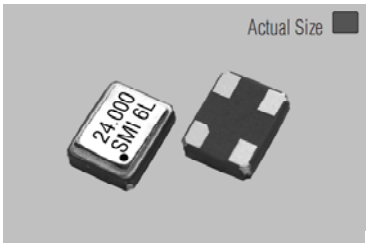
# Crystal Clock Oscillators

**32SMO** (+1.8V, +2.5V, +3.0V or +3.3V FIXED MODELS) — **3.2x2.5mm STANDARD SMD CLOCK**

## 32SMO




## STANDARD SPECIFICATIONS

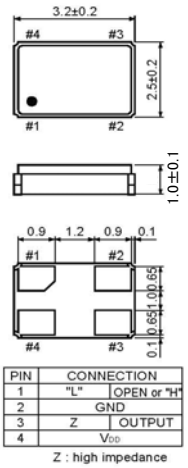
**CMOS OUTPUT**

| Item | | Specifications | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Generic part number | | 32SMO※1 | | | | | | | |
| Frequency range | | 0.625 MHz to 135.000 MHz | | | | | 133.000 MHz to 170.000 MHz | | |
| Frequency stability (over all conditions) | | 32SMO(A) : ±100 ppm over −20℃ to +70℃<br>32SMO(B) : ±50 ppm over −20℃ to +70℃<br>32SMO(C) : ±30 ppm over −20℃ to +70℃<br>32SMO(D) : ±25 ppm over −20℃ to +70℃<br>32SMO(E) : ±20 ppm over −20℃ to +70℃<br>32SMO(AW) : ±100 ppm over −40℃ to +85℃<br>32SMO(BW) : ±50 ppm over −40℃ to +85℃<br>32SMO(CW) : ±30 ppm over −40℃ to +85℃<br>32SMO(DW) : ±25 ppm over −40℃ to +85℃ | | | | | | | |
| Operating Conditions<br>Operating temperature | | −20℃ to +70℃ (Standard)<br>−40℃ to +85℃ (W=Option) | | | | | | | |
| Supply voltage ($V_{DD}$) | | +1.8V, +2.5V, +3.0V or +3.3V ±5% | | | | | +2.5V, +3.0V or +3.3V ±5% | | |
| Stand-by control voltage(Pin#1) | | $V_{IH}$ : 70%$V_{DD}$ min.<br>$V_{IL}$ : 30%$V_{DD}$ max.※2 | | | | | | | |
| Absolute Max. Ratings<br>Supply voltage<br>Storage temperature | | −0.5V to +4.0V DC<br>−55℃ to +100℃ | | | | | | | |
| Input current (Pin#1=Open or VIH) (max. mA) | $V_{DD}$ | 0.625MHz+ | 20MHz+ | 35MHz+ | 50MHz+ | 80MHz+ | 100MHz+ | 133MHz+ | 170MHz |
| | +1.8V | 2.5 | 3.0 | 3.5 | 6.5 | 7.0 | 7.5 | 8.5 | n.a. |
| | +2.5V | 4.5 | 5.5 | 6.5 | 7.0 | 8.0 | 8.5 | 10.5 | 18.0 |
| | +3.3V | 6.0 | 7.0 | 8.0 | 9.0 | 9.5 | 10.5 | 13.5 | 21.0 |
| Stand-by current*2 | | 10 μA max. (Pin#1=$V_{IL}$) | | | | | | | |
| Output (−40℃ to +85℃)<br>Symmetry<br>Rise and fall times<br>"0" level<br>"1" level<br>Load | | 45% to 55% at 1/2$V_{DD}$ level<br>5 ns max. (10%$V_{DD}$ to 90%$V_{DD}$ level)<br>$V_{OL}$ : 10%$V_{DD}$ max.<br>$V_{OH}$ : 90%$V_{DD}$ min.<br>15 pF max. (CMOS) | | | | | | | |
| Disable delay time | | 200 ns max. | | | | | | | |
| Enable delay time | | 5 ms max. | | | | | | | |
| Startup time | | 10 ms max. | | | | | | | |
| SSB phase noise (at $V_{DD}$=+3.3V & 133.0MHz) | | −135 dBc/Hz, Typical at 1kHz offset<br>−160 dBc/Hz, Typical at 1MHz offset | | | | | | | |
| Aging (non operating) | | ±5 ppm max. at +25℃ ±3℃ for first year | | | | | | | |
| Reflow condition | | +250℃ ±10℃ for 10 seconds<br>+175℃ ±10℃ for 1 to 2 minutes (preheating) | | | | | | | |

(※1) Final exact part number to be determined with package type, input voltage, frequency stability, operating temperature and frequency.
e.g. 32SMO(2.8VD) 24.000 MHz.

(※2) Internal crystal oscillation to be halted (Pin#1=$V_{IL}$).

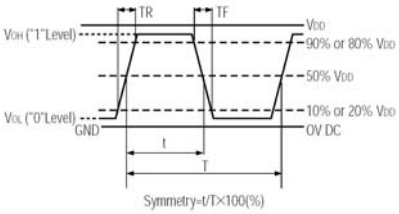
## 32SMO



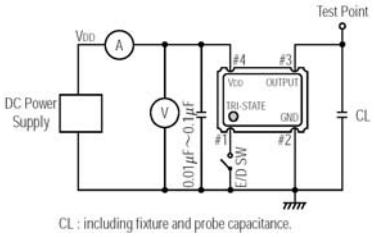

| PIN | CONNECTION | |
|---|---|---|
| 1 | "L" | OPEN or "H" |
| 2 | GND | |
| 3 | Z | OUTPUT |
| 4 | $V_{DD}$ | |

Z : high impedance

## OUTPUT WAVEFORM

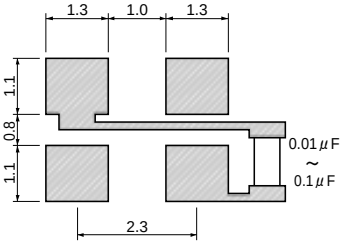



## TEST CIRCUIT




CL : including fixture and probe capacitance.

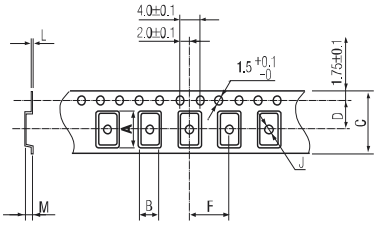
## SOLDERING PATTERN




## PACKAGE DATA

| Item \ Package | 32SMO |
|---|---|
| Lid | Metal |
| Base | Ceramic |
| Sealing | Seam |
| Terminal | Tungsten (metalized) |
| Terminal plating | Gold / Nickel (surface) / (under) |
| RoHS | Compliant (Pb-free) |

## TAPE SPECIFICATIONS




| A | B | C | D | F | J | L | M | Reel Dia. | Qty/Reel |
|---|---|---|---|---|---|---|---|---|---|
| 3.5 | 2.8 | 8.0 | 3.5 | 4.0 | 1.0 | 0.3 | 1.4 | 178 | 1000pcs |