

M2 Series (D100)

PIEZOELECTRIC DEVICE

VOLTAGE CONTROLLED OSCILLATOR

DESCRIPTION

The M2 series (D100) voltage controlled oscillators (VCO) operate in the frequency range of 4 to 30 MHz.

The M2 series VCOs use a single LiTaO₃ (lithium tantalate) piezoelectric crystal with a high electromechanical coupling coefficient for stable and wide variable frequency width.

FEATURES

- Wider variable frequency width than quartz crystals: $\pm 0.2\%$ or more
- High stability (100 times more stable than LC configuration)
- Excellent carrier noise ratio
- Hermetically sealed in a metal case for high reliability in severe environmental conditions
- Compatible with 14-pin DIP IC packages

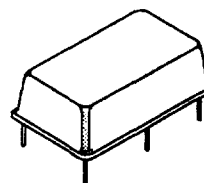
ABSOLUTE MAXIMUM RATINGS (See NOTE)

Parameter	Symbol	Ratings	Unit
Power Supply Voltage	V_{CC}	-0.5 to 7.0	V
Input Control Voltage	V_{IN}	-0.5 to 10	V
Output Voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	V
Output Current	I_{OUT}	± 25	mA
Operating Temperature	T_a	-30 to +85	°C
Storage Temperature	T_{STG}	-40 to +100	°C
Oscillation Frequency Range		4 to 30	MHz

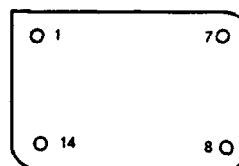
RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Ratings	Unit
Power Supply Voltage	V_{CC}	4.75 to 5.25	V
Input Control Voltage	V_{IN}	0.5 to 5.0	V
Operating Temperature	T_a	-30 to +85	°C

NOTE: Permanent device damage may occur if absolute maximum ratings are exceeded. Functional operation should be restricted to the conditions as detailed in the operation sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



**Metal Case
DIP-14**



Bottom View

Terminal No.	Terminal Name	Description
1	V_{IN1}	Control Voltage Input Terminal
7	GND	Grounding Terminal
8	V_{OUT}	Oscillation Output Terminal
14	V_{CC}	Power Supply Terminal

The device contains circuitry to protect the inputs against damage due to high static voltage or electric fields. However, it is advised that normal precautions be taken to avoid application of any voltage higher than maximum rated voltages to this high impedance circuit.

M2 Series (D100)

STANDARD FREQUENCIES

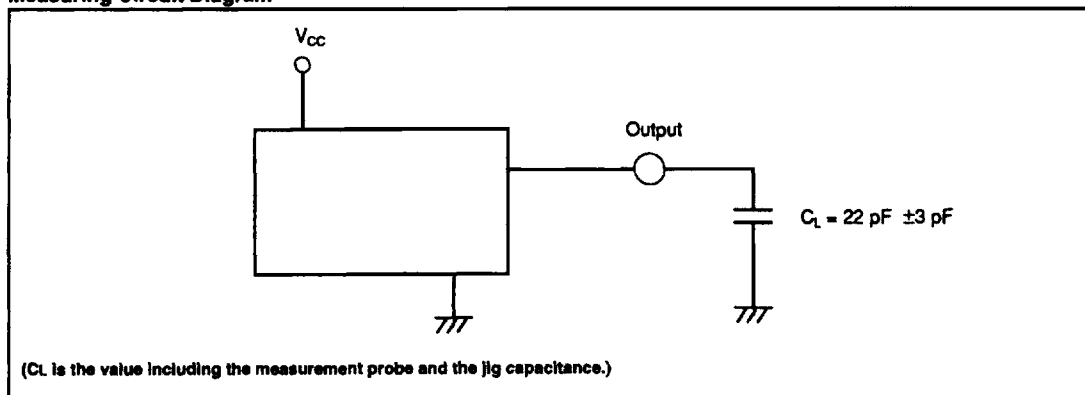
8.192 MHz	14.318 MHz	17.734 MHz	21.053 MHz	25.175MHz
9.408 MHz	16.000 MHz	18.432 MHz	21.477 MHz	27.338 MHz
11.290 MHz	16.257 MHz	18.816 MHz	22.579 MHz	28.224 MHz
11.580 MHz	16.384 MHz	20.480 MHz	24.576 MHz	28.836 MHz
12.288 MHz	16.934 MHz			

ELECTRICAL CHARACTERISTICS

DC Characteristics

Item	Symbol	Condition	Ratings		Unit
			Minimum	Maximum	
Output Level	V_{OUT}	See the measuring circuit diagram	0.5	—	$V_{p,p}$
Power Supply Current	I_{CC}	Load open	—	15	mA

Measuring Circuit Diagram

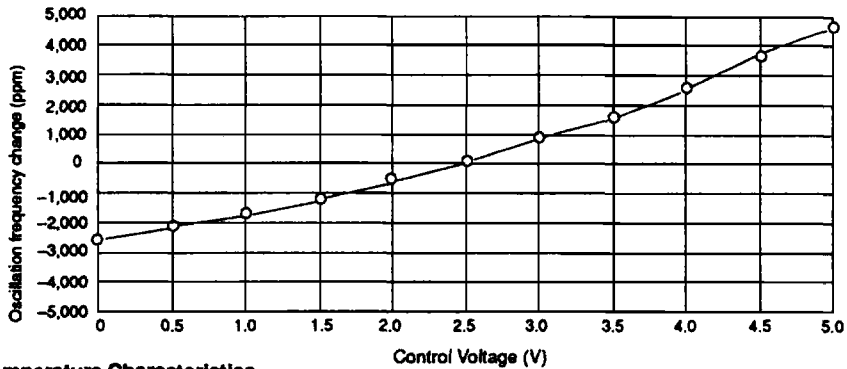
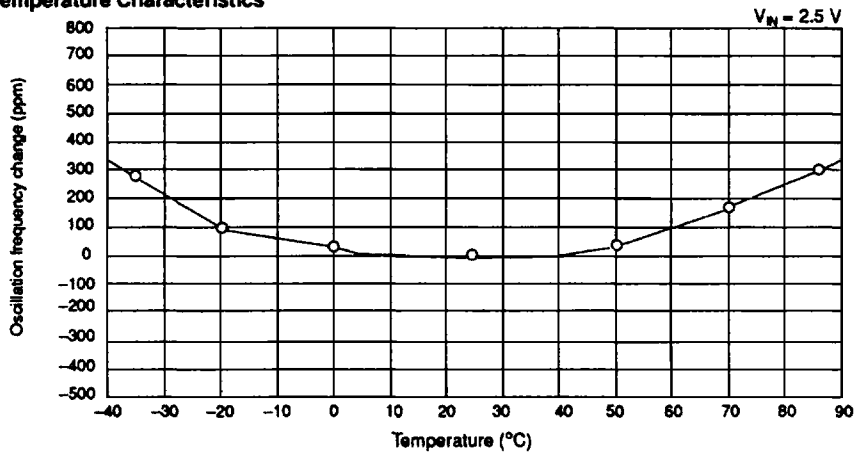
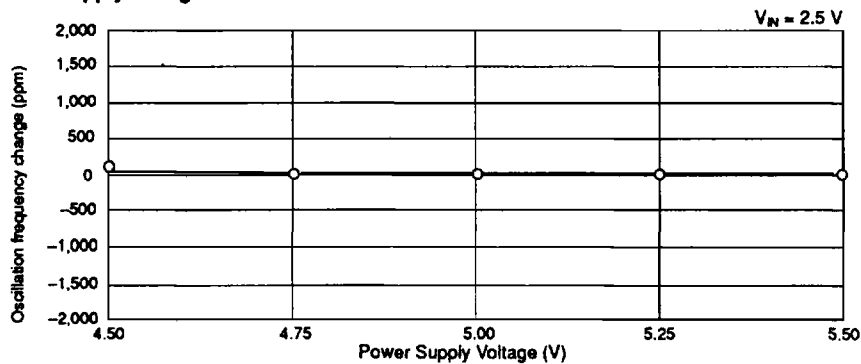


AC Characteristics

Item	Symbol	Condition	Ratings		Unit	Remarks
			Minimum	Maximum		
Oscillation Frequency	f_{OSC}	$V_{IN} = 2.5 \text{ V}$	-0.05	+0.05	%	Nominal Frequency reference $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$
	f_H	$V_{IN} = 4.5 \text{ V}$	+0.15	—	%	
	f_L	$V_{IN} = 0.5 \text{ V}$	—	-0.15	%	
Frequency Voltage Stability	$\Delta f, V_{CC}$	$V_{CC} = 4.75 \text{ V}$ $V_{CC} = 5.25 \text{ V}$	-200	200	ppm	5 V reference, $V_{IN} = 2.5 \text{ V}$
Frequency Temperature Stability	$\Delta f, T_A$	$V_{IN} = 0.5 \text{ V}$ $V_{IN} = 4.5 \text{ V}$	-500	500	ppm	25°C reference -10° to 70°C , $T_A = 25^\circ\text{C}$

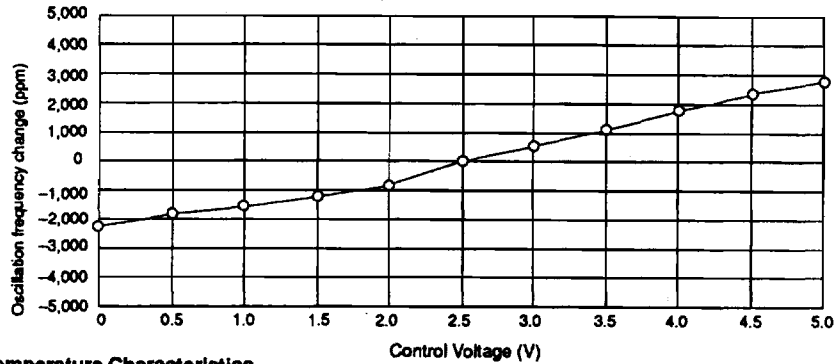
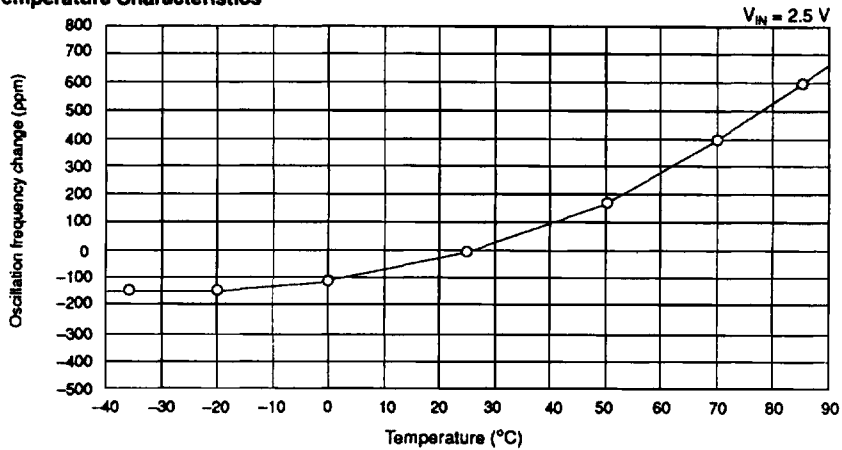
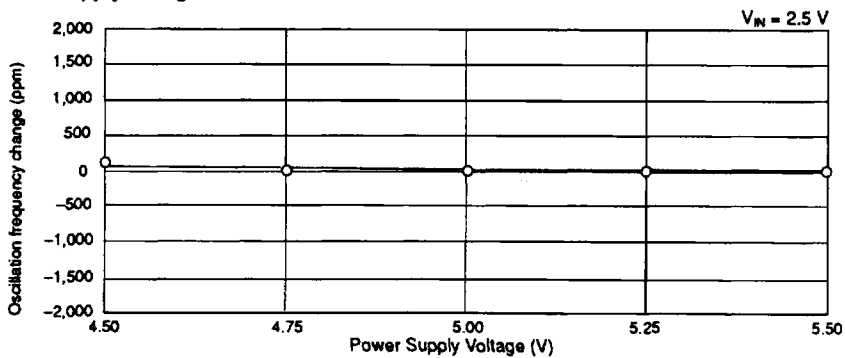
STANDARD CHARACTERISTICS:

Part Number: M2DA-8M1920-D100

Control Voltage and Oscillation Frequency**Temperature Characteristics****Power Supply Voltage Characteristics**

STANDARD CHARACTERISTICS:

Part Number: M2DA-28M636-D100

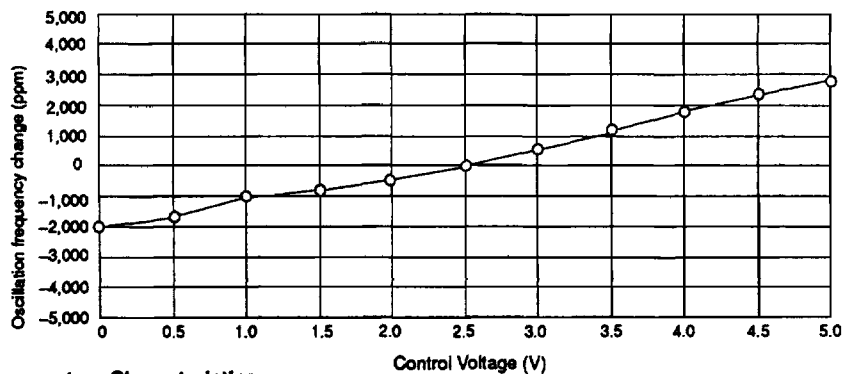
Control Voltage and Oscillation Frequency**Temperature Characteristics****Power Supply Voltage Characteristics**

M2 Series (D100)

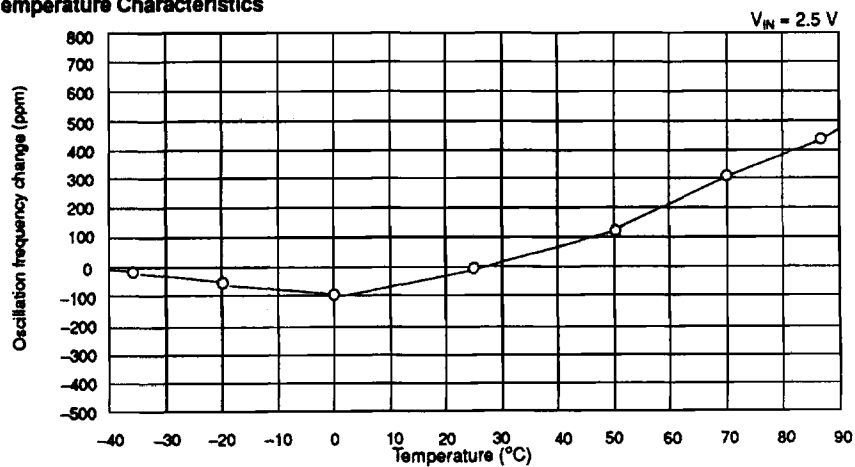
STANDARD CHARACTERISTICS:

Part Number: M2DA-12M288-D100

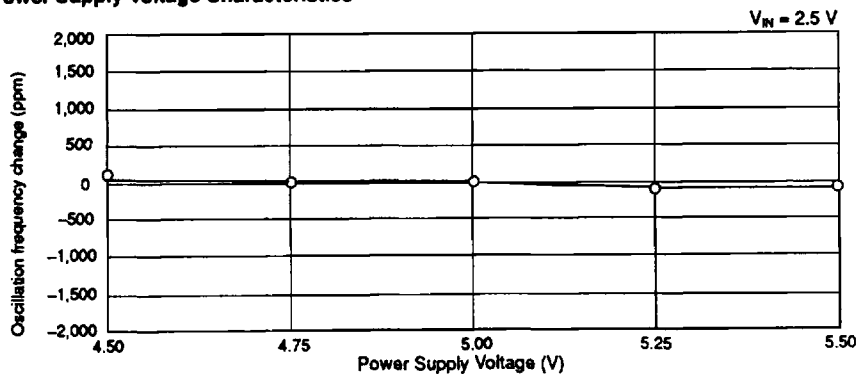
Control Voltage and Oscillation Frequency



Temperature Characteristics

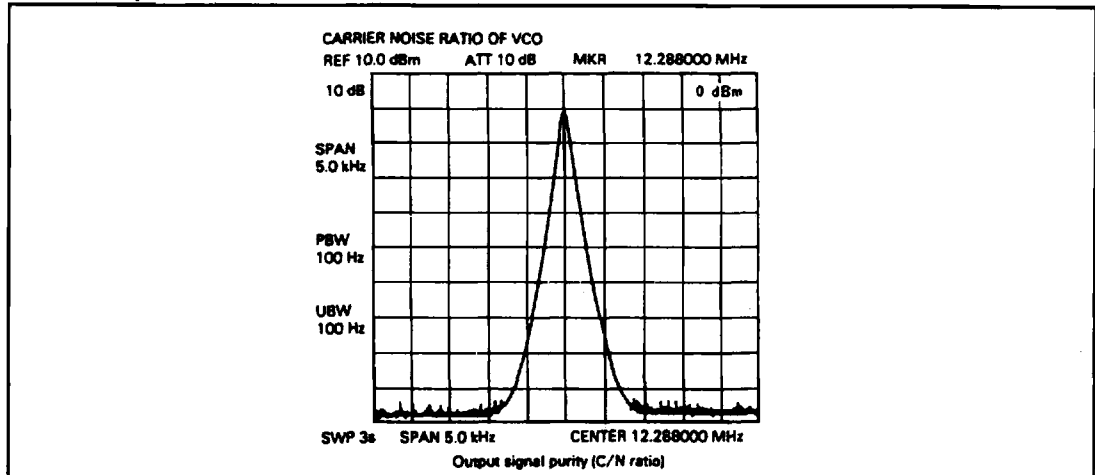


Power Supply Voltage Characteristics



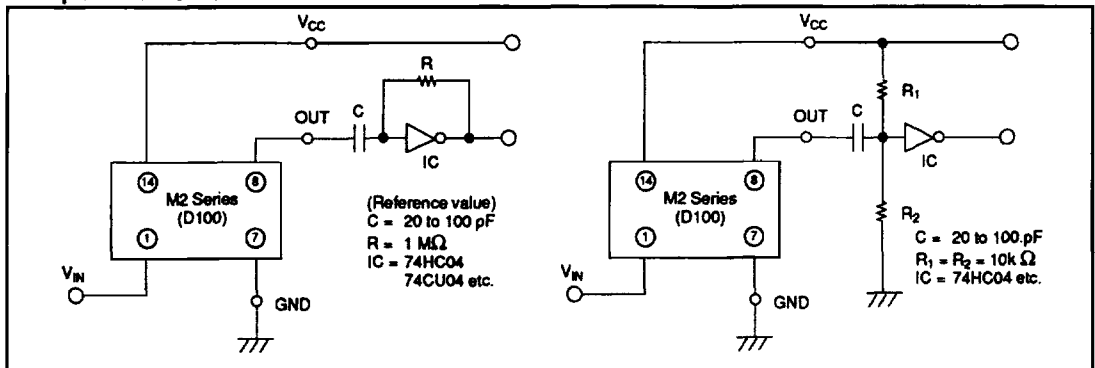
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Oscillation Spectrum

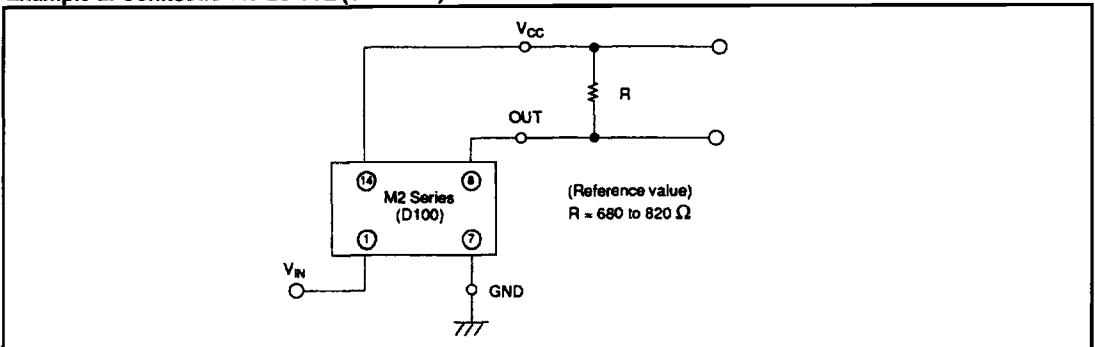


APPLICATION CIRCUIT EXAMPLES

Example 1. Connection to CMOS



Example 2. Connection to LS TTL (or CMOS)



PART NUMBERING SYSTEM

Part Number Example

M2DA - □□□□□□ - D □□□

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- ① Frequency Designation: Designate the nominal frequency in six alphanumeric characters.
M indicates the decimal point in MHz.

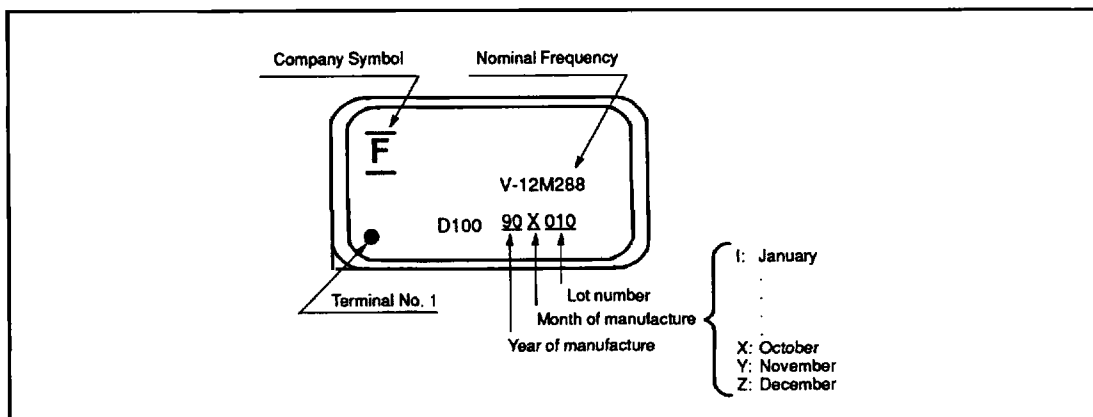
Frequency	Designation
8.192 MHz	8M1920
9.408 MHz	9M4080
11.290 MHz	11M290
11.580MHz	11M580
12.288 MHz	12M288
14.318 MHz	14M318
16.000 MHz	16M000
16.257 MHz	16M257
16.384 MHz	16M384
16.934 MHz	16M934
17.734 MHz	17M734

Frequency	Designation
18.432 MHz	18M432
18.816 MHz	18M816
20.480 MHz	20M480
21.053 MHz	21M053
21.477 MHz	21M477
22.579 MHz	22M579
24.576 MHz	24M576
25.175 MHz	25M175
27.338 MHz	27M338
28.224 MHz	28M224
28.636 MHz	28M636

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- ② Serial Number (of the Series): Standard: 100
Non-Standard products: 001 to 099

MARKING



M2 Series (D100)

DIMENSIONS

