

### Features

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

ENABLE / DISABLE FUNCTION	
Pin <sup>1</sup>	Output (pin 3)
OPEN <sup>1</sup>	Active
'1' Level V <sub>IH</sub> ≥ 70%V <sub>DD</sub>	Active
'0' Level V <sub>IL</sub> ≤ 30%V <sub>DD</sub>	High Z

Available Options by Stability & Operating Temp		
Frequency Stability <sup>2</sup>	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM	-40 ~ +85	1.25 ~ 60.000
±100PPM	-40 ~ +105	1.25 ~ 60.000
±100PPM	-40 ~ +125	1.25 ~ 60.000
±50PPM	-40 ~ +85	1.25 ~ 60.000
±50PPM	-40 ~ +105	1.25 ~ 60.000
±50PPM <sup>3</sup>	-40 ~ +125	1.25 ~ 60.000
±25PPM <sup>3</sup>	-40 ~ +85	1.25 ~ 60.000

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

<sup>2</sup> Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, Vibration, reflow, and one-year aging, shock, and vibration.

<sup>3</sup> Inclusive of 25°C tolerance and operating temperature range.

2.5V ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range (F <sub>0</sub> )	1.25 ~ 60.000MHz
Storage Temperature Range (T <sub>STG</sub> )	-55°C ~ +150°C
Supply Voltage (V <sub>DD</sub> )	2.5V±5%
Input Current (I <sub>DD</sub> )	
1.250 ~ 9.999999MHz	6mA
10.000 ~ 31.999999MHz	8mA
32.000 ~ 60.000MHz	20mA
Standby Current	
T <sub>OPR</sub> = -40 ~ +85°C	10µA
T <sub>OPR</sub> = -40 ~ +105°C / -40 ~ +125°C	20µA
Output Symmetry (50% V <sub>DD</sub> )	45 % ~ 55 %
Rise Time (10%~90% V <sub>DD</sub> )	5nS
Fall Time (90%~10% V <sub>DD</sub> )	5nS
Output Voltage (V <sub>OL</sub> )	10 % V <sub>DD</sub>
(V <sub>OH</sub> )	90 % V <sub>DD</sub> Min
Output Load (HCMOS)	15pF
Start-up Time (T <sub>S</sub> )	10mS
Output Disable Time <sup>1</sup>	200nS
Output Enable Time <sup>1</sup>	10mS
Aging (per year @ 25°C)	±5PPM

ENABLE / DISABLE FUNCTION	
Pin <sup>1</sup>	Output (pin 3)
OPEN <sup>1</sup>	Active
'1' Level V <sub>IH</sub> ≥ 70%V <sub>DD</sub>	Active
'0' Level V <sub>IL</sub> ≤ 30%V <sub>DD</sub>	High Z

Available Options by Stability & Operating Temp		
Frequency Stability <sup>2</sup>	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM	-40 ~ +85	1.25 ~ 60.000
±100PPM	-40 ~ +105	1.25 ~ 60.000
±100PPM	-40 ~ +125	1.25 ~ 60.000
±50PPM	-40 ~ +85	1.25 ~ 60.000
±50PPM	-40 ~ +105	1.25 ~ 60.000
±50PPM <sup>3</sup>	-40 ~ +125	1.25 ~ 60.000
±25PPM <sup>3</sup>	-40 ~ +85	1.25 ~ 60.000

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

<sup>2</sup> Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, Shock, vibration, reflow, and one-year aging.

<sup>3</sup> Inclusive of 25°C tolerance and operating temperature range.

3.3V ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range (F <sub>0</sub> )	1.25 ~ 160.000 MHz
Storage Temperature Range (T <sub>STG</sub> )	-55°C ~ +150°C
Supply Voltage (V <sub>DD</sub> )	3.3V±10%
Input Current (I <sub>DD</sub> )	
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 <sub>OPR</sub> = -40 ~ +85°C	10 μA
T <sub>OPR</sub> = -40 ~ +105°C / -40 ~ +125°C	
1.25~134.999999 MHz	20μA
135 ~160 MHz	100μA
Output Symmetry (50% V <sub>DD</sub> )	45 % ~ 55 %
Rise Time (10%~90% V <sub>DD</sub> )	5nS
Fall Time (90%~10% V <sub>DD</sub> )	5nS
Output Voltage (V <sub>OL</sub> )	10 % V <sub>DD</sub>
(V <sub>OH</sub> )	90 % V <sub>DD</sub> Min
Output Load (HCMOS)	15pF
Start-up Time (T <sub>S</sub> )	10mS
Output Disable Time <sup>1</sup>	200nS
Output Enable Time <sup>1</sup>	10mS
Aging (per year @ 25°C)	±5 PPM

ENABLE / DISABLE FUNCTION	
Pin <sup>1</sup>	Output (pin 3)
OPEN <sup>1</sup>	Active
'1' Level V <sub>IH</sub> ≥ 70%V <sub>DD</sub>	Active
'0' Level V <sub>IL</sub> ≤ 30%V <sub>DD</sub>	High Z

Available Options by Stability & Operating Temp		
Frequency Stability <sup>2</sup>	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM	-40 ~ +85	1.25 ~ 160.000
±100PPM	-40 ~ +105	1.25 ~ 160.000
±100PPM	-40 ~ +125	1.25 ~ 160.000
±100PPM	-40 ~ +85	1.25 ~ 160.000
±50PPM	-40 ~ +105	1.25 ~ 160.000
±50PPM <sup>3</sup>	-40 ~ +125	1.25 ~ 133.333
±25PPM <sup>3</sup>	-40 ~ +85	1.25 ~ 160.000

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

<sup>2</sup> Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, reflow, One-year aging, shock, and vibration.

<sup>3</sup> Inclusive of 25°C tolerance, operating temperature rang

1.6V~3.63V ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range (F <sub>0</sub> )	1.25 ~ 135MHz
Storage Temperature Range (T <sub>STG</sub> )	-55°C ~ +150°C
Supply Voltage (V <sub>DD</sub> )	1.6V±3.63V
Input Current (I <sub>DD</sub> )	
2.000 ~ 19.999999MHz	4mA
20.000 ~ 39.999999MHz	6mA
40.000 ~ 59.999999MHz	10mA
60.000 ~ 80.000MHz	15mA
80.000001 ~ 135MHz	30mA
Standby Current	
T <sub>OPR</sub> = -40 ~ +85°C	10 μA
T <sub>OPR</sub> = -40 ~ +105°C / -40 ~ +125°C	20μA
Output Symmetry (50% V <sub>DD</sub> )	45 % ~ 55 %
Rise Time (10%~90% V <sub>DD</sub> )	5nS
Fall Time (90%~10% V <sub>DD</sub> )	5nS
Output Voltage (V <sub>OL</sub> )	10 % V <sub>DD</sub>
(V <sub>OH</sub> )	90 % V <sub>DD</sub> Min
Output Load (HCMOS)	15pF
Start-up Time (T <sub>S</sub> )	10mS
Output Disable Time <sup>1</sup>	200nS
Output Enable Time <sup>1</sup>	10mS
Aging (per year @ 25°C)	±5 PPM

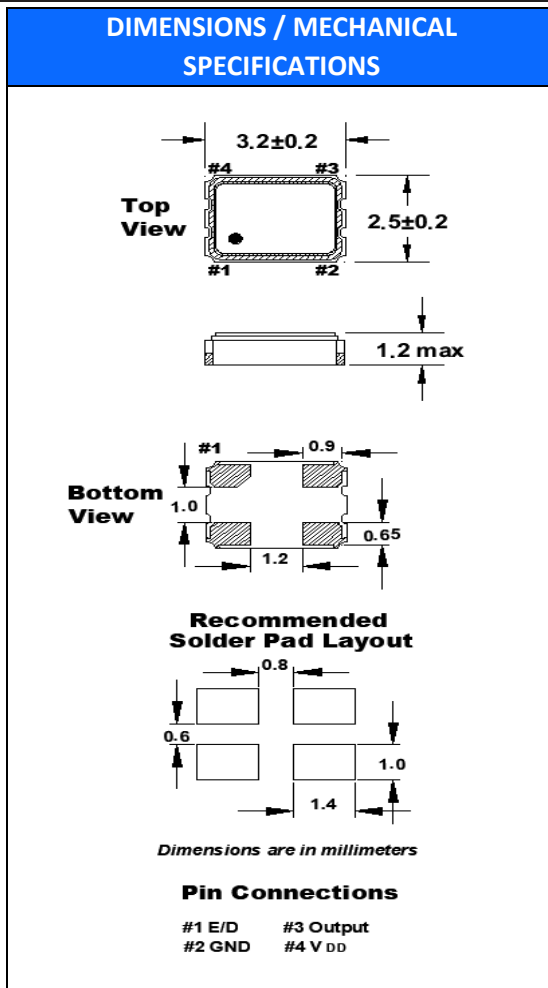
ENABLE / DISABLE FUNCTION	
Pin <sup>1</sup>	Output (pin 3)
OPEN <sup>1</sup>	Active
'1' Level V <sub>IH</sub> ≥ 70%V <sub>DD</sub>	Active
'0' Level V <sub>IL</sub> ≤ 30%V <sub>DD</sub>	High Z

Available Options by Stability & Operating Temp		
Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM <sup>2</sup>	-40 ~ +85	1.25 ~ 135.000
±100PPM <sup>2</sup>	-40 ~ +105	1.25 ~ 135.000
±100PPM <sup>2</sup>	-40 ~ +125	1.25 ~ 135.000
±100PPM <sup>2</sup>	-40 ~ +85	1.25 ~ 135.000
±50PPM <sup>2</sup>	-40 ~ +105	1.25 ~ 135.000
±50PPM <sup>3</sup>	-40 ~ +125	1.25 ~ 135.000
±25PPM <sup>3</sup>	-40 ~ +85	1.25 ~ 135.000

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

<sup>2</sup> Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, Reflow, one-year aging, shock, and vibration.

<sup>3</sup> Inclusive of 25°C tolerance, operating temperature range.



Note:

- \*A 0.01μF capacitor should be placed between VDD (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

STANDARD SPECIFICATIONS	
PARAMETERS	MAX (Unless otherwise noted)
Maximum Soldering Temp / Time	260°C / 10 Seconds x 2
Moisture Sensitivity Level (MSL) per J-STD-033	1
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

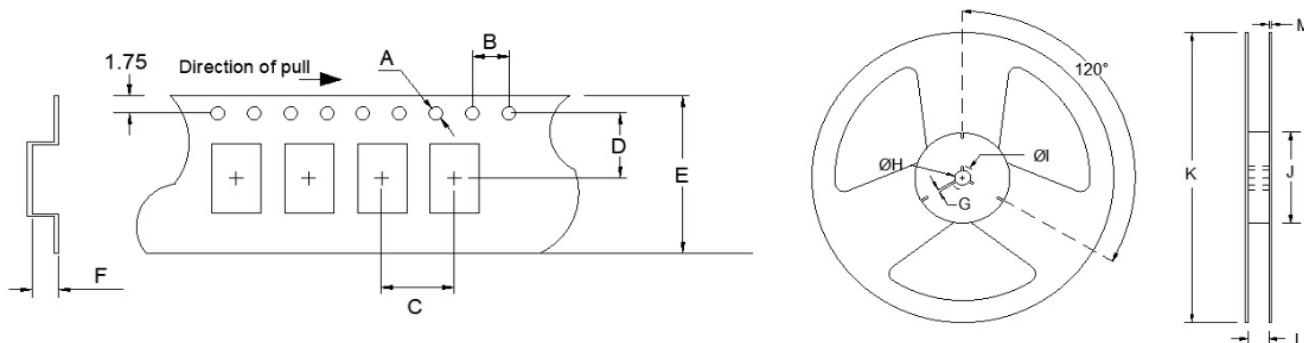
# FO3HA

(Former FA3xx Series)

3.2mm x 2.5mm  
Auto Grade Oscillator



TAPE SPECIFICATIONS (mm)							REEL SPECIFICATIONS (mm)						
A	B	C	D	E	F	REEL QTY	G	H	I	J	K	L	M
∅1.5	4.0	4.0	3.5	8.0	1.4	-T1 = 1,000 -T2 = 2,000 -T3 = 3,000	2.0	∅13	∅21	∅60	∅180	9.0	1.2



## Available Options & Part Identification for Auto Grade Oscillator O3HA\*

Sample PN: FO3HACBP25.0-T3

F	O3HA	C	B	P	25.0	-T3
<b>Fox</b>	<b>Model Number</b>	<b>Voltage</b> K = 1.8V±5% H = 2.5V±5% <b>C = 3.3V±10%</b> V = 1.6V ~ 3.63V	<b>Stability</b> A = ±100PPM <b>B = ±50PPM</b> D = ±25PPM	<b>Operating Temperature</b> M = -40 to +85°C <b>P = -40 to +105°C</b> I = -40 to +125°C	<b>Frequency (MHz)</b>	<b>Values Added Options</b> Blank = Bulk T1 = 1,000 pcs T2 = 2,000 pcs <b>T3 = 3,000 pcs</b>

\* Not all frequencies in the frequency range, or every combination of stability, temp range, and voltage available. See stabilities and op temps for each V<sub>DD</sub>.

### Reliability Test Conditions

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