



2.0x1.6mm Auto Grade Oscillator

O1HA DATASHEET

AEC Q200 Qualified
 IATF-16949 QMS
 Stabilities to ± 25 PPM
 Temperature Ranges as wide as -40°C to $+125^{\circ}\text{C}$
 Supply Voltages: 1.8V; 2.5V; 3.3V; 1.7V~3.63V

1.8V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1.250 ~ 60.000MHz
Storage Temperature Range (T_{STG})	$-55 \sim +150^{\circ}\text{C}$
Supply Voltage (V_{DD})	1.8V $\pm 5\%$
Input Current (I_{DD})	
1.250 ~ <10.000MHz	3 mA
10.000 ~ <32.000MHz	5 mA
32.000 ~ 60.000MHz	10 mA
Standby Current	
$T_{OPR} = -40 \sim +85^{\circ}\text{C}$	10 μA
$T_{OPR} = -40 \sim +105^{\circ}\text{C} / -40 \sim +125^{\circ}\text{C}$	20 μA
Output Symmetry (50% V_{DD})	45% ~ 55%
Rise Time (10%~90% V_{DD})	5 nS
Fall Time (90%~10% V_{DD})	5 nS
Output Voltage (V_{OL})	10% V_{DD}
(V_{OH})	90% V_{DD} Min
Output Load (HCMOS)	15 pF
Start-up Time (T_s)	10 mS
Output Disable Time ¹	200 nS
Output Enable Time ¹	10 mS
Aging (per year @ 25C)	± 5 PPM

ENABLE / DISABLE FUNCTION

Pin1	Output (pin 3)
OPEN ¹	Active
'1' Level $V_{IH} \geq 70\%V_{DD}$	Active
'0' Level $V_{IL} \leq 30\%V_{DD}$	High Z

• Available Options by Stability & Operating Temp for 1.8V²

Frequency Stability	Operating Temperature ($^{\circ}\text{C}$)	Frequency Range (MHz)
± 100 PPM	$-40 \sim +85$	1.250 ~ 60.000
± 100 PPM	$-40 \sim +105$	1.250 ~ 60.000
± 100 PPM	$-40 \sim +125$	1.250 ~ 60.000
± 50 PPM	$-40 \sim +85$	1.250 ~ 60.000
± 50 PPM	$-40 \sim +105$	1.250 ~ 60.000
± 50 PPM	$-40 \sim +125$	1.250 ~ 60.000
± 25 PPM	$-40 \sim +85$	1.250 ~ 60.000

¹ An internal pull-up resistor from pin 1 to pin 4 allows active output if pin 1 is left open

² Inclusive of 25 $^{\circ}\text{C}$ tolerance and operating temperature range.

7/29/2020 Updated termination finish and MSL info

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Title / Description: O1HA SERIES STANDARD SPECIFICATIONS

Drawing Number: O1HA-DOC-1

Part Number:

Draftsperson: BEC

Revision: C

Cage: 61429

Approved: MAJ

Revision Date: 07/29/2020



2.5V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F _o)	1.250 ~ 60.000MHz
Storage Temperature Range (T _{STG})	-55 ~ +150°C
Supply Voltage (V _{DD})	2.5V±5%
Input Current (I _{DD})	
1.250 ~ <10.000MHz	6 mA
10.000 ~ <32.000MHz	8 mA
32.000 ~ 60.000MHz	20 mA
Standby Current	
T _{OPR} = -40 ~ +85°C	10 µA
T _{OPR} = -40 ~ +105°C / -40 ~ +125°C	20 µA
Output Symmetry (50% V _{DD})	45% ~ 55%
Rise Time (10%~90% V _{DD})	5 nS
Fall Time (90%~10% V _{DD})	5 nS
Output Voltage (V _{OL})	10% V _{DD}
(V _{OH})	90% V _{DD} Min
Output Load (HCMOS)	15 pF
Start-up Time (T _s)	10 mS
Output Disable Time ¹	200 nS
Output Enable Time ¹	10 mS
Aging (per year @ 25C)	±5 PPM

ENABLE / DISABLE FUNCTION

Pin1	Output (pin 3)
OPEN ¹	Active
'1' Level V _{IH} ≥ 70%V _{DD}	Active
'0' Level V _{IL} ≤ 30%V _{DD}	High Z

• Available Options by Stability & Operating Temp for 2.5V²

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM	-40 ~ +85	1.250 ~ 60.000
±100PPM	-40 ~ +105	1.250 ~ 60.000
±100PPM	-40 ~ +125	1.250 ~ 60.000
±50PPM	-40 ~ +85	1.250 ~ 60.000
±50PPM	-40 ~ +105	1.250 ~ 60.000
±50PPM	-40 ~ +125	1.250 ~ 60.000
±25PPM	-40 ~ +85	1.250 ~ 60.000

¹ An internal pull-up resistor from pin 1 to pin 4 allows active output if pin 1 is left open

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3.3V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F _o)	1.250 ~ 60.000MHz
Storage Temperature Range (T _{STG})	-55 ~ +150°C
Supply Voltage (V _{DD})	3.3V±10%
Input Current (I _{DD})	
1.250 ~ <20.000MHz	7 mA
20.000 ~ <32.000MHz	12 mA
32.000 ~ 50.000MHz	20 mA
>50.000 ~ 60.000MHz	25 mA
Standby Current	
T _{OPR} = -40 ~ +85°C	10 µA
T _{OPR} = -40 ~ +105°C / -40 ~ +125°C	20 µA
Output Symmetry (50% V _{DD})	45% ~ 55%
Rise Time (10%~90% V _{DD})	5 nS
Fall Time (90%~10% V _{DD})	5 nS
Output Voltage (V _{OL})	10% V _{DD}
(V _{OH})	90% V _{DD} Min
Output Load (HCMOS)	15 pF
Start-up Time (T _s)	10 mS
Output Disable Time ¹	200 nS
Output Enable Time ¹	10 mS
Aging (per year @ 25C)	±5 PPM

ENABLE / DISABLE FUNCTION

Pin1	Output (pin 3)
OPEN ¹	Active
'1' Level V _{IH} ≥ 70%V _{DD}	Active
'0' Level V _{IL} ≤ 30%V _{DD}	High Z

• Available Options by Stability & Operating Temp for 3.3V²

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM	-40 ~ +85	1.250 ~ 60.000
±100PPM	-40 ~ +105	1.250 ~ 60.000
±100PPM	-40 ~ +125	1.250 ~ 60.000
±50PPM	-40 ~ +85	1.250 ~ 60.000
±50PPM	-40 ~ +105	1.250 ~ 60.000
±50PPM	-40 ~ +125	1.250 ~ 60.000
±25PPM	-40 ~ +85	1.250 ~ 60.000

¹ An internal pull-up resistor from pin 1 to pin 4 allows active output if pin 1 is left open

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**VARIABLE VOLTAGE ELECTRICAL CHARACTERISTICS**

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F ₀)	1.25 ~ 135 MHz
Storage Temperature Range (T _{STG})	-55 ~ +125°C
Supply Voltage (V _{DD})	1.7V ~ 3.63V
Input Current (I _{DD})	
1.25 ~ 19.999MHz	4 mA
20.0 ~ 39.999MHz	6 mA
40.0 ~ 59.999MHz	10 mA
60.0 ~ 80MHz	15 mA
>80.0 ~ 135.0MHz	30 mA
Standby Current	
T _{OPR} = -40 ~ +85°C	10 μA
T _{OPR} = -40 ~ +105°C / -40 ~ +125°C	20 μA
Output Symmetry (50% V _{DD})	
1.25 ~ 80MHz	45% ~ 55%
>80.0 ~ 135MHz	40% ~ 60%
Rise/Fall Time (10%/90% V _{DD} Levels) (T _R /T _F)	6 nS
Output Voltage (V _{OL})	10% V _{DD}
(V _{OH})	90% V _{DD} Min
Output Load (HCMOS)	15 pF
Start-up Time (T _S)	5 mS
Output Disable Time ¹	200 nS
Output Enable Time ¹	5 mS
Aging (per year @ 25C)	±5 PPM

ENABLE / DISABLE FUNCTION

Pin1	Output (pin 3)
OPEN ¹	Active
'1' Level V _{IH} ≥ 70%V _{DD}	Active
'0' Level V _{IL} ≤ 30%V _{DD}	High Z

• Available Options by Stability & Operating Temp²

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM	-40 ~ +85	1.250 ~ 135.000
±100PPM	-40 ~ +105	1.250 ~ 135.000
±100PPM	-40 ~ +125	1.250 ~ 135.000
±50PPM	-40 ~ +85	1.250 ~ 135.000
±50PPM	-40 ~ +105	1.250 ~ 135.000
±50PPM	-40 ~ +125	1.250 ~ 135.000
±25PPM	-40 ~ +85	1.250 ~ 135.000

¹ An internal pull-up resistor from pin 1 to pin 4 allows active output if pin 1 is left open² Inclusive of 25°C tolerance and operating temperature range.

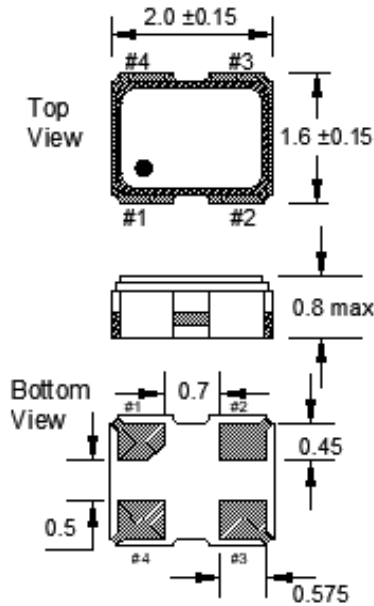
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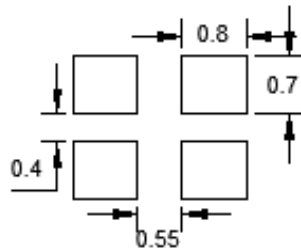
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DIMENSIONS / MECHANICAL SPECIFICATIONS



Recommended Solder Pad Layout



Dimensions are in millimeters.

Pin Connections

#1 E/D #3 Output
#2 GND #4 V_{DD}

Maximum Soldering Temp / Time	260°C / 10 Seconds x 2
Moisture Sensitivity Level (MSL) per J-STD-033	N/A
Termination Finish	Au (0.3~1µm) over Ni (1.27~8.89µm)
Seal Method	Seam
Lead (Pb) Free	Yes
RoHS Compliant	Yes, no exemptions
REACH Compliant (latest version)	Yes

Notes:

*A 0.01µF capacitor should be placed between V_{DD} (Pin 4) and GND (Pin2) to minimize power supply line noise.

*Dimensional drawing is for reference to critical specifications defined by size measurements.

Certain non-critical visual attributes, such as side castellations, reference pin shape, etc. may vary

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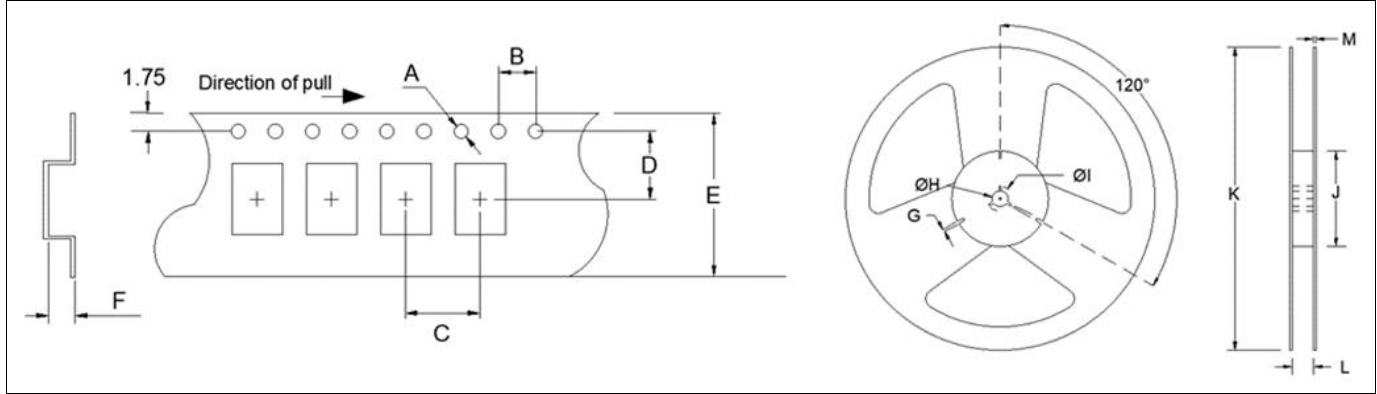
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Tape Specifications (millimeters)							Reel Specifications (millimeters)						
A	B	C	D	E	F	Reel Qty	G	H	I	J	K	L	M
Ø1.5	4.0	4.0	3.5	8.0	1.15	-T3 = 3,000 -T2 = 2,000 -T1 = 1,000	2.0	Ø13	Ø21	Ø60	Ø180	9.0	1.7



Available Options & Part Identification*

Example: F O1HA C B P 25.0

F	O1HA	C	B	P	25.0
Fox	Model Number	Voltage	Stability	Operating Temperature	Frequency (MHz)
		K = 1.8V±5% H = 2.5V±5% C = 3.3V±10% V = 1.7V ~ 3.63V	A = ±100PPM B = ±50PPM D = ±25PPM	M = -40 to +85°C P = -40 to +105°C I = -40 to +125°C	

*Not all frequencies in the frequency range, nor every combination of stability, temp range, and voltage available. See stabilities and op temps for each VDD.



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