

## ASSP

# Piezo Electric VCO

## M2 Series (D110)

### VOLTAGE CONTROLLED OSCILLATOR (4 to 30 MHz)

#### ■ DESCRIPTION

The M2 series (D110) Voltage Controlled Oscillators (VCO) directly oscillate in the frequency range of 4 to 30 MHz. The M2 series VCO use a piezoelectric single crystal with high electromechanical coupling coefficient (LiTaO<sub>3</sub>: lithium tantalate) for stable and wide variable frequency width.

Excellent S/N and jitter characteristic due to high Q of lithium tantalate can realize high quality playback sound and picture, especially in PLL circuit of digital audio and video equipments.

#### ■ FEATURES

- Wider variable frequency width than quartz crystals:  $\pm 0.2\%$  or more
- High stability (100 times more stable than LC or TTL-IC VCO)
- Excellent S/N and jitter characteristic due to high Q of lithium tantalate for high quality playback sound and picture.
- Excellent temperature characteristic:  $-300 \sim 500$  ppm ( $-10 \sim +70^\circ\text{C}$ )
- 10-pin SIP ready for high-density mounting.

#### ■ PACKAGE

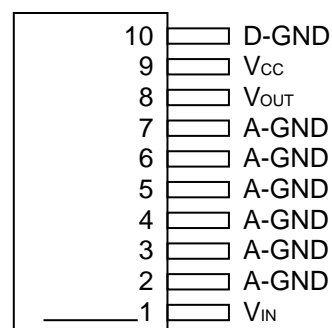


# M2 Series (D110)

## ■ TERMINAL ASSIGNMENT

Terminal No.	Terminal Name	Description
1	V <sub>IN</sub>	Control voltage input terminal
2, 3, 4, 5, 6, 7	A-GND	Analog grounding terminal
8	V <sub>OUT</sub>	Output terminal
9	V <sub>CC</sub>	Power supply terminal
10	D-GND	Digital grounding terminal

(Front view)



**Note:** The GND terminals are not connected inside the module.  
Be sure to route them on the PC board.

## ■ MAXIMUM RATINGS

Item	Symbol	Rated value	Unit
Power supply voltage	V <sub>CC</sub>	-0.5 ~ +7.0	V
Input control voltage	V <sub>IN</sub>	-0.5 ~ +10.0	
Power consumption	P <sub>D</sub>	100	mW
Operating temperature	T <sub>a</sub>	-10 ~ +70	°C
Storage temperature	T <sub>stg</sub>	-30 ~ +100	
Oscillation frequency range	—	4 ~ 30	MHz

## ■ RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Rated value	Unit
Power supply voltage	V <sub>CC</sub>	4.75 ~ 5.25	V
Input control voltage	V <sub>IN</sub>	0 ~ 5	
Operating temperature	T <sub>a</sub>	-10 ~ +60	°C

## ■ STANDARD FREQUENCIES

Frequencies	Uses	Part number
12.288 MHz	Audio	FAR-M2SC-12M288-D110
13.500 MHz	Video	FAR-M2SC-13M500-D110
14.318 MHz	Video	FAR-M2SC-14M318-D110
16.934 MHz	Audio	FAR-M2SC-16M934-D110

Frequencies	Uses	Part number
17.734 MHz	Video	FAR-M2SC-17M734-D110
22.579 MHz	Audio	FAR-M2SC-22M579-D110
24.576 MHz	Audio	FAR-M2SC-24M576-D110
28.636 MHz	Video	FAR-M2SC-28M636-D110

## ■ ELECTRICAL CHARACTERISTICS

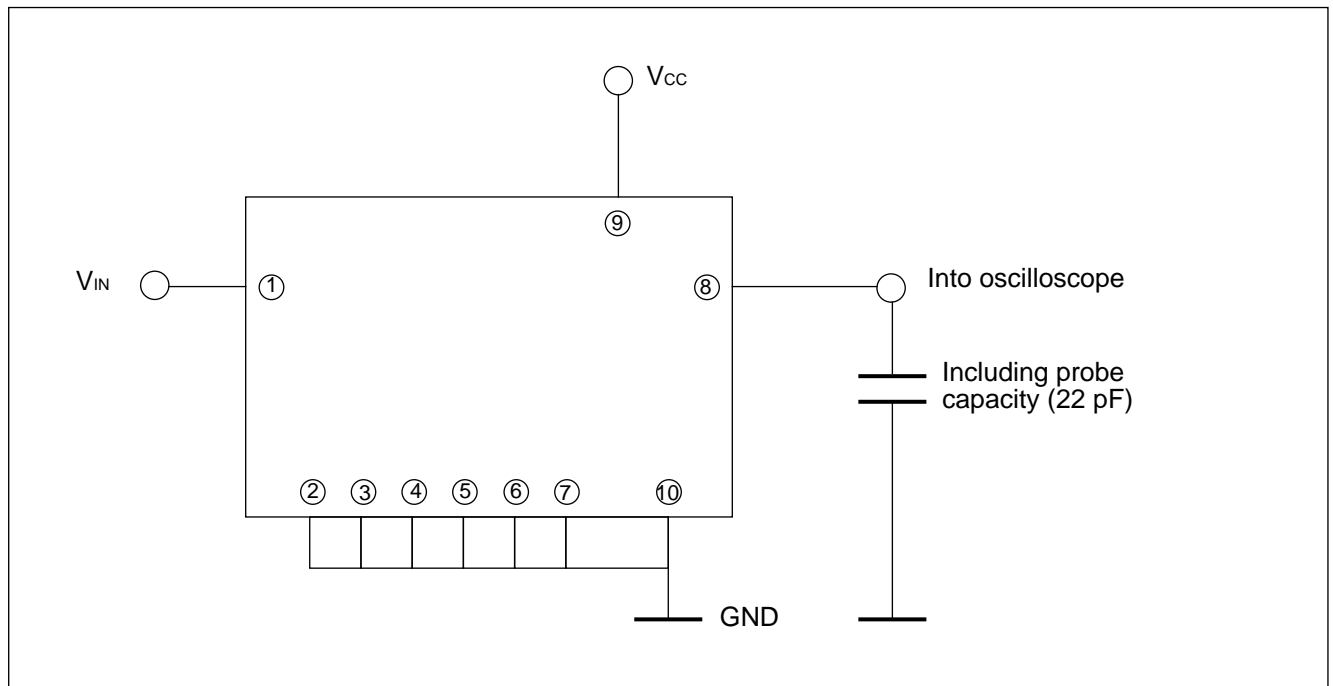
( $V_{CC} = 5.0\text{ V}$ )

Item	Symbol	Condition	Rated value			Unit	
			minimum	standard	maximum		
Power supply current	$I_{CC}$	Not loaded	—	10	15	mA	
Oscillation frequency	$f_H$	$V_{IN} = 5.0\text{ V}$	+2000	—	—	ppm	
	$f_1$	$V_{IN} = 0\text{ V}$	—	—	-2000		
Output voltage	H level	$V_{OH}$	$V_{IN} = 2.5\text{ V}$	$V_{CC} - 0.5$	5.0	V	
	L level	$V_{OL}$	$V_{IN} = 2.5\text{ V}$	—	0		0.5
Frequency voltage stability	$\Delta f (V_{CC})$	$V_{CC} = 4.75 \sim 5.25\text{ V}$	-100	—	+100	ppm	*1
Frequency temperature stability	$\Delta f (T_a)$	$V_{IN} = 2.5\text{ V}$	-300	—	+500		*2

\*1:  $V_{CC} = 5.0\text{ V}$  standard

\*2:  $25^\circ\text{C}$  standard,  $T_a = -10 \sim +70^\circ\text{C}$

## ■ MEASURING CIRCUIT DIAGRAM

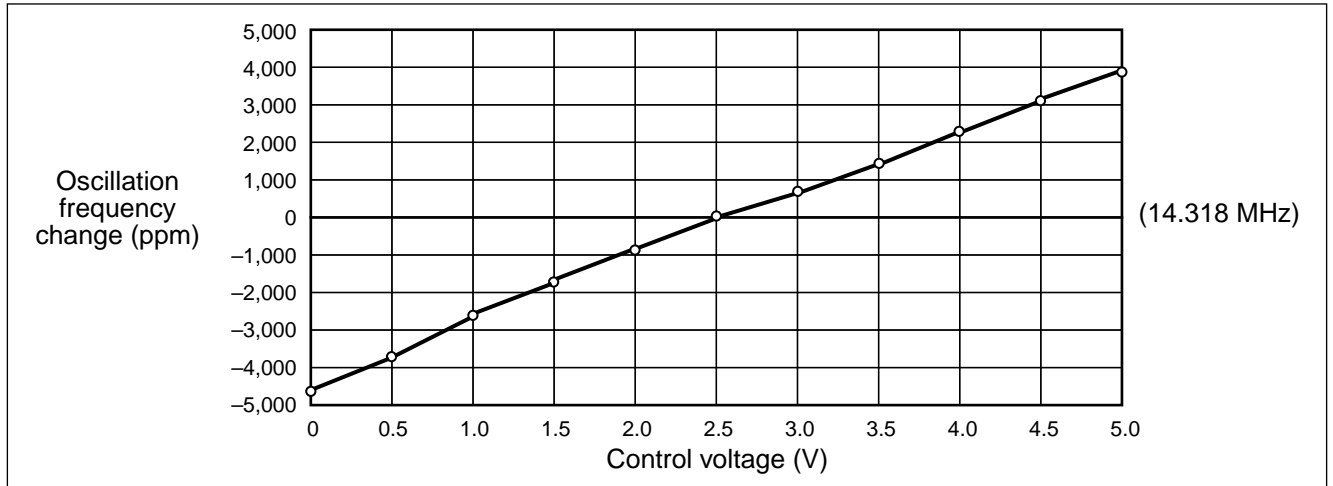


# M2 Series (D110)

## STANDARD CHARACTERISTICS

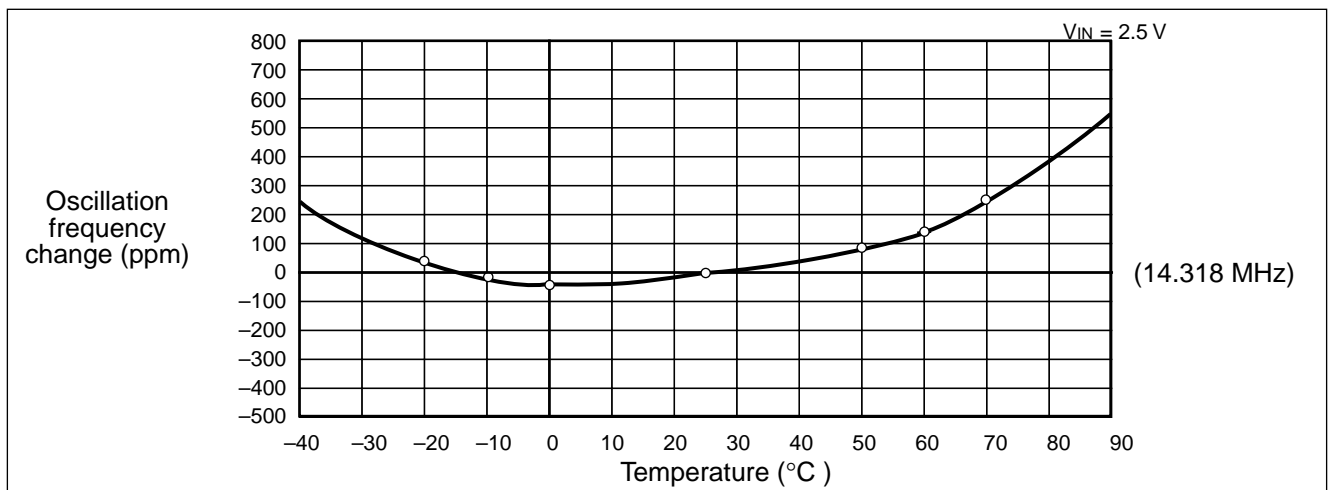
Part number : FAR-M2SC-14M318-D110

### 1. Control voltage and oscillation frequency



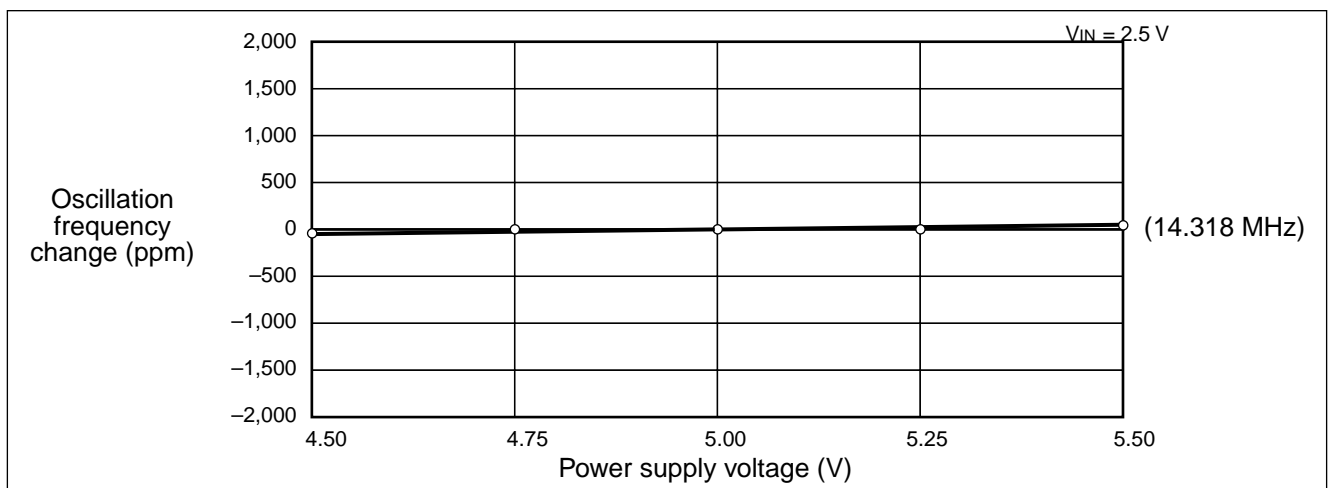
### 2. Temperature characteristics

(25°C standard)



### 3. Power supply voltage characteristics

( $V_{CC} = 5.0\text{ V}$  standard)





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