

Features

- 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; 1.6V ~ 3.63V

1.0V ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range	1.250 ~ 60.000 MHz
Temperature Range	
Storage (T_{STG})	$-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
Supply Voltage (V_{DD})	$1.8\text{V} \pm 5\%$
Input Current (I_{DD})	
1.250 ~ <10.000MHz	3 mA
10.000 ~ <32.000 MHz	5 mA
32.000 ~ 60.000 MHz	10 mA
Standby Current	
$T_{\text{OPR}} = -40 \sim +85^{\circ}\text{C}$	$10\mu\text{A}$
$T_{\text{OPR}} = -40 \sim +105^{\circ}\text{C} / -40 \sim +125^{\circ}\text{C}$	$20\mu\text{A}$
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 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 $V_{\text{IH}} \geq 70\%V_{\text{DD}}$	Active
'0' Level $V_{\text{IL}} \leq 30\%V_{\text{DD}}$	High Z

Available Options by Stability & Operating Temp for 1.8V ²		
Frequency Stability	Operating Temperature ($^{\circ}\text{C}$)	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-40 \sim +85$	1.250 ~ 60.000
$\pm 100\text{PPM}$	$-40 \sim +105$	1.250 ~ 60.000
$\pm 100\text{PPM}$	$-40 \sim +125$	1.250 ~ 60.000
$\pm 50\text{PPM}$	$-40 \sim +85$	1.250 ~ 60.000
$\pm 50\text{PPM}$	$-40 \sim +105$	1.250 ~ 60.000
$\pm 50\text{PPM}$	$-40 \sim +125$	1.250 ~ 60.000
$\pm 25\text{PPM}$	$-40 \sim +85$	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°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	6 mA
10.000 ~ <32.000 MHz	8 mA
32.000 ~ 60.000 MHz	20 mA
Standby Current	
T_{OPR} = -40 ~ +85°C	10µA
T_{OPR} = -40 ~ +105°C / -40 ~ +125°C	20µA
Output Symmetry (50% V_{DD})	45 % ~ 55 %
RiseTime (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 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 (Fo)	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	7 mA
20.000 ~ <32.000 MHz	12 mA
32.000 ~ 50.000 MHz	20 mA
>50.000 ~ 60.000 MHz	25 Ma
>60.000 ~ 160.000 MHz	35 mA
Standby Current	
T _{OPR} = -40 ~ +85°C	10µA
T _{OPR} = -40 ~ +105°C / -40 ~ +125°C	
1.25 ~ <135.000 MHz	20µA
135.000 ~ 160.000 MHz	100 µA
Output Symmetry (50% V _{DD})	45 % ~ 55 %
Rise Time (10%/90% V _{DD})	
1.250 ~ <20.000 MHz	6 nS
20.000 ~ 160.000 MHz	5 nS
Fall Time (90%/10% V _{DD})	
1.250 ~ <20.000 MHz	6 nS
20.000 ~ 160.000 MHz	5 nS
Output Voltage (V _{OL})	10 % V _{DD}
(V _{OH})	90 % V _{DD} Min
Output Current (I _{OL})	2 mA Min
(I _{OH})	-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} ≥ 70%V _{DD}	Active
'0' Level V _{IL} ≤ 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	4 mA
20.0 ~ 39.999MHz	6 mA
40.0 ~ 59.999MHz	10 mA
60.0 ~ 70MHz	15 mA
>70.0 ~ 135.0MHz	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})	
1.25 ~ 70MHz	45 % ~ 55 %
>70.0 ~ 135 MHz	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	200nS
Output Enable Time ¹	5 mS
Aging (per year @ 25°C)	±5 PPM

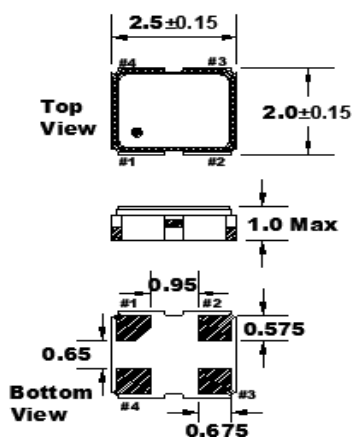
ENABLE / DISABLE FUNCTION	
Pin1	Output (pin 3)
OPEN ¹	Active
'1' Level $V_{IH} \geq 70\%V_{DD}$	Active
'0' Level $V_{IL} \leq 30\%V_{DD}$	High Z

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

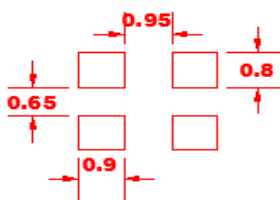
¹ An internal pull-up resistor from pin 1 to pin 4 allows active output if pin 1 is left open

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}

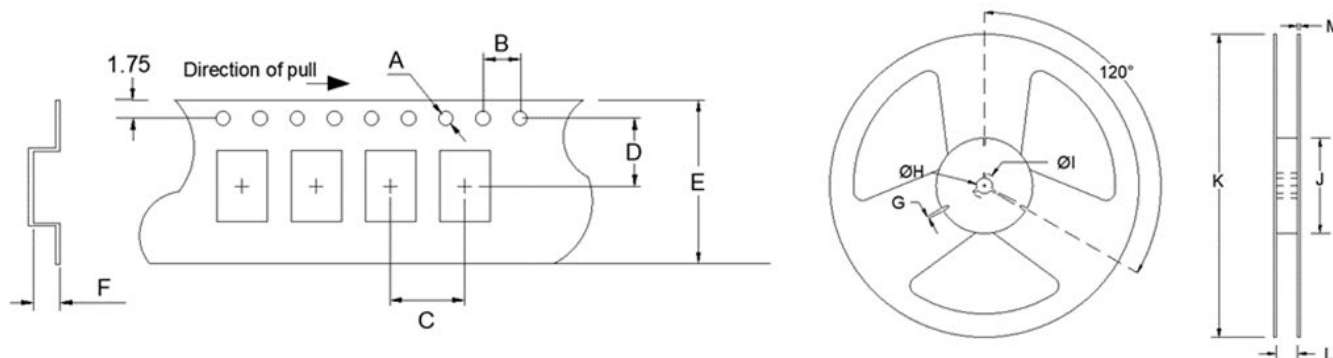
Note:

- 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 castellations, 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

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

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[FO2HACBM12.0-T3](#) [FO2HACAI25.0-T3](#) [FO2HACBM25.0-T3](#) [FO2HACAI25.0-T1](#) [FO2HAVBM14.7456-T1](#)
[FO2HAVBM14.7456-T3](#) [FO2HAVBM24.0-T1](#) [FO2HAVBM24.0-T3](#) [FO2HAVBM16.6666-T1](#)