



Evaluation Board for AK8126/AK8126A/AK8126B AKD8126-miniEva AKD8126A-miniEva AKD8126B-miniEva

1. Description

AKD8126X-miniEva-Y is a common evaluation board and can produce a center or down spectrum spreading output with pin-selectable modulation ratio. The board is compatible with the AK8126, AK8126A and AK8126B. AKD8126X-miniEva-Y has three footprint types for crystal unit.

2. Ordering Information

AKD8126X-miniEva-Y allows the user to choose a device type and a crystal unit.

AKD8126X-miniEva-Y

X: Device Type

N: AK8126

A: AK8126A

B: AK8126B

Y: 3 Types of Crystal Unit

Type-1:

49 Type Crystal Unit or External Clock

Type-2:

5032 Type Crystal Unit or External Clock

Type-3:

3225 Type Crystal Unit or External Clock

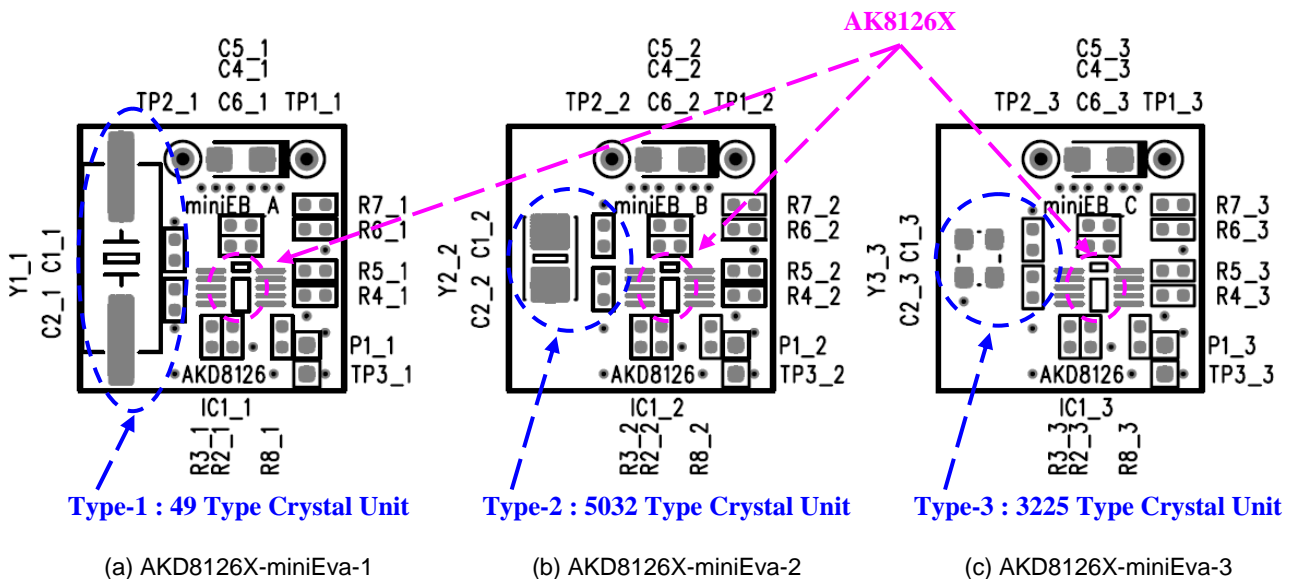
3. Configuration

The AKD8126X-miniEva-Y allows the user to set all function for AK8126 series by 0[Ω] chip resistors.

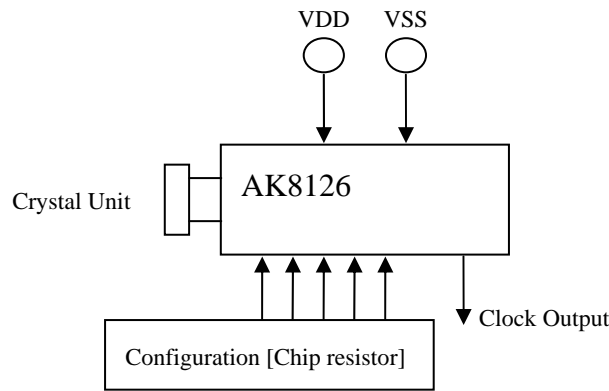
The modulation mode and the modulation ratio are selectable by the state of the C/D/OFF, S0 and S1 pins.

The operation frequency range applying to the board is required to select by the state of the FR0 and FR1 pins.

- Spread Off
- Center Spread
 - ±0.25% ±0.5% ±1.0% ±1.5%
- Down Spread
 - 0.5% -1.0% -2.0% -3.0%
- Input Clock Source
 - Crystal Unit External Clock
- Input Frequency and Scaling
 - 16-32MHz(x1) 16-32MHz(x4)
 - 32-64MHz(x1) 64-128MHz(x1)
- Default setting



4. Block Diagram



AK8126X-miniEva-Y Evaluation Board

5. Absolute Maximum Rating

Over operating free-air temperature range unless otherwise noted ⁽¹⁾

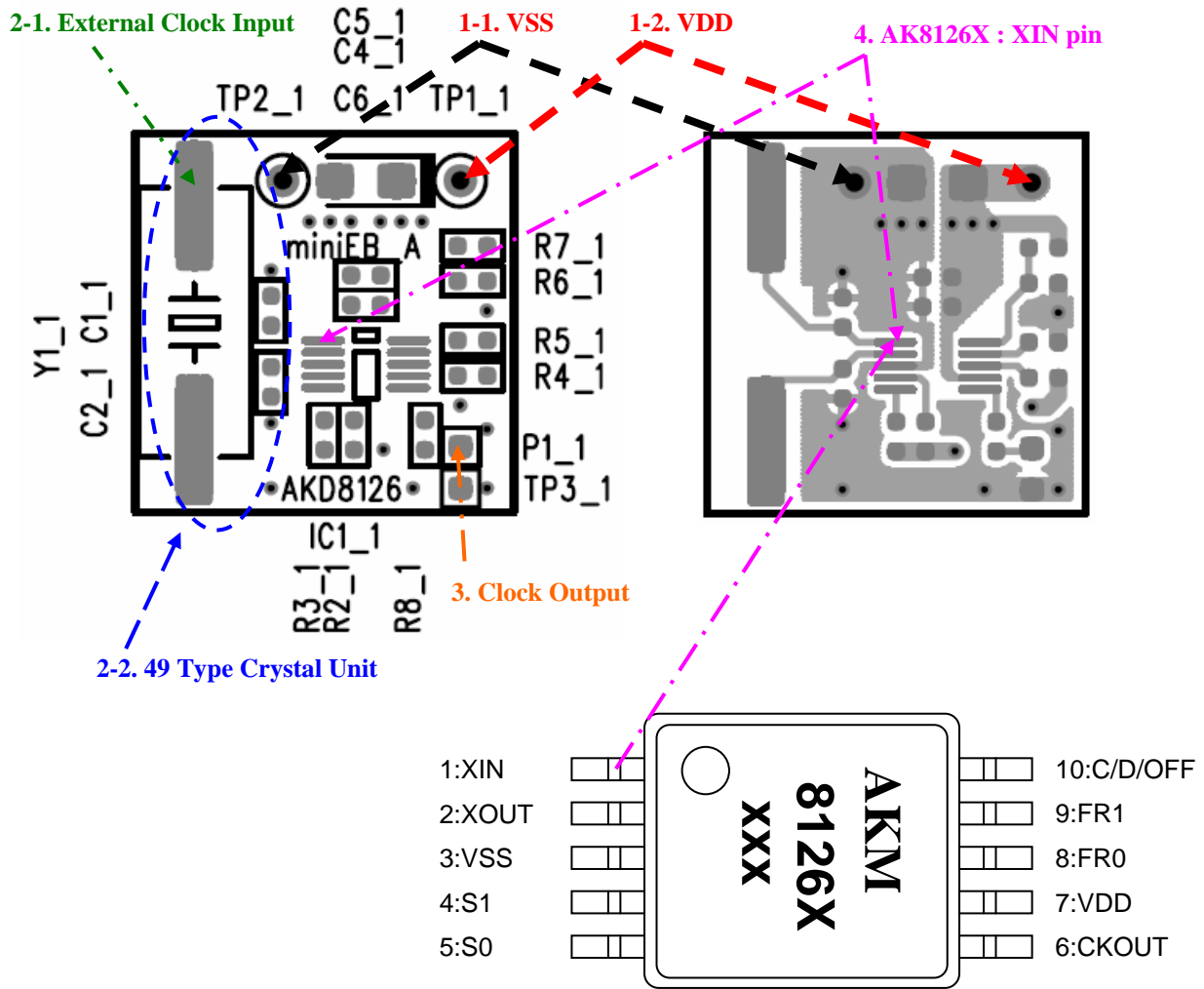
Items	Symbol	Ratings	Unit
Supply voltage	VDD/VDDI	-0.3 to 4.6	V
Input voltage	V _{in}	VSS-0.3 to VDD+0.3	V
Input current (any pins except supplies)	I _{IN}	±10	mA
Storage temperature	T _{stg}	-55 to 130	°C

Note

(1) Stress beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to absolute-maximum-rating conditions for extended periods may affect device reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

6.1. Type-1: AKD8126X-miniEva-1

6.1.1 Functions



1-1. VSS, 1-2. VDD

Please connect the lead line to VDD (3.3V; Red) and VSS (GND; Black).

2-1. External Clock Input

It is possible to input the external clock for IC1_1 by connecting the lead line from Y1_1.

2-2. Crystal Unit

Y1_1: 49 type crystal oscillator are mountable.
C1_1 and C2_1 are the load capacitors for frequency adjustment.

3. Clock Output, 4. AK8126X

Clock output from AK8126X leads to pads P1_1. Spectrum Analyzer or Oscilloscope is available to measure clock performances by connecting here.

Table 1. AKD8126X-miniEva-1 top view

Name	Function
IC1_1	AK8126 series
Y1_1	49 Type Crystal Connection or an External Clock Input
TP1_1	VDD = 3.0 ~ 3.6[V]
TP2_1	GND
TP3_1	GND
P1_1	CKOUT pin
R2_1	0[Ω] Chip Resistor : Connecting S1 pin to VDD
R3_1	0[Ω] Chip Resistor : Connecting S0 pin to VDD
R4_1	0[Ω] Chip Resistor : Connecting FR0 pin to VDD
R5_1	0[Ω] Chip Resistor : Connecting FR1 pin to GND
R6_1	0[Ω] Chip Resistor : Connecting C/D/OFF pin to GND
R7_1	0[Ω] Chip Resistor : Connecting C/D/OFF pin to VDD
R8_1	0[Ω] Chip Resistor : Connecting CKOUT pin to P1_1
C1_1	Load Capacitor Connection
C2_1	Load Capacitor Connection
C4_1	0.01[μF]
C5_1	0.1[μF]
C6_1	22[μF]

6.1.2. Configuration

Chip Resistor Setting

(1) Modulation Mode Selection (#10 : C/D/OFF pin)

Modulation mode is selected by setting these 0[Ω] chip resistors.

Table 2 : Modulation Mode Selection

C/D/OFF pin	Modulation Mode	Chip Resistor Setting	
		R6_1	R7_1
H	Center Spread	Open	Short
L	Down Spread	Short	Open
M	Spread Off	Open	Open

(2) Modulation Ratio Selection (#2, 3 : S0, S1 pin)

Modulation ratio is selected by setting these 0[Ω] chip resistors.

Table 3 : Modulation Ratio Selection

S1 pin	S0 pin	Center Spread	Down Spread	Chip Resistor Setting	
		C/D/OFF pin = "H"	C/D/OFF pin = "L"	R2_1	R3_1
L	L	±0.5[%]	-1.0[%]	Open	Open
L	H	±0.25[%]	-0.5[%]	Open	Short
H	L	±1.0[%]	-2.0[%]	Short	Open
H	H	±1.5[%]	-3.0[%]	Short	Short

(3) Operation Frequency Range Selection (#8, 9 : FR0, FR1 pin)

Operation frequency range is selected by setting these 0[Ω] chip resistors.

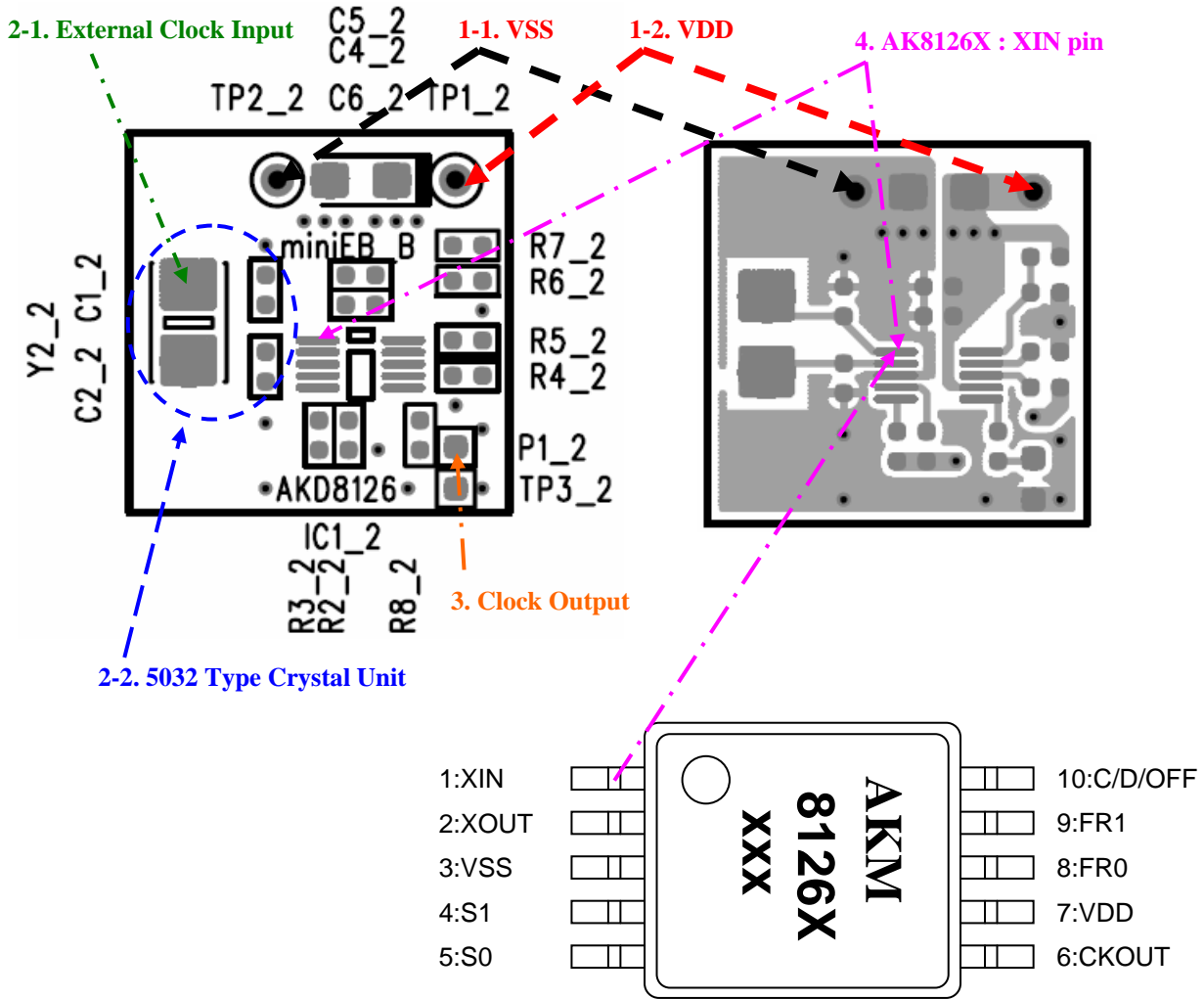
Table 4 : Operation Frequency Range Selection

FR1 pin	FR0 pin	Input Frequency Range	Output Frequency Range	Chip Resistor Setting	
				R4_1	R5_1
L	L	16-32[MHz]	16-32[MHz] (x1)	Open	Short
L	H	32-64[MHz]	32-64[MHz] (x1)	Short	Short
H	L	64-128[MHz]	64-128[MHz] (x1)	Open	Open
H	H	16-32[MHz]	64-128[MHz] (x4)	Short	Open

Note: AK8126 outputs a input frequency x 4, when FR0 pin = FR1 pin = "H" is selected.

6.2. Type-2: AKD8126X-miniEva-2

6.2.1. Functions



1-1. VSS, 1-2. VDD

Please connect the lead line to VDD (3.3V; Red) and VSS (GND; Black).

2-1. External Clock Input

It is possible to input the external clock for IC1_2 by connecting the lead line from Y2_2.

2-2. Crystal Unit

Y2_2: 5032 type crystal oscillator are mountable.
C1_2 and C2_2 are the load capacitors for frequency adjustment.

3. Clock Output, 4. AK8126X

Clock output from AK8126X leads to pads P1_2. Spectrum Analyzer or Oscilloscope is available to measure clock performances by connecting here.

Table 5. AKD8126X-miniEva-2 top view

Name	Function
IC1_2	AK8126 series
Y2_2	5032 Type Crystal Connection or an External Clock Input
TP1_2	VDD = 3.0 ~ 3.6[V]
TP2_2	GND
TP3_2	GND
P1_2	CKOUT pin
R2_2	0[Ω] Chip Resistor : Connecting S1 pin to VDD
R3_2	0[Ω] Chip Resistor : Connecting S0 pin to VDD
R4_2	0[Ω] Chip Resistor : Connecting FR0 pin to VDD
R5_2	0[Ω] Chip Resistor : Connecting FR1 pin to GND
R6_2	0[Ω] Chip Resistor : Connecting C/D/OFF pin to GND
R7_2	0[Ω] Chip Resistor : Connecting C/D/OFF pin to VDD
R8_2	0[Ω] Chip Resistor : Connecting CKOUT pin to P1_1
C1_2	Load Capacitor Connection
C2_2	Load Capacitor Connection
C4_2	0.01[μF]
C5_2	0.1[μF]
C6_2	22[μF]

6.2.2. Configuration

Chip Resistor Setting

(1) Modulation Mode Selection (#10 : C/D/OFF pin)

Modulation mode is selected by setting these 0[Ω] chip resistors.

Table 6 : Modulation Mode Selection

C/D/OFF pin	Modulation Mode	Chip Resistor Setting	
		R6_2	R7_2
H	Center Spread	Open	Short
L	Down Spread	Short	Open
M	Spread Off	Open	Open

(2) Modulation Ratio Selection (#2, 3 : S0, S1 pin)

Modulation ratio is selected by setting these 0[Ω] chip resistors.

Table 7 : Modulation Ratio Selection

S1 pin	S0 pin	Center Spread C/D/OFF pin = "H"	Down Spread C/D/OFF pin = "L"	Chip Resistor Setting	
				R2_2	R3_2
L	L	±0.5[%]	-1.0[%]	Open	Open
L	H	±0.25[%]	-0.5[%]	Open	Short
H	L	±1.0[%]	-2.0[%]	Short	Open
H	H	±1.5[%]	-3.0[%]	Short	Short

(3) Operation Frequency Range Selection (#8, 9 : FR0, FR1 pin)

Operation frequency range is selected by setting these 0[Ω] chip resistors.

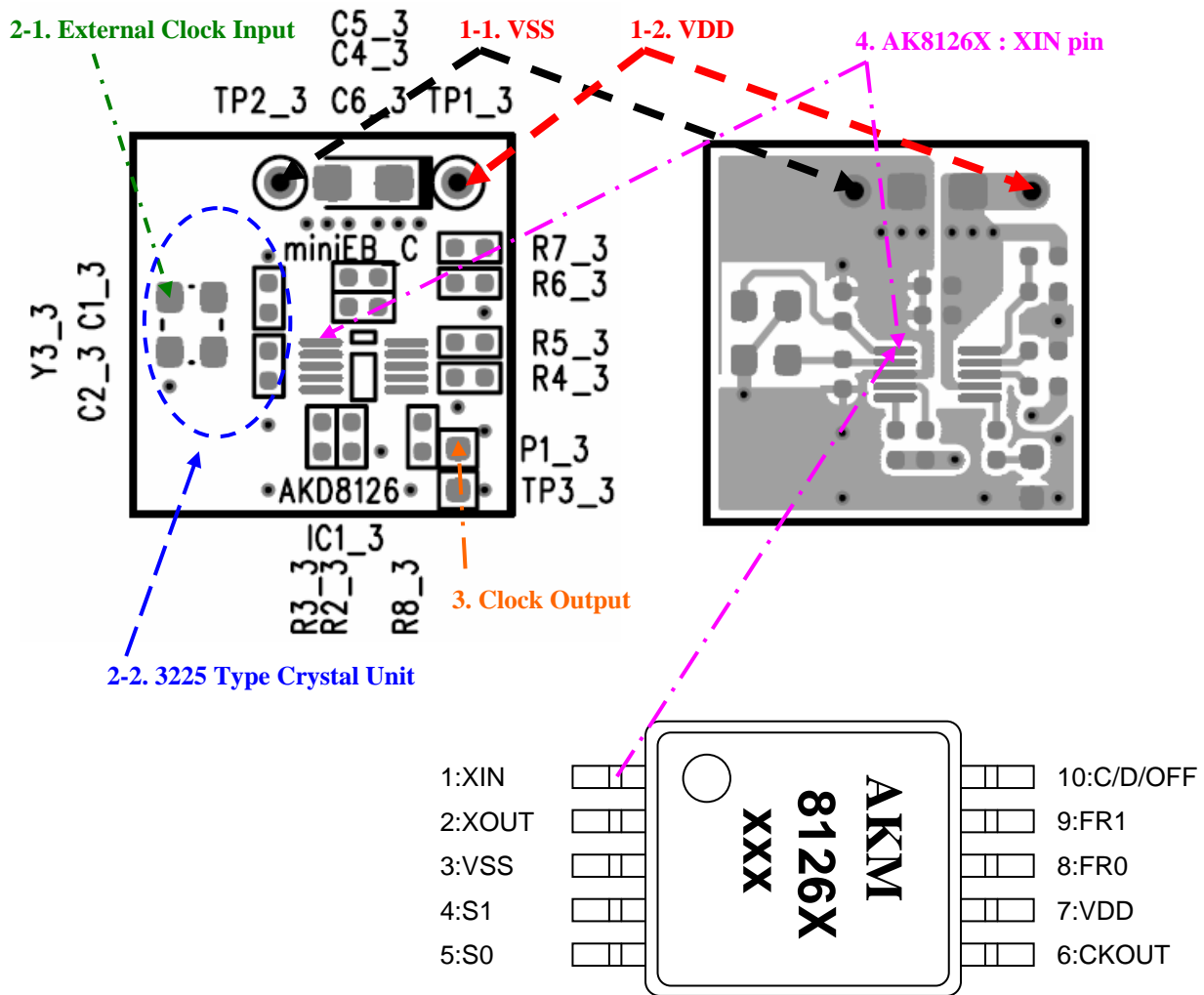
Table 8 : Operation Frequency Range Selection

FR1 pin	FR0 pin	Input Frequency Range	Output Frequency Range	Chip Resistor Setting	
				R4_2	R5_2
L	L	16-32[MHz]	16-32[MHz] (x1)	Open	Short
L	H	32-64[MHz]	32-64[MHz] (x1)	Short	Short
H	L	64-128[MHz]	64-128[MHz] (x1)	Open	Open
H	H	16-32[MHz]	64-128[MHz] (x4)	Short	Open

Note: AK8126 outputs a input frequency x 4, when FR0 pin = FR1 pin = "H" is selected.

6.3. Type-3: AKD8126X-miniEva-3

6.3.1. Functions



1-1. VSS, 1-2. VDD

Please connect the lead line to VDD (3.3V; Red) and VSS (GND; Black).

2-1. External Clock Input

It is possible to input the external clock for IC1_3 by connecting the lead line from Y3_3.

2-2. Crystal Unit

Y3_3: 3225 type crystal oscillator are mountable.
C1_3 and C2_3 are the load capacitors for frequency adjustment.

3. Clock Output, 4. AK8126X

Clock output from AK8126X leads to pads P1_3. Spectrum Analyzer or Oscilloscope is available to measure clock performances by connecting here.

Table 9. AKD8126X-miniEva-3 top view

Name	Function
IC1_3	AK8126 series
Y3_3	3225 Type Crystal Connection or an External Clock Input
TP1_3	VDD = 3.0 ~ 3.6[V]
TP2_3	GND
TP3_3	GND
P1_3	CKOUT pin
R2_3	0[Ω] Chip Resistor : Connecting S1 pin to VDD
R3_3	0[Ω] Chip Resistor : Connecting S0 pin to VDD
R4_3	0[Ω] Chip Resistor : Connecting FR0 pin to VDD
R5_3	0[Ω] Chip Resistor : Connecting FR1 pin to GND
R6_3	0[Ω] Chip Resistor : Connecting C/D/OFF pin to GND
R7_3	0[Ω] Chip Resistor : Connecting C/D/OFF pin to VDD
R8_3	0[Ω] Chip Resistor : Connecting CKOUT pin to P1_1
C1_3	Load Capacitor Connection
C2_3	Load Capacitor Connection
C4_3	0.01[μF]
C5_3	0.1[μF]
C6_3	22[μF]

6.3.2. Configuration

Chip Resistor Setting

(1) Modulation Mode Selection (#10 : C/D/OFF pin)

Modulation mode is selected by setting these 0[Ω] chip resistors.

Table 10 : Modulation Mode Selection

C/D/OFF pin	Modulation Mode	Chip Resistor Setting	
		R6_3	R7_3
H	Center Spread	Open	Short
L	Down Spread	Short	Open
M	Spread Off	Open	Open

(2) Modulation Ratio Selection (#2, 3 : S0, S1 pin)

Modulation ratio is selected by setting these 0[Ω] chip resistors.

Table 11 : Modulation Ratio Selection

S1 pin	S0 pin	Center Spread C/D/OFF pin = "H"	Down Spread C/D/OFF pin = "L"	Chip Resistor Setting	
				R2_3	R3_3
L	L	±0.5[%]	-1.0[%]	Open	Open
L	H	±0.25[%]	-0.5[%]	Open	Short
H	L	±1.0[%]	-2.0[%]	Short	Open
H	H	±1.5[%]	-3.0[%]	Short	Short

(3) Operation Frequency Range Selection (#8, 9 : FR0, FR1 pin)

Operation frequency range is selected by setting these 0[Ω] chip resistors.

Table 12 : Operation Frequency Range Selection

FR1 pin	FR0 pin	Input Frequency Range	Output Frequency Range	Chip Resistor Setting	
				R4_3	R5_3
L	L	16-32[MHz]	16-32[MHz] (x1)	Open	Short
L	H	32-64[MHz]	32-64[MHz] (x1)	Short	Short
H	L	64-128[MHz]	64-128[MHz] (x1)	Open	Open
H	H	16-32[MHz]	64-128[MHz] (x4)	Short	Open

Note: AK8126 outputs a input frequency x 4, when FR0 pin = FR1 pin = "H" is selected.

■ Example of spectrum measurement

Input Clock : Crystal Unit 27[MHz]

Output Clock : Input Frequency Scaling [x4], Center spread $\pm 1.0\%$

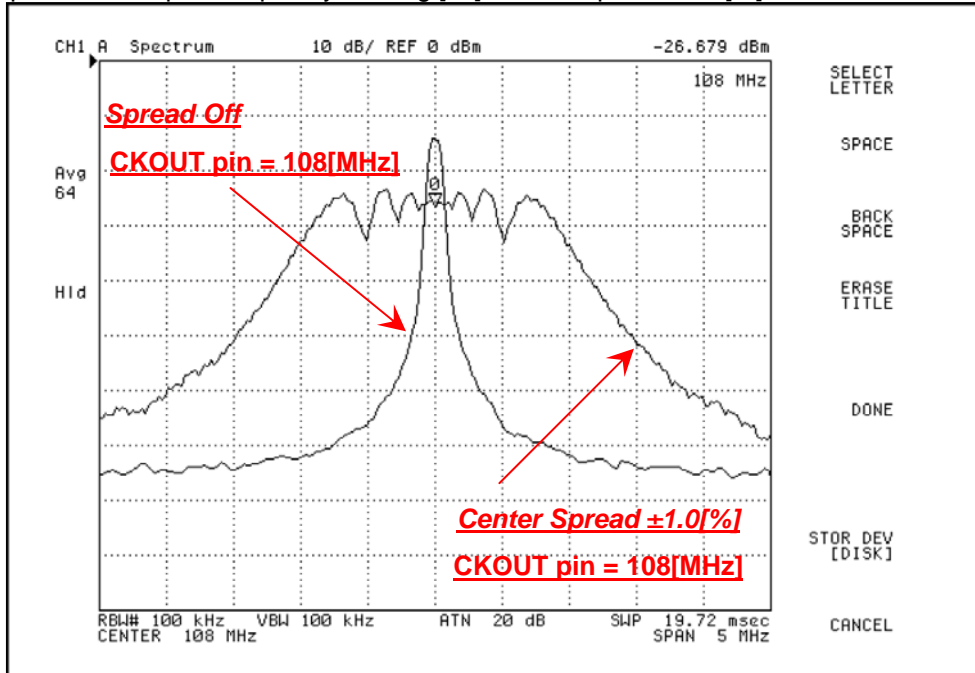


Figure.1

Input Clock : External Clock 74.25[MHz]

Output Clock : Input Frequency Scaling [x1], Center spread $\pm 1.5\%$

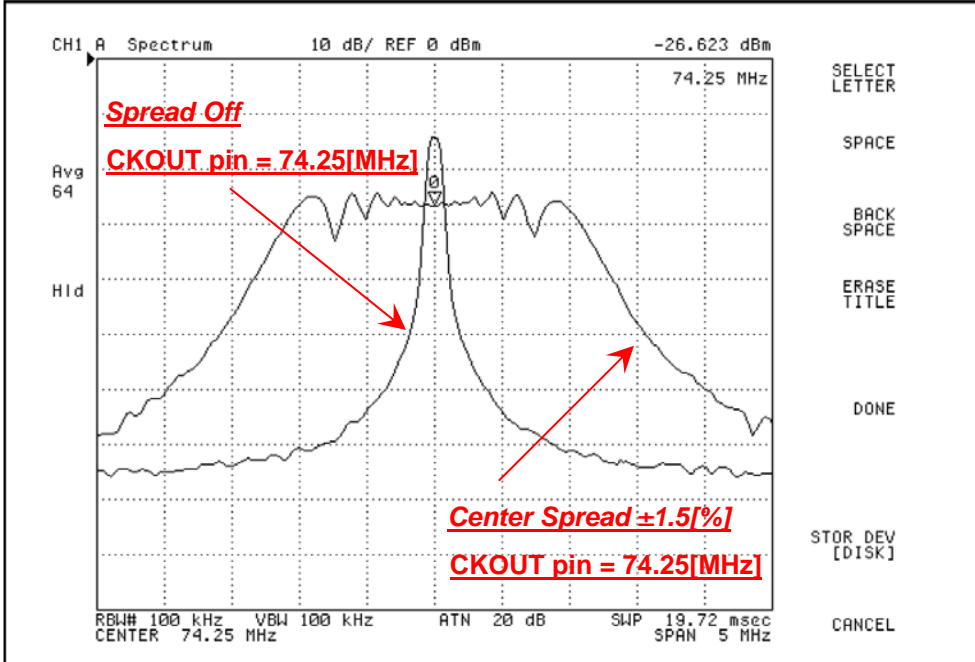


Figure.2

Input Clock : External Clock 33.333[MHz]
 Output Clock : Input Frequency Scaling [x1], Down spread -3.0[%]

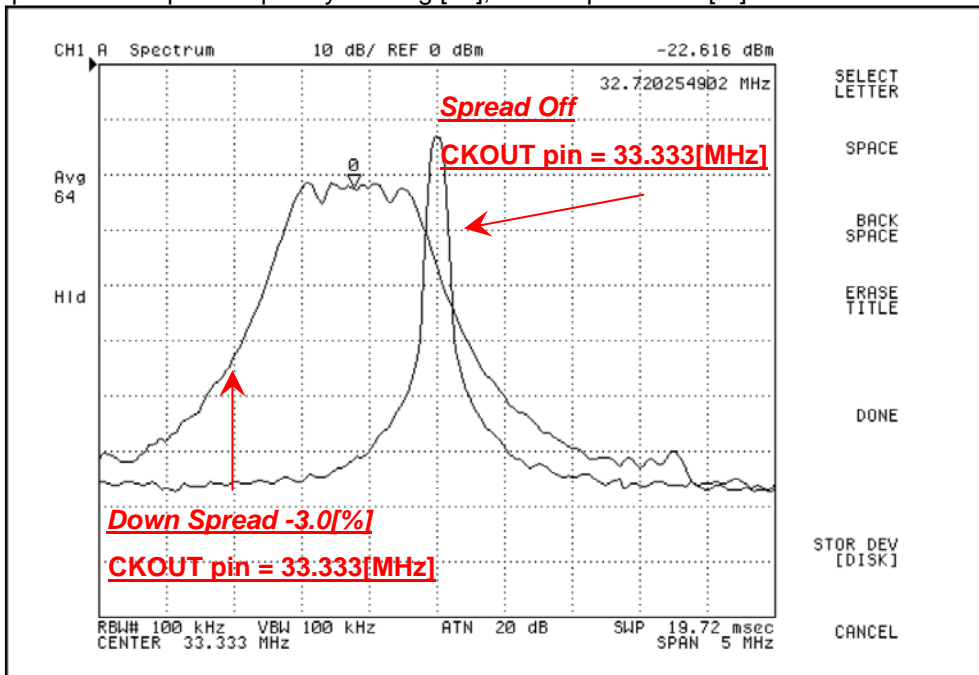


Figure.3

IMPORTANT NOTICE

- These products and their specifications are subject to change without notice.
When you consider any use or application of these products, please make inquiries the sales office of Asahi Kasei Microdevices Corporation (AKM) or authorized distributors as to current status of the products.
- AKM assumes no liability for infringement of any patent, intellectual property, or other rights in the application or use of any information contained herein.
- Any export of these products, or devices or systems containing them, may require an export license or other official approval under the law and regulations of the country of export pertaining to customs and tariffs, currency exchange, or strategic materials.
- AKM products are neither intended nor authorized for use as critical components^{Note1)} in any safety, life support, or other hazard related device or system^{Note2)}, and AKM assumes no responsibility for such use, except for the use approved with the express written consent by Representative Director of AKM. As used here:
Note1) A critical component is one whose failure to function or perform may reasonably be expected to result, whether directly or indirectly, in the loss of the safety or effectiveness of the device or system containing it, and which must therefore meet very high standards of performance and reliability.
Note2) A hazard related device or system is one designed or intended for life support or maintenance of safety or for applications in medicine, aerospace, nuclear energy, or other fields, in which its failure to function or perform may reasonably be expected to result in loss of life or in significant injury or damage to person or property.
- It is the responsibility of the buyer or distributor of AKM products, who distributes, disposes of, or otherwise places the product with a third party, to notify such third party in advance of the above content and conditions, and the buyer or distributor agrees to assume any and all responsibility and liability for and hold AKM harmless from any and all claims arising from the use of said product in the absence of such notification.