



## Description

Vectron's VP-700 Crystal Oscillator (XO) is a quartz stabilized square wave generator with a CMOS output. The VP-700 utilized a high performance, low frequency quartz resonator followed by a custom ASIC to synthesize the output frequency.

## Features

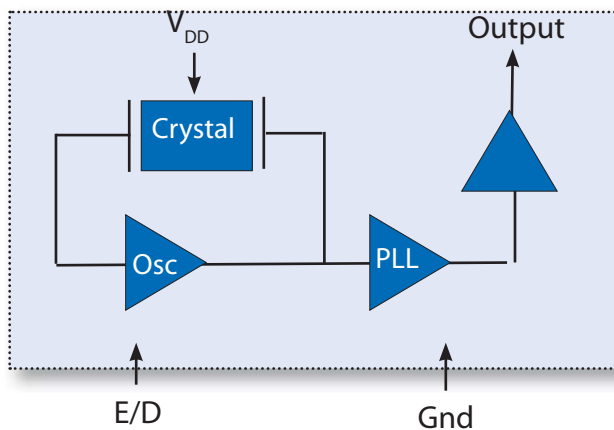
- Quick Delivery
- Wide output Frequency range up to 160 MHz
- Stabilities of  $\pm 50, \pm 100$  PPM
- 5.0, 3.3 V Operation
- HCMOS/TTL Compatible
- Product is free of lead and compliant to EC RoHS Directive



## Applications

- Proto-type delivery

## Block Diagram

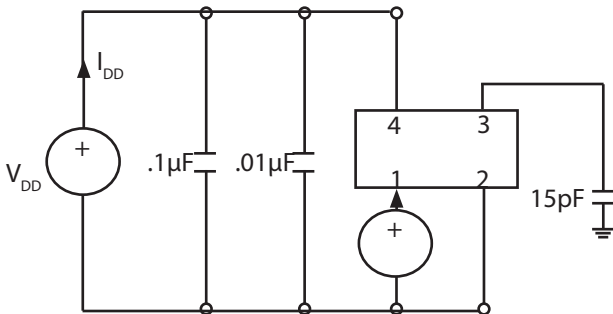


# Performance Specifications

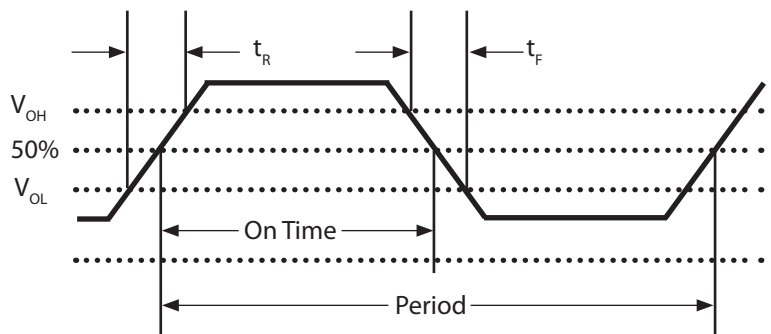
**Table 1. Electrical Performance, 5V Option**

Parameter	Symbol	Min	Typical	Maximum	Units
<b>Supply</b>					
Voltage <sup>1</sup>	$V_{CC}$	4.5	5.0	5.5	V
Current <sup>2</sup>	$I_{CC}$			45	mA
<b>Frequency</b>					
Nominal Frequency	$f_N$	1.544		160.000	MHz
Stability <sup>4</sup> , (Ordering Option)		$\pm 25, \pm 50, \pm 100$			ppm
<b>Outputs</b>					
Output Logic Levels <sup>2</sup> Output Logic High Output Logic Low	$V_{OH}$ $V_{OL}$	$0.9 \cdot V_{DD}$		$0.1 \cdot V_{DD}$	V V
Load	$I_{OUT}$			15	pF
Output Rise /Fall Time <sup>2,4</sup> <20.000MHz 20.001 to 160.000MHz	$t_R/t_F$			8 4	ns
Duty Cycle <sup>2,5</sup>		45	50	55	%
<b>Enable/Disable</b>					
Output Enable/Disable Output Enable Output Disable	$V_E$ $V_D$	4.0		0.8	V V
Start-Up Time	$t_{SU}$			10	ms
Operating Temp, (Ordering Option)	$T_{OP}$	$-10/70$ or $-40/85$			$^{\circ}C$

- 1] The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 and 0.01uF
- 2] Parameters are tested with production test circuit below , Figure 1.
- 3] See Standard Frequencies and Ordering Information tables for more specific information
- 4] Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging for 50 and 100ppm options.
- 5] Duty Cycle is measured as On Time/Period (Fig 2).
- 6] The Output is Enabled if the Enable/Disable is left open.



**Fig 1: Test Circuit**



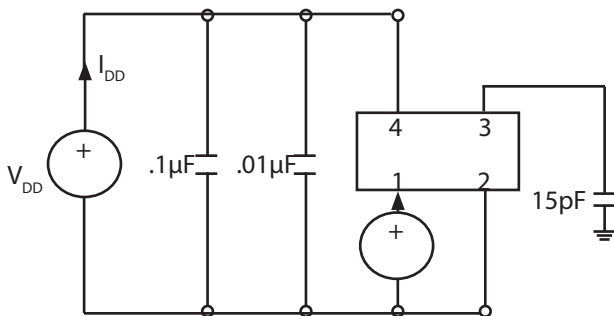
**Fig 2: Waveform**

# Performance Specifications

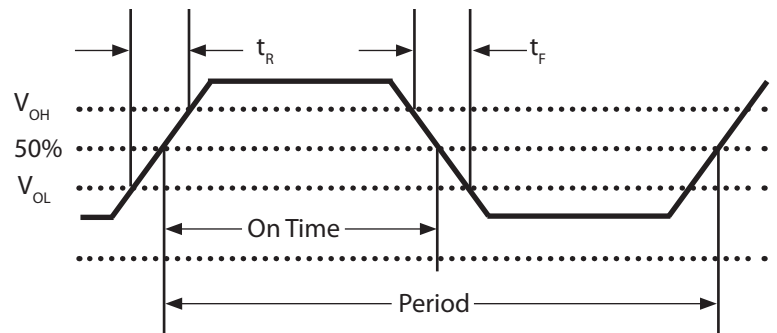
**Table 2. Electrical Performance, 3.3V Option**

Parameter	Symbol	Min	Typical	Maximum	Units
<b>Supply</b>					
Voltage <sup>1</sup>	$V_{CC}$	2.97	3.3	3.63	V
Current <sup>2</sup>	$I_{CC}$			28	mA
<b>Frequency</b>					
Nominal Frequency	$f_N$	1.544		125.000	MHz
Stability <sup>2</sup> , (Ordering Option)		$\pm 25, \pm 50, \pm 100$			ppm
<b>Outputs</b>					
Output Logic Levels <sup>2</sup> Output Logic High Output Logic Low	$V_{OH}$ $V_{OL}$	$0.9 * V_{DD}$		$0.1 * V_{DD}$	V V
Load	$I_{OUT}$			15	pF
Output Rise /Fall Time <sup>2</sup> <20.000MHz 20.000 to 125.000MHz	$t_R/t_F$			10 6	ns
Duty Cycle		45	50	55	%
<b>Enable/Disable</b>					
Output Enable/Disable <sup>7</sup> Output Enable Output Disable	$V_E$ $V_D$	2.0		0.5	V V
Start-Up Time	$t_{SU}$			10	ms
Operating Temp, (Ordering Option)	$T_{OP}$	-10/70 or -40/85			°C

- 1] The power supply should have by-pass capacitors as close to the supply and to ground as possible, for example 0.1 and 0.01uF
- 2] Parameters are tested with production test circuit below , Figure 1.
- 3] See Standard Frequencies and Ordering Information tables for more specific information
- 4] Includes initial accuracy, operating temperature, supply voltage, shock and vibration (not under operation) and aging for 50 and 100ppm options.
- 5] Duty Cycle is measured as On Time/Period (Fig 2).
- 6] The Output is Enabled if the Enable/Disable is left open.

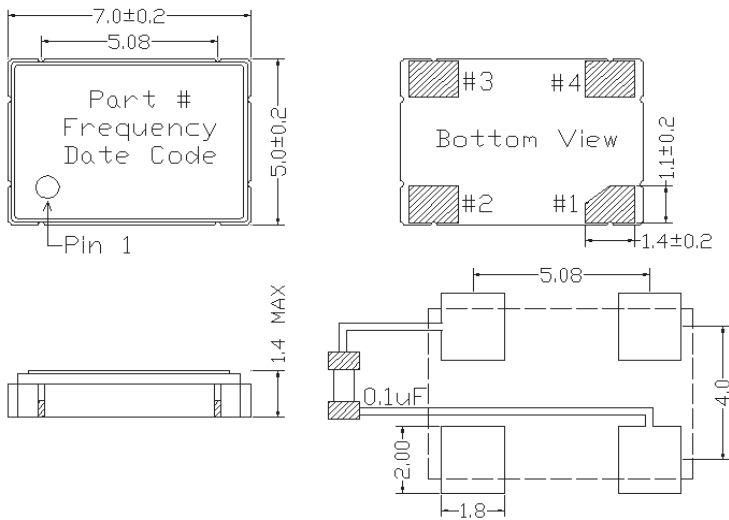


**Fig 1: Test Circuit**



**Fig 2: Waveform**

## Outline Drawing & Pad Layout



Recommended soldering pattern

**Table 3. Pin Out**

Pin	Symbol	Function
1	E/D	Enable Disable
2	GND	Case and Electrical Ground
3	Output	Output
4	V <sub>DD</sub>	Power Supply Voltage

## Reliability

VI qualification includes aging at various extreme temperatures, shock and vibration, temperature cycling, and IR reflow simulation. The VP-700 family is capable of meeting the following qualification tests:

**Table 4. 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
Moisture Sensitivity Level	MSL 1
Contact Pads	Gold over Nickel

Although ESD protection circuitry has been designed into the VP-700 proper precautions should be taken when handling and mounting. VI employs a human body model (HBM) and a charged device model (CDM) for ESD susceptibility testing and design protection evaluation.

**Table 5. ESD Ratings**

Model	Minimum	Conditions
Human Body Model	1500V	MIL-STD-883, Method 3015
Charged Device Model	1000V	JESD22-C101

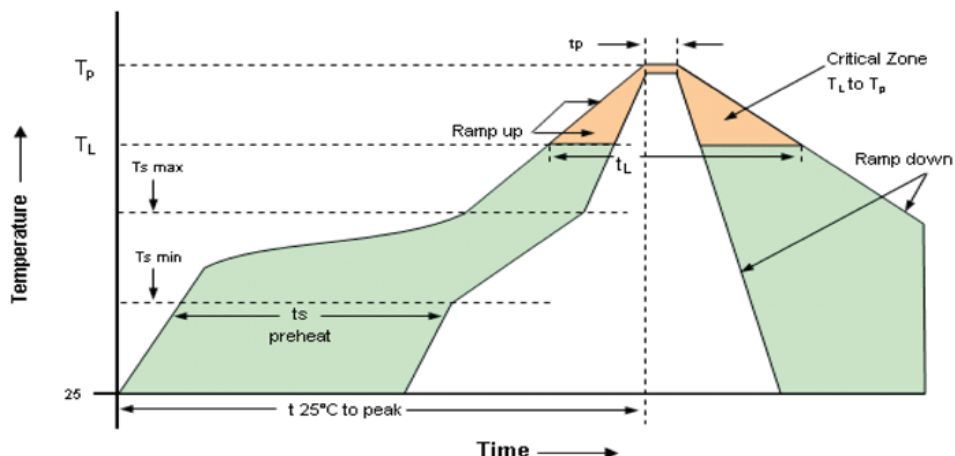
Stresses in excess of the absolute maximum ratings can permanently damage the device. Functional operation is not implied at these or any other conditions in excess of conditions represented in the operational sections of this data sheet. Exposure to absolute maximum ratings for extended periods may adversely affect device reliability. Permanent damage is also possible if E/D is applied before V<sub>cc</sub>.

**Table 6. Absolute Maximum Ratings**

Parameter	Symbol	Ratings	Unit
Storage Temperature	T <sub>S</sub>	-55 to 125	°C
Soldering Temp/Time	T <sub>LS</sub>	260 / 10	°C / sec

The VP-700 is qualified to meet the JEDEC standard for Pb-Free assembly. The temperatures and time intervals listed are based on the Pb-Free small body requirements. The VP-700 device is hermetically sealed so an aqueous wash is not an issue.

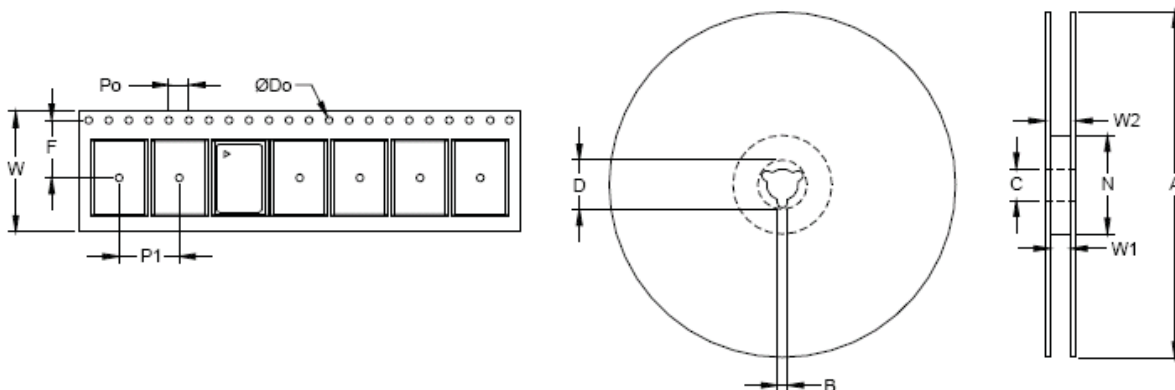
### Solderprofile:



**Table 7. Reflow Profile**

Parameter	Symbol	Value
PreHeat Time Ts-min Ts-max	$t_s$	60 sec Min, 260 sec Max 150°C 200°C
Ramp Up	$R_{UP}$	3 °C/sec Max
Time Above 217 °C	$t_L$	60 sec Min, 150 sec Max
Time To Peak Temperature	$T_{AMB-P}$	480 sec Max
Time at 260 °C	$t_p$	10 sec Max
Ramp Down	$R_{DN}$	6 °C/sec Max

## Tape and Reel

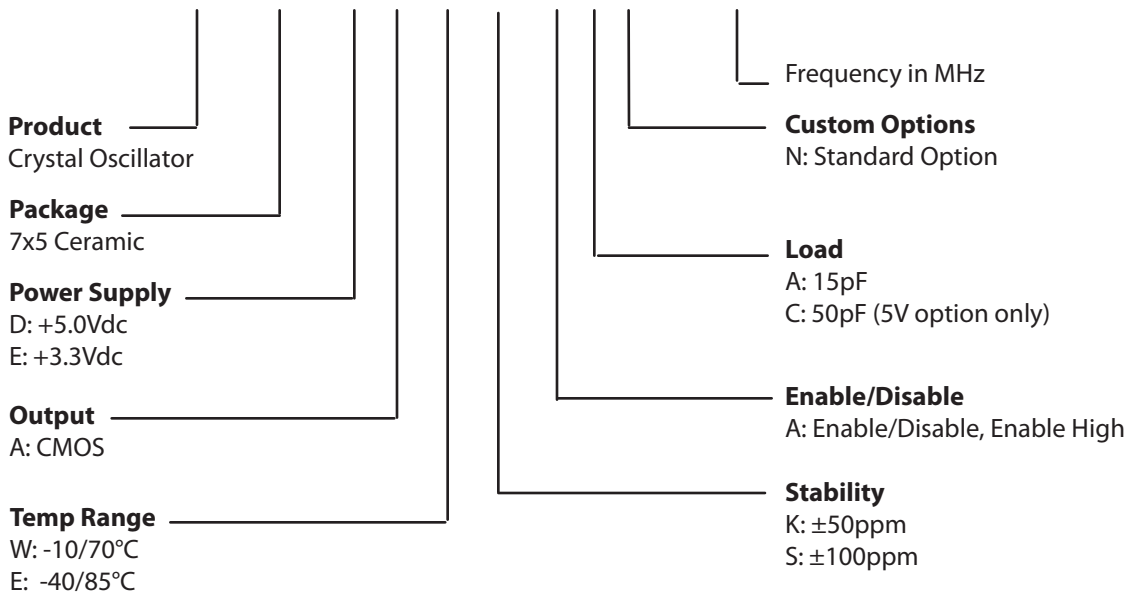


**Table 8. Tape and Reel Information**

Tape Dimensions (mm)						Reel Dimensions (mm)							# Per Reel
Dimension	W	F	Do	Po	P1	A	B	C	D	N	W1	W2	
Tolerance	Typ	Typ	Typ	Typ	Typ	Typ	Min	Typ	Min	Min	Typ	Max	
VP-700	16	7.5	1.5	4	8	180	2	13	21	60	17	21	1000

## Ordering Information

### VP-700- E A W- K A A N- xxMxxxxxxx



*\*Note: not all combination of options are available.  
Other specifications may be available upon request.*

**Example: VP-700-DAW-KAAN-125M000000**

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