FO2HA

(Former FA200)

2.5mm x 2.0mm
Auto Grade Oscillator

Features

- AEC Q200 Qualified
- IATF-16949 QMS
- Stabilities to ±25 PPM
- Temperature Ranges as wide as -40°C to +125°C
- Supply Voltages: 1.8V, 2.5V, 3.3V; 1.6V ~ 3.63V

1.0V ELECTRICAL CHARACTERISTICS	
PARAMETERS	**MAX (Unless otherwise noted)**
Frequency Range	1.250 ~ 60.000 MHz
Temperature Range Storage (T_{STG})	 -55°C ~ +125°C
Supply Voltage (V_{DD})	1.8V±5%
Input Current (I_{DD}) 1.250 ~ <10.000MHz 10.000 ~ <32.000 MHz 32.000 ~ 60.000 MHz	 3 mA 5 mA 10 mA
Standby Current T_{OPR} = -40 ~ +85°C T_{OPR} = -40 ~ +105°C / -40 ~ +125°C	 10µA 20µA
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}) (V_{OH})	10 % V_{DD} 90 % V_{DD} Min
Output Load (HCMOS)	15 pF
Start-up Time (T_S)	10 mS
Output Disable Time [1]	200 µS
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 1.8V[2]		
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

[2] Inclusive of 25°C tolerance and operating temperature range.

2.5V ELECTRICAL CHARACTERISTICS	
PARAMETERS	**MAX (Unless otherwise noted)**
Frequency Range (F_D)	1.250 ~ 60.000 MHz
Temperature Range Storage (T_{STG})	 -55°C ~ +150°C
Supply Voltage (V_{DD})	2.5V±5%
Input Current (I_{DD}) 1.250 ~ <10.000 MHz 10.000 ~ <32.000 MHz 32.000 ~ 60.000 MHz	 6 mA 8 mA 20 mA
Standby Current T_{OPR}= -40 ~ +85°C T_{OPR}= -40 ~ +105°C / -40 ~ +125°C	 10µA 20µA
Output Symmetry (50% V_{DD})	45 % ~ 55 %
RiseTime (10%~90% VDD)	5 nS
Fall Time (90%~10% VDD)	5 nS
Output Voltage (V_{OL}) (V_{OH})	10 % V_{DD} 90 % V_{DD} Min
Output Load (HCMOS)	15 pF
Start-up Time (T_S)	10 mS
Output Disable Time [1]	200 µS
Output Enable Time [1]	10 mS
Aging (per year @ 25˚C)	±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 2.5V[2]		
Frequency Stability[2]	**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

[2] Inclusive of 25°C tolerance and operating temperature range.

3.3V ELECTRICAL CHARACTERISTICS	
PARAMETERS	**MAX (Unless otherwise noted)**
Frequency Range (F_O)	1.250 ~ 160.000MHz
Temperature Range Storage (T_{STG})	 -55°C ~ +150°C
Supply Voltage (V_{DD})	3.3V±5%
Input Current (I_{DD}) 1.250 ~ <20.000MHz 20.000 ~ <32.000 MHz 32.000 ~ 50.000 MHz >50.000 ~ 60.000 MHz >60.000 ~ 160.000 MHz	 7 mA 12 mA 20 mA 25 Ma 35 mA
Standby Current T_{OPR}= -40 ~ +85°C T_{OPR}= -40 ~ +105°C / -40 ~ +125°C 1.25 ~ <135.000 MHz 135.000 ~160.000 MHz	 10µA 20µA 100 µA
Output Symmetry (50% V_{DD})	45 % ~ 55 %
Rise Time (10%/90% V_{DD}) 1.250 ~ <20.000 MHz 20.000 ~ 160.000 MHz	 6 nS 5 nS
Fall Time (90%/10% V_{DD}) 1.250 ~ <20.000 MHz 20.000 ~ 160.000 MHz	 6 nS 5 nS
Output Voltage (V_{OL}) (V_{OH})	10 % V_{DD} 90 % V_{DD} Min
Output Current (I_{OL}) (I_{OH})	2 mA Min -2 mA 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 @ 25˚C)	±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 3.3V[2]		
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
[2] Inclusive of 25°C tolerance and operating temperature range.

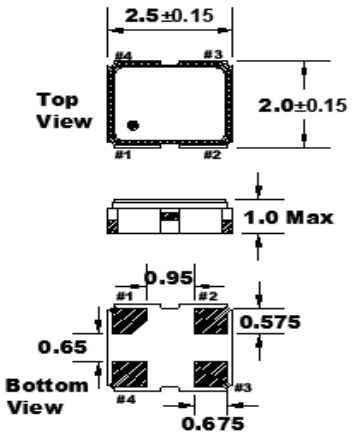
VARIABLE VOLTAGE ELECTRICAL CHARACTERISTICS	
PARAMETERS	**MAX (Unless otherwise noted)**
Frequency Range (F_O)	1.25 ~ 135 MHz
Temperature Range Storage (T_{STG})	 -55°C ~ +125°C
Supply Voltage (V_{DD})	1.6V ~ 3.63V
Input Current (I_{DD}) 1.25 ~ 19.999MHz 20.0 ~ 39.999MHz 40.0 ~ 59.999MHz 60.0 ~ 70MHz >70.0 ~ 135.0MHz	 4 mA 6 mA 10 mA 15 mA 30 mA
Standby Current T_{OPR}= -40 ~ +85°C T_{OPR}= -40 ~ +105°C / -40 ~ +125°C	 10 µA 20 µA
Output Symmetry (50% V_{DD}) 1.25 ~ 70MHz >70.0 ~ 135 MHz	 45 % ~ 55 % 40 % ~ 60 %
Rise/Fall Time (10%/90% V_{DD} Levels) (T_R/T_F)	6 nS
Output Voltage (V_{OL}) (V_{OH})	10 % V_{DD} 90 % V_{DD} Min
Output Load (HCMOS)	15 pF
Start-up Time (T_S)	5 mS
Output Disable Time [1]	200nS
Output Enable Time [1]	5 mS
Aging (per year @ 25˚C)	±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

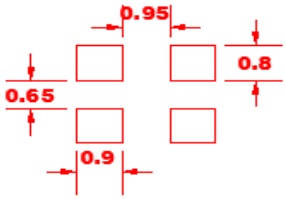
Available Options by Stability & Operating Temp[2]		
Frequency Stability	**Operating Temperature (°C)**	**Frequency Range (MHz)**
±100PPM	-40 ~ +85	1.250 ~ 135.000
±100PPM	-40 ~ +105	1.250 ~ 135.000
±100PPM	-40 ~ +125	1.250 ~ 135.000
±50PPM	-40 ~ +85	1.250 ~ 135.000
±50PPM	-40 ~ +105	1.250 ~ 135.000
±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 open
[2] Inclusive of 25°C tolerance and operating temperature range.

DIMENSIONS / MECHANICAL SPECIFICATIONS



Recommended Solder Pad Layout



All dimensions are in millimeters.

Pin Connections

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

Note:
1, A 0.01µF capacitor should be placed between V_{DD} (Pin 4) and G_{ND} (Pin2) to minimize power supply line noise.
2, Dimensional drawing is for reference to critical specifications defined by size measurements. Certain non-critical visual attributes, such as side castellation's, etc. may vary.

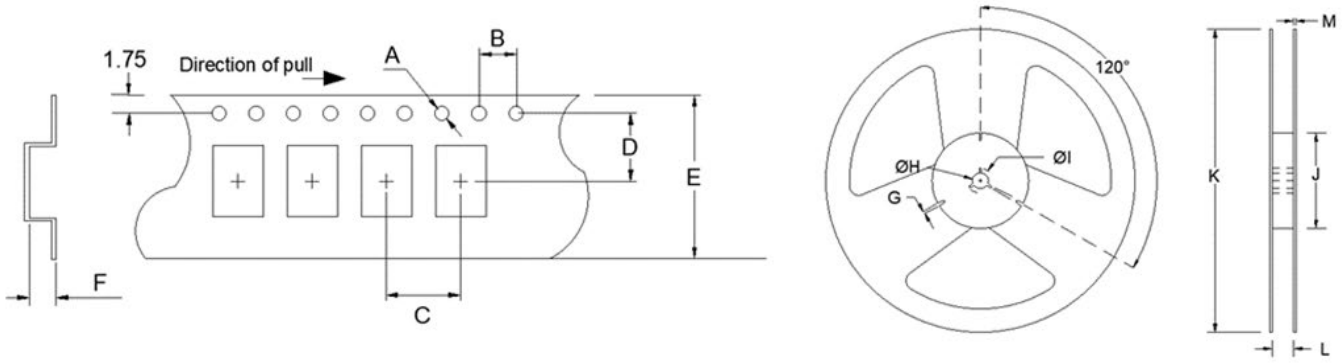
STANDARD SPECIFICATIONS	
PARAMETERS	**MAX (Unless otherwise noted)**
Maximum Soldering Temp / Time	260°C / 10 Seconds x 2
Moisture Sensitivity Level (MSL)	N/A
Termination Finish	Au (0.3~1µm) over Ni (1.27~8.89µm)
Seal Method	Seam
Lead (Pb) Free	Yes
RoHS Compliant	Yes, no exemptions
REACH Compliant (latest version)	Yes

FO2HA

(Former FA200)

2.5mm x 2.0mm
Auto Grade Oscillator

TAPE SPECIFICATIONS (mm)							REEL SPECIFICATIONS (mm)						
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	2.0



Available Options & Part Identification*						
Sample PN: **FO2HACBP25.0-T3**						
F	**O2HA**	**C**	**B**	**P**	**25.0**	**-T3**
Fox	**Model Number**	**Voltage** K = 1.8V±5% H = 2.5V±5% **C = 3.3V±10%** V = 1.6V ~ 3.63V	**Stability** A = ±100 PPM **B = ±50 PPM** D = ±25 PPM	**Operating Temperature** M = -40 to +85°C **P = 40 to +105°C** I = -40 to +125°C	**Frequency (MHz)**	**Values Added Options** Blank = Bulk T1 = 1,000 pcs T2 = 2,000 pcs **T3 = 3,000 pcs**

* 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_{DD}.

Reliability Test Conditions
Please contact Abracon Quality Assurance department