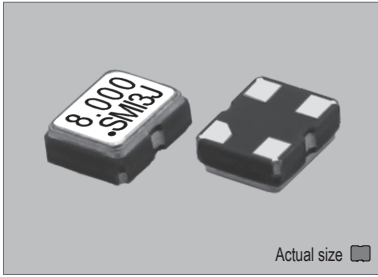
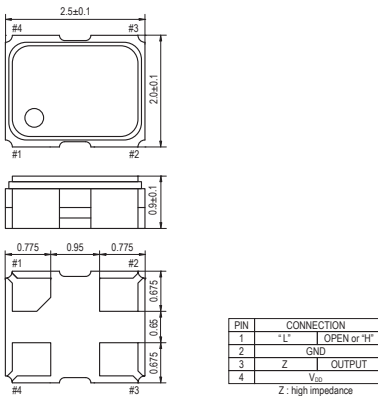


22SMO

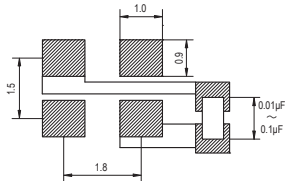


Actual size  
0.014 gm (wt.)

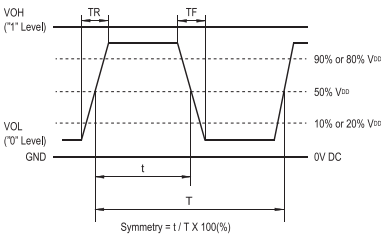
22SMO



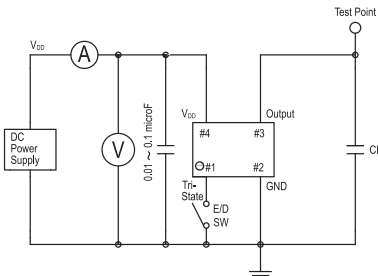
SOLDERING PATTERN



OUTPUT WAVEFORM



TEST CIRCUIT



CL: including fixture and probe capacitance.

STANDARD SPECIFICATIONS

- WIDE FREQUENCY RANGE
- CMOS OUTPUT
- PACKAGE SIZE 2.5x2.0 mm

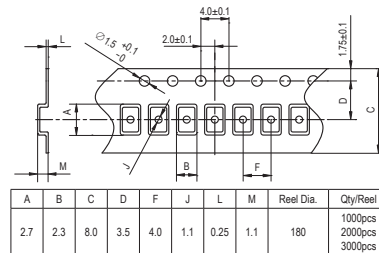
Item		Specifications																																								
General part number		22SMO* <sup>1</sup>																																								
Frequency range		1.500 MHz to 135.000 MHz	133.000 MHz to 170.000 MHz																																							
Frequency stability (over all conditions)		22SMO(A) : ±100 ppm over -20°C to +70°C 22SMO(B) : ±50 ppm over -20°C to +70°C 22SMO(C) : ±30 ppm over -20°C to +70°C 22SMO(D) : ±25 ppm over -20°C to +70°C 22SMO(E) : ±20 ppm over -20°C to +70°C 22SMO(AW) : ±100 ppm over -40°C to +85°C 22SMO(BW) : ±50 ppm over -40°C to +85°C 22SMO(CW) : ±30 ppm over -40°C to +85°C 22SMO(DW) : ±25 ppm over -40°C to +85°C																																								
Operating Conditions	Operating temperature	-20°C to +70°C (Standard) -40°C to +85°C (W = Option) -40°C to +105°C (WW = Option) 1.500 MHz to 80.000 MHz -40°C to +125°C (WWW = Option) 1.500 MHz to 80.000 MHz																																								
	Supply voltage (V <sub>DD</sub> )	+1.8V, +2.5V, +3.0V or +3.3V DC ±5%	+2.5V, +3.0V or +3.3V DC ±5%																																							
	Stand-by control voltage (Pin#1)	V <sub>HI</sub> : 70% V <sub>DD</sub> min. V <sub>LI</sub> : 30% V <sub>DD</sub> max.* <sup>2</sup>																																								
Absolute Max. Ratings	Supply voltage	-0.3V to +4.0V DC																																								
	Storage temperature	-55°C to +125°C																																								
Input current (max. mA) (Pin#1 = Open or V <sub>HI</sub> ) No load		<table border="1"> <thead> <tr> <th rowspan="2">V<sub>DD</sub></th> <th colspan="7">Frequency</th> </tr> <tr> <th>1.0M+</th> <th>10M+</th> <th>40M+</th> <th>75M+</th> <th>85M+</th> <th>101M+</th> <th>135M+</th> </tr> </thead> <tbody> <tr> <td>+1.8V</td> <td>1.5</td> <td>2.0</td> <td>5.0</td> <td>7.0</td> <td>7.5</td> <td>10</td> <td>n.a.</td> </tr> <tr> <td>+2.5V</td> <td>2.0</td> <td>2.3</td> <td>6.0</td> <td>8.0</td> <td>8.5</td> <td>12</td> <td>25.5</td> </tr> <tr> <td>+3.3V</td> <td>2.4</td> <td>3.5</td> <td>7.0</td> <td>9.0</td> <td>10.5</td> <td>15</td> <td>29.5</td> </tr> </tbody> </table>		V <sub>DD</sub>	Frequency							1.0M+	10M+	40M+	75M+	85M+	101M+	135M+	+1.8V	1.5	2.0	5.0	7.0	7.5	10	n.a.	+2.5V	2.0	2.3	6.0	8.0	8.5	12	25.5	+3.3V	2.4	3.5	7.0	9.0	10.5	15	29.5
V <sub>DD</sub>	Frequency																																									
	1.0M+	10M+	40M+	75M+	85M+	101M+	135M+																																			
+1.8V	1.5	2.0	5.0	7.0	7.5	10	n.a.																																			
+2.5V	2.0	2.3	6.0	8.0	8.5	12	25.5																																			
+3.3V	2.4	3.5	7.0	9.0	10.5	15	29.5																																			
Stand-by current* <sup>2</sup>		10 µA max. (Pin#1 = V <sub>LI</sub> ) ... -40°C to +85°C 20 µA max. (Pin#1 = V <sub>LI</sub> ) ... -40°C to +105°C / +125°C																																								
Output (-40°C to +85°C)	Symmetry	45% to 55% at 1/2 V <sub>DD</sub> level																																								
	Rise and fall times	6 ns max. (10% V <sub>DD</sub> to 90% V <sub>DD</sub> level)	3 ns max. (10% V <sub>DD</sub> to 90% V <sub>DD</sub> level)																																							
	"0" Level	V <sub>OL</sub> : 10% V <sub>DD</sub> max.																																								
	"1" Level	V <sub>OH</sub> : 90% V <sub>DD</sub> min.																																								
	Load	15 pF max. (CMOS)																																								
Disable delay time		200 ns max.																																								
Enable delay time		10 ms max.																																								
Start-up time		10 ms max.																																								
SSB phase noise (at V <sub>DD</sub> = +3.3V & 40.000 MHz)		-140 dBc / Hz, Typical at 1 kHz offset -160 dBc / Hz, Typical at 1 MHz offset																																								
RMS jitter (12 kHz to 20.000 MHz band)		500 fs max. (180 fs, Typical at 40.000 MHz)																																								
Aging		±5 ppm max. at +25°C ±3°C for first year																																								
Reflow condition		+250°C ±10°C for 10 seconds +170°C ±10°C for 1 to 2 minutes (preheating)																																								

(\*<sup>1</sup>) Final part number to be assigned with package type, input voltage, frequency stability, operating temperature and frequency. e.g. 22SMO(2.5VBW) 27.000MHz  
 (\*<sup>2</sup>) Internal crystal oscillation to be halted (Pin#1 = V<sub>LI</sub>)

PACKAGE DATA

Item	Package	22SMO
Lid		Metal
Base		Ceramic
Sealing		Seam
Terminal		Tungsten (metalized)
Terminal plating		Gold / Nickel (surface) / (under)
RoHS		Compliant (Pb-free)

TAPE SPECIFICATIONS



XTAL

CLK OSC

VCXO

TCXO

OCXO

MCF