

XVO

FAST TURNAROUND VCXO

DESCRIPTION

The XVO clock series is a cutting edge family of low to high frequency, **low jitter output, single or multi - frequency** voltage controlled clock oscillators (VCXO). The XVO VCXO's are available in **7.0 x 5.0, 5.0 x 3.2, or 3.2 x 2.5 mm** ceramic packages with output frequencies ranging from **10 MHz to 1.2 GHz**. Its outstanding flexibility significantly reduces design cycle time and overall cost. The XVO design incorporates a low frequency crystal along with low jitter frequency synthesizer to provide a wide range of frequencies. The XVO VCXO's are available in **LVCMOS, LVPECL and LVDS** outputs, allowing for a wide variety of applications.

This product is ideal for the time conscious customer as shipments are made within days of a placed order.

FEATURES

- **Fast Turnaround (Ships Within Days)**
- **Very Low Jitter (Typical 0.6 ps)**
- **10 MHz to 1.2 GHz Frequency Range**
- **Selectable Single or Dual Frequencies**
- **Stability as low as ± 20 ppm ($-40 \sim 85^\circ\text{C}$)**
- **Available Sizes:**
 - ✓ **7.0 x 5.0 mm**
 - ✓ **5.0 x 3.2 mm**
 - ✓ **3.2 x 2.5 mm**

SELECTOR GUIDE	LVCMOS			LVDS			LVPECL		
Package Size (mm)	7.0x5.0	5.0x3.2	3.2x2.5	7.0x5.0	5.0x3.2	3.2x2.5	7.0x5.0	5.0x3.2	3.2x2.5
Family Part Number	XVO-74	XVO-54	XVO-34	XVO-78	XVO-58	XVO-38	XVO-79	XVO-59	XVO-39
Frequency Range (MHz)	10 – 250			10 – 1200			10 - 1200		
Absolute Pull Range (ppm)	$\pm 20, \pm 25, \pm 50, \pm 100$			$\pm 20, \pm 25, \pm 50, \pm 100$			$\pm 20, \pm 25, \pm 50, \pm 100$		
Number of Frequencies	1, 2			1, 2			1, 2		
Supply Voltage (V)	2.5, 3.3			2.5, 3.3			2.5, 3.3		
Temperature Range ($^\circ\text{C}$)	$-20 \sim +70$			$-20 \sim +70$			$-20 \sim +70$		
	$-40 \sim +85$			$-40 \sim +85$			$-40 \sim +85$		

OUTPUT CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVCMOS	Frequency Range	f_o		10		250	MHz
	Output Levels	V_{OH}		$0.9V_{cc}$			V
		V_{OL}				$0.1V_{cc}$	V
	Rise/Fall Time	T_r/T_f	20% - 80% (V_{OL} , V_{OH})			0.5	ns
	Supply Current	I_s	2.5V			30	mA
			10 – 50 MHz			30	
			51 – 135 MHz			45	
			136 – 250 MHz			55	
		3.3V	10 – 50 MHz			35	
			51 – 135 MHz			50	
			136 – 250 MHz			60	
	Output Load	O_{CL}	Standard			15	pF

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVPECL	Frequency Range	f_o		10		1200	MHz
	Output levels	V_{OH}	Load 50Ω to V_{cc} -2V	V_{cc} -1.03		V_{cc} -0.6	V
		V_{OL}		V_{cc} -1.85		V_{cc} -1.6	V
	Rise/Fall Time	T_r/T_f				0.25	ns
	Output Voltage Swing	V_{p-p}	Output termination 50Ω / V_{cc} - 2.0V	0.6 ~ 1.0			V
	Supply Current	I_s	2.5 V			35	mA
			10 – 50 MHz			35	
			51 – 215 MHz			45	
			216 – 640 MHz			65	
			641 – 1200 MHz			70	
		3.3V	10 – 50 MHz			85	
			51 – 215 MHz			95	
			216 – 640 MHz			115	
			641 – 1200 MHz			120	
	Output Load	O_{CL}	Output Termination 50Ω to V_{cc} -2V			50	Ω

	PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
				Min	Typ.	Max	
LVDS	Frequency Range	f_o		10		1200	MHz
	Differential Output Voltage	V_{OD}	10 – 1200 MHz		0.6		V
	Offset Voltage	V_{OS}	V DC		1.3		V
	Rise/Fall Time	T_r/T_f				0.35	ns
	Supply Current	I_s	2.5V	10 – 50 MHz		25	mA
				51 – 215 MHz		30	
				216 – 640 MHz		43	
				641 – 1200 MHz		60	
			3.3V	10 – 50 MHz		65	
				51 – 215 MHz		72	
				216 – 640 MHz		83	
				641 – 1200 MHz		100	
	Output Load	O_{CL}	Differential 100Ω Load Connected Between Each Output			100	Ω

ELECTRICAL SPECIFICATIONS

PARAMETER	SYMBOL	CONDITION	VALUE			UNIT
			Min.	Typ.	Max.	
Supply Voltage ¹	V _{CC}			2.5 or 3.3		V
Duty Cycle	DC	Load depends on output type	45		55	%
RMS Phase Jitter	J	12 kHz – 20 MHz Bandwidth		0.6	1	ps
Absolute Pull Range ^{1,2}	$\Delta f/f_c$	Min. guaranteed frequency pull over $\Delta f/f_c$ -40°C to +85°C			± 20 ± 50 ± 100	ppm
Control Voltage	V _C	Centered = ½ (V _{CC})		1.25, 1.65		V
Control Voltage Range		Positive slope; 10% linearity			V _{CC}	V
Input Impedance	Z			500		kΩ
Modulation Bandwidth	BW	-3db	20			kHz
Start-Up Time	t _{start}	T _a =25°C			10	ms
Enable	En	Min (logic 1 or open) HCMOS levels	0.7V _{CC}			V
Disable ³	Dis	Max (logic 0) HCMOS levels			0.3	V
OE Function OE Pin Input LVCMOS/ LVTTTL	Input Capacitance	C _{IN}		4		pF
	Input High Voltage	V _{IH}	0.7V _{CC}			V
	Input Low Voltage	V _{IL}			0.3V _{CC}	V
	Input High Current	I _{IH}			5	μA
	Input Low Current	I _{IL}	-10			μA
	Equivalent Internal Pull-up Resistance	R _{PULLUP}		900		kΩ
Aging		First year			±5	ppm
		Year thereafter			±2	
Operating Temperature ¹	T _a		-40		+85	°C
Storage Temperature	T _(stg)	Absolute max	-45		+100	°C
Absolute Voltage Range	V _{CC(abs)}				4.6	V
Moisture Sensitivity Level	MSL	JEDEC J-STD-020			1	
Termination Finish			Au			
ESD Sensitivity	HBM	Human body model JESD22-A114			3	kV

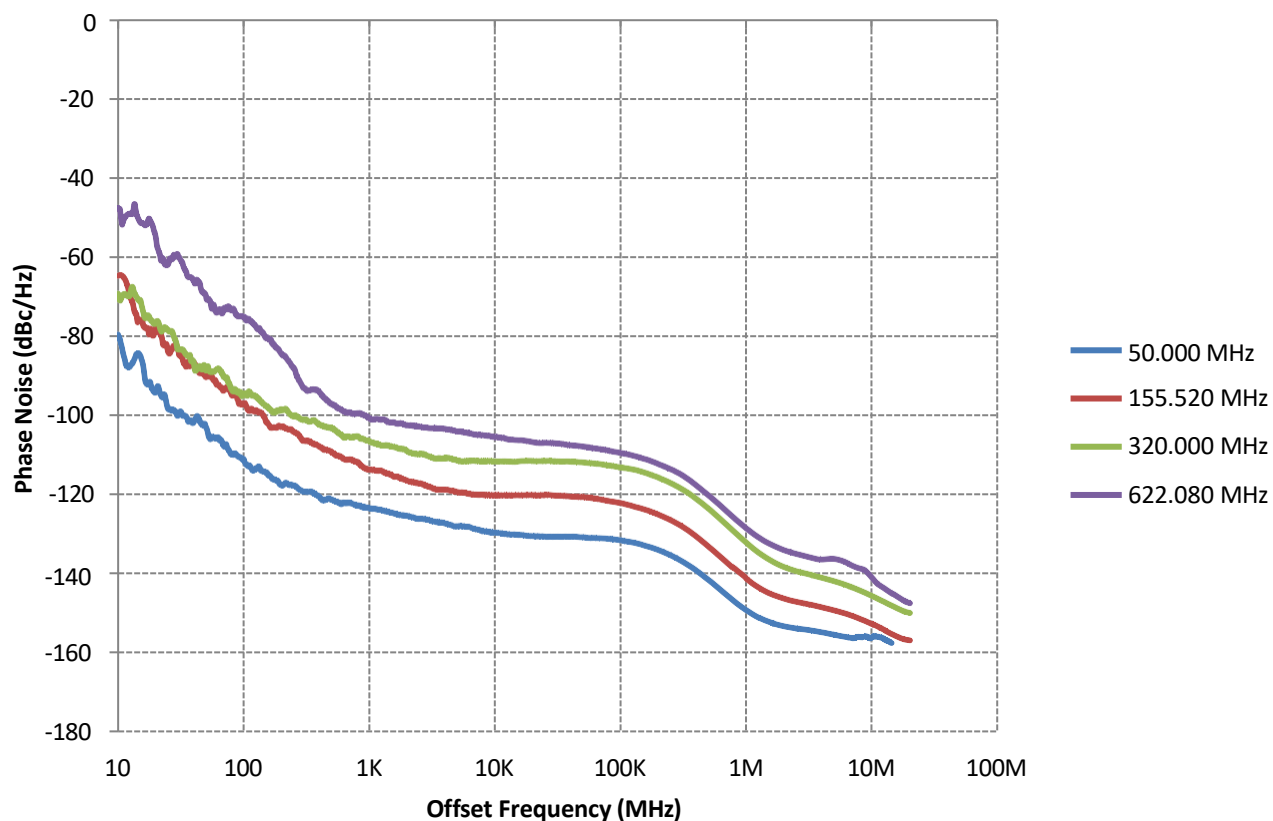
Notes

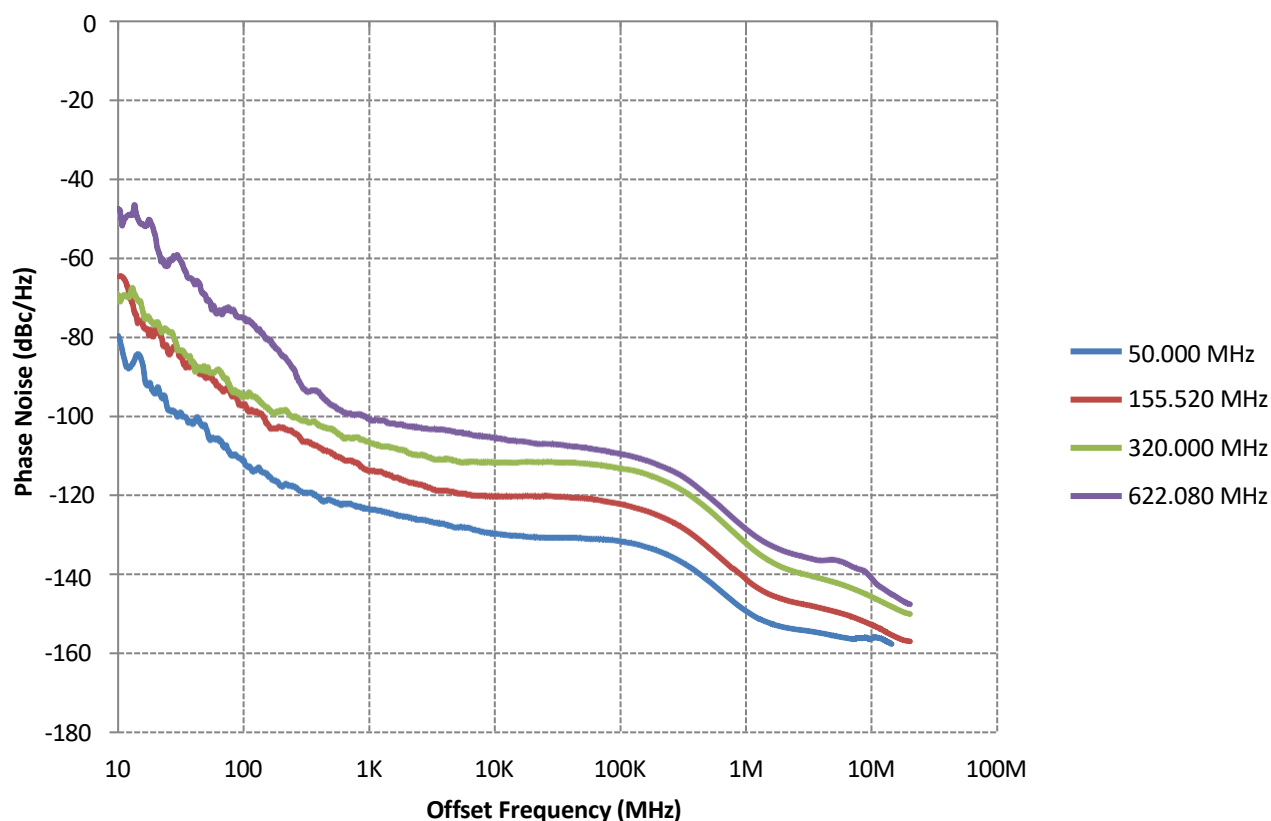
¹ See part numbering table

² Inclusive of 25°C calibration, tolerance, operating temperature range, input voltage variation, load change, aging, shock and vibration

³ Output goes to high impedance

PHASE NOISE AND JITTER PERFORMANCE



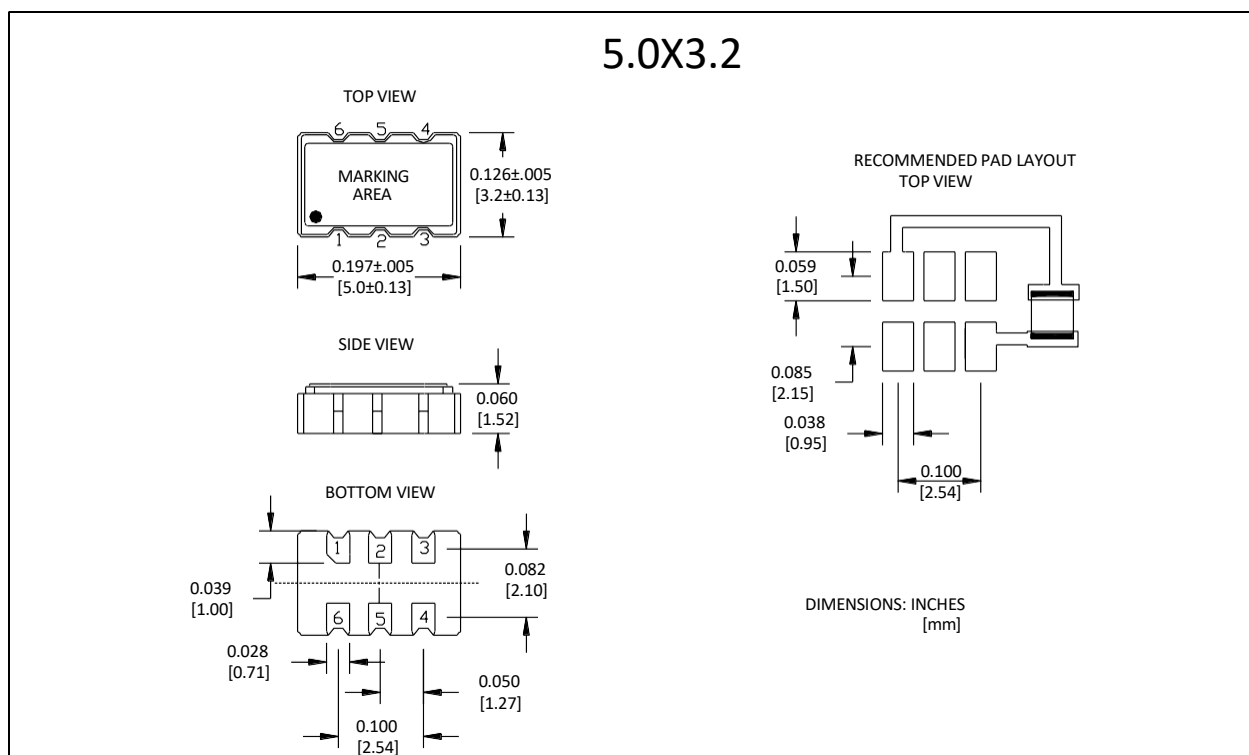
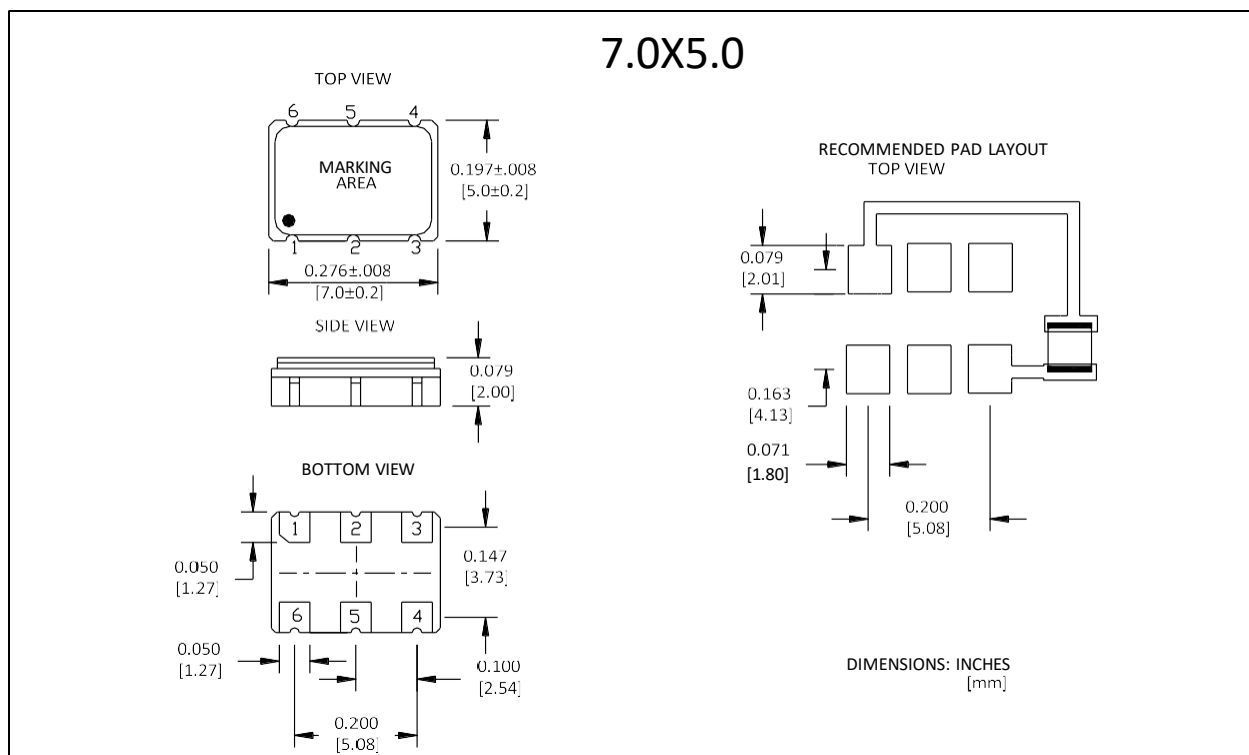


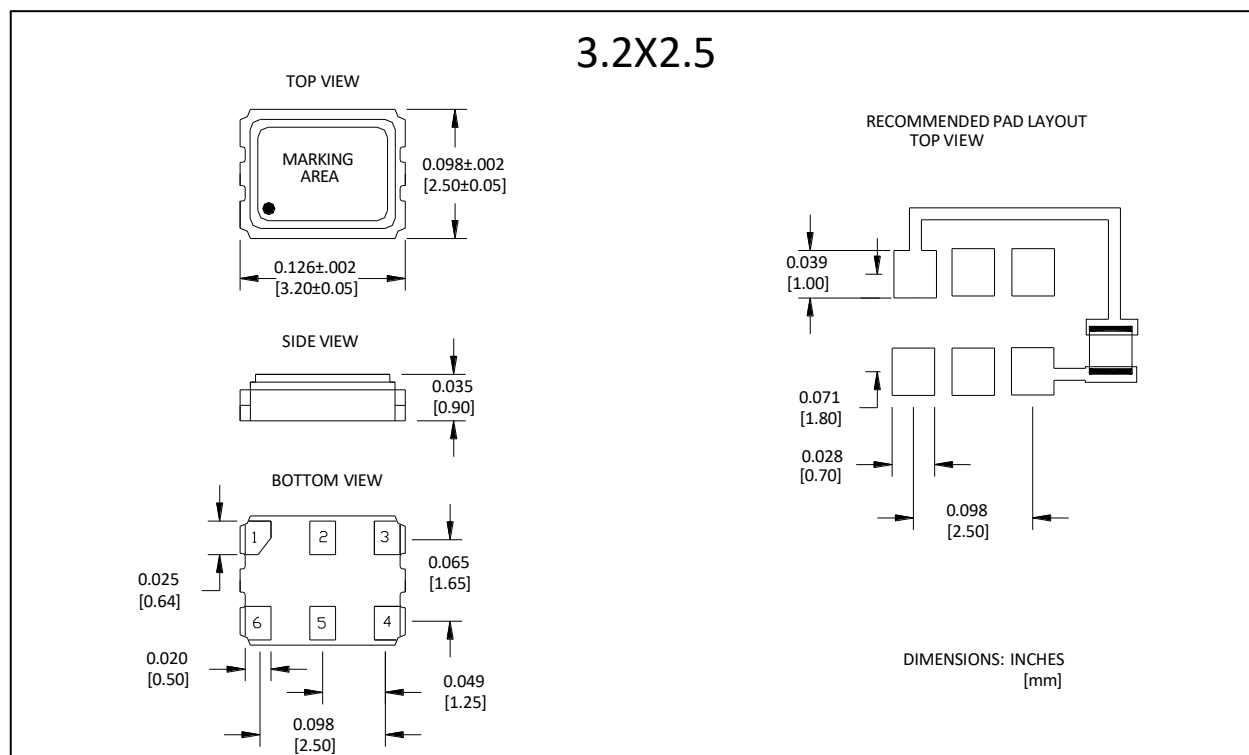
Data collected using Agilent E5052B signal source analyzer. $V_{cc} = 2.5V$.

FREQUENCY (MHz)	FULL BANDWIDTH PHASE JITTER (ps)	PHASE JITTER 12 kHz to 20 MHz INTEGRATED BANDWIDTH (ps RMS)
50.000	3.0	0.9
155.520	2.1	0.6
320.000	3.2	0.7
622.080	3.3	0.7

Phase jitter integrated using Agilent E5052B signal source analyzer. $V_{cc} = 2.5V$ (LVCMOS, LVDS, LCPECL – load)

MECHANICAL DIMENSIONS AND PIN FUNCTIONING





Notes (Applicable To All Packages)

¹ Enable / Disable feature is available on either pin 1 or pin 2. See options on part numbering table.

² There is no enable/disable option when the number of output frequencies is four.

³ 0.01 μ F external bypass capacitor is recommended as seen in solder pattern for 7 x 5 mm, and required for 5 x 3.2 and 3.2 x 2.5 mm

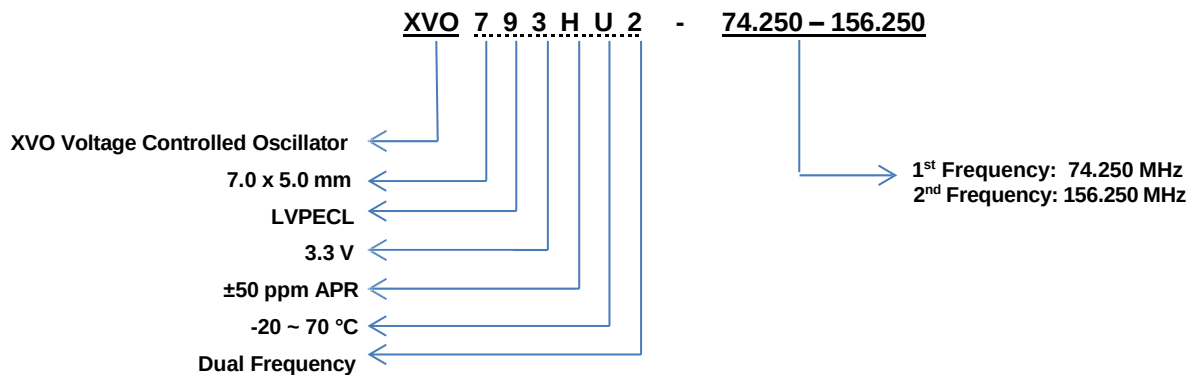
PIN	SYMBOL	FUNCTION
1	V _C	Control Voltage
2	see below	Refer to Pin Logic Table Below
3	GND	Case and Electrical Ground
4	Output 1	Output 1
5	Output 2 or NC	Complementary Output (LVPECL, LVDS) or N/C (LVCMOS)
6	V _{CC}	Power Supply Voltage

PIN LOGIC TABLE			
NUMBER OF FREQUENCIES	PIN 1	PIN 2	FREQUENCY OUTPUT
1	Control Voltage	N/C or "1" Logic Level	F ₁
		"0" Logic Level	Output Disabled
2	Control Voltage	"0" Logic Level	F ₁
		"1" Logic Level	F ₂

PART NUMBERING

SERIES	PACKAGE (mm)	OUTPUT	SUPPLY VOLTAGE (V)	APR (ppm)	TEMP RANGE (°C)	NUMBER OF FREQUENCIES	-	OUTPUT FREQUENCY (MHz)
XVO	7: 7.0 x 5.0 5: 5.0 x 3.2 3: 3.2 x 2.5	4: LVCMOS 8: LVDS 9: LVPECL	2: V _{cc} = 2.5 3: V _{cc} = 3.3	K: ±20 H: ±50 J: ±100	U: -20~70 V: -40~85	1: Single 2: Dual	-	F ₁ F ₁ - F ₂

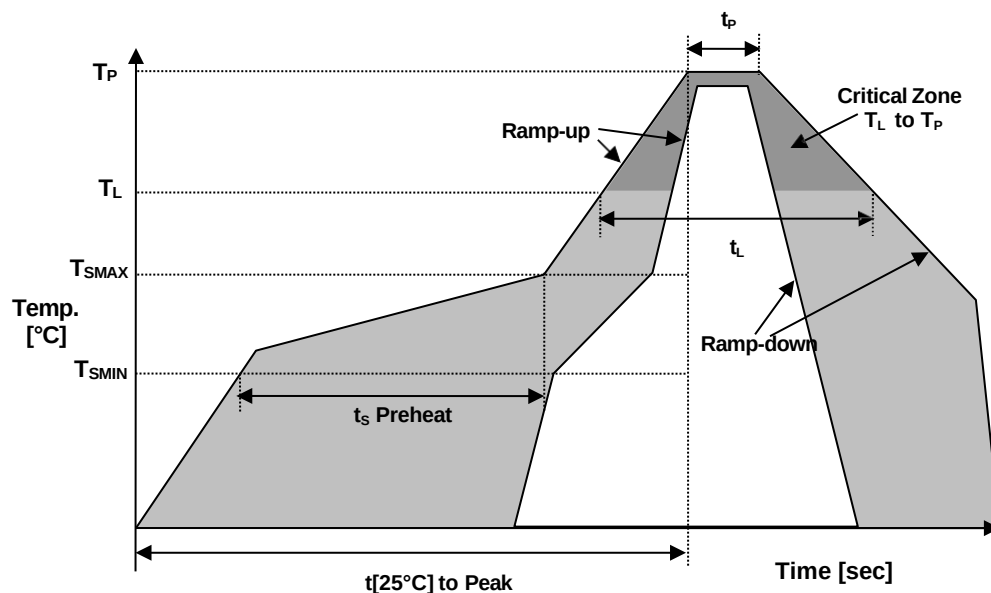
EXAMPLE:



MARKING

- A marking code will be issued by the sales department at order confirmation.

REFLOW PROFILE



Recommended Solder Reflow Profile		
Temperature Min Preheat	T _{SMIN}	150°C
Temperature Max Preheat	T _{S MAX}	175°C
Time (T _{SMIN} to T _{S MAX})	t _s	60-180 sec.
Temperature	T _L	217°C
Peak Temperature	T _P	260°C
Ramp-up rate	R _{UP}	3°C/sec max.
Ramp-down rate	R _{DOWN}	6°C/sec max.
Time within 5°C of Peak Temperature	t _p	10 sec max.
Time t[25°C] to Peak Temperature	t[25°C] to Peak	480 sec.
Time	t _L	60-150 sec.

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