

ASSP

Piezoelectric VCO (4 to 30 MHz)

M2 Series (F100)

■ DESCRIPTION

The M2 series (F100) of VCO (Voltage Controlled Oscillator) apply to the frequency range 4-30 MHz.

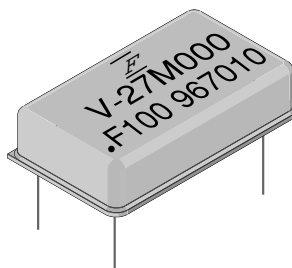
The M2 series of VCO have a high reliability and wide controllable frequency ranges using a LiTaO₃ piezoelectric single crystal with high electromechanical coupling coefficient. Output level applies to CMOS type for digital interface.

■ FEATURES

- Wide frequency controllable range (Over than ± 2000 ppm)
- High carrier noise ratio
- Excellent temperature stability
- CMOS output level
- High reliability due to hermetic seal

■ PACKAGE

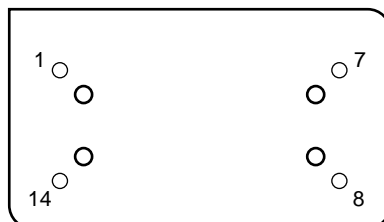
14 pin DIP size, Metal can package



M2 Series (F100)

■ PIN ASSIGNMENT

(BOTTOM VIEW)



■ PIN DESCRIPTIONS

Pin Number	Symbol	Functions
1	V_{IN}	Input (Control voltage)
7	GND	Ground
8	V_{OUT}	Output
14	V_{CC}	V_{CC}

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■ ABSOLUTE MAXIMUM RATINGS (See WARNING)

Parameter	Symbol	Rating	Unit
Power supply voltage	V_{CC}	-0.5 to +7.0	V
Control voltage	V_{IN}	-0.5 to +7.0	V
Operating temperature	T_a	-10 to +70	°C
Storage temperature	T_{stg}	-40 to +100	°C
Frequency range	—	+4 to +30	MHz

WARNING: Permanent device damage may occur if the above **Absolute Maximum Ratings** are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

■ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Power supply voltage	V_{CC}	+4.75 to +5.25	V
Control voltage	V_{IN}	+0.0 to +5.0	V
Operating temperature	T_a	-10 to +70	°C

■ STANDARD FREQUENCIES

Frequency	Application	Part number
12.288 MHz	For audio	FAR-M2DB-12M288-F100
13.500 MHz	For video	FAR-M2DB-13M500-F100
14.318 MHz	For video	FAR-M2DB-14M318-F100
18.432 MHz	For audio	FAR-M2DB-18M432-F100
21.053 MHz	For video	FAR-M2DB-21M053-F100
24.576 MHz	For audio	FAR-M2DB-24M576-F100
25.175 MHz	For video	FAR-M2DB-25M175-F100
27.000 MHz	For video	FAR-M2DB-27M000-F100
28.636 MHz	For video	FAR-M2DB-27M636-F100

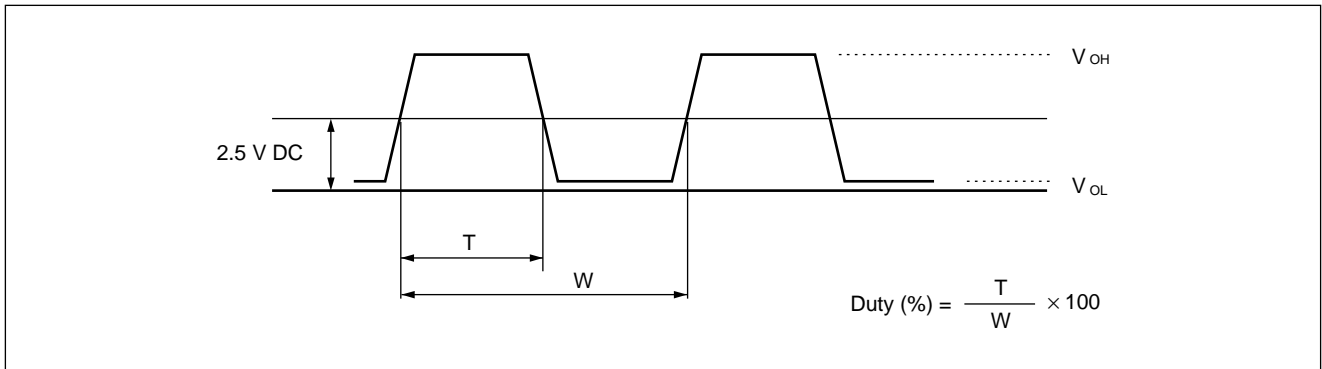
M2 Series (F100)

■ ELECTRICAL CHARACTERISTICS

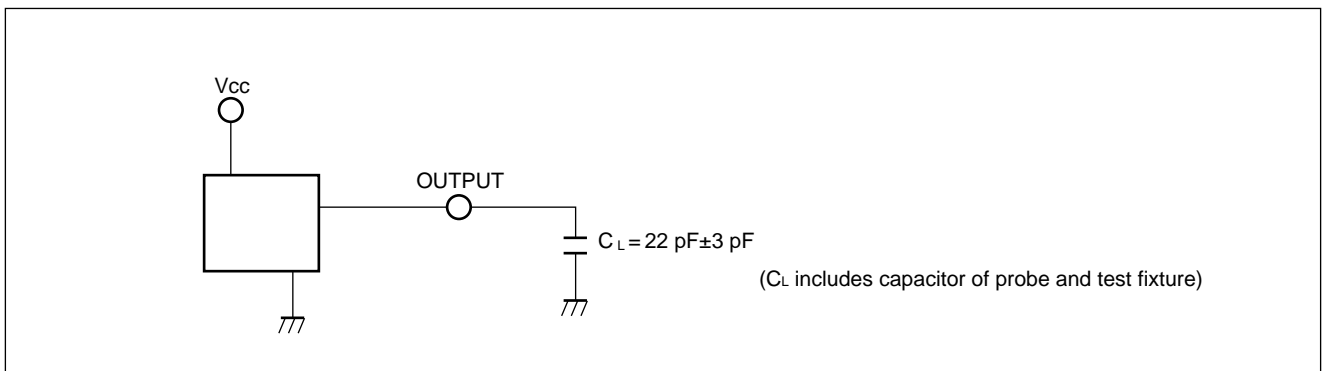
Unless otherwise specified $T_a = +25\text{ }^\circ\text{C}$, $V_{CC} = +5.0\text{ V}$

Parameter	Symbol	Condition	Value			Unit	Remarks	
			Min.	Typ.	Max.			
Current consumption	I_{CC}	Without load	—	9.0	15	mA		
Output voltage	"H"	V_{OH}	$V_{IN} = 2.5\text{ V}$	$V_{CC} - 0.5$	5.0	—	V	
	"L"	V_{OL}	$V_{IN} = 2.5\text{ V}$	—	0	+0.5	V	
Duty ratio	DUTY	$V_{IN} = 2.5\text{ V}$	40	50	60	%	*	
Initial deviation of oscillation frequency	Δf_0	$V_{IN} = 2.5\text{ V}$	-500	—	+500	ppm		
Oscillation frequency	f_H	$V_{IN} = 4.5\text{ V}$	+1600	—	—	ppm	Nominal frequency reference	
	f_L	$V_{IN} = 0.5\text{ V}$	—	—	-1600	ppm		
Frequency stability	$\Delta f(V_{CC})$	$V_{CC} = 4.75\text{ V}$ to 5.25 V $V_{IN} = 2.5\text{ V}$	-100	—	+100	ppm	$V_{CC} = 5.0\text{ V}$ reference	
Frequency stability with temperature	$\Delta f(T_a)$	$V_{IN} = 2.5\text{ V}$ ($f_0 < 23\text{ MHz}$)	-500	—	+500	ppm	25°C reference	
		$V_{IN} = 2.5\text{ V}$ ($f_0 \geq 23\text{ MHz}$)	-400	—	+600	ppm	$T_a = -10\text{ to }+70\text{ }^\circ\text{C}$	

* : Duty Ratio



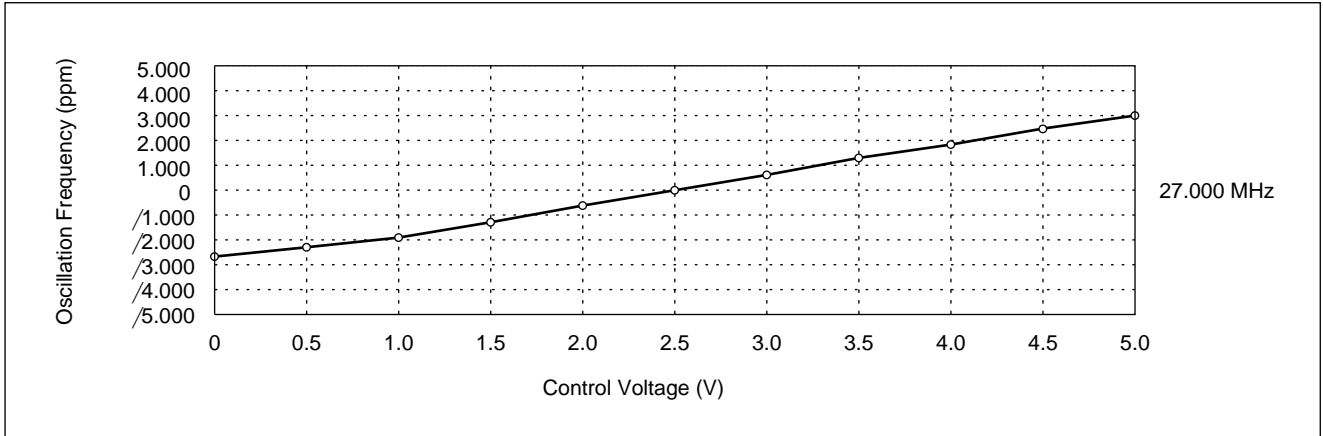
■ MEASUREMENT CIRCUIT



■ **TYPICAL CHARACTERISTICS**

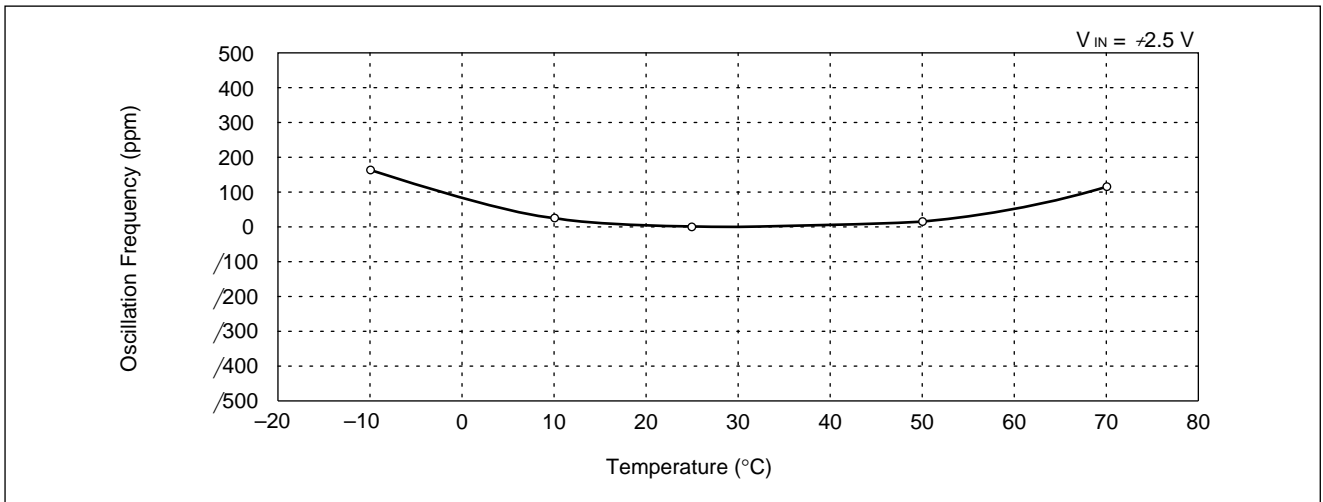
Part number : FAR-M2DB-27M000-F100

1. Oscillation Frequency vs. Control Votage



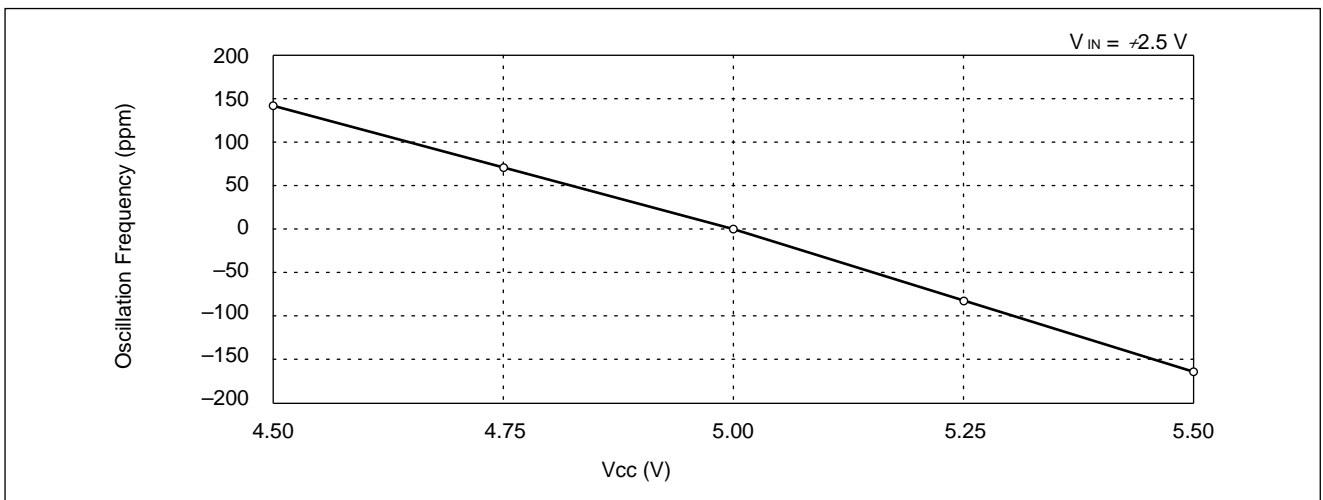
2. Frequency Stability With Temperature

($T_a = +25^\circ\text{C}$ reference)



3. Frequency Stability vs. Vcc

($V_{CC} = +50$ reference)



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■ PART NUMBER DESIGNATION

[Designation example]

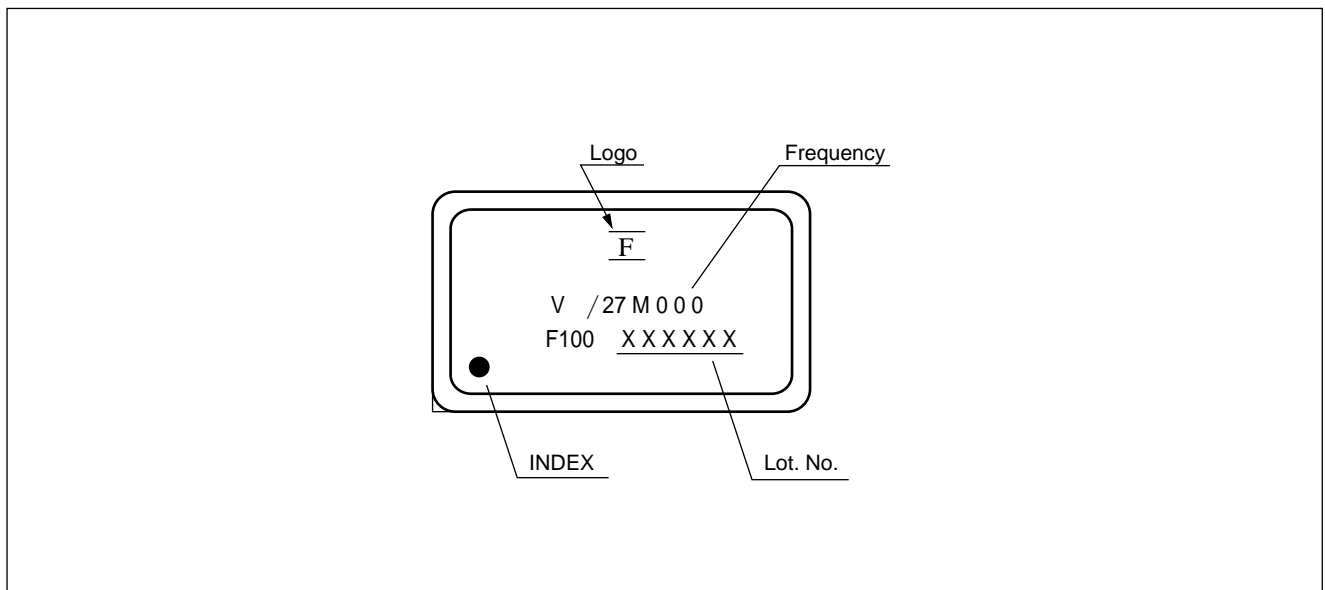
FAR – M2DB – □□□□□□ – F100

*

* : Frequency designation : Specify the nominal frequency in six alphanumeric characters.
Enter M at the decimal point.

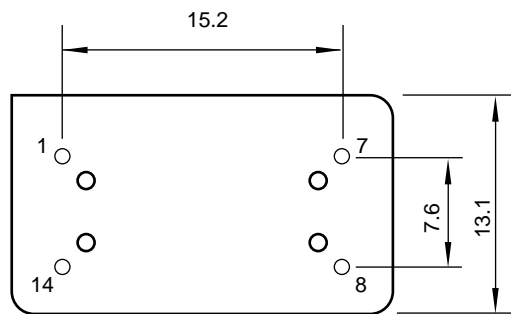
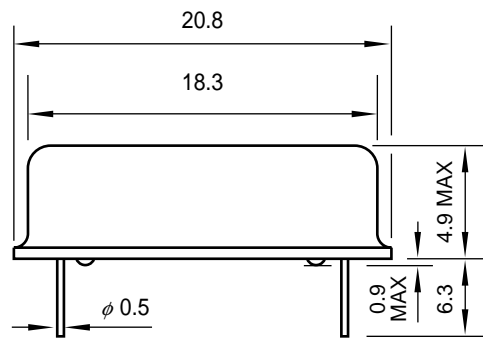
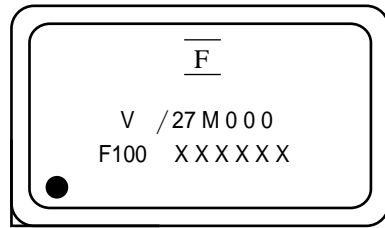
[Example] 27.000 MHz → 27M000

■ MARKING



M2 Series (F100)

■ PACKAGE DIMENSION



Dimensions in mm.

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