



# Specification of Quartz Crystal Units

1	NDK Part Number	NX2016SA-32M-EXS00A-CS06465
2	Chipset Maker	Semtech
3	Application	LoRa
4	Chipset Name	SX127x
5	NDK Specification Number	EXS00A-CS06465
6	Type	NX2016SA
7	Electrical Characteristics	

	Parameters	SYM.	Electrical Spec.				Notes
			min	typ	max	Units	
1	Nominal Frequency (f <sub>nom</sub> )	f <sub>nom</sub>	32.000			MHz	
2	Overtone order	-	Fundamental			-	
3	Frequency tolerance	-	-10	-	+10	ppm at +25°C	
4	Frequency versus temperature characteristics *1.	-	-10	-	+10	ppm at -20 to +70°C	
		-	-30	-	+30	ppm at -40 to +85°C	
5	Equivalent Series Resistance	R <sub>r</sub>	-	-	50	Ω IECπ -Network Series	
6	Load capacitance	CL	-	10	-	pF IECπ -PI-Network	
7	Level of drive	-	-	10	100	μW	
8	Shunt Capacitance	C0	-30%	0.6	+30%	pF	
9	Motional Capacitance	C1	-30%	1.89	+30%	fF	
10	Motional Inductance	L1	-30%	13.14	+30%	mH	
11	Pulling sensitivity	S	-30%	8.41	+30%	ppm/pF *2	
12	Aging	-	-3	-	+3	ppm	1st year (at +25°C)
		-	-5	-	+5		5 years (at +25°C)
		-	-10	-	+10		10 years (at +25°C)
		-	-15	-	+15		20 years (at +25°C)
13	Insulation resistance	-	500	-	-	Ω *3	
14	Operating temperature range	-	-40	-	+85	°C	
15	Storage temperature range	-	-40	-	+85	°C	
16	Air-tightness	-	-	-	1.1x10 <sup>-9</sup>	Pa.m <sup>3</sup> /s Helium leak detector	
17	Recommended oscillation margin	-	600	-	-	Ω *4	
18	G-sensitivity	-	-	-	2	ppb/G *5	

\*1. The reference temperature shall be +25°C

\*2. CL=10pF. This value is calculated by following formula.

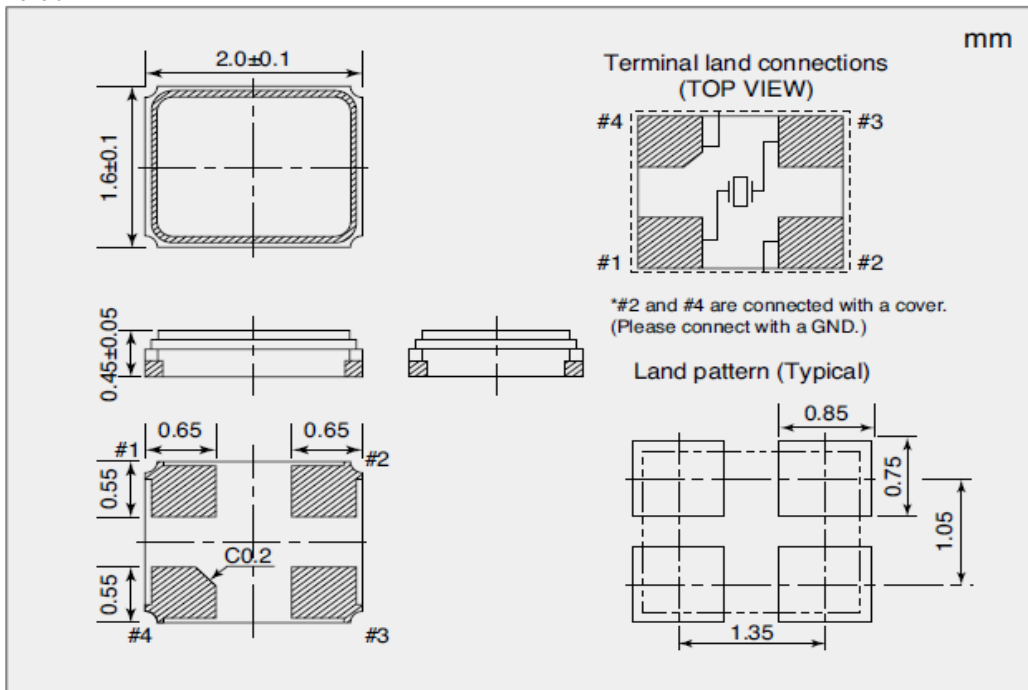
$$S = (C1 \times 1,000) / (2(C0 + CL)^2) \text{ [ppm/pF]} \quad \text{Unit } C0: [\text{pF}], C1: [\text{fF}], CL: [\text{pF}]$$

\*3. When terminal to terminal and terminal to cover were applied at DC100V ±15V.

\*4. When the circuit does not have enough value as above, please contact us.

\*5. When using NDK standard osc. circuit.

## Dimension



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