Available at Digi-Key**
www.digikey.com

OCXO Specification OX914xS3 Series

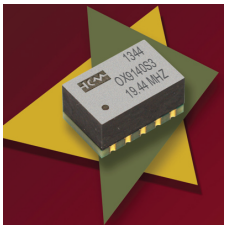
CONNOR WINFIELD

2111 Comprehensive Drive
Aurora, Illinois 60505
Phone: 630-851-4722
Fax: 630-851-5040
www.conwin.com

US Headquarters:
630-851-4722
European Headquarters:
+353-61-472221

Description:

Connor-Winfield model series OX914xS3 is a 3.3 Vdc, Oven Compensated Crystal Oscillator (OCXO) in a 9x14 mm SMT package. The OX914xS3 series is a low cost, high performance OCXO that meets STRATUM 3 requirements.



Features:

- 3.3 Vdc Operation
- SMT Package
- Frequency Stability: +/-140 ppb
- Temperature Ranges Available: 0 to 70°C; -20 to 70°C; -40 to 85°C
- LVCMOS Output Logic
- Tape and Reel Packaging
- RoHS Compliant / Lead Free

Absolute Maximum Ratings

Parameter	Minimum	Nominal	Maximum	Units	Notes
Storage Temperature	-55	-	85	°C	
Supply Voltage	-0.5	-	5.5	Vdc	
Operating Supply Voltage (Vcc)	3.135	3.30	3.465	Vdc	

Absolute Ratings: Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only. The functional operation of the device at those or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to conditions outside the "recommended operating conditions" for any extended period of time may adversely impact device reliability and result in failures not covered by warranty.

Operating Specifications

Parameter	Minimum	Nominal	Maximum	Units	Notes
Frequencies Available: (Fo)		10, 12.8,13, 19.2, 19.44, 20, 26		MHz	
Freq. Calibration @ 25°C	-1.0	-	1.0	ppm	1
Freq. Stability vs. Temperature	-140	-	140	ppb	2
Daily Aging	-40	-	40	pbb	3
Holdover Stability:	-320	-	320	ppb	4
MTIE	-	-	1E-6		5
Aging per Year	-300	-	300	ppb	3
Freq. Stability vs. Supply Voltage	-20	-	20	ppb	(+/-5%)
Freq. Stability vs. Load Change	-10	-	10	ppb	(+/-10%)
Short Term Stability	-	-	1.0E-9/s		
Total Frequency Tolerance (20 Years)	-4.6	-	4.6	ppm	6
Operating Temperature Range:(See Ordering Information.)					
Models OX9140S3	0	-	70	°C	
Models OX9142S3	-20	-	70	°C	
Models OX9143S3	-40	-	85	°C	
Supply Voltage: (+/-5%) (Vcc)	3.135	3.30	3.465	Vdc	
Power Consumption: Turn On	-	-	3.00	W	
Power Consumption: Steady State	-	-	1.30	W	
Start-up Time	-	-	10	ms	
Warm Up Time (Within Specification @ 25°C)		-	60	s	
Warm Up Time (Within Specification @ -40 C)		-	90	s	

LVCMOS Output Characteristics

Parameter	Minimum	Nominal	Maximum	Units	Notes
Load	-	15	-	pF	7
Output Voltage: High (Voh)	2.7	-	-	Vdc	
Low (Vol)	-	-	0.3	Vdc	
Drive Current: High (Ioh)	-	-	-4	mA	
Low (Iol)	-	-	4	mA	
Duty Cycle at 50% of Vcc	45	50	55	%	
Rise / Fall Time: 10% to 90%	-	-	6.5	ns	
Phase Jitter (BW=12KHz to Fo/2)	-	0.5	1	ps rms	
Typical Phase Noise for Fo = 10.0 MHz					
SSB Phase Noise at 1Hz offset	-	-65	-	dBc/Hz	
SSB Phase Noise at 10Hz offset	-	-105	-	dBc/Hz	
SSB Phase Noise at 100Hz offset	-	-130	-	dBc/Hz	
SSB Phase Noise at 1KHz offset	-	-148	-	dBc/Hz	
SSB Phase Noise at 10KHz offset	-	-153	-	dBc/Hz	
SSB Phase Noise at 100KHz offset	-	-155	-	dBc/Hz	

Package Characteristics

OX914 Package Package consisting of a FR-4 substrate and Ryton-R-4 cover. Water Resistant package, non-hermetic seal. (Engineering Properties of Ryton R-4 Application Note AN2100)

RoHS COMPLIANT

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Fax: 630-851-5040
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Environmental Characteristics

Shock	500 G's 1ms, Halfsine, 3 shocks per direction, per MIL-STD 202G, Method 213B Test Condition D.
Sinusoidal Vibration	0.06" D.A. or 10G's Peak, 10 to 500 Hz, per MIL-STD-202G, Method 204D, Test Condition A.
Random Vibration	5.35 G's rms. 20 to 2000 Hz per MIL-STD-202G, Method 214,Test Condition 1A, 15 minutes each axis.
Moisture	10 cycles, 95% RH, Per MIL-STD-202G, Method 112.
Marking Permanency	Per MIL-STD-202G, Method 215J.
Solder Process Recommendations:	RoHS compliant, lead free. See solder profile on page 3.
In-line reflow:	Refer to recommended reflow pre-heat and reflow temperatures on page 6. Package material consist of Ryton R-4 high temperature cover with FR4 substrate. Component solder is Pb free high temperature eutectic alloy with a melting point of 221°C.|
In-line oven profile:	We recommend using KIC profiler or similar device placing one of the thermocouples on the device to insure that the internal package temperature does not exceed 221°C.
Removal of device:	If for any reason the device needs to be removed from the board, use a temperature controlled repair station with profile monitoring capabilities. Following a monitored profile will insure the device is properly pre-heated prior to relow. Refer to IPC 610E for inspection guidelines.
Recommended Cleaning Process:	(If required) Device is non-hermetic, water resistance with four weep holes, one in each corner to allow moisture to be removed during the drying cycle. We recommend in-line warm water wash with air knife and drying capabilities. If cleaner does not have drying capability, then use hot air circulated oven. Boards should be placed in the oven vertically for good water runoff **Device must be dried properly prior to use!**
	Note: If saponifier is used make sure the device is rinsed properly to insure all residues are removed. PH of saponifier should not exceed 10.
Drying Temperature:	Between 85 to 100°C.
Drying Time:	Time will vary depending on the board size.

Caution: Do not submerge the device!

Notes:

1. *Initial calibration @ 25°C.*
2. *Frequency stability vs. change in temperature. [±(Fmax - Fmin)/(2*Fo)].*
3. *After 30 days of operation.*
4. *Peak to peak frequency stability vs. change in temperature, frequency stability vs. change in voltage, frequency stability vs. change in load and aging over a 24 hour period.*
5. *0.16 seconds < Observed time < 64 seconds at a constant temperature with 1 hour warm-up.*
6. *Inclusive of calibration @ 25°C, frequency vs. change in temperature, change in supply voltage (±5%), load change (±10%), shock and vibration and 20 years aging*
7. *Attention: To achieve optimal frequency stability, and in some cases to meet the specification stated on this data sheet, it is required that the circuit connected to this OCXO output must have the equivalent input capacitance that is specified by the nominal load capacitance. Deviations from the nominal load capacitance will have a graduated effect on the stability of approximately 20 ppb per pF load difference.*

Ordering Information

** Not all options available at Digi-Key

OX914	0	S3	-019.44M
Oscillator Type OX914xxx - OCXO 9x14mm Package	Temperature Range 0 = 0 to 70°C 2 = -20 to 70°C 3 = -40 to 85°C	STRATUM 3 S3	Output Frequency Frequency Format -xxx.xM Min.* -xxx.xxxxxxM Max*

Example Part Number:
OX9140S3-019.44M = OCXO, 9x14mm package, 0 to 70°C, STRATUM 3, 19.44 MHz

*Amount of numbers after the decimal point. M = MHz



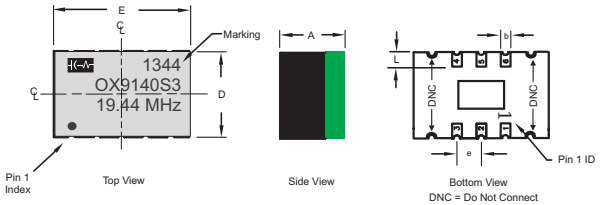
Attention: System Designers please review Application Note AN2093:
System Design Information and Printed Circuit Board Layout Guidelines for OCXO Oscillators.
@ www.conwin.com/technologies.html

Specifications subject to change without notification. See Connor-Winfield's website for latest revision. All dimensions in inches.
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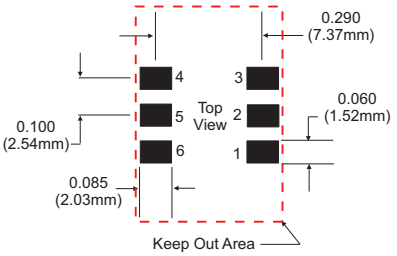
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Package Outline



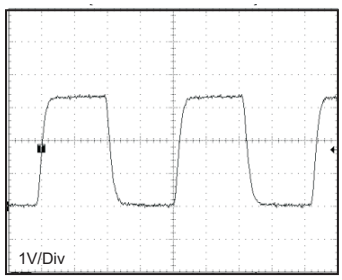
	mm			inches		
Symbol	Min	Nom.	Max.	Min	Nom.	Max.
A	-	-	7.92	-	-	0.312
D	8.89	9.02	9.15	0.350	0.355	0.360
E	13.34	13.47	13.60	0.545	0.550	0.555
A1	-	2.36	-	-	0.093	-
L	-	1.52	-	-	0.060	-
b	-	1.02	-	-	0.040	-
e	-	2.54	-	-	0.100	-

Suggested Pad Layout

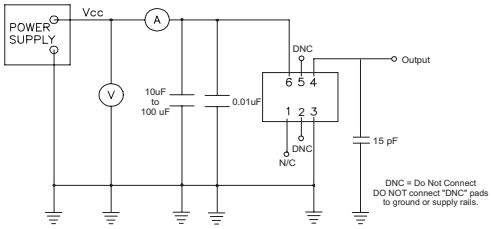


Keep Out Area Note: Do not route any traces under the device in the keep out area.

CMOS Output Waveform



Test Circuit

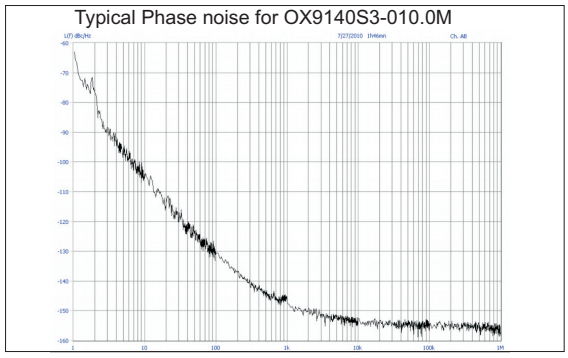


Pad Connections

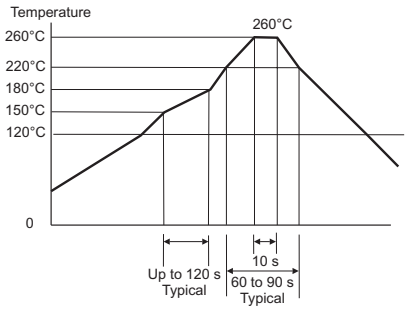
1: N/C
2: Do Not Connect
3 Ground:
4: Output
5: Do Not Connect
6: Supply Voltage (Vcc)

*DO NOT connect "DNC" pads to ground or supply rails.

Phase Noise Plot



Solder Profile



Meets IPC/JEDEC J-STD-020C

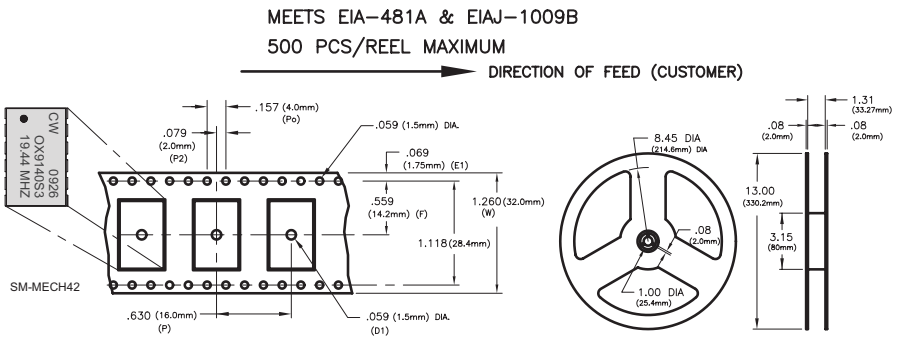
Bulletin	**Cx181**
Page	**3 of 4**
Revision	**05**
Date	**17 Sep 2013**

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Tape and Reel Information



Revision History

Revision	Date	Description
00	09/22/10	Data sheet released
01	01/20/11	Added tape and reel information to the data sheet
02	04/22/11	Added frequency stability note and Recommended Cleaning Process
03	05/25/11	Updated specifications
04	05/07/13	Updated Environmental Characteristics
05	09/17/13	Updated package drawing and suggested layout to IPC

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