VX-805

Voltage Controlled Crystal Oscillator

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 ±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

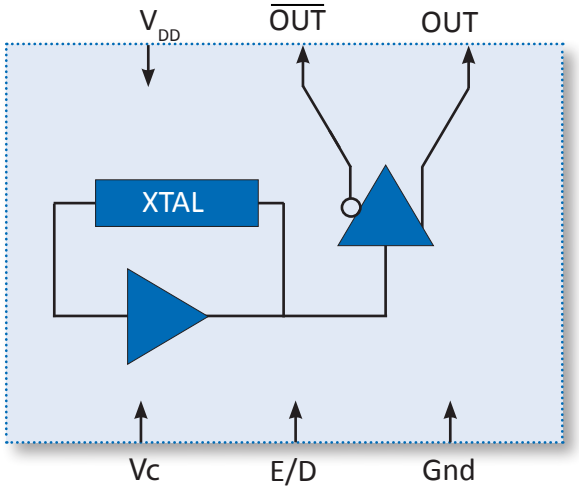

Figure 1. Block Diagram

Performance Specifications

Table 1. Electrical Performance - 3.3V LVPECL

Parameter	Symbol	Min	Typical	Max	Units
Supply					
Voltage[1]	V_{DD}	3.135	3.3	3.465	V
Current[2]	I_{DD}		50	90	mA
Frequency					
Nominal Frequency	f_N	100		204.8	MHz
Absolute Pull Range [2,6], *ordering option*	APR		±50		ppm
Linearity[2]	Lin		5		%
Gain Transfer[2]	K_V		+80		ppm/V
Temperature Stability[3]	f_{STAB}		±20		ppm
Outputs					
Output Logic Levels[2] Output Logic High Output Logic Low	 V_{OH} V_{OL}	 V_{DD}-1.025 V_{DD}-1.810	 V_{DD}-0.950 V_{DD}-1.700	 V_{DD}-0.880 V_{DD}-1.620	 V V
Rise Time[2,4]	t_R		0.3	0.5	ns
Fall Time[2,4]	t_F		0.3	0.5	ns
Symmetry[2] Symmetry[2] (-40 °C to 105 °C)	SYM	45 40	50 50	55 60	% %
Jitter, RMS [5,7] (12kHz to 20 MHz)	ϕJ		0.2	0.5	ps
Phase Noise[7], 122.88MHz 10Hz 100Hz 1kHz 10kHz 100kHz 1MHz 10MHz			 -68 -98 -125 -148 -157 -157 -157		dBc/Hz
Control Voltage					
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[8] Output Enabled, Option A Output Disabled, Option A	 V_{IH} V_{IL}	 0.9*V_{DD}		 0.1*V_{DD}	V
Start-Up Time	T_S			10	ms
Operating Temp, *Ordering Option*	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 Vc = 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

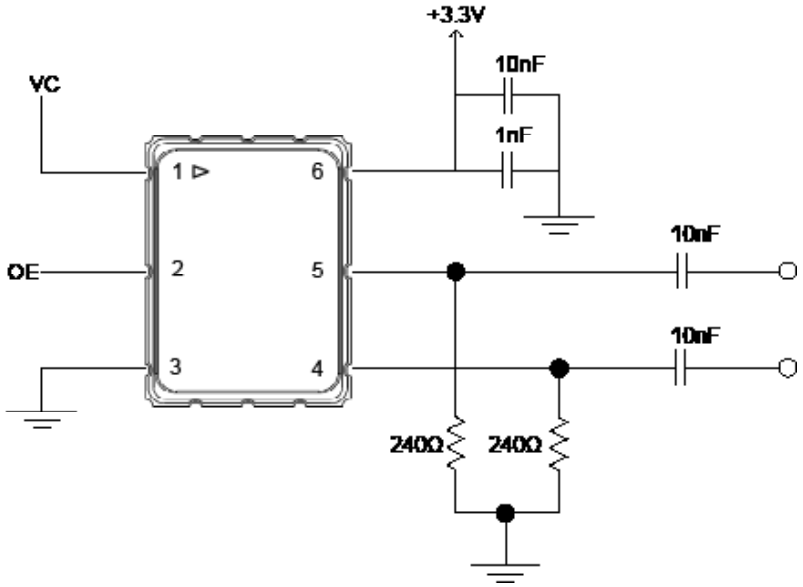

Figure 2. LVPECL Test Circuit

Waveform

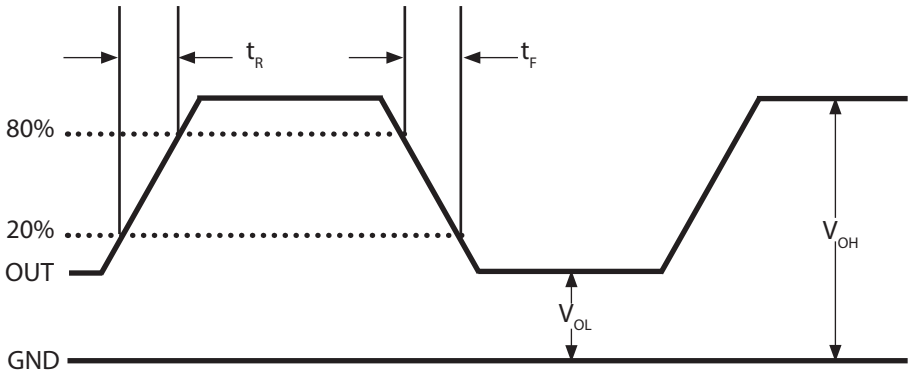

Figure 3. Output Waveform

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	TS	-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

VI 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 over Nickel

Handling Precautions

Although ESD protection circuitry has been designed into the VX-805 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 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

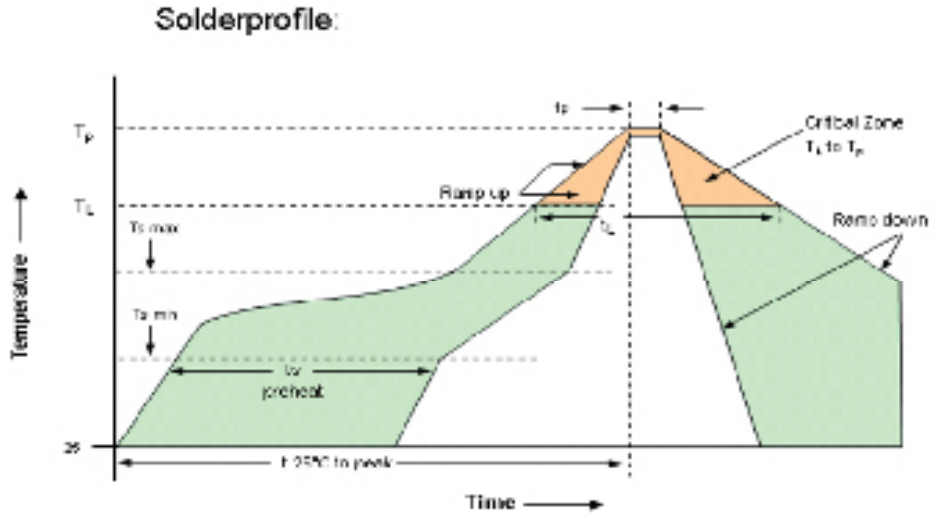

Figure 4. Recommended Reflow Profile

Outline Drawing & Pad Layout

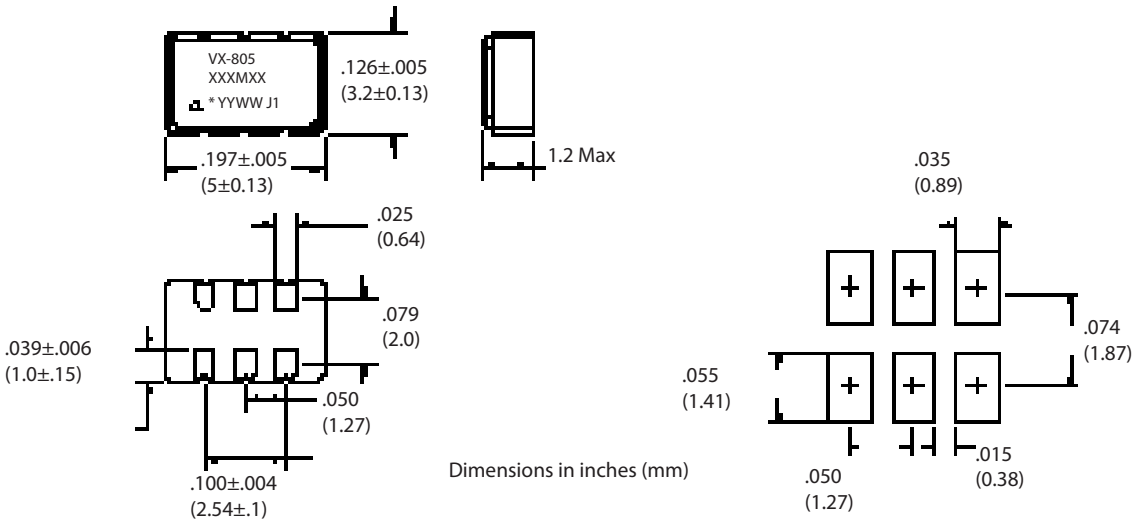

Figure 5. Outline Drawing and Pad Layout

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)

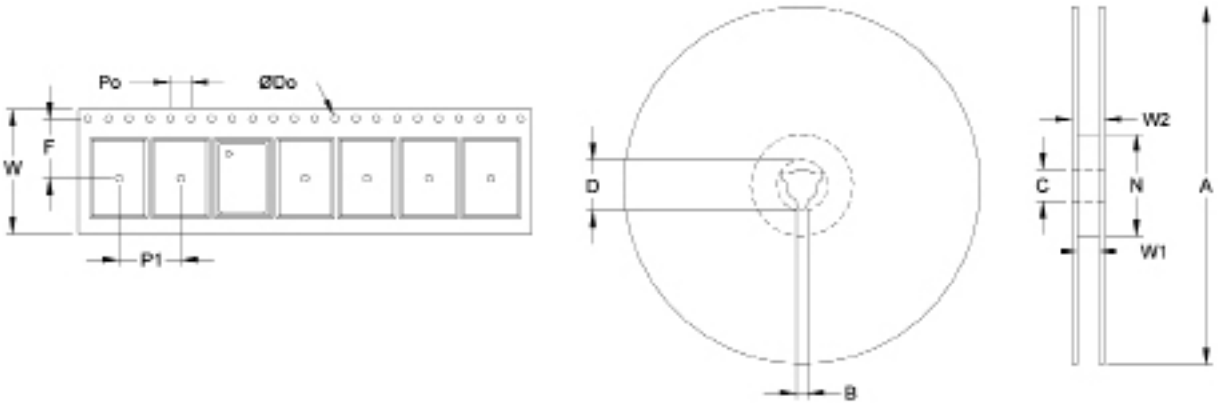

Figure 6. Tape and Reel Drawing

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

Ordering Information

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

Product
VCXO, 5032 Package

Voltage Options
E: +3.3 Vdc

Output
C: LVPECL

Temp Range
T: 0/70°C
E: -40/85°C
F: -40/105°C

Absolute Pull Range
K: ±50 ppm

Stability
X: Standard
E: ±20 ppm Temperature Stability

Enable / Disable
A: Enable High, Pin 2
C: Enable Low, Pin 2
X: No Enable Disable Feature, Pin 2
(No Connect Internally)

Other (Future Use)
N: Standard

Frequency in MHz

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.*

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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