



3.2x2.5mm Auto Grade Oscillator

O3HA
(former FA3xx Series)
DATASHEET

- AEC Q200 Qualified
- IATF-16949 QMS
- Temperature Ranges to -40°C to +125°C
- Supply Voltages: 1.8V; 2.5V; 3.3V; 1.6V~3.63V

1.8V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F _O)	1.25 ~ 60.000 MHz
Storage Temperature Range (T _{STG})	-55 ~ +150°C
Supply Voltage (V _{DD})	1.8V±5%
Input Current (I _{DD})	
1.250 ~ 9.999999MHz	3mA
10.000 ~ 31.999999MHz	5mA
32.000 ~ 60.000MHz	10mA
Standby Current	
T _{OPR} = -40 ~ +85°C	10µA
T _{OPR} = -40 ~ +105°C / -40 ~ +125°C	20µA
Output Symmetry (50% V _{DD})	45% ~ 55%
Rise Time (10%~90% V _{DD})	5nS
Fall Time (90%~10% V _{DD})	5nS
Output Voltage (V _{OL})	10% V _{DD}
(V _{OH})	90% V _{DD} Min
Output Load (HCMOS)	15pF
Start-up Time (T _S)	10mS
Output Disable Time ¹	200nS
Output Enable Time ¹	10mS
Aging (per year @ 25C)	±5PPM

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

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-40 ~ +85	1.25 ~ 60.000
±100PPM ²	-40 ~ +105	1.25 ~ 60.000
±100PPM ²	-40 ~ +125	1.25 ~ 60.000
±50PPM ²	-40 ~ +85	1.25 ~ 60.000
±50PPM ²	-40 ~ +105	1.25 ~ 60.000
±50PPM ³	-40 ~ +125	1.25 ~ 60.000
±25PPM ³	-40 ~ +85	1.25 ~ 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°C tolerance, operating temperature range, input voltage change, load change, shock, vibration, reflow, and one-year aging.

³ Inclusive of 25°C tolerance and operating temperature range.

7/29/2020 Updated termination finish and MSL info.
11/11/2020 – Corrected variable voltage

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Title / Description: O3HA SERIES STANDARD SPECIFICATIONS

Drawing Number: O3HA-DOC-1

Revision: D

Part Number:

Cage: 61429

Draftsperson: BEC

Approved: MAJ

Revision Date: 11/11/2020



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2.5V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1.25 ~ 60.000MHz
Storage Temperature Range (T_{STG})	-55 ~ +150°C
Supply Voltage (V_{DD})	2.5V±5%
Input Current (I_{DD})	
1.250 ~ 9.999999MHz	6mA
10.000 ~ 31.999999MHz	8mA
32.000 ~ 60.000MHz	20mA
Standby Current	
$T_{OPR} = -40 \sim +85^\circ\text{C}$	10µA
$T_{OPR} = -40 \sim +105^\circ\text{C} / -40 \sim +125^\circ\text{C}$	20µA
Output Symmetry (50% V_{DD})	45% ~ 55%
Rise Time (10%~90% V_{DD})	5nS
Fall Time (90%~10% V_{DD})	5nS
Output Voltage (V_{OL})	10% V_{DD}
(V_{OH})	90% V_{DD} Min
Output Load (HCMOS)	15pF
Start-up Time (T_s)	10mS
Output Disable Time ¹	200nS
Output Enable Time ¹	10mS
Aging (per year @ 25C)	±5PPM

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

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-40 ~ +85	1.25 ~ 60.000
±100PPM ²	-40 ~ +105	1.25 ~ 60.000
±100PPM ²	-40 ~ +125	1.25 ~ 60.000
±50PPM ²	-40 ~ +85	1.25 ~ 60.000
±50PPM ²	-40 ~ +105	1.25 ~ 60.000
±50PPM ³	-40 ~ +125	1.25 ~ 60.000
±25PPM ³	-40 ~ +85	1.25 ~ 60.000

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3.3V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1.25 ~ 160.000 MHz
Storage Temperature Range (T_{STG})	-55 ~ +150°C
Supply Voltage (V_{DD})	3.3V±10%
Input Current (I_{DD})	
1.25 ~ 19.999999MHz	7mA
20.000 ~ 31.999999MHz	12mA
32.000 ~ 50.000MHz	20mA
50.000001 ~ 60.000MHz	25mA
60.000001 ~ 160.000MHz	35mA
Standby Current	
$T_{OPR} = -40 \sim +85^{\circ}\text{C}$	10μA
$T_{OPR} = -40 \sim +105^{\circ}\text{C} / -40 \sim +125^{\circ}\text{C}$	
1.25~134.999999 MHz	20μA
135 ~160 MHz	100μA
Output Symmetry (50% V_{DD})	45% ~ 55%
Rise Time (10%~90% V_{DD})	5nS
Fall Time (90%~10% V_{DD})	5nS
Output Voltage (V_{OL})	10% V_{DD}
(V_{OH})	90% V_{DD} Min
Output Load (HCMOS)	15pF
Start-up Time (T_s)	10mS
Output Disable Time ¹	200nS
Output Enable Time ¹	10mS
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

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-40 ~ +85	1.25 ~ 160.000
±100PPM ²	-40 ~ +105	1.25 ~ 160.000
±100PPM ²	-40 ~ +125	1.25 ~ 133.333
±50PPM ²	-40 ~ +85	1.25 ~ 160.000
±50PPM ²	-40 ~ +105	1.25 ~ 160.000
±50PPM ³	-40 ~ +125	1.25 ~ 133.333
±25PPM ³	-40 ~ +85	1.25 ~ 60.000

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1.6V~3.63V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1.25 ~ 135MHz
Storage Temperature Range (T_{STG})	-55 ~ +150°C
Supply Voltage (V_{DD})	1.6V~3.63V
Input Current (I_{DD})	
2.000 ~ 19.999999MHz	4 mA
20.000 ~ 39.999999MHz	6 mA
40.000 ~ 59.999999MHz	10 mA
60.000 ~ 80.000MHz	15 mA
80.000001 ~ 135MHz	30 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

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
$\pm 100\text{PPM}^2$	-40 ~ +85	1.25 ~ 135.0
$\pm 100\text{PPM}^2$	-40 ~ +105	1.25 ~ 135.0
$\pm 100\text{PPM}^2$	-40 ~ +125	1.25 ~ 135.0
$\pm 50\text{PPM}^2$	-40 ~ +85	1.25 ~ 135.0
$\pm 50\text{PPM}^2$	-40 ~ +105	1.25 ~ 135.0
$\pm 50\text{PPM}^3$	-40 ~ +125	1.25 ~ 135.0
$\pm 25\text{PPM}^3$	-40 ~ +85	1.25 ~ 135.0

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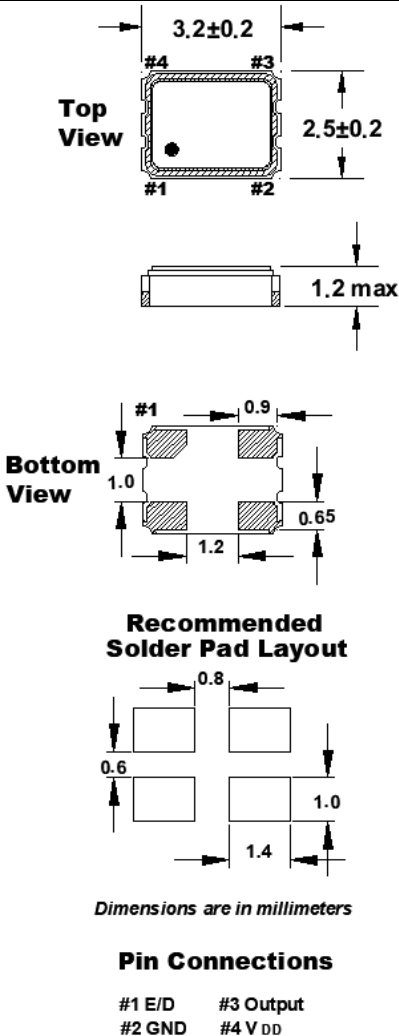
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DIMENSIONS / MECHANICAL SPECIFICATIONS



Maximum Soldering Temp / Time	260°C / 10 Seconds x2
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	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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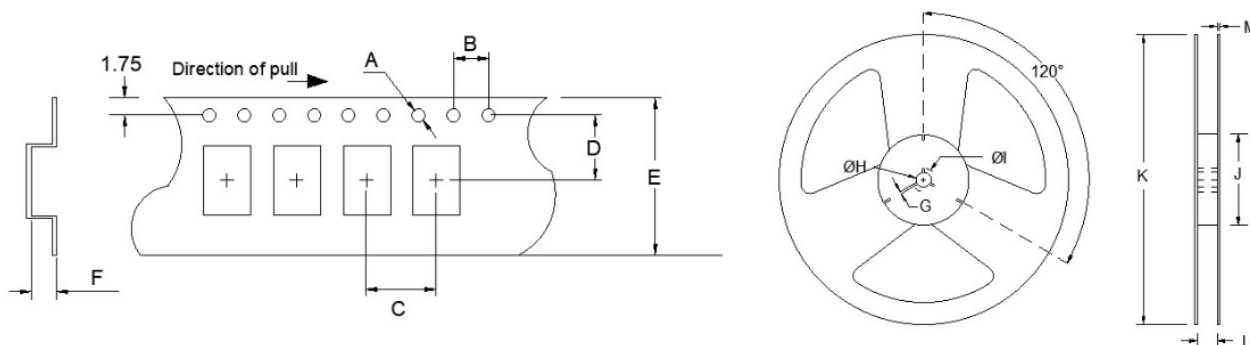
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Tape Specifications (millimeters)							Reel Specifications (millimeters)						
A	B	C	D	E	F	Reel Qty	G	H	I	J	K	L	M
Ø1.5	4.0	4.0	3.5	8.0	1.4	-T3 = 1,000 -T2 = 2,000 -t3 = 3,000	2.0	Ø13	Ø21	Ø60	Ø180	9.0	1.2



Available Options & Part Identification*

Example: **F O3HA C B P 25.0**

F	O3HA	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 = 1.6V ~ 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 V_{DD}.



Corporate Headquarters

5570 Enterprise Parkway
Fort Myers, FL 33905
<http://www.FOXONLINE.com>

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1-888-GET-2-FOX (1-888-438-2369)
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