

# SMD Crystal Clock Oscillator (SPXO)

Low phase noise / 2.5 mm x 2.0 mm / 16.9344 MHz to 50 MHz / CMOS / 1.8 V to 3.3 V

## FCXO-05E

## FEATURES

- 2520 size CMOS oscillator (16.9344 MHz to 50 MHz) with ultra-low phase noise for audio systems :
  - 157 dBc/Hz typical @offset 1 kHz
  - 165 dBc/Hz typical @offset 100 kHz
- Frequency tolerance of  $\pm 7$  ppm (@25 °C) available
- Wide operating temperature range of -40 °C to +105 °C available
- Robust ceramic package with metal lid sealed by electron beam
- Specifications in conformity with AEC-Q200 available on request



(2.5 × 2.0 × 0.9 mm)



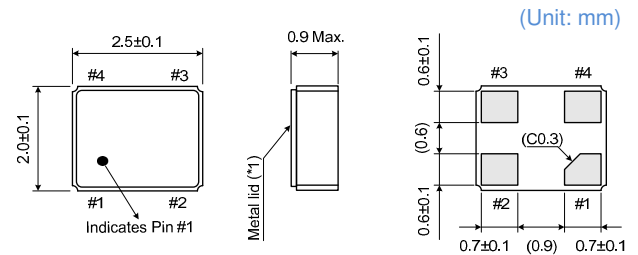
## APPLICATIONS

- Hi-Fi audio/video systems / mobile communication / wireless-modules
- Car audio systems / car GPS units / remote keyless entry / dash cameras

## STANDARD SPECIFICATIONS

Item	Specifications	Unit	Conditions / Remarks
Nominal frequency	16.9344 to 50	MHz	-
Frequency tolerance	$\pm 7$	ppm	@25 °C (See below for more options)
Storage temperature	-55 to +125	°C	-
Operating temperature	-40 to +85, -40 to +105	°C	(See below for more options)
Frequency / temperature characteristics	$\pm 10$ (-20 °C to +70 °C) $\pm 30$ (-40 °C to +105 °C)	ppm	Refer to 25 °C (See below for more options)
Supply voltage	1.8, 3.3	V	(See below for more options)
Current consumption (Max.)	10	mA	$V_{DD} = 3.0$ V, No load
Stand-by current (Max.)	35	$\mu$ A	Stand-by = "L"
Output voltage	$V_{OH}$ (Min.)	0.9 $V_{DD}$	V
	$V_{OL}$ (Max.)	0.1 $V_{DD}$	V
Drivability	$\pm 2$	mA	-
Output load (Max.)	15	pF	-
Output level	CMOS	-	-
Symmetry (Duty Cycle)	50 $\pm$ 5	%	$V_{TH} = 0.5V_{DD}$
Rise time / Fall time (Max.)	4.7	ns	0.1 $V_{DD}$ to 0.9 $V_{DD}$
Start-up time (Max.)	2.0	ms	$V_{DD} = 3.3$ V
	5.0	ms	$V_{DD} = 1.8$ V
Random Jitter (Typ.)	3.5	ps	$V_{DD} = 3.3$ V Measured on WaveCrest 3100C
Total Jitter (Typ.)	47	ps	$V_{DD} = 3.3$ V, $T_J = n \cdot R_J$ ( $n \approx 14.1$ , BER = 10-12) Measured on WaveCrest 3100C
Phase Noise (Max.)	-157	dBc/Hz	Offset 1 kHz ( $V_{DD} = 1.8$ V)
	-165	dBc/Hz	Offset 100 kHz ( $V_{DD} = 1.8$ V)
Stand-by function (Pin #1)	$V_{IH}$ (Min.)	0.7 $V_{DD}$	V
	$V_{IL}$ (Max.)	0.3 $V_{DD}$	V
Tape and reel	3000	pcs/reel	Reel diameter: $\varnothing 180$ mm

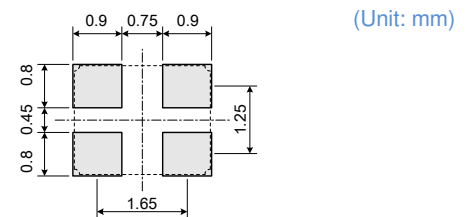
## OUTLINE DIMENSIONS



Pin	Function
#1	Stand-by
#2	Ground
#3	Output
#4	$V_{DD}$

\* Pin #2 is connected to the metal lid (\*1)

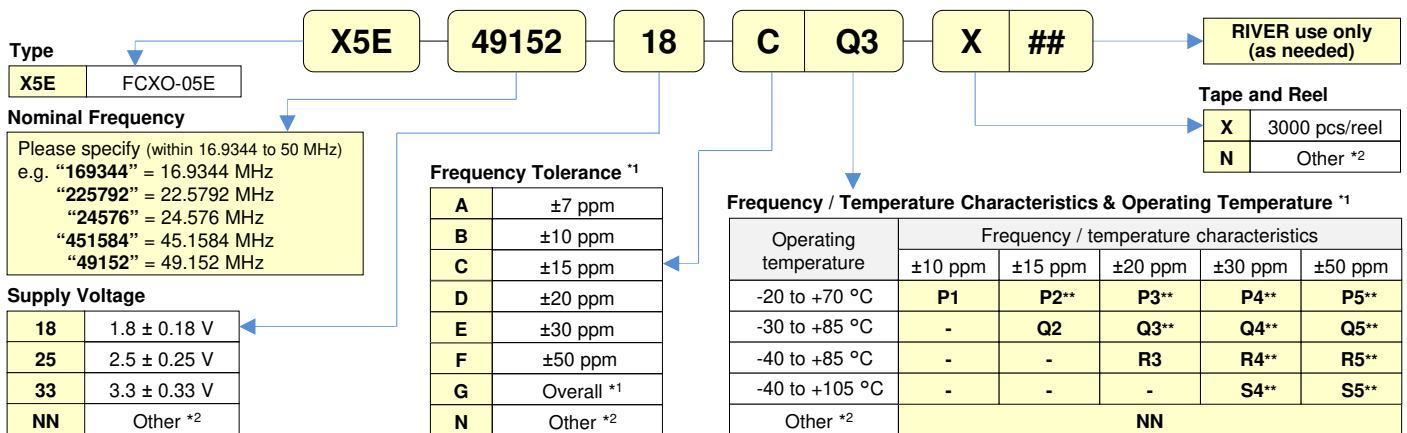
## RECOMMENDED LAND PATTERN



## GENERAL NOTES

- Certain combinations of standard options may be classified as high-spec models.
- Please consult us for specifications that do not match the standard specifications.
- The information in this document is subject to change without notice.
- For operational stability, a 0.01  $\mu$ F bypass capacitor should be placed between  $V_{DD}$  (Pin #4) and Ground (Pin #2) as close as possible to the product.

## ORDERING NUMBER GUIDE



\*1. For overall frequency stability inclusive of stability at 25 °C and an operating temp. range, please select "G (Overall)" from the table "Frequency Tolerance" followed by a code that is with " \*\* " from the table "Freq./Temp. Characteristics & Operating Temp". (e.g. **GP2** = Overall  $\pm 15$  ppm (-20 to +70 °C))

\*2. Please consult us for your requirements.