



# Evaluation Board for AK8130 AKD8130

## Description

The AKD8130 is an evaluation board for AK8130 clock generator family. Therefore, it is easy to evaluate the jitters and VCXO performance. 4 types of boards are prepared depending on crystal foot pattern.

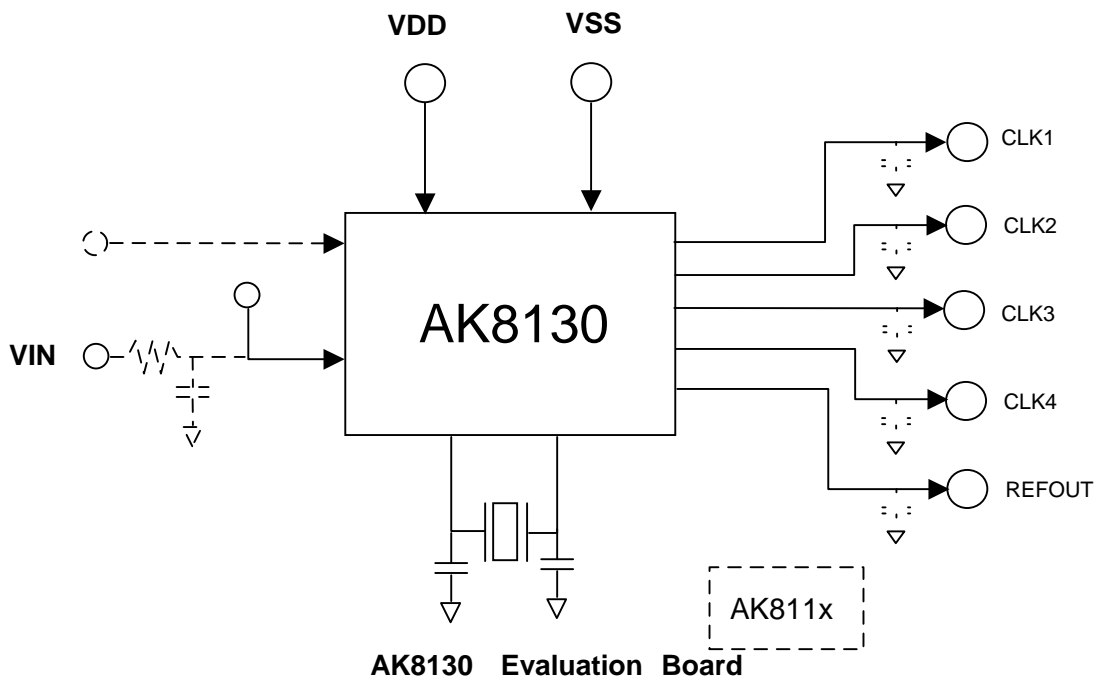
## Ordering guide

**n** AKD813X\_C

X: Device type  
 0:AK8130  
 0A:AK8130A  
 0B:AK8130B

C: Crystal type  
 N: Non Crystal  
 A: 49 Surface mount type  
 B: 5032 2 terminal  
 C: 3025 2 terminal  
 D: 3225 4 terminal

## Block Diagram



**Functions**

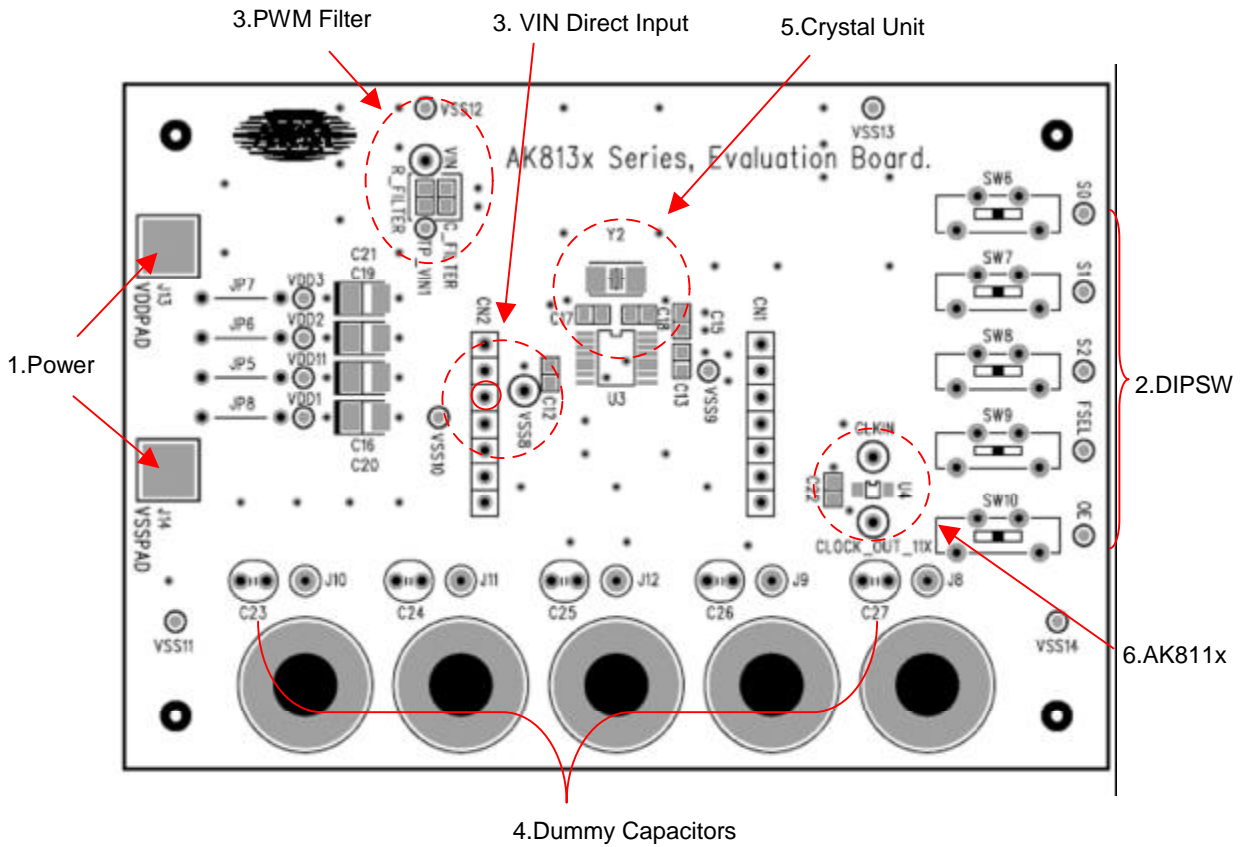


Figure 1. AKD8130 top view

1. Power Supply

Please connect the lead line to VDDPAD (3V) and VSSPAD (GND).

2. DIPSW Setting

DISPSW6-10 are connected to the mode setting pins of AK8130 and AK811x. If these pins are controlled with general-purpose port, microprocessor or other methods, please keep these pins "open".

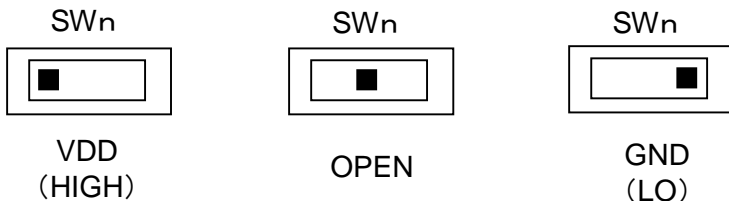


Table1.1

SW	Connect to:
SW6	AK8130 Pin2
SW7	AK8130 Pin3
SW8	AK8130 Pin14
SW9	AK811x Pin5
SW10	AK811x Pin4

### 3. Smoothing filter for PWM signal

There are patterns to configure a passive smoothing filter for PWM signal which is supplied to control the oscillation frequency of VCXO. It is necessary to mount resistor and condenser on these patterns and also input PWM signal between VIN and VSS12 pins when this filter is employed. It is also possible to control the voltage without using this filter. In this case, please input DC voltage directly to CN2 pin over VSS8 pin.

### 4. Dummy capacitor loads

There are several dummy capacitor loads, C23 through C27. It is useful to measure clock performance or current consumption by loading capacitor which is virtually assumed in the system. It is important to take line capacitance into account and it is approximately 5pF. Consequently if there is 25pF capacitance assumed in the system, another 20pF capacitor needs to be mounted. Each clock outputs from AK8130 lead to J8 through J12. Chassis mount test jacks for miniature probe (Tektronix 131-0258-00) are available by mounting there.

Table1.2

Jn/Cn	Connect to:
J8/C8	AK8130 Pin11
J9/C9	AK8130 Pin10
J10/C10	AK8130 Pin7
J11/C11	AK8130 Pin8
J12/C12	AK8130 Pin9

### 5. Quartz oscillator foot pattern

There are 4 types of boards depending on quartz oscillator. VCXO is controlled its oscillation frequency by capacitance fluctuation of quartz oscillator. Therefore parasitic capacitance exists on the line pattern affects the oscillation performance. However in this board, ground patterns under quartz oscillator and Pin1/Pin16 is removed to minimize the unwanted affection. It is possible to check and tune characteristics of VCXO by using this board because those characteristics are adjustable by changing load capacitor, C17 and C18, to the suitable value. Please refer VCXO characteristic as a example.

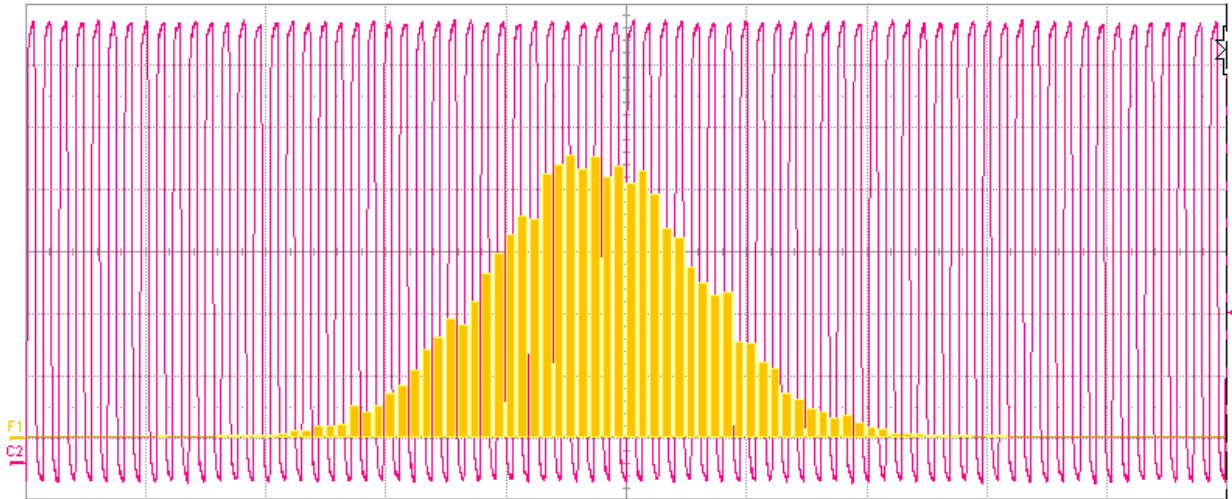
### 6. AK811x foot pattern

It is possible to mount AK811x series 1ch-PLL on this board.

**Jitter measurement**

Device:AK8130B

Condition: S2/S1/S0=HHH, Dummy capacitor=0pF



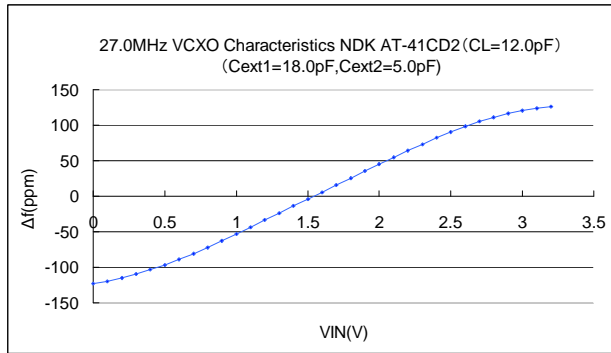
Measure	P1:freq(C2)	P2:per@lv(C2)	P3:dper@lv(C2)	P4:duty@lv(C2)	P5:TIE@lv(C2)	P6:time@lv(C2)	P7:dper@lv(C2)	P8:time@lv(C2)
value	74.184 MHz	13.481 ns	5 ps	49.73 %	-49 ps	498.891 ns		
mean	74.187209 MHz	13.47941 ns	6 fs	49.7313 %	-9.47 ps	178.70 ps		
min	74.0829 MHz	13.462 ns	-29 ps	49.61 %	-116 ps	-498.611 ns		
max	74.2972 MHz	13.497 ns	30 ps	49.91 %	76 ps	498.985 ns		
sdev	27.775 kHz	4.51 ps	7.58 ps	33.1 m%	21.11 ps	291.81201 ns		
num	10.582e+3	10.582e+3	10.439e+3	10.582e+3	10.725e+3	10.725e+3		
status		✓	✓	✓	✓	✓		

<b>C2</b>	<b>F1</b>
475 mV/div	100 #/div
-1.620 V ofst	5.0 ps/div
	10.000 k#
↓ 3.17 V	↓ ---
↑ 3.17 V	↑ ---

<b>Timebase</b>	0 ns	<b>Trigger</b>	<b>C2</b>
100 ns/div	20 GS/s	Stop	1.145 V
20.0 kS		Edge	Positive
X1= 499.95000 ns	ΔX= 0.00 ps		
X2= 499.95000 ns	1/ΔX= ---		

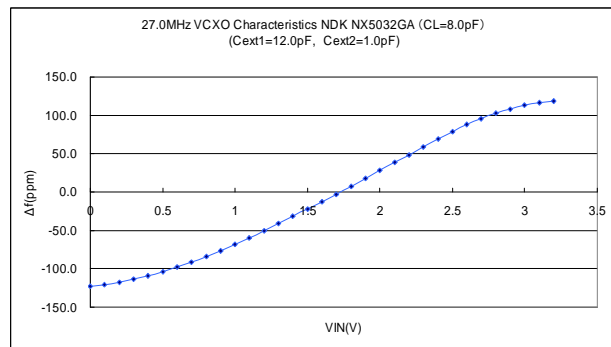
**Pullable Range Profile tested**

Device:AK8130



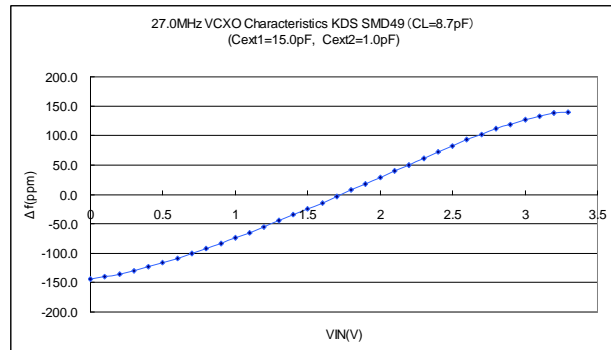
Parts Name	AT-41CD2		
Manufacture	NDK		
Parameter		Unit	
Motional inductance	L1	mH	2
Motional capacitance	C1	fF	17.3
Equivalent resistance	R1	Ω	8.7
Shunt capacitance	C0	pF	4.2
Load capacitance@27M	CL	pF	12

Cext1	C17	pF	18.0
Cext2	C18	pF	5.0



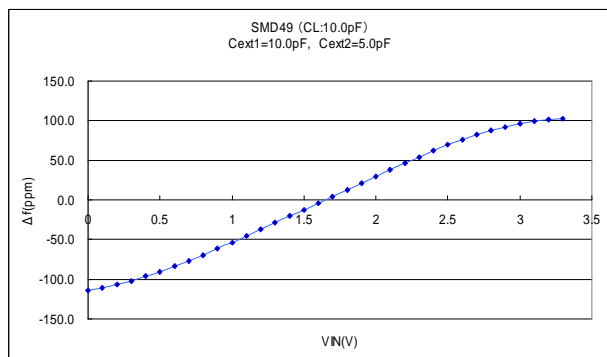
Parts Name	NX5032GA		
Manufacture	NDK		
Parameter		Unit	
Motional inductance	L1	mH	5.71
Motional capacitance	C1	fF	6.09
Equivalent resistance	R1	Ω	10
Shunt capacitance	C0	pF	1.5
Load capacitance @27M	CL	pF	8.0

Cext1	C17	pF	12.0
Cext2	C18	pF	1.0



Parts Name	SMD49		
Manufacture	KDS		
Parameter		Unit	
Motional inductance	L1	mH	4.4
Motional capacitance	C1	fF	7.9
Equivalent resistance	R1	Ω	6.0
Shunt capacitance	C0	pF	1.8
Load capacitance@ 27M	CL	pF	8.7

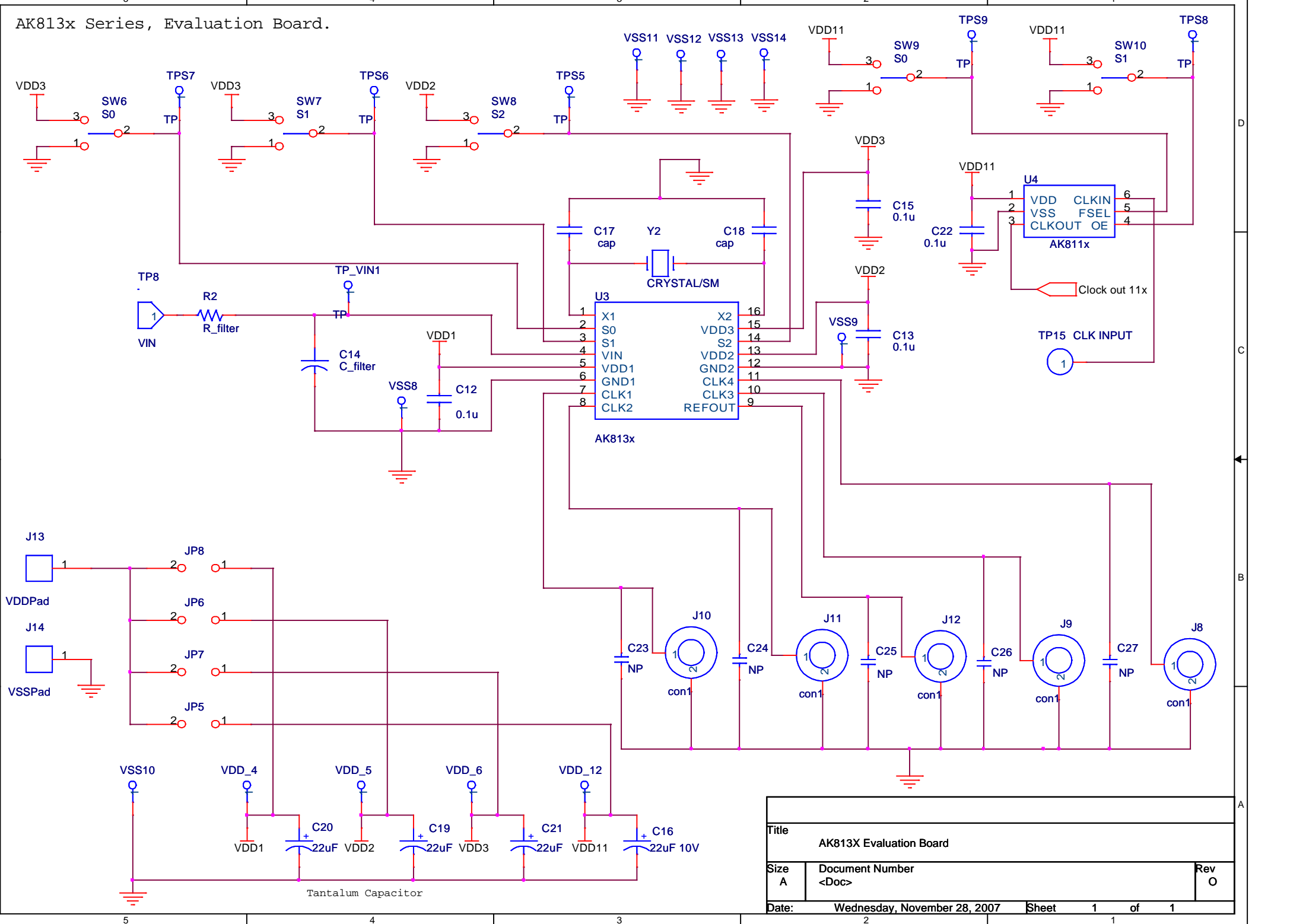
Cext1	C17	pF	15.0
Cext2	C18	pF	1.0



Parts Name	SMD49		
Manufacture	KDS		
Parameter		Unit	
Motional inductance	L1	mH	4.4
Motional capacitance	C1	fF	7.9
Equivalent resistance	R1	Ω	6.0
Shunt capacitance	C0	pF	1.8
Load capacitance@ 27M	CL	pF	10.0

Cext1	C17	pF	10.0
Cext2	C18	pF	5.0

AK813x Series, Evaluation Board.



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AK813X Evaluation Board		
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Date:	Wednesday, November 28, 2007	Sheet 1 of 1