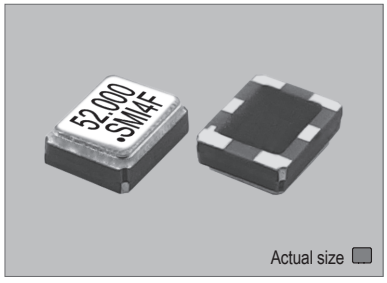
# SXO-2200HGED SERIES (+1.8V to +3.3V FIXED MODELS) 2.5x2.0 mm

STANDARD SMD TCXO

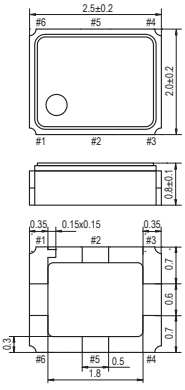


## SXO-2200HGED




0.014 gm (wt.)

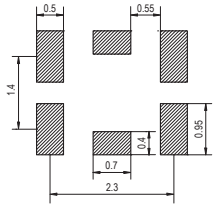
## SXO-2200HGED



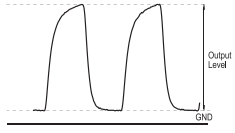

| PIN | CONNECTION | | | |
|---|---|---|---|---|
| | TCXO | | VC-TCXO | |
| | SXO-2200HGED | | SXO-2200HGEDV | |
| 1 | GND | | Vcontrol | |
| 2 | "L" | OPEN or "H" | "L" | OPEN or "H" |
| 3 | GND | | | |
| 4 | "Z" | OUTPUT | "Z" | OUTPUT |
| 5 | NC or GND | | | |
| 6 | $V_{DD}$ | | | |

Z : high impedance

## SOLDERING PATTERN

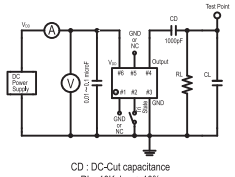



## OUTPUT WAVEFORM



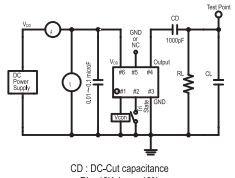

## TEST CIRCUIT

### SXO-2200HGED




CD : DC-Cut capacitance
RL : 10Kohm ± 10%
CL : 10pF ± 10% including fixture and probe capacitance

### SXO-2200HGEDV




CD : DC-Cut capacitance
RL : 10Kohm ± 10%
CL : 10pF ± 10% including fixture and probe capacitance

## STANDARD SPECIFICATIONS

- ENABLE / DISABLE OUTPUT CONTROL
- GPS APPLICATION
- CLIPPED SINE WAVEFORM
- PACKAGE SIZE 2.5x2.0 mm

| Item | | Specifications | |
|---|---|---|---|
| General part number | | SXO-2200HGED*1 | SXO-2200HGEDV*1 |
| Frequency range | | 13.000 MHz to 52.000 MHz | |
| Initial frequnecy tolerance at +25°C ±2°C | | ±1.5 ppm max.*2 | ±1.5 ppm max. (Vcon = 1/2 $V_{DD}$)*2 |
| TCXO or VC-TCXO | | TCXO | VC-TCXO |
| Frequency Stability | Temperature range | ±0.5 ppm max. over -30°C to +85°C (referred to +25°C)*3 | |
| | Input voltage change | ±0.2 ppm max. at $V_{DD}$ ±5% DC | |
| | Output load change | ±0.2 ppm max. at 10 kΩ ±10% with 10 pF ±10% | |
| | Aging | ±1 ppm max. per year at +25°C ±3°C | |
| Operating Conditions | Operating temperature | -30°C to +85°C (Standard)<br>-40°C to +85°C (W = Option, frequency dependent) | |
| | Supply voltage ($V_{DD}$) | D = +1.8V, F = +2.5V, H = +2.8V, J = +3.0V, K = +3.3V DC ±5% | |
| | Control voltage (Vcon) | n.a. | +0.9V ±0.8V ($V_{DD}$ = +1.8V) |
| | | | 1/2 $V_{DD}$ ±1V ($V_{DD}$ = +2.5V to +3.3V) |
| | E/D control voltage (Pin#2) | $V_{IH}$ : 80% $V_{DD}$ min. (Enable)<br>$V_{IL}$ : 20% $V_{DD}$ max. (Disable) | |
| Absolute Max. Ratings | Supply voltage | -0.6V to +4.6V DC | |
| | Vcontrol voltage (Vcon) | n.a. | -0.6V to $V_{DD}$ +0.6V DC |
| | E/D control voltage (Pin#2) | -0.6V to $V_{DD}$ +0.6V (+4.6V max.) | |
| | Storage temperature | -40°C to +85°C | |
| Input current | | 1.5 mA max. (13.000 MHz to 30.000 MHz)<br>1.7 mA max. (30.000 MHz to 40.000 MHz)<br>2 mA max. (40.000 MHz to 52.000 MHz) | |
| Disable current | | 2 μA max. (Pin#2 = $V_{IL}$) | |
| Output (-40°C to +85°C) | Level | 0.8 Vp-p min. | |
| | Load | 10 kΩ. // 10 pF | |
| | Waveform | Clipped sine wave (DC-coupling) | |
| Frequency Adjustment | Voltage control (Vcon) | n.a. | ±8 ppm to ±13 ppm ($V_{DD}$ = +1.8V) |
| | | | ±9 ppm to ±15 ppm ($V_{DD}$ = +2.5V to +3.3V) |
| Frequency slope | | n.a. | Positive |
| Harmonic distortion | | -5 dBc max. | |
| Start-up time | | 10 ms max. | |
| SSB phase noise (26.000 MHz) | | -135 dBc / Hz, Typical at 1 kHz offset | |
| Frequency slope vs. temperature | | ±0.1 ppm / °C max. (-20°C to +75°C)<br>±0.3 ppm / °C max. (-30°C to +85°C) | |
| Short-term frequency stability | | ±1 ppb max. (Allan variance Tau = 0.1 sec.) | |
| IR reflow resistance | | ±1 ppm max. (referred to frequency before reflow) | |
| Reflow condition | | +250°C ±10°C for 10 seconds<br>+170°C ±10°C for 1 to 2 minutes (preheating) | |
| Standard frequencies (MHz) | | 16.368, 16.369, 19.200, 26.000, 27.456, 33.600, 38.400, 52.000 | |

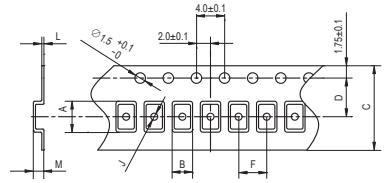
| Optional Operating Temperature*4 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Low limit / Symbol | -10°C / g | -15°C / h | -20°C / i | -25°C / j | -30°C / k | -35°C / l | -40°C / m |
| | High limit / Symbol | +55°C / ff | +60°C / gg | +65°C / hh | +70°C / ii | +75°C / jj | +80°C / kk | +85°C / ll |

(*1) Final part number to be assigned with package type, TCXO or VC-TCXO, input voltage, operating temperature and frequency. e.g. SXO-2200HGED-J-52MHz
(*2) Referred to nominal frequency before reflow soldering.
(*3) At Vcon = 1/2 $V_{DD}$ DC for SXO-2200HGEDV.
(*4) Select "low limit" and "high limit" for new operating temperature combination from the lists.

## PACKAGE DATA

| Item \ Package | SXO-2200HGED |
|---|---|
| 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 |
|---|---|---|---|---|---|---|---|---|---|
| 2.85 | 2.35 | 8.0 | 3.5 | 4.0 | 1.0 | 0.25 | 0.9 | 180 | 2000pcs |