

## 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.

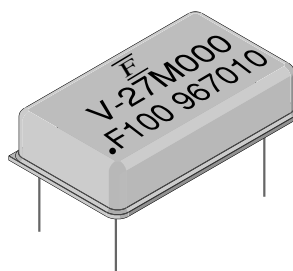
The M2 series of VCO have a high reliability and wide controllable frequency ranges using a LiTaO<sub>3</sub> piezoelectric single crystal with high electromechanical coupling coefficient. Output level applies to CMOS type for digital interface.

### ■ FEATURES

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

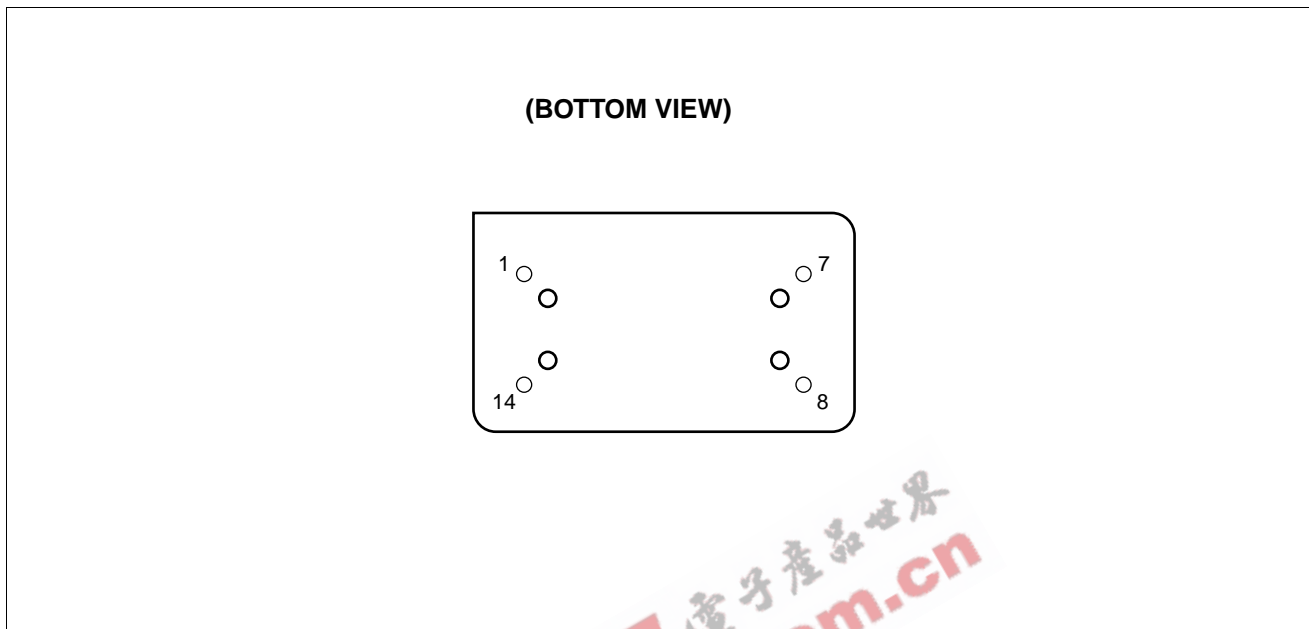
### ■ PACKAGE

14 pin DIP size, Metal can package



# M2 Series (F100)

## ■ PIN ASSIGNMENT



## ■ PIN DESCRIPTIONS

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

## M2 Series (F100)

### ■ ABSOLUTE MAXIMUM RATINGS (See WARNING)

Parameter	Symbol	Rating	Unit
Power supply voltage	V <sub>CC</sub>	-0.5 to +7.0	V
Control voltage	V <sub>IN</sub>	-0.5 to +7.0	V
Operating temperature	T <sub>a</sub>	-10 to +70	°C
Storage temperature	T <sub>stg</sub>	-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 <sub>CC</sub>	+4.75 to +5.25	V
Control voltage	V <sub>IN</sub>	+0.0 to +5.0	V
Operating temperature	T <sub>a</sub>	-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

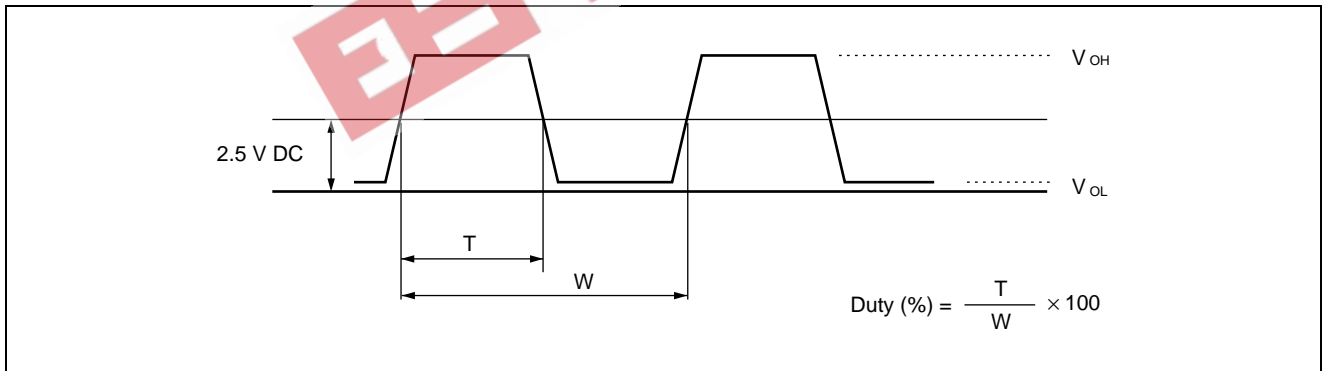
# M2 Series (F100)

## ELECTRICAL CHARACTERISTICS

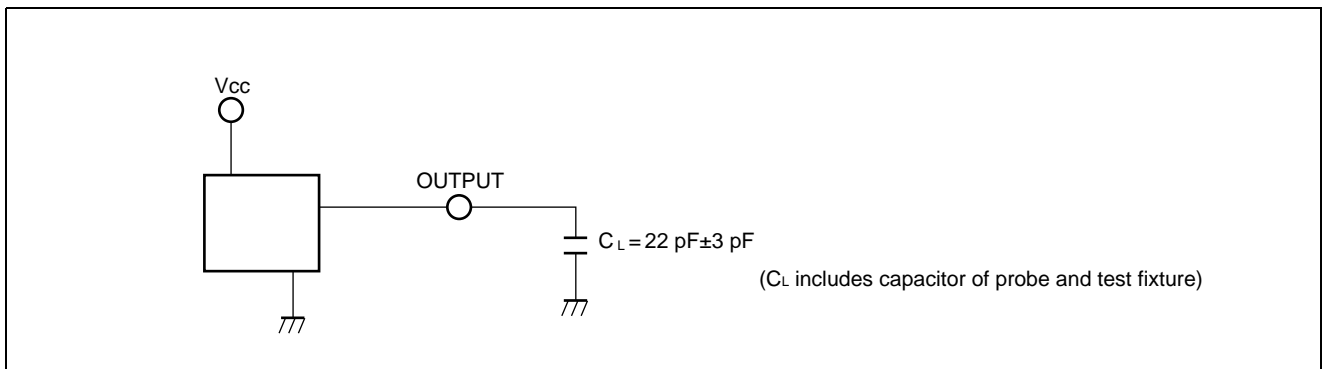
Unless otherwise specified Ta = +25 °C, Vcc = +5.0 V

Parameter	Symbol	Condition	Value			Unit	Remarks	
			Min.	Typ.	Max.			
Current consumption	I <sub>CC</sub>	Without load	—	9.0	15	mA		
Output voltage	“H”	V <sub>OH</sub>	V <sub>IN</sub> = 2.5 V	V <sub>CC</sub> - 0.5	5.0	—	V	
	“L”	V <sub>OL</sub>	V <sub>IN</sub> = 2.5 V	—	0	+0.5	V	
Duty ratio	DUTY	V <sub>IN</sub> = 2.5 V	40	50	60	%	*	
Initial deviation of oscillation frequency	Δf <sub>o</sub>	V <sub>IN</sub> = 2.5 V	-500	—	+500	ppm		
Oscillation frequency	f <sub>H</sub>	V <sub>IN</sub> = 4.5 V	+1600	—	—	ppm	Nominal frequency reference	
	f <sub>L</sub>	V <sub>IN</sub> = 0.5 V	—	—	-1600	ppm		
Frequency stability	Δf(V <sub>CC</sub> )	V <sub>CC</sub> = 4.75 V to 5.25 V V <sub>IN</sub> = 2.5 V	-100	—	+100	ppm	V <sub>CC</sub> = 5.0 V reference	
Frequency stability with temperature	Δf(T <sub>a</sub> )	V <sub>IN</sub> = 2.5 V (f <sub>o</sub> < 23 MHz)	-500	—	+500	ppm	25°C reference	
		V <sub>IN</sub> = 2.5 V (f <sub>o</sub> ≥ 23 MHz)	-400	—	+600	ppm	T <sub>a</sub> = -10 to +70°C	

\* : Duty Ratio



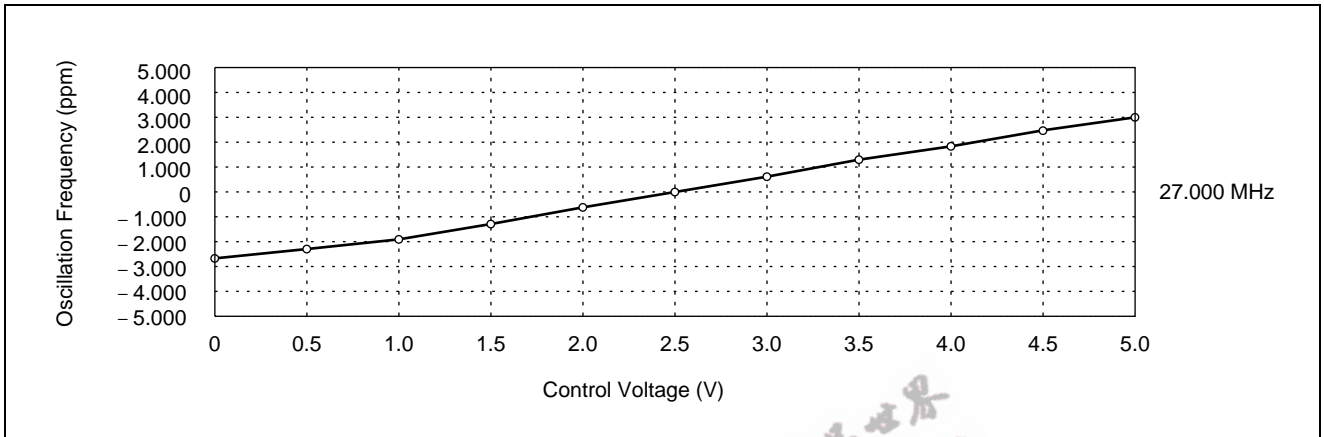
## MEASUREMENT CIRCUIT



## ■ TYPICAL CHARACTERISTICS

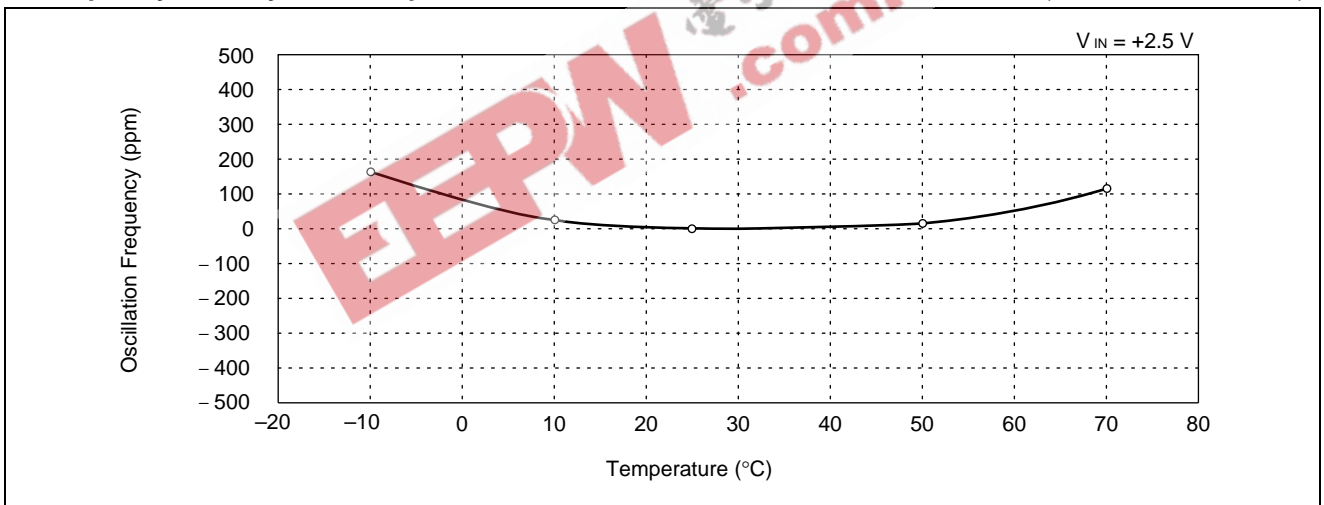
Part number : FAR-M2DB-27M000-F100

### 1. Oscillation Frequency vs. Control Voltage



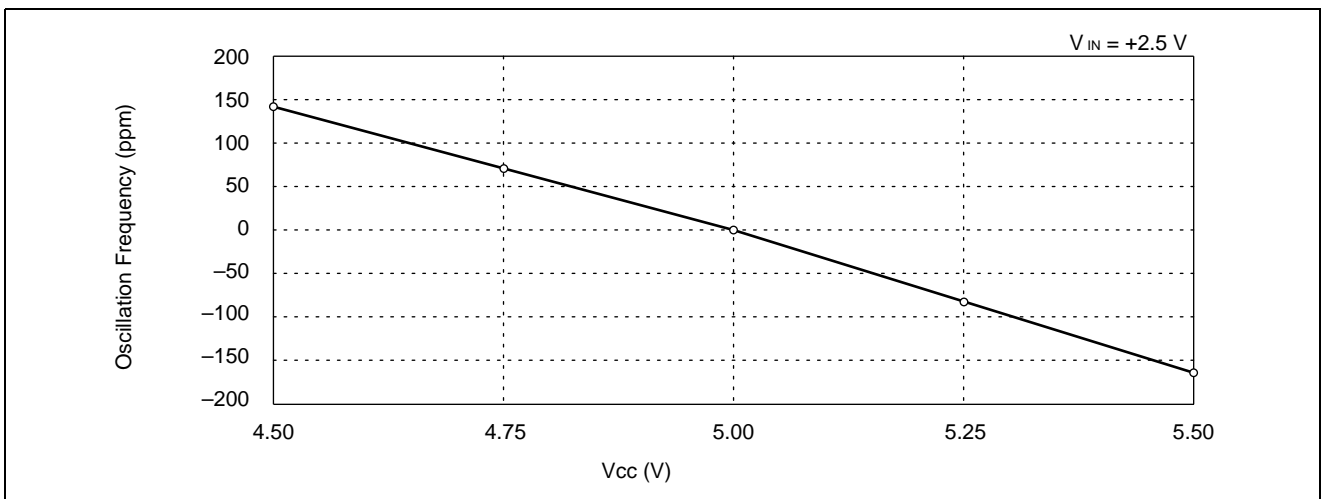
### 2. Frequency Stability With Temperature

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



### 3. Frequency Stability vs. Vcc

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



# M2 Series (F100)

## ■ PART NUMBER DESIGNATION

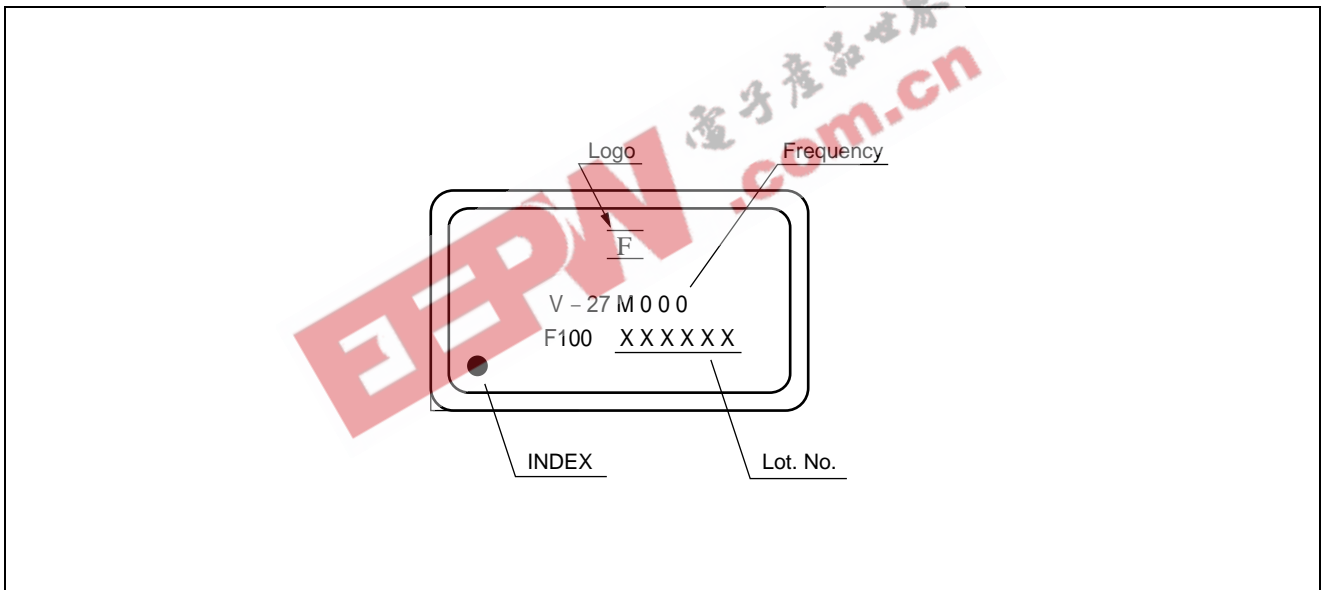
[Designation example]

FAR – M2DB – □□□□□□ – F100  
\*

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

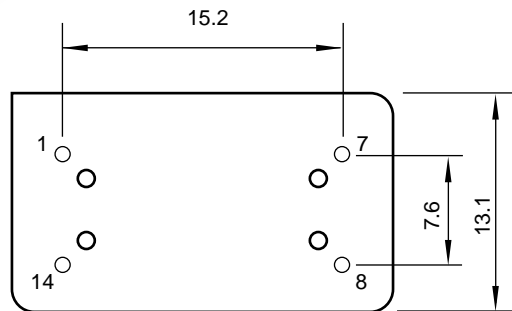
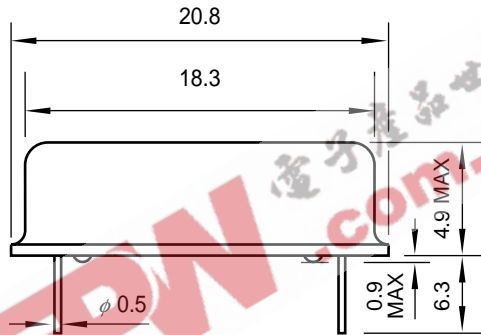
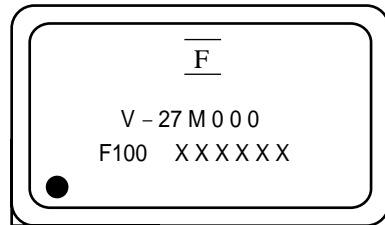
[Example] 27.000 MHz → 27M000

## ■ MARKING



# M2 Series (F100)

## ■ PACKAGE DIMENSION



Dimensions in mm.

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