

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 (LiTaO₃: 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

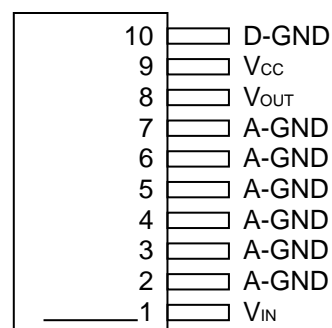


M2 Series (D110)

■ TERMINAL ASSIGNMENT

Terminal No.	Terminal Name	Description
1	V _{IN}	Control voltage input terminal
2, 3, 4, 5, 6, 7	A-GND	Analog grounding terminal
8	V _{OUT}	Output terminal
9	V _{CC}	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 _{CC}	-0.5 ~ +7.0	V
Input control voltage	V _{IN}	-0.5 ~ +10.0	
Power consumption	P _D	100	mW
Operating temperature	T _a	-10 ~ +70	°C
Storage temperature	T _{stg}	-30 ~ +100	
Oscillation frequency range	—	4 ~ 30	MHz

■ RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Rated value	Unit
Power supply voltage	V _{CC}	4.75 ~ 5.25	V
Input control voltage	V _{IN}	0 ~ 5	
Operating temperature	T _a	-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

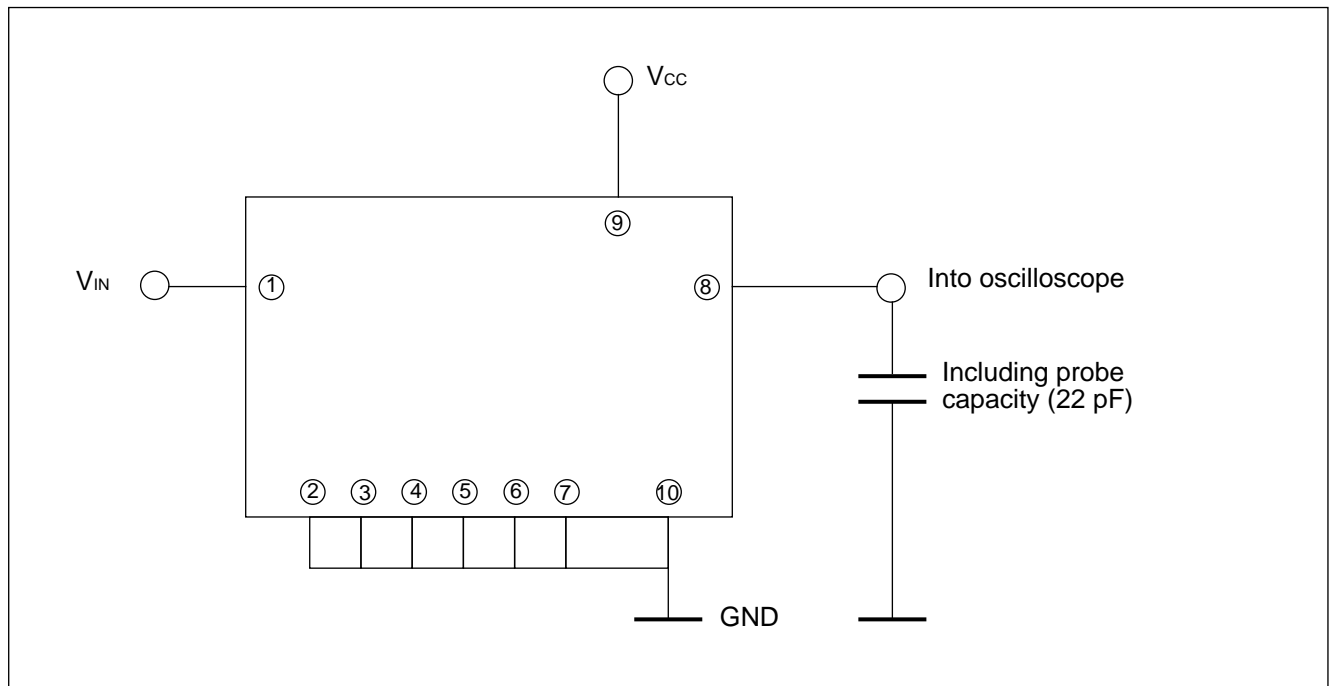
($V_{CC} = 5.0\text{ V}$)

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°C standard, $T_a = -10 \sim +70^\circ\text{C}$

■ MEASURING CIRCUIT DIAGRAM

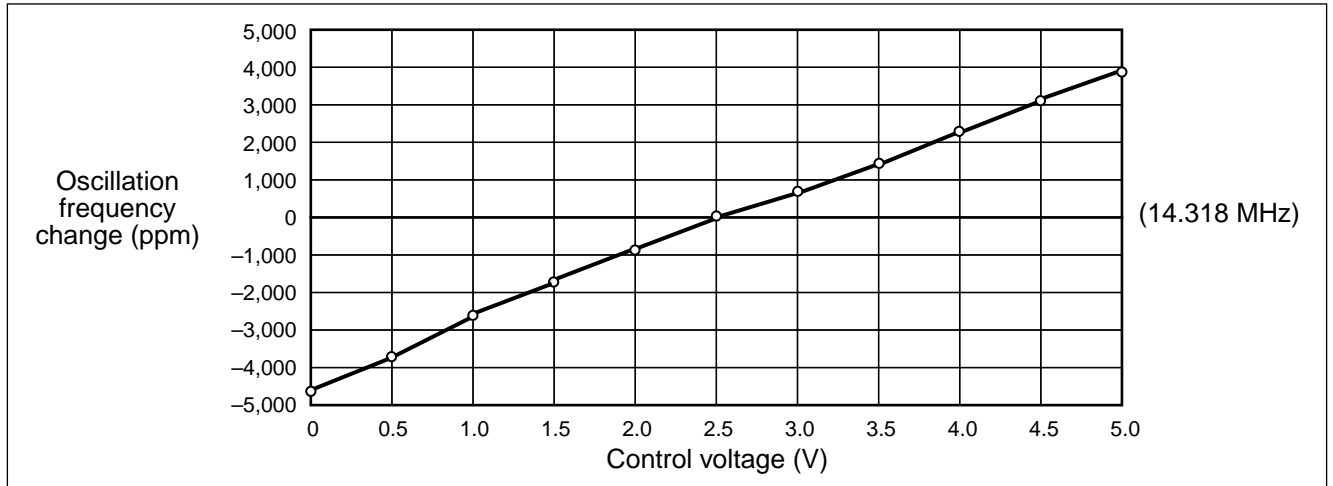


M2 Series (D110)

STANDARD CHARACTERISTICS

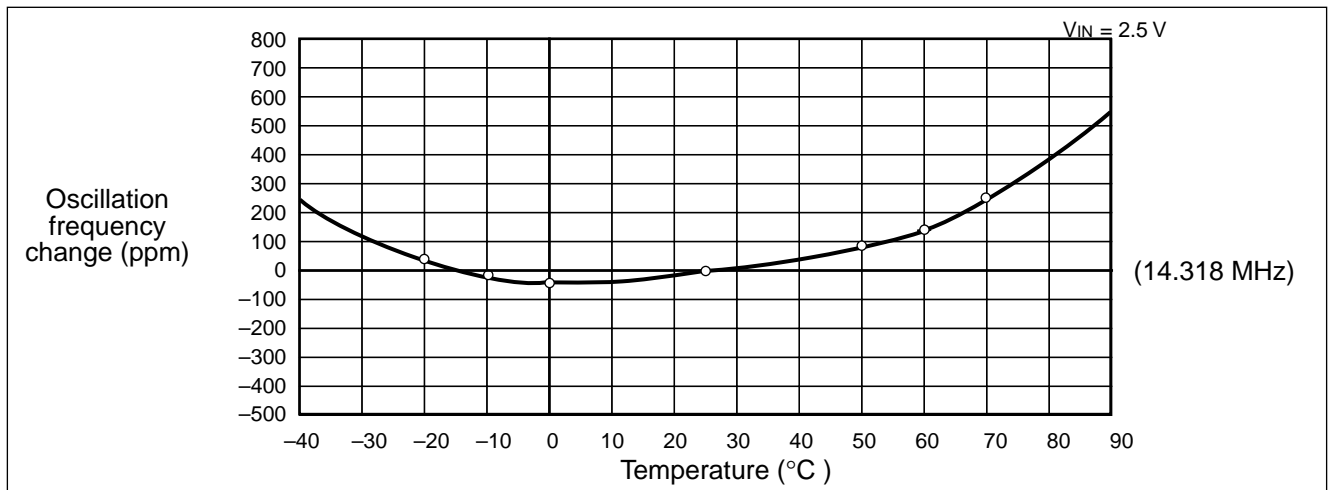
Part number : FAR-M2SC-14M318-D110

1. Control voltage and oscillation frequency



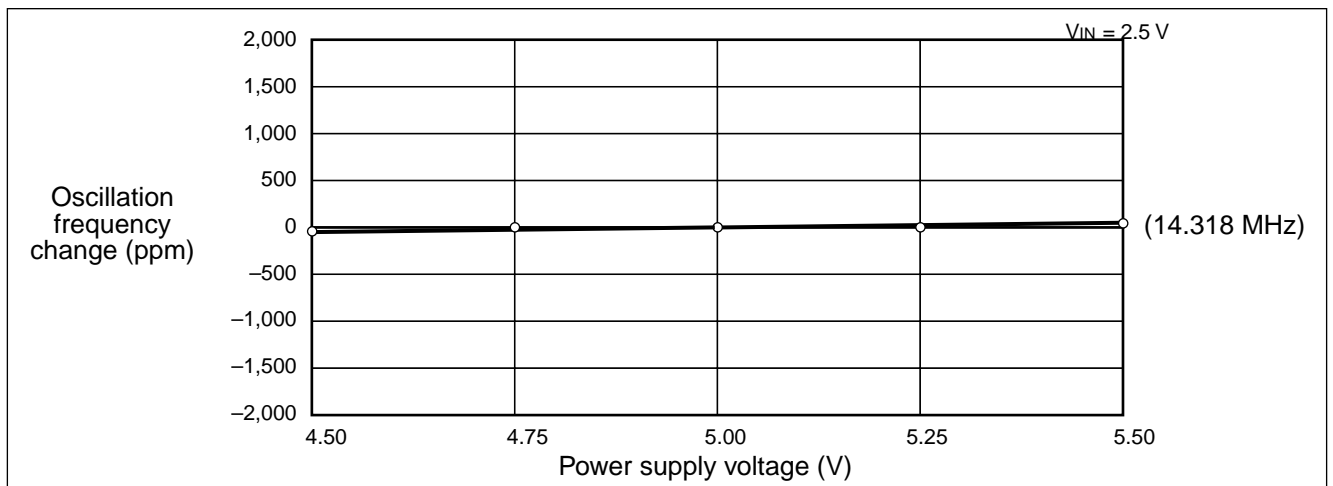
2. Temperature characteristics

(25°C standard)



3. Power supply voltage characteristics

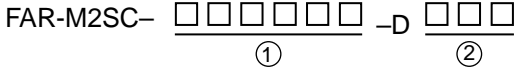
($V_{CC} = 5.0\text{ V}$ standard)



M2 Series (D110)

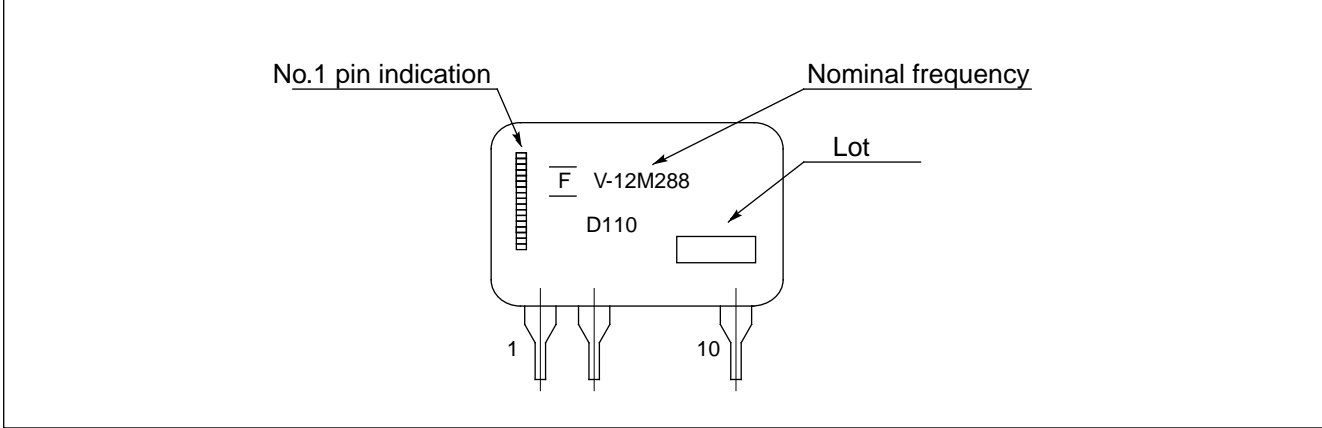
■ PART NUMBER SYSTEM

[Part number example]

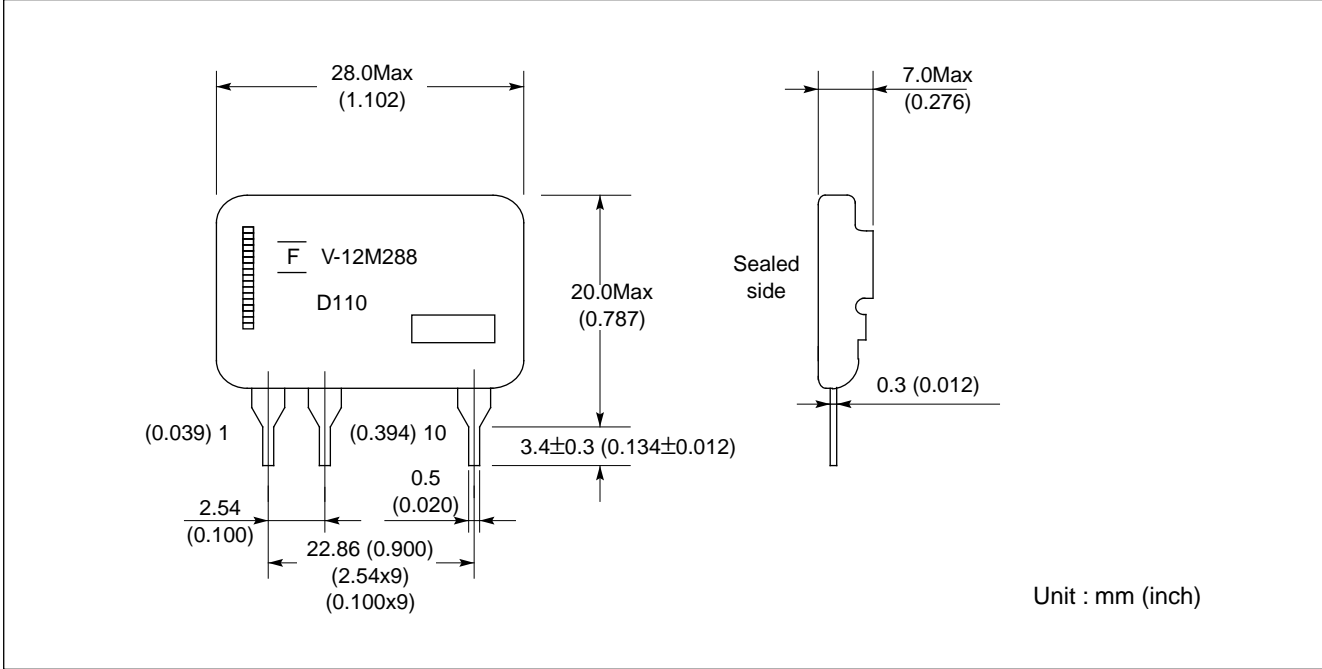


- ① Frequency designation : Nominal frequency in six alphanumeric characters.
M indicates the decimal point in MHz.
(Example) 14.318 MHz 14M318
- ② Serial No. : 110 ~ 119 (standard : 110)

■ MARKING



■ DIMENSION



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