# Evaluation Board for AK8133
# AKD8133

## Description

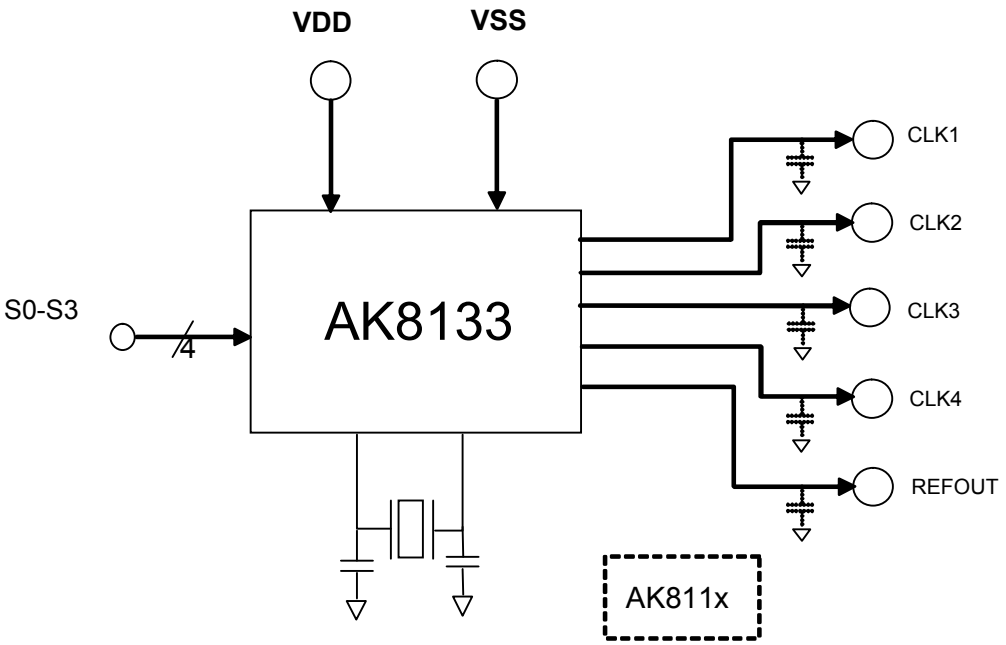
The AKD8133 is an evaluation board for AK8133 clock generator. Therefore, it is easy to evaluate the jitters and XO performance.
4 types of boards are prepared depending on crystal foot pattern.

## Ordering guide

- AKD8133_X

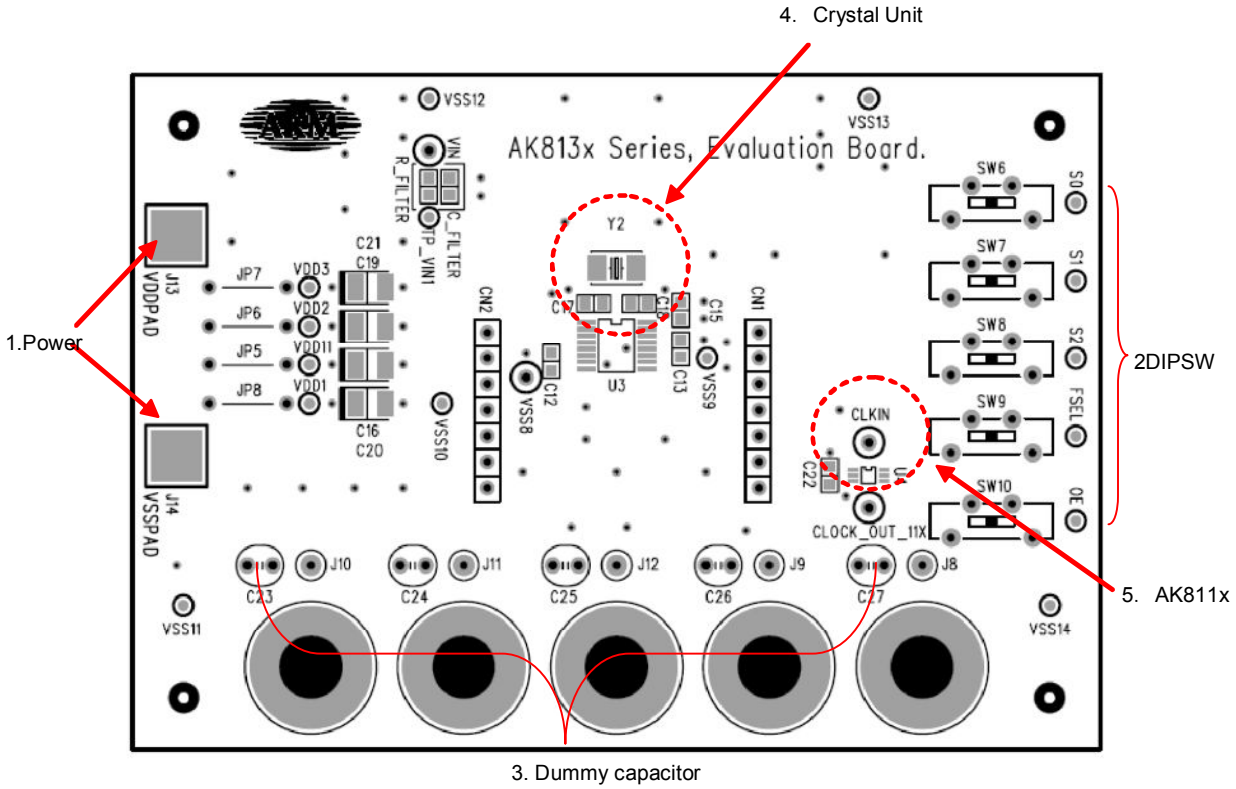
X: Crystal type
N: Non Crystal
A: 49 Surface mount type
B: 5032 2 terminal
C: 3225 2 terminal
D: 3225 4 terminal

## Block Diagram




**AK8133 Evaluation Board**

## Functions




### 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 AK8133 and AK811x.
If these pins are controlled with general-purpose port, microprocessor or other methods, please keep these pins “open”.

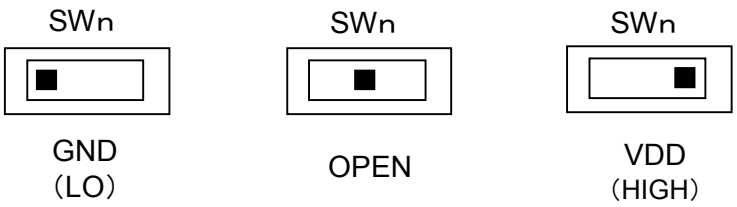



**Table2.1 Dip Switch Connection**

| SW | Connect to: |
|---|---|
| SW6 | AK8133 Pin2(S0) |
| SW7 | AK8133 Pin3(S1) |
| SW8 | AK8133 Pin14(S3) |
| SW9 | AK811x Pin5 |
| SW10 | AK8133 Pin4(S2) |

**Table2.2 CLK1 Output Frequency**

| **Selection Pin** **SW8** (S3/Pin14) | **Output Frequency(MHz)** **J10** (CLK1/Pin 7) |
|---|---|
| L | 36.864 |
| H | 24.576 |

**Table2.3 CLK2-4 Clock output Frequency**

| **Sampling Frequency (kHz)** | **Selection Pin** | | | **Clock Output Frequency (MHz)** | | |
|---|---|---|---|---|---|---|
| | **SW10** (S2/Pin 4) | **SW7** (S1/Pin3) | **SW6** (S0/Pin 2) | **J11** **256fs** (CLK2/Pin 8) | **J9** **384fs** (CLK3/Pin10) | **J8** (CLK4/Pin11) |
| 48.0 | L | L | L | 12.288 | 18.432 | 33.8688 |
| 44.1 | L | L | H | 11.2896 | 16.9344 | 33.8688 |
| 32.0 | L | H | L | 8.192 | 12.288 | 33.8688 |
| 192.0 | L | H | H | 49.152 | 73.728 | 33.8688 |
| 88.2 | H | L | L | 22.5792 | 33.8688 | 33.8688 |
| 96.0 | H | L | H | 24.576 | 36.864 | 33.8688 |
| 64.0 | H | H | L | 16.384 | 24.576 | 33.8688 |
| 16.0/22.05 | H | H | H | 4.096 | 8.4672 | 16.9344 |

## 3. 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 AK8133 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 | AK8133 Pin11 |
| J9/C9 | AK8133 Pin10 |
| J10/C10 | AK8133 Pin7 |
| J11/C11 | AK8133 Pin8 |
| J12/C12 | AK8133 Pin9 |

## 4. Quartz oscillator foot pattern

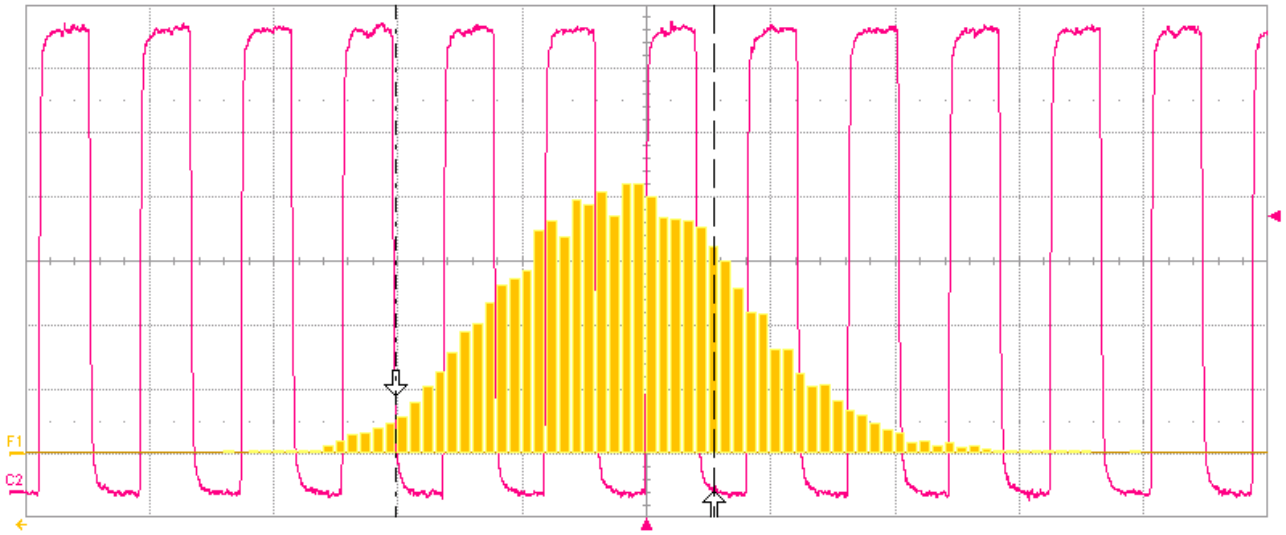
There are 4 types of boards depending on quartz oscillator. C17 and C18 are the load capacitance for crystal unit. In case of external clock input, please remove these capacitors.

## 5. AK811x foot pattern

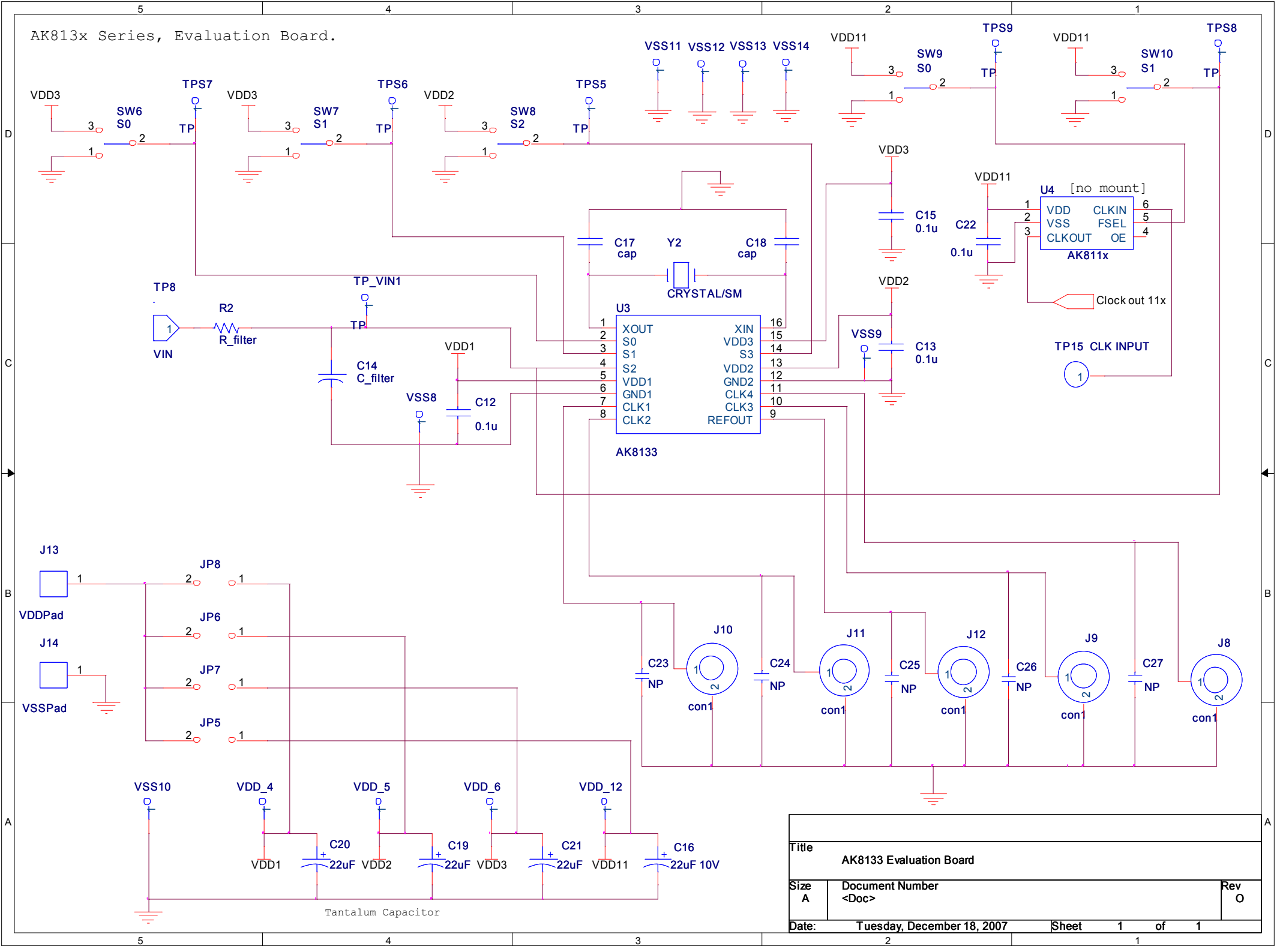
It is possible to mount AK811x series 1ch-PLL on this board.

## Jitter measurement

Device:AK8133E
Condition: S2/S1/S0=HHH, Dummy capacitor=0pF




| Measure | P1:freq(C2) | P2:per@lv(C2) | P3:duty@lv(C2) | P4:dper@lv(C2) | P5:TIE@lv(C2) | P6:max(C2) | P7:min(C2) | P8:mean(C2) |
|---|---|---|---|---|---|---|---|---|
| value | 24.5654 MHz | 40.708 ns | 49.99 % | 11 ps | 28 ps | 3.28 V | -50 mV | 1.614 V |
| mean | 24.576202 MHz | 40.68977 ns | 49.9814 % | -1 fs | 6.46 ps | 3.2660 V | -37.0 mV | 1.61353 V |
| min | 24.5517 MHz | 40.658 ns | 49.90 % | -60 ps | -79 ps | 3.25 V | -57 mV | 1.605 V |
| max | 24.5956 MHz | 40.730 ns | 50.07 % | 52 ps | 99 ps | 3.30 V | -22 mV | 1.621 V |
| sdev | 5.769 kHz | 9.55 ps | 20.8 m% | 14.87 ps | 18.54 ps | 7.9 mV | 5.1 mV | 2.51 mV |
| num | 13.812e+3 | 13.812e+3 | 13.812e+3 | 12.661e+3 | 14.963e+3 | 1.151e+3 | 1.151e+3 | 1.151e+3 |
| status | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |


AK813x Series, Evaluation Board.
VSS11 VSS12 VSS13 VSS14
VDD11
SW9
S0
TPS9
TP
VDD11
SW10
S1
TPS8
TP
VDD3
SW6
S0
TPS7
TP
VDD3
SW7
S1
TPS6
TP
VDD2
SW8
S2
TPS5
TP
VDD3
C15
0.1u
VDD11
C22
0.1u
U4 [no mount]
VDD
VSS
CLKOUT
CLKIN
FSEL
OE
AK811x
Clock out 11x
C17
cap
Y2
C18
cap
CRYSTAL/SM
TP8
VIN
R2
R_filter
TP_VIN1
TP
C14
C_filter
VDD1
VSS8
C12
0.1u
U3
XOUT
S0
S1
S2
VDD1
GND1
CLK1
CLK2
XIN
VDD3
S3
VDD2
GND2
CLK4
CLK3
REFOUT
AK8133
VDD2
VSS9
C13
0.1u
TP15 CLK INPUT
J13
VDDPad
J14
VSSPad
JP8
JP6
JP7
JP5
J10
J11
J12
J9
J8
C23
NP
C24
NP
C25
NP
C26
NP
C27
NP
con1
VSS10
VDD_4
VDD_5
VDD_6
VDD_12
C20
22uF
C19
22uF
C21
22uF
C16
22uF 10V
VDD1
VDD2
VDD3
VDD11
Tantalum Capacitor
Title
AK8133 Evaluation Board
Size
A
Document Number
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Rev
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Tuesday, December 18, 2007
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