5.0x7.0mm Surface Mount LVDS Clock Oscillator Series

CONNOR WINFIELD

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Description

The Connor-Winfield LMxxx - Series are 5x7.0mm Surface Mount, LVDS, Fixed Frequency Crystal Controlled Oscillator (XO). Through the use of multiplication, the LMxxx - Series are designed for applications requiring tight frequency stability, wide temperature range and low jitter. Operating at 2.5V or 3.3V supply voltage, the LMxxx - Series provides LVDS Differential Outputs with enable / disable function. The surface mount package is designed for high-density mounting and is optimum for mass production.

Features:

Model LMxxx - Series

- 5.0 x7.0mm Surface Mount Package
- 2.5V or 3.3V Operation
- LVDS Output Logic
- Frequency Stabilities Available:
  - LM14x / LM34x / LM44x: +/-20ppm
  - LM11x / LM31x / LM41x: +/-25ppm
  - LM12x / LM22x / LM32x / LM42x: +/-50ppm
  - LM13x / LM23x / LM33x / LM43x: +/-100ppm
- Temperature Ranges Available:
  - LM1xx Series: 0 to 70°C
  - LM2xx Series: -40 to 85°C
  - LM3xx Series: 0 to 85°C
  - LM4xx Series: -20 to 70°C
- Low Jitter <1pS RMS
- Tri-State Enable/Disable
- Tape and Reel Packaging
- RoHS Compliant / Lead Free ✓RoHS

Model Specifications

Absolute Maximum Ratings — Table 1.0

Parameter	Units	Minimum	Nominal	Maximum	Units	Note
Storage Temperature		-55	-	125	°C	
Supply Voltage	(Vcc)	-0.5	-	4.6	Vdc	
Input Voltage		-0.5	-	Vcc+0.5	Vdc	

Operating Specifications — Table 2.0

Parameter		Minimum	Nominal	Maximum	Units	Note
Center Frequency	(Fo)	100	-	670	MHz	
Total Frequency Tolerance	(See Table 9 for full part number)					
Model LMx4x	(See Table 9)	-20	-	20	ppm	1
Model LMx1x	(See Table 9)	-25	-	25	ppm	1
Model LMx2x	(See Table 9)	-50	-	50	ppm	1
Model LMx3x	(See Table 9)	-100	-	100	ppm	1
Operating Temperature Range						
Model LM1xx	(See Table 9)	0	-	70	°C	
Model LM4xx	(See Table 9)	-20	-	70	°C	
Model LM3xx	(See Table 9)	0	-	85	°C	
Model LM2xx	(See Table 9)	-40	-	85	°C	
Supply Voltage	(Vcc)					
Model LMxx2	(See Table 9)	2.375	2.500	2.625	Vdc	
Model LMxx3	(See Table 9)	3.135	3.3	3.465	Vdc	
Supply Current	(Icc)	-	60	90	mA	
Period Jitter		-	3	5	ps RMS	
Phase Jitter- BW=12KHz to 20MHz		-	0.6	1.0	ps RMS	
SSB Phase Noise at 10Hz offset		-	-40	-	dBc/Hz	
SSB Phase Noise at 100Hz offset		-	-75	-	dBc/Hz	
SSB Phase Noise at 1KHz offset		-	-95	-	dBc/Hz	
SSB Phase Noise at 10KHz offset		-	-110	-	dBc/Hz	
SSB Phase Noise at 100KHz offset		-	-115	-	dBc/Hz	
Sub-Harmonics		-	-60	-50	dBc	

Input Characteristics — Table 3.0

Parameter		Minimum	Nominal	Maximum	Units	Note
Disable Input Voltage (Low)	(Vil)	-	-	0.3Vcc	Vdc	2
Enable Input Voltage (High)	(Vih)	0.7Vcc	-	-	Vdc	2

LVDS Output Characteristics — Table 4.0

Parameter		Minimum	Nominal	Maximum	Units	Note
LOAD		-	-	100	Ohms	
Output Differential Voltage	(Vod)	250	-	450	mV	3
Output Swing (Differential Output peak to peak)	(Vopp)	500	700	900	mV	
Duty Cycle measured at 50%		45	50	55	%	4
Differential Rise / Fall Time 20% to 80%		-	0.3	0.7	ns	

Notes

1) Includes initial tolerance, deviation over temperature, supply and load variations, shock, vibration and 20 years aging.
2) When the oscillator is disabled, the outputs are at High Impedance. Output is enabled with no connection on pad 1.
3) Vod measured with 100 ohm resistor between the true output and the complementary output.
4) Duty Cycle measured at 50% of output swing.

RoHS COMPLIANT

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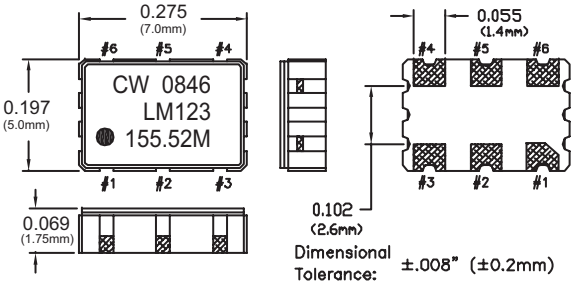
Ordering Information

LM	1	2	3	-	155.52M
Type: LVDS Clock Series 5x7mm	Temperature Range: 1 = 0 to 70° C 2 = -40 to 85° C 3 = 0 to 85° C 4 = -20 to 70° C	Frequency Stability: 4 = +/-20 ppm ^ 1 = +/-25 ppm ^ 2 = +/-50 ppm 3 = +/-100 ppm	Supply Voltage: 2 = 2.5Vdc. 3 = 3.3Vdc.		Output Frequency: Frequency Format -xxx.xM Min.* -xxx.xxxxxxM Max.* *Amount of numbers after the decimal point. M = MHz

^ Models LM212, LM213, LM242 and LM243 are not currently available.
Example: LM123-155.52M = LVDS Clock, 0 to 70°C, +/-50ppm, 3.3Vdc @ 155.52 MHZ

Package Outline



Package Characteristics

Table 5.0

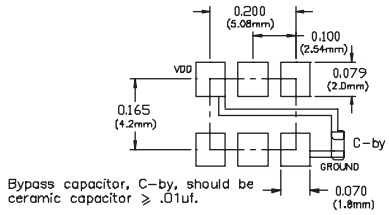
Package	Hermetically sealed ceramic package and metal cover.
Soldering Process	RoHS compliant, see solder profile on page 2.

Environmental Characteristics

Table 6.0

Vibration:	Vibration per Mil Std 883E Method 2007.3 Test Condition A
Shock:	Mechanical Shock per Mil Std 883E Method 2002.4 Test Condition B.
Soldering:	SMD product suitable for Convection Reflow soldering. Peak temperature 260°C. Maximum time above 220°C, 60 seconds.
Solderability	Solderability per Mil Std 883E Method 2003

Suggested Pad Layout



Pad Connections - Enable / Disable Function

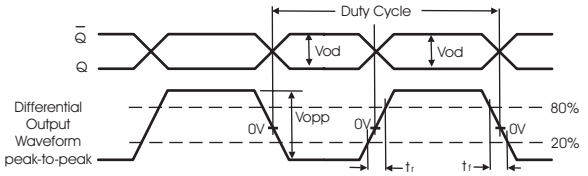
Table 7.0

Pad	Connection
1	Enable / Disable
2	N/C
3	Ground
4	Q Output
5	$\overline{Q}$ Output
6	Vcc

Table 8.0

Enable / Disable Function (Pad 1)	Output
High or Open	Enable
Low	Disable (High Impedance)

LVDS Output Waveform



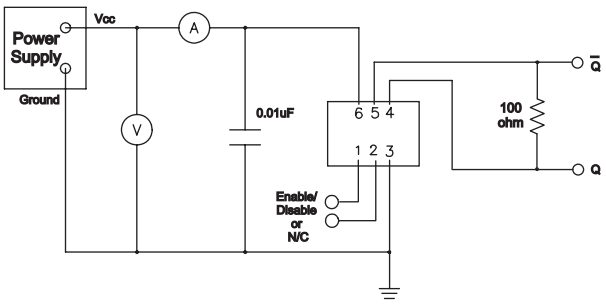
Model Matrix

Table 9.0

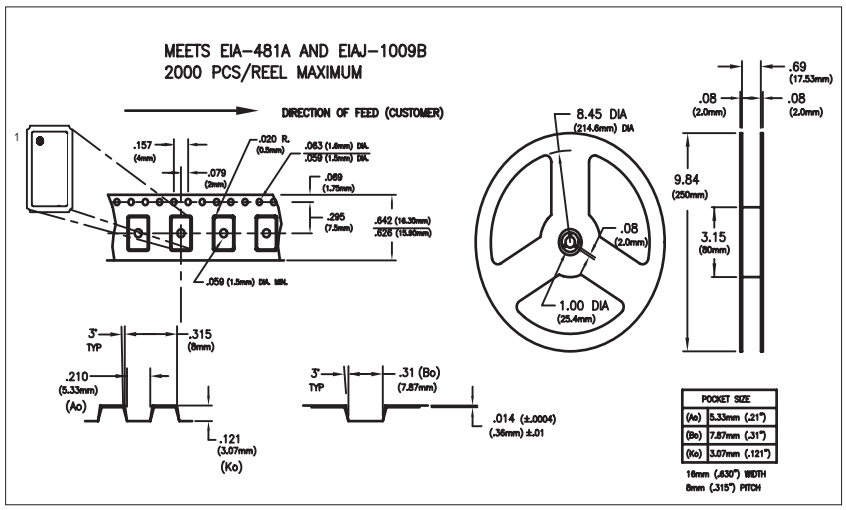
Frequency Tolerance ±20ppm	Frequency Tolerance ±25ppm	Frequency Tolerance ±50ppm	Frequency Tolerance ±100ppm	Supply Voltage	Temperature Range
LM142	**LM112**	**LM122**	**LM132**	2.5Vdc	0 to 70°C
LM442	**LM412**	**LM422**	**LM432**	2.5Vdc	-20 to 70°C
LM342	**LM312**	**LM322**	**LM332**	2.5Vdc	0 to 85°C
x	**x**	**LM222**	**LM232**	2.5Vdc	-40 to 85°C
LM143	**LM113**	**LM123**	**LM133**	3.3Vdc	0 to 70°C
LM443	**LM413**	**LM423**	**LM433**	3.3Vdc	-20 to 70°C
LM343	**LM313**	**LM323**	**LM333**	3.3Vdc	0 to 85°C
x	**x**	**LM223**	**LM233**	3.3Vdc	-40 to 85°C

X = Models LM212, LM213, LM242 and LM243 are not currently available.

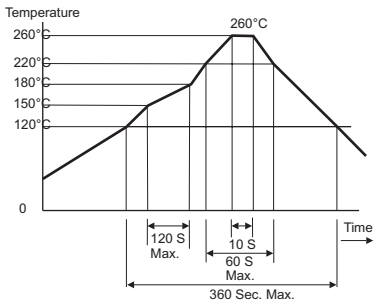
Test Circuit



Tape and Reel Specifications



Solder Profile



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