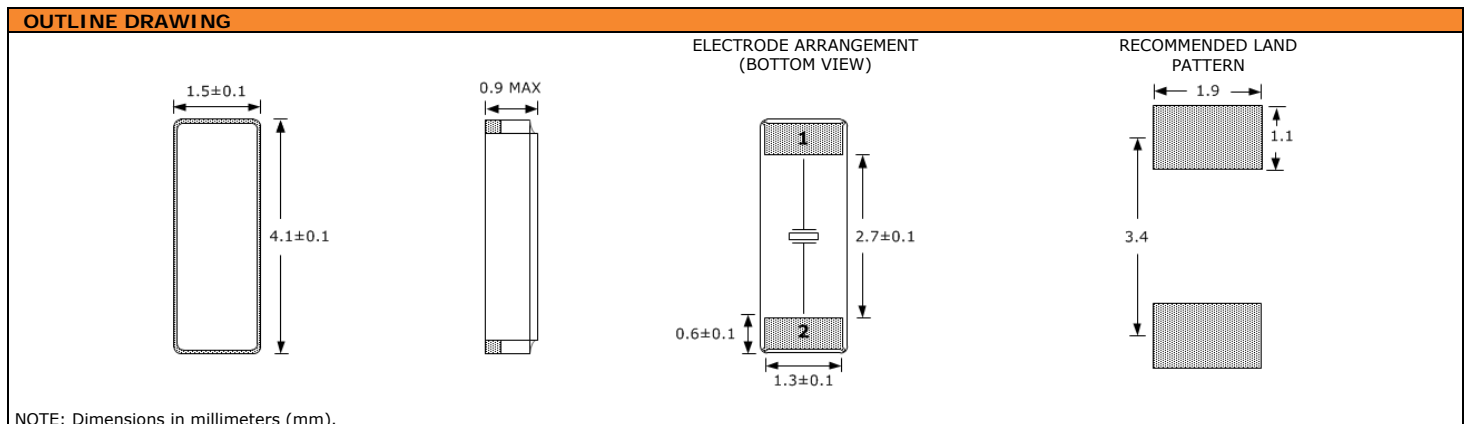
**D** → *FREQUENCY TOLERANCE*  
D: ±20ppm

**48** → *OPERATING TEMPERATURE RANGE*  
16: -10°C to +60°C  
48: -40°C to +85°C

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>	-0.040	-0.034	-0.028	
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		1.33		
Drive Level	μW			1	
Insulation Resistance	MΩ	500			@ 100V <sub>DC</sub> ± 15V.
Equivalent Series Resistance	kΩ			70	

**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 B
Resistance to Solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-883, Method 2003

