

ATMEL

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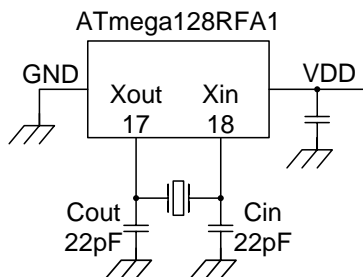
Thank you for your inquiry and we are pleased to report you our circuit analysis report as follows.

## Circuit Analysis Report

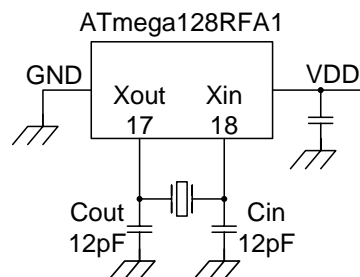
### 1. CONDITION

Test IC	ATmega128RFA1	
Crystal	Holder	NX3215SA
	Frequency	32.768kHz
	Load capacitance	CL=9pF
	NDK Spec. No.	STD-MUA-9
Test Circuit	IC	MEGA128RFA1-ZU 1105D 0T6227
	VDD	+3V / +1.8V
	PCB	TB3_MEGA_RF AVR2067 - Crystal Characterization for AVR RF

### 2. CIRCUIT DIAGRAM



(Current Circuit)



(Suggested Circuit)

### 3. RESULTS

- 1) This crystal unit requires negative resistance of  $-R = 240k\Omega$  minimum for stable oscillation
- 2) Circuit characteristics

Circuit	Cout/Cin	Frequency deviation dF/F	Negative Resistance -R	Drive Level DL	Startup time Tstr
Current	22pF/22pF	-87ppm (CL=9pF)	460k $\Omega$	0.03uW	0.5s
Suggested	12pF/12pF	-5ppm (CL=9pF)	1150k $\Omega$	0.01uW	0.3s

- 3) The current circuit has enough negative resistance. However, frequency shifts to minus.
- 4) In order to improve frequency deviation, we recommend changing capacitance values from Cout/Cin=22pF/22pF to **Cout/Cin=12pF/12pF**.