

# 3.3V Surface Mount 7.5x5mm Crystal Clock Oscillator HSM9

# CONNOR WINFIELD



**XO**

## Features:

- 1.0 to 170 MHz
- 3.3V Operation
- RoHS Compliant
- Tri-State Enable/Disable
- Power Saving Function: 10uA When Disabled
- Overall Frequency Tolerance:
  - HSM943 ± 20 ppm, HSM913 ± 25 ppm
  - HSM923 ± 50 ppm, HSM933 ± 100 ppm
- Temperature Range: -10 to 70°C
- Ceramic Surface Mount Package
- Tape and Reel Packaging

The Connor-Winfield HSM943, HSM933, HSM923, and HSM913 are 7.5mm x 5mm, 3.3V LVC MOS, Surface Mount, Fixed Frequency Crystal Oscillators (XO) designed for use in all applications requiring precision clocks. The RoHS compliant surface mount package is designed for high-density mounting and is optimum for mass production

## Absolute Maximum Ratings

Parameter	Minimum	Nominal	Maximum	Units	Notes
Storage Temperature	-55	-	125	°C	
Supply Voltage (Vcc)	-0.5	-	5.0	Vdc	

## Operating Specifications

Parameter	Minimum	Nominal	Maximum	Units	Notes
Frequency Range (Fo)	1.0	-	125 & 155.52	MHz	
HSM943			170		
HSM913			170		
HSM923			170		
HSM933			170		
Frequency Tolerance	-	-	-	ppm	1
HSM943	-20		20		
HSM913	-25		25		
HSM923	-50		50		
HSM933	-100		100		
Operating Temp Range	-10	-	70	°C	
Supply Voltage (Vdd)	2.97	3.3	3.63	Vdc	
Supply Current (Icc)	-	-	-	mA	
1.544 to 31.999 MHz			15		
32 to 49.999 MHz			20		
50 to 66.999 MHz			25		
67 to 124.999 MHz			40		
125 to 170 MHz			50		

## Input Characteristics

Parameter	Minimum	Nominal	Maximum	Units	Notes
Enable Voltage - (Vih)	≥ 70% Vdd	-	-	Vdc	2
Disable Voltage - (Vil)	-	-	≤ 30% Vdd	Vdc	
Enable Time	-	-	10	mS	
Disable Time	-	-	150	nS	
Output Disable Current (Icc)	-	-	10	uA	

## LVC MOS Output Characteristics

Parameter	Minimum	Nominal	Maximum	Units	Notes
Load	-	15	-	pF	
Voltage High (Voh)	2.91	-	-	Vdc	
Voltage Low (Vol)	-	-	0.33		
Current High (Ioh)	-4	-	-	mA	
Current Low (Iol)	-	-	4		
Duty Cycle at 50% of Vcc	45	50	55	%	
Rise / Fall Time: 20% to 80%					
1.544 to 19.999 MHz	-	3.0	6.0	ns	
20.00 to 49.999 MHz	-	2.0	4.0	ns	
50.00 to 99.9999 MHz	-	1.5	3.0	ns	
100.00 to 170 MHz	-	0.5	1.0	ns	
Start-Up Time	-	-	10	ms	
Jitter (10 Hz to 20 MHz)	-	-	5	ps RMS	
(12 kHz to 20 MHz)	-	-	1	ps RMS	

### Notes:

1. Inclusive of calibration @ 25°C, frequency vs temperature stability, supply voltage change, load change, shock and vibration, 15 years aging.
2. Oscillator output is enabled with no connection on pad 1

2111 Comprehensive Drive

Aurora, Illinois 60505

Phone: 630-851-4722

Fax: 630-851-5040

[www.conwin.com](http://www.conwin.com)

US Headquarters:

630-851-4722

European Headquarters:

+353-61-472221



Bulletin **Sm007**

Page **1 of 2**

Revision **32**

Date **10 Aug 2016**

## Package Characteristics

Package Hermetically sealed ceramic package and metal cover

## Environmental Characteristics

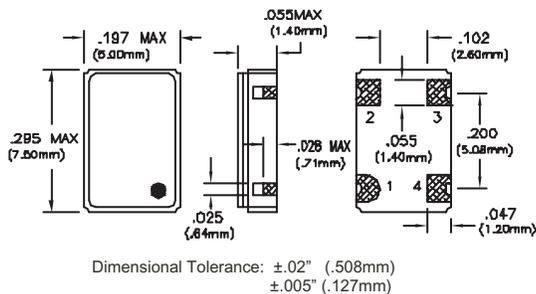
Temperature Cycle The specimen shall meet electrical characteristics after tested 5 cycles of -55°C / 30 minutes and +125°C / 30 minutes  
Hermetical No bubbles appear in Flourinert (FC-43) at 125°C ±5°C for 5 minutes  
Solvent Resistance Marking will withstand immersion in Isopropyl Alcohol or Trichloroethylene

## Soldering

General Conditions 260°C max x 10 sec max x 2 times max or 230°C max x 180 sec max x 1 time  
Typical Operation Data (Vapor phase reflow) 20 to 100 sec up to 215°C, 50 sec at 215°C, then down to room temperature per 1 to 5°C / sec

## Mechanical Characteristics

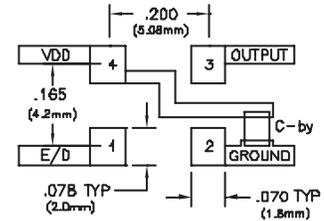
Free Drop The specimen shall meet electrical characteristics after tested 3 times, Free Drop testing on the hard wooden board from a height of 75 cm.  
Vibration The specimen shall meet electrical characteristics after tested by the following conditions: 10-55Hz 1.5mm Amplitude, 55-2000 Hz 20 G's, 2 hours for each plane  
Thermal Shock After applied Thermal Shock of 260°C max x 10 sec max x 2 times, or 230°C max x 180 sec max, the specimen shall meet electrical characteristics  
Solderability (EIAJ-RCX-0102.101 Condition 1a)  
1) Flux: MIL-F-14256 (WW Rosin=25%, Isopropyl Alcohol = 75%)  
2) Solder: QQ-S-571 (Sn = 63%, Pb = 37%)  
3) Solder bath temperature: 235°C ±5°C  
4) Depth of immersion: Up to electrical terminal  
5) Immersing time: Within 2 sec ±0.5 sec into solder bath  
After performing the above procedures, a newly soldered coverage shall be greater than 90%



## Pin Connections

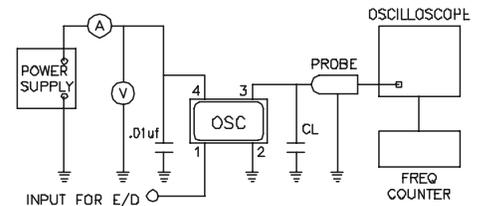
- 1: Tri-State E/D
- 2: Ground
- 3: Output
- 4: VDD

## Suggested Pad Layout

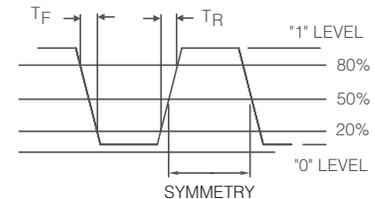


Bypass capacitor, C-by, should be ceramic capacitor ≥ .01uf.

## Test Circuit



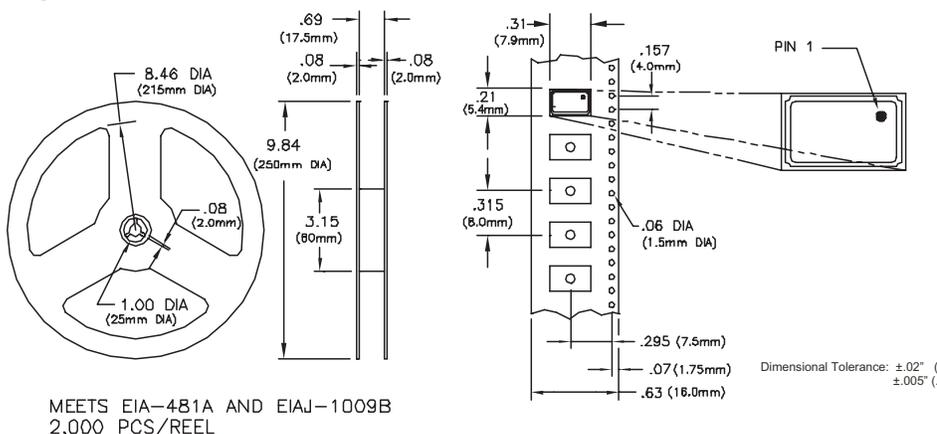
## Output Waveform



## Marking Information

Part Number	Marking
HSM913	HSM913XX
HSM923	HSM923XX
HSM933	HSM933XX
HSM943	HSM943XX
	XX = Date Code

## Tape and Reel Dimensions



MEETS EIA-481A AND EIAJ-1009B  
2,000 PCS/REEL

## Ordering Information

HSM943 - 012.288M

CLOCK SERIES CENTER FREQUENCY

Bulletin	Sm007
Page	2 of 2
Revision	32
Date	10 Aug 2016