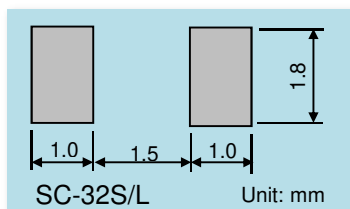◆Specification for Quartz Crystal

Size (mm)	Products			Load capacitance CL	Motional Resistance R1	Maximum Drive Level DL max.	Shunt Capacitance C0
3.2×1.5×0.85	**SC-32S**			12.5pF 7pF 6pF	70kΩ max.	1.0µW max.	1.0pF typ.
	NEW **SC-32L**			4pF	40kΩ max.		

◆RECOMMENDED SOLDERING PATTERN

1.8
1.0 1.5 1.0
SC-32S/L   Unit: mm

◆**Circuit matching constant for Oscillation circuit**

Oscillation mode	32.768kHz quartz crystals		Constants			V_DD (V)	Characteristics of Oscillation			
	Products	R1Max. (kΩ)	CL (pF)	Rd (kΩ)	Cg (pF)	Cd (pF)	RL (kΩ)	M (Times)	D.L (µW)	Ts (sec)
Standard CL	SC-32S	70	12.5	0	22	22	1.8	-425	6.1	0.10	0.52
							3.3	-425	6.1	0.10	0.52
							5.0	-425	6.1	0.10	0.52
							5.5	-435	6.2	0.10	0.52
Low CL 1	SC-32S	70	7	0	9	9	1.8	-711	10.2	0.02	0.40
							3.3	-711	10.2	0.02	0.40
							5.0	-711	10.2	0.02	0.38
							5.5	-711	10.2	0.02	0.38
Low CL 2	SC-32S	70	6	0	7	7	1.8	-384	5.5	0.01	0.80
							3.3	-384	5.5	0.01	0.83
							5.0	-384	5.5	0.01	0.79
							5.5	-384	5.5	0.01	0.74
Low CL 3	SC-32L	40	4	0	3	3	1.8	-307	7.7	0.01	0.52
							3.3	-307	7.7	0.01	0.52
							5.0	-307	7.7	0.01	0.48
							5.5	-307	7.7	0.01	0.48

◆Qualification item for Oscillation circuit characteristics
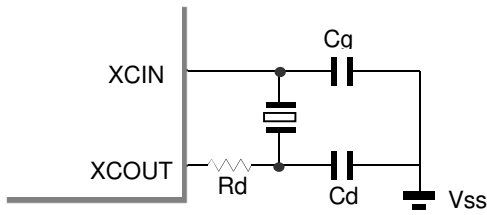
No	Item	Symbol	Recommended conditions
1	Negative Resistance	RL	
2	Oscillation allowance	M	more than 5 times of R1Max.
3	Drive Level	D.L	SC-32S/L : 1µW
4	Oscillation Rising Time	Ts	-

Oscillation rising time (Ts) measurement conditions
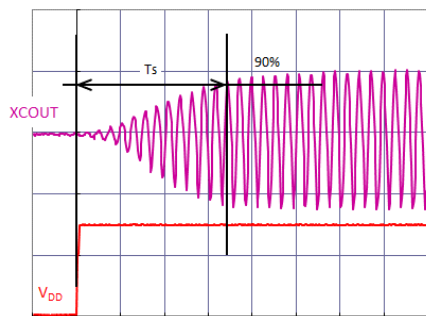
Time from the application of VDD until the XCOU amplitude reaches 90%

◆**Approximate expression for Circuit load capacitance**
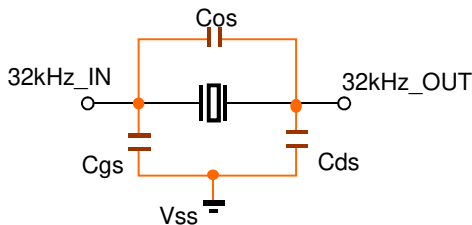
$$CL = Cg \times Cd / (Cg + Cd) + Cs \ \ (pF)$$

Cos : 32kHz_IN-32kHz_OUT Stray capacitance
Cgs : 32kHz_IN-Vss Stray capacitance
Cds : 32kHz_OUT-Vss Stray capacitance

◆**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.

◆**Notes for the design of Circuit board**

Please keep the wiring short and place Quartz Crystal, Condensor, and Resistance
close as possible to Microchip 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).

We value the "takumi" spirit.