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## Description

The VX-805 is a Voltage Control Crystal Oscillator that operates at the fundamental frequency of the internal crystal. The crystal is a high-Q quartz device that enables the circuit to achieve low phase noise jitter performance over a wide operating temperature range. The VX-805 is housed in an industry standard hermetically sealed LCC package and is available in tape and reel.

## Features

- LVPECL output VCXO
- Output Frequencies from 100 MHz to 204.8 MHz
- 3.3 V Operation
- Fundamental Crystal Design with Low Jitter Performance
- Output Disable Feature
- Excellent  $\pm 20$  ppm Temperature Stability,
- 0/70°C, -40/85°C or -40/105°C Operating Temperature
- Small Industry Standard 5.0 x 3.2mm Package
- Product is free of lead and compliant to EC RoHS Directive 

## Applications

- LTE
- SONET/SDH/DWDM
- Ethernet, SyncE, GE
- xDSL, PCMIA
- Digital Video
- Broadband Access
- Base Stations, Picocells
- Test and Measurement

## Block Diagram

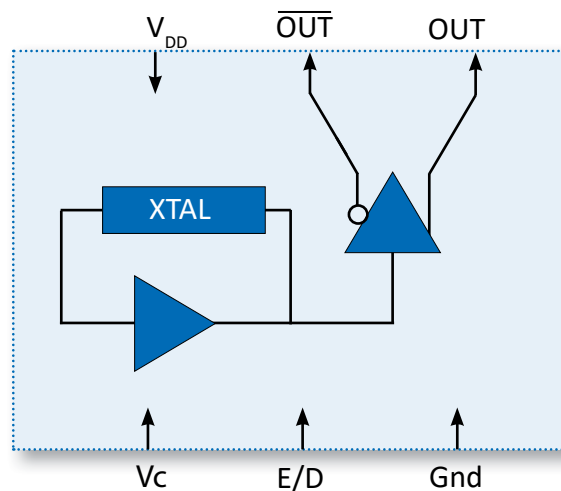


Figure 1. Block Diagram

# Performance Specifications

**Table 1. Electrical Performance - 3.3V LVPECL**

Parameter	Symbol	Min	Typical	Max	Units
<b>Supply</b>					
Voltage <sup>1</sup>	$V_{DD}$	3.135	3.3	3.465	V
Current <sup>2</sup>	$I_{DD}$		50	90	mA
<b>Frequency</b>					
Nominal Frequency	$f_N$	100		204.8	MHz
Absolute Pull Range <sup>2,6</sup> , <i>ordering option</i>	APR	±50			ppm
Linearity <sup>2</sup>	Lin		5		%
Gain Transfer <sup>2</sup>	$K_V$	+80			ppm/V
Temperature Stability <sup>3</sup>	$f_{STAB}$		±20		ppm
<b>Outputs</b>					
Output Logic Levels <sup>2</sup>					
Output Logic High	$V_{OH}$	$V_{DD}-1.025$	$V_{DD}-0.950$	$V_{DD}-0.880$	V
Output Logic Low	$V_{OL}$	$V_{DD}-1.810$	$V_{DD}-1.700$	$V_{DD}-1.620$	V
Rise Time <sup>2,4</sup>	$t_R$		0.3	0.5	ns
Fall Time <sup>2,4</sup>	$t_F$		0.3	0.5	ns
Symmetry <sup>2</sup>	SYM	45	50	55	%
Symmetry <sup>2</sup> (-40 °C to 105 °C)		40	50	60	%
Jitter, RMS <sup>5,7</sup> (12kHz to 20 MHz)	$\phi_J$		0.2	0.5	ps
Phase Noise <sup>7</sup> , 122.88MHz					dBc/Hz
10Hz			-68		
100Hz			-98		
1kHz			-125		
10kHz			-148		
100kHz			-157		
1MHz			-157		
10MHz			-157		
<b>Control Voltage</b>					
Control Voltage Range for Pull Range	$V_C$	0.3		3.0	V
Control Voltage Input Impedance	$Z_{IN}$	10			MΩ
Control Voltage Modulation BW	BW	20			kHz
Output Enable/Disable <sup>8</sup>					V
Output Enabled, Option A	$V_{IH}$	0.9* $V_{DD}$			
Output Disabled, Option A	$V_{IL}$			0.1* $V_{DD}$	
Start-Up Time	$T_S$			10	ms
Operating Temp, <i>Ordering Option</i>	$T_{OP}$	0/70 or -40/85 or -40/105			°C
Package Size		5.0 x 3.2 x 1.2			mm

1] The power supply should have by-pass capacitors as close to the supply and to ground as possible, for examples 0.1 and 0.01uF

2] Parameters are tested with production test circuit below as shown in Figure 2.

3] ±20ppm temperature stability is not available for -40 °C to 105 °C temperature range

4] Measured from 20% to 80% of a full output swing as shown in Figure 4.

5] Not tested in production, guaranteed by design, verified at qualification.

6] Tested with  $V_C = 0V$  to 3.3V unless otherwise stated in part description

7] Phase Noise is measured with an Agilent E5052A Signal Source Analyzer.

8] The Output is Enabled if the Enable/Disable is left open.

## Test Circuit

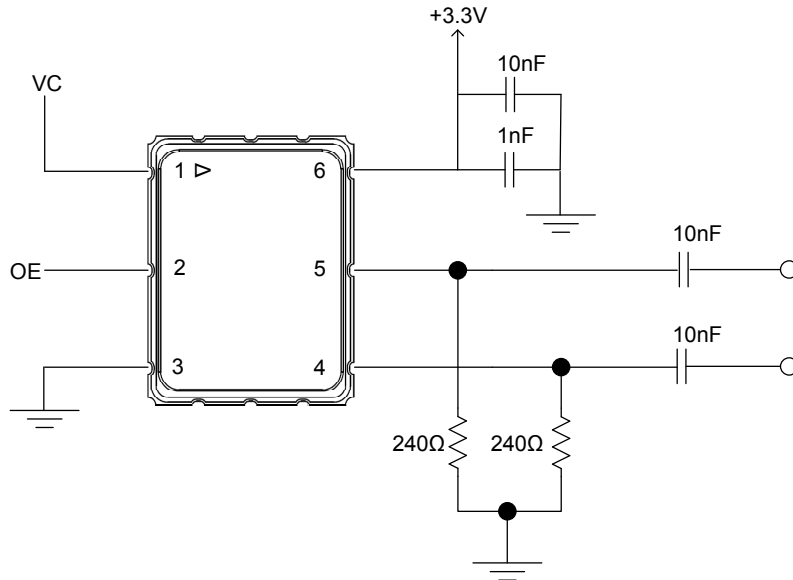


Figure 2. LVPECL Test Circuit

## Waveform

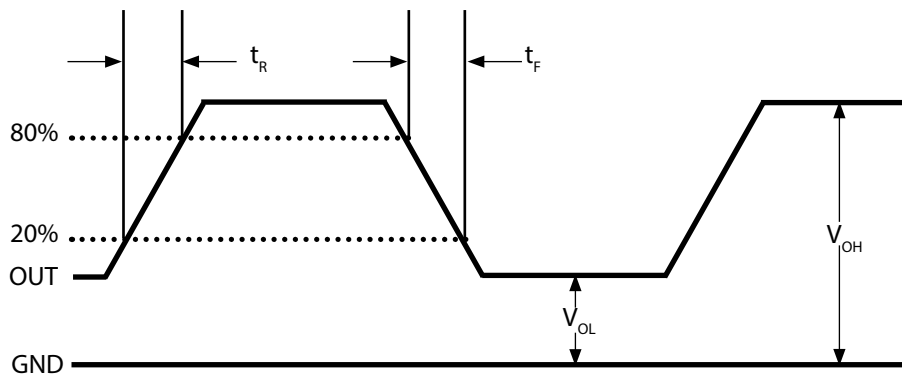


Figure 3. Output Waveform

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Power Supply	$V_{DD}$	0 to 6	V
Voltage Control Range	$V_C$	0 to $V_{DD}$	V
Storage Temperature	$T_S$	-55 to 125	°C
Soldering Temp/Time	$T_{LS}$	260 / 20	°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 datasheet. Exposure to absolute maximum ratings for extended periods may adversely affect device reliability. Permanent damage is also possible if OD or Vc is applied before  $V_{DD}$ .

# Reliability

Vectron qualification includes aging at various extreme temperatures, shock and vibration, temperature cycling, and IR reflow simulation. The VX-805 family is capable of meeting the following qualification tests:

Table 3. 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 (0.3 um min to 1.0um max) over Nickel
Weight	57 mg

# Handling Precautions

Although ESD protection circuitry has been designed into the VX-805 proper precautions should be taken when handling and mounting. Vectron employs a human body model (HBM) and a charged device model (CDM) for ESD susceptibility testing and design protection evaluation.

Table 4. ESD Ratings		
Model	Minimum	Conditions
Human Body Model	500V	MIL-STD-883, Method 3015
Charged Device Model	500V	JESD22-C101

Table 5. Reflow Profile		
Parameter	Symbol	Value
PreHeat Time	$t_s$	60 sec Min, 260 sec Max
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	$t_p$	30 sec Max
Ramp Down	$R_{DN}$	6 °C/sec Max

The device 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 VX-805 device is hermetically sealed so an aqueous wash is not an issue.

Termination Plating:  
Electroless Gold Plate over Nickel Plate

Solderprofile:

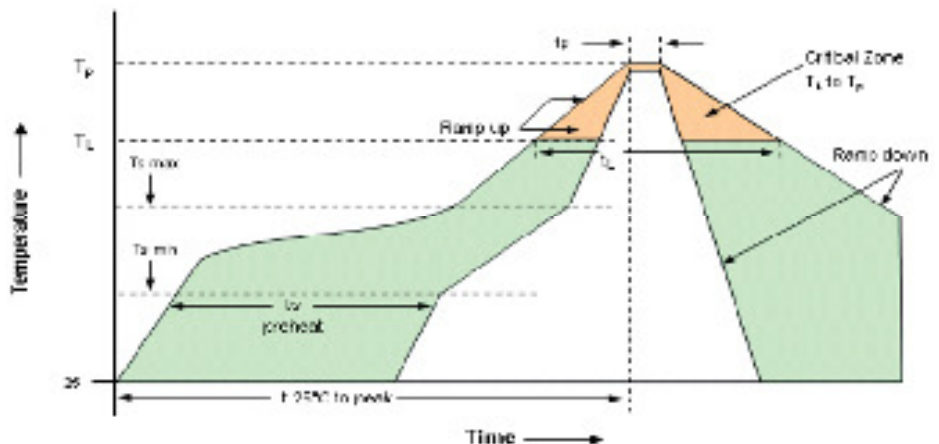
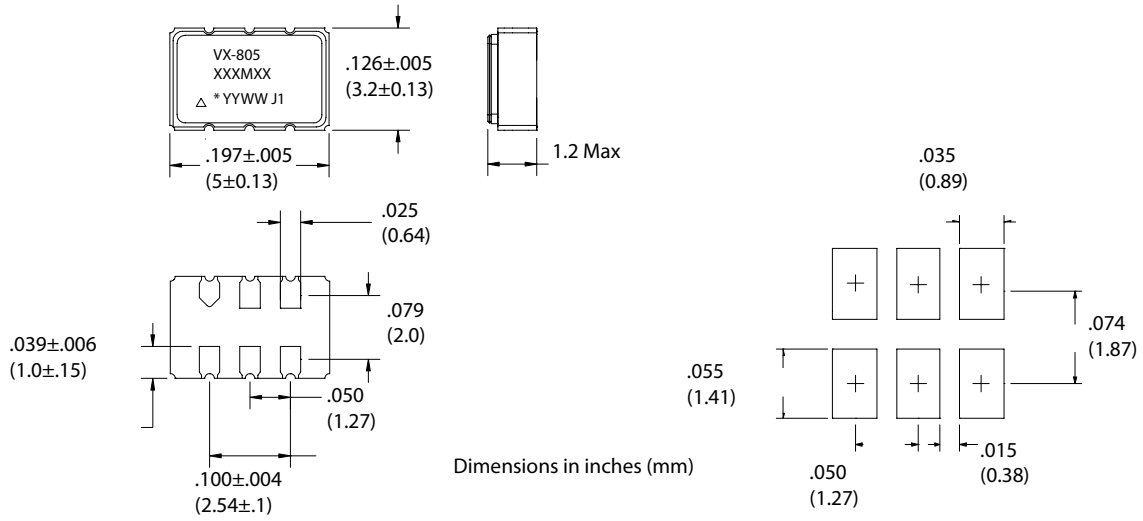


Figure 4. Recommended Reflow Profile

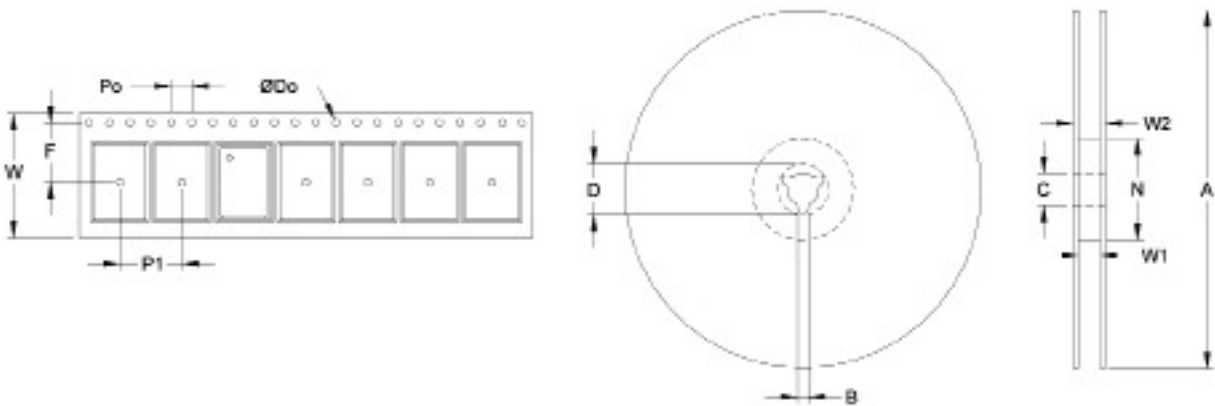
## Outline Drawing & Pad Layout



**Figure 5. Outline Drawing and Pad Layout**

Table 6. Pin Out		
Pin	Symbol	Function
1	$V_C$	VCXO Control Voltage
2	E/D	Enable Disable **See Ordering Options**
3	GND	Case and Electrical Ground
4	Output	Output
5	COutput	Complementary Output
6	$V_{DD}$	Power Supply Voltage

## Tape & Reel (EIA-481-2-A)

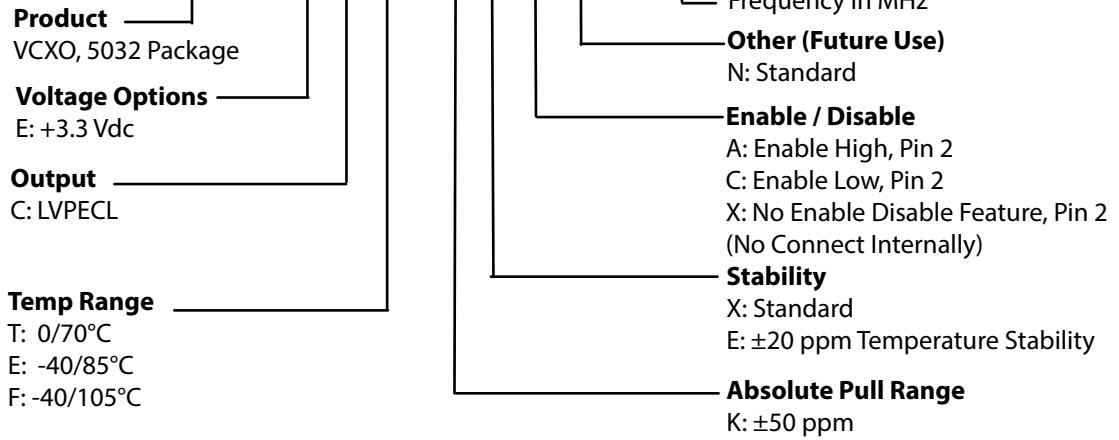


**Figure 6. Tape and Reel Drawing**

Table 7. Tape and Reel Information													
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	
VX-805	16	5.5	1.5	4	8	178	1.78	13	20.6	55	12.4	22.4	500/1000

## Ordering Information

### VX-805- E C T - K X A N- 122M880000



**Example: VX-805-ECT-KXAN-122M880000**

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

\* Add **\_SNPB** for tin lead solder dip  
Example: VX-805-ECT-KXAN-122M880000\_**SNPB**

## Revision History

Revision Date	Approved	Description
January 17, 2017	RC	Update Reflow Profile
February 3, 2016	RC	Update Figure 3.
January 21, 2015	VN	Included Extended temperature Range of -40/105°C. Added revision history table.
May 28, 2015	VN	Changed maximum nominal output frequency from 250MHz to 204.8MHz
August 10, 2018	FB	Updated logo and contact information, added "SNPBDIP" ordering option
April 15, 2019	FB	Updated logo and contact information, change SNPBDIP to SNPB

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