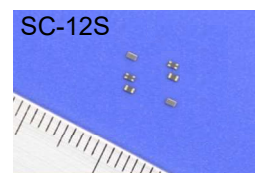
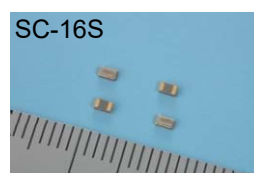
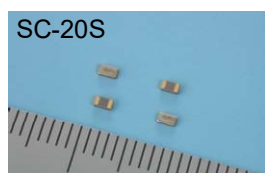
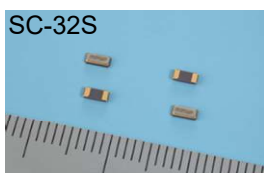
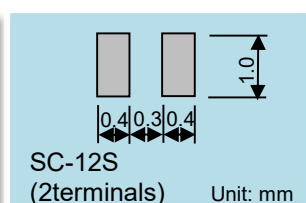
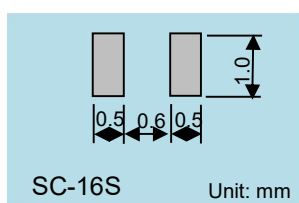
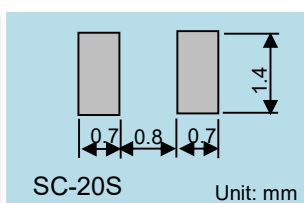
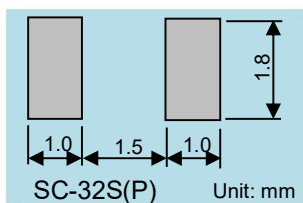


## ◆Specification for Quartz Crystal

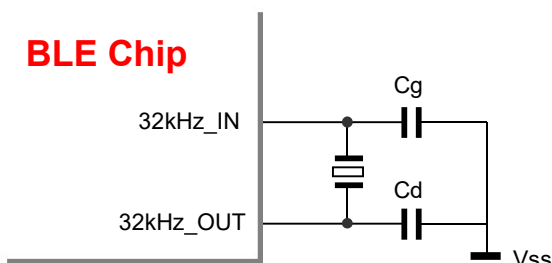
	SC-32S	SC-20S	SC-16S	SC-12S
Nominal Frequency	32.768kHz	32.768kHz	32.768kHz	32.768kHz
Frequency Tolerance	+/-20x10 <sup>-6</sup>	+/-20x10 <sup>-6</sup>	+/-20x10 <sup>-6</sup>	+/-20x10 <sup>-6</sup>
Load capacitance: CL	6pF~12.5pF	7pF~12.5pF	7pF~12.5pF	7pF~12.5pF
Motional Resistance: R1	70kΩmax	70kΩmax	90kΩmax	90kΩmax
Absolute Maximum Drive Level	1.0μW max	1.0μW max	0.5μW max	0.3μW max
Dimensions (Thickness: Max.Value)	3.2×1.5×0.85mm	2.0×1.2×0.6mm	1.6×1.0×0.5mm	1.2×1.0×0.5mm



## RECOMMENDED SOLDERING PATTERN

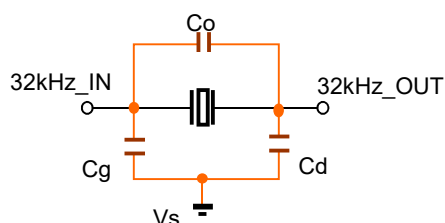


## ◆Qualification item for Oscillation circuit characteristics



No	Items	Symbol	Recommendation
1	Negative Resistance	RL	
2	Oscillation allowance	M	more than 5 times of R1Max.
3	Absolute Maximum Drive Level	D.L	SC-32S/SC-20S: 1μW SC-16S: 0.5μW SC-12S: 0.3μW

## ◆Approximate expression for Circuit load capacitance



$$CL = Cg \times Cd / (Cg + Cd) + Cs \text{ (pF)}$$

Cos : 32kHz\_IN-32kHz\_OUT Stray capacitance

Cgs : 32kHz\_IN-Vss Stray capacitance

Cds : 32kHz\_OUT-Vss Stray capacitance

## ◆Notes for the design of Circuit board

Please keep the wiring short and place Quartz Crystal, Condenser, and Resistance close as possible to Nordic microcontroller. In order to prevent interference with other signal lines, do not provide other signal lines, please do not provide other signal lines on the crystal mounting part (bottom surface).

◆Circuit matching constant for Oscillation circuit



Product	32kHz Quartz Crystal			External condensor		Oscillation Characteristics			Supply Vdd (V)
	Product	R1Max. (kΩ)	CL (pF)	Cg (pF)	Cd (pF)	RL (kΩ)	M (Times)	D.L (μW)	
nRF51422	SC-32S	70	9	12	12	-964	14	0.01	3
			12.5	18	18	-560	8	0.01	
	SC-20S	70	9	12	12	-1,023	15	0.01	3
			12.5	18	18	-556	8	0.01	
	SC-16S	90	7	9	8	-1,420	16	0.01	3
			9	13	12	-943	10	0.01	
			12.5	20	18	-536	6	0.02	
nRF52832	SC-32S	70	7	3	3	-1,457	21	0.01	3
			9	7	7	-950	14	0.01	
			12.5	15	15	-464	7	0.01	
	SC-20S	70	7	4	3	-1,371	20	0.01	3
			9	8	7	-946	14	0.01	
			12.5	15	15	-452	7	0.01	
SC-16S	90	7	4	4	-1,320	17	0.01	3	
		9	9	8	-743	9	0.01		
		12.5	15	15	-496	6	0.01		
nRF52840	SC-32S	70	7	5	5	-967	14	0.01	3
			9	12	12	-670	10	0.01	
			12.5	15	15	-544	8	0.01	
	SC-20S	70	7	6	6	-971	14	0.01	3
			9	12	12	-646	9	0.01	
			12.5	18	18	-362	5	0.01	
	SC-16S	90	7	6	6	-1,010	11	0.01	3
			9	12	12	-713	8	0.01	
SC-12S	90	7	5	5	-1,020	11	0.01	3	
		9	12	12	-713	8	0.01		

◆Notes

The above evaluation results are reference values evaluated in the specific sample, and the contents are not guaranteed.  
Please note that in the actual circuit board, the value of the external element capacitance and the characteristics may change depending on the difference in stray capacitance and so on.