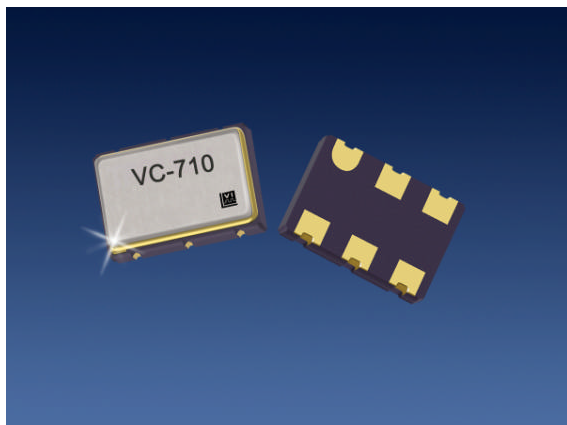


VC-710

Voltage Controlled Crystal Oscillator



Features

- Small Industry Standard Package, 5.0 x 7.5 x 1.8 mm
- Output Frequencies from 120 MHz to 200 MHz
- 3.3 V Operation
- HFF crystal for ultra low jitter
- Complementary PECL Outputs
- Low phase noise and custom options
- 0/70° C or -40/85° C operating temperature
- Enable /Disable (PECL)
- RoHS compliant lead free construction

Applications

PLL circuits for Clock Smoothing and Frequency Translation

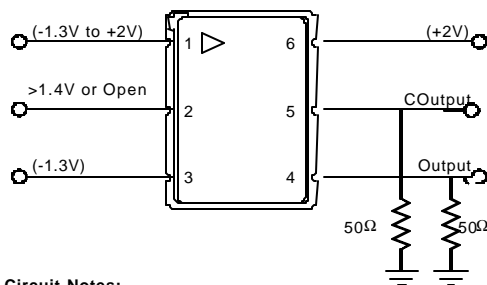
- Fiber Channel
- SONET
- SDH, ITU-T G.709
- SONET, GR-253-CORE Issue3

Description

The VC-710 is a voltage controlled crystal oscillator that operates at the fundamental frequency of the internal HFF crystal. The HFF crystal is a high-Q quartz device that enables the circuit to achieve low phase jitter performance over a wide operating temperature range. The oscillator is housed in an industry standard hermetically sealed leadless surface mount package and is available on tape and reel.

VC-710 Voltage Controlled Crystal Oscillator

Electrical Performance					
Parameter	Symbol	Min	Typical	Maximum	Units
Frequency	f_0	120	155.52	200	MHz
Supply Voltage (+3.3 V)	V_{DD}	3.135	3.3	3.465	V
Supply Current	I_{DD}		50	<90	mA
Output Logic Levels					
Output Logic High +25 °C	V_{OH}	$V_{CC} - 1.025$	$V_{CC} - 0.950$	$V_{CC} - 0.880$	V
Output Logic Low +25 °C	V_{OL}	$V_{CC} - 1.810$	$V_{CC} - 1.700$	$V_{CC} - 1.620$	V
Transition Times					
Rise Time	t_R		0.5	1	ns
Fall Time	t_F		0.5	1	ns
Symmetry or Duty Cycle	SYM	45	50	55	%
Operating temperature (ordering option)		0/70 or -40/85			°C
Jitter (12 kHz – 20 MHz BW), 155.52 MHz			0.3		ps (rms)
Jitter (50 kHz – 80 MHz BW), 155.52 MHz			0.5		ps (rms)
Phase Noise, $f_0 = 155.52$ MHz					
10 Hz offset			-64		dBc/Hz
100 Hz offset			-95		dBc/Hz
1kHz offset			-123		dBc/Hz
10 kHz offset			-143		dBc/Hz
100 kHz offset			-146		dBc/Hz
1 MHz offset			-146		dBc/Hz
10 MHz offset			-146		dBc/Hz
Test Conditions for APR (+3.3V)	V_C	0.3		3.0	V
Absolute Pull Range (APR)	APR	± 50			ppm
Gain Transfer		Positive, 65			ppm/V
Control Voltage Bandwidth (-3dB)	BW	20	100		kHz
Package Size		5.0 x 7.5 x 1.8			mm



Test Circuit Notes:

- 1) To Permit 50Ω Measurement of Outputs, all DC Inputs are Biased Down 1.3V.
- 2) All Voltage Sources Contain Bypass Capacitors to Minimize Supply Noise.
- 3) 50Ω Terminations are Within Test Equipment.

Figure 1. Test Circuit (3.3 V)

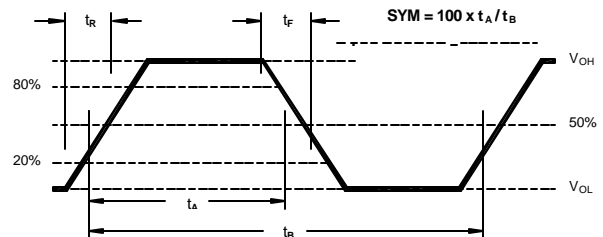
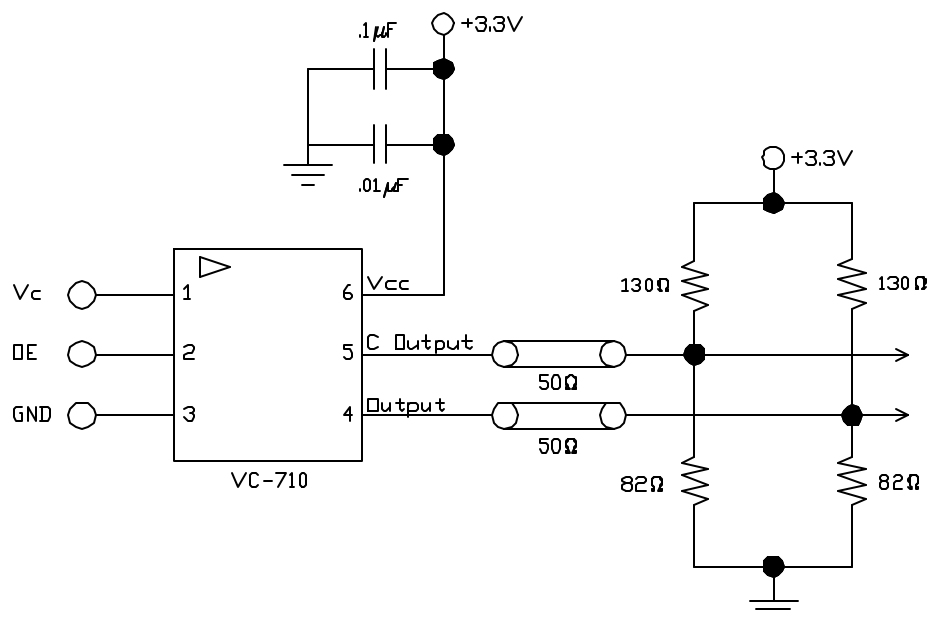


Figure 2. PECL Waveform

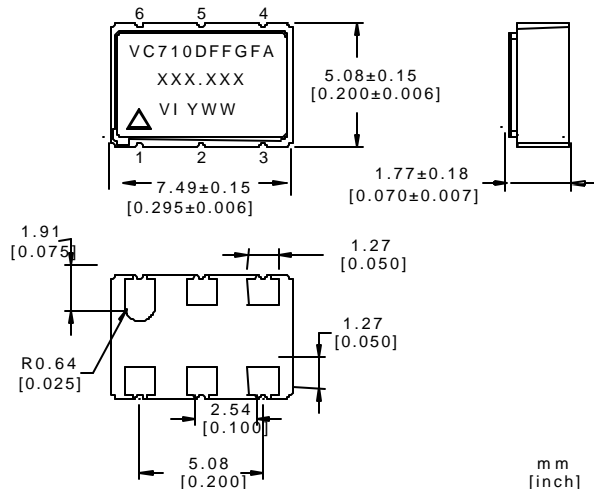
VC-710 Voltage Controlled Crystal Oscillator

SUGGESTED OUTPUT LOAD CONFIGURATION

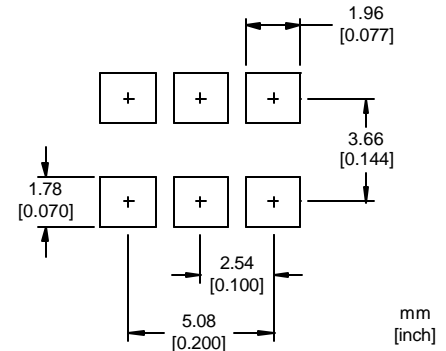


VC-710 Voltage Controlled Crystal Oscillator

Outline Diagram



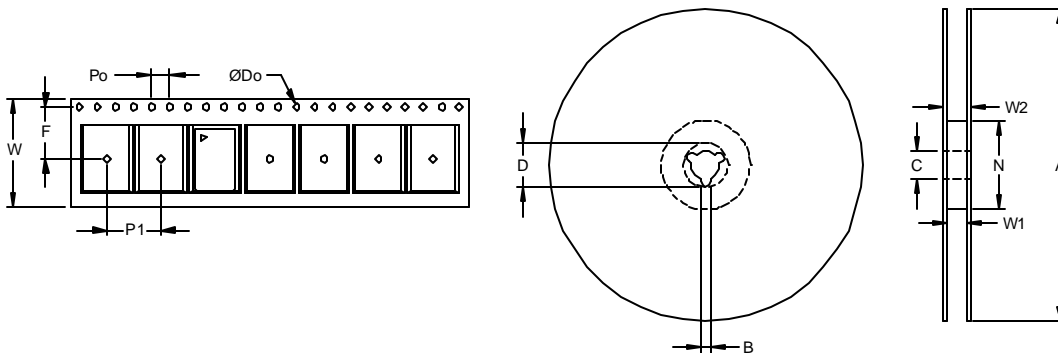
Pad Layout



Pin Out

Pin	Symbol	Function
1	V _C	VCXO Control Voltage
2	OE	Enable / Disable Enabled = High or Open Disabled = Low High impedance output (Oscillator running)
3	GND	Case and Electrical Ground
4	Output	Output
5	COutput	Complementary Output
6	V _{CC}	Power Supply Voltage (3.3 V)

Tape and Reel (EIA-481-2-A)



Tape Dimensions (mm)

Reel Dimensions (mm)

Dimension	W	F	Do	Po	P1	A	B	C	D	N	W1	W2	# Per Reel
Tolerance	Typ	Typ	Typ	Typ	Typ	Typ	Min	Typ	Min	Min	Typ	Max	Reel
VC-710	16	7.5	1.5	4	8	178	1.5	13	20.2	50	16.4	22.4	200

VC-710 Voltage Controlled Crystal Oscillator

Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power Supply	V_{CC}	0 to 6	V
Voltage Control Range	V_C	0 to V_{CC}	V
Storage Temperature	TS	-55 to 125	°C
Soldering Temp/Time	T_{LS}	240/10	°C/sec

Stresses in excess of the absolute maximum ratings can permanently damage the device. Functional operation is not implied at these or any other conditions in excess of conditions represented in the operational sections of this data sheet. Exposure to absolute maximum ratings for extended periods may adversely affect device reliability.

Reliability

The VC-710 family is capable of meeting the following qualification tests:

Environmental Compliance

Parameter	Conditions
Mechanical Shock	MIL-STD-883, Method 2002
Mechanical Vibration	MIL-STD-883, Method 2007
Solderability	MIL-STD-883, Method 2003
Gross and Fine Leak	MIL-STD-883, Method 1014
Resistance to Solvents	MIL-STD-883, Method 2015

Handling Precautions

Although ESD protection circuitry has been designed into the VC-710 proper precautions should be taken when handling and mounting. VI employs a human body model and a charged-device model (CDM) for ESD susceptibility testing and design protection evaluation.

ESD Ratings

Model	Minimum	Conditions
Human Body Model	500	MIL-STD 883, Method 3015
Charged Device Model	500	JESD 22-C101

Recommended Solder Reflow Profile

VI qualification includes aging at various extreme temperatures, shock and vibration, temperature cycling, and IR reflow simulation. The conditions a device can withstand are well understood and devices can be subjected to the profile above. This profile shows a ramp up condition to prevent thermal shock, a preheat period in which the flux is activated, a ramp up to 183°C which is the reflow temperature of Sn/Pb eutectic, and a gradual cool down. The time above 183°C should not exceed 60 seconds and the peak temperature should be no more than 220°C for 10 seconds. The VC-710's are hermetically sealed so an aqueous wash is not an issue.

VC-710 Voltage Controlled Crystal Oscillator

Standard Frequencies (MHz)

125.000	139.624	155.520	156.250	161.1328	166.6286	167.3316	192.456
200.000							

Other frequencies available upon request

Ordering Information

VC - 710 - D F F - G F A - xxx.xxx

Product Family

VC: VCXO

Package

710: 5.0 x 7.5 x 1.8 mm

Input

D: 3.3 Vdc \pm 5%

Output

F: Complementary PECL

Frequency

120 - 200 MHz

Linearity, Temp. Stability

A: N/A

L: \pm 10 %linearity

M: \pm 20 ppm temp. stability

Enable - Disable)

F: Pin 2

Absolute Pull Range

G: \pm 50 ppm

Operating Temperature

C: 0 to 70 °C

F: -40 to 85 °C

1. Not all combinations are possible.
2. \pm 10% linearity available at certain frequencies. Consult factory.

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