

### Features

- HCMOS Output
- Stabilities to  $\pm 20$  PPM
- Temperature Ranges as wide as  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Supply Voltages: 1.8V, 2.5V, 3.3V, Variable (1.6V ~ 3.63V; 2.25V~3.63V)

1.8V ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range ( $F_o$ )	1.25 ~ 133.0 MHz
Temperature Range Storage ( $T_{STG}$ )	$-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	1.8V $\pm$ 5%
Input Current ( $I_{DD}$ )	
1.25 ~ 10.0MHz	2.5 mA
>10.0 ~ 20.0MHz	3.5 mA
>20.0 ~ 30.0MHz	4.0 mA
>30.0 ~ 40.0MHz	4.5 mA
>40.0 ~ 60.0MHz	6.0 mA
>60.0 ~ 100.0MHz	10.0 mA
>100.0 ~ 133.0MHz	20.0 mA
Standby Current	10 $\mu$ A
Output Symmetry (50% $V_{DD}$ )	
1.25 ~ 50.0 MHz	45 % ~ 55 %
>50.0 MHz	40% ~ 60%
Rise/Fall Time (10%/90% $V_{DD}$ Levels) ( $T_R/T_F$ )	10 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 <sup>1</sup>	10 $\mu$ S
Output Enable Time <sup>1</sup>	10 mS

ENABLE / DISABLE FUNCTION <sup>1</sup>	
Pin1	Output (pin 3)
OPEN <sup>1</sup>	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		
Frequency Stability	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}^2$	$-20 \sim +70$	1.25 ~ 133.0
$\pm 100\text{PPM}^2$	$-40 \sim +85$	1.25 ~ 133.0
$\pm 50\text{PPM}^2$	$-20 \sim +70$	1.25 ~ 133.0
$\pm 50\text{PPM}^2$	$-40 \sim +85$	1.25 ~ 133.0
$\pm 25\text{PPM}^2$	$-20 \sim +70$	1.25 ~ 133.0
$\pm 25\text{PPM}^3$	$-40 \sim +85$	1.25 ~ 133.0

<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  $25^{\circ}\text{C}$  tolerance, operating temperature range, input voltage change, load change, Reflow, one year aging, shock, and vibration.

<sup>3</sup> Inclusive of  $25^{\circ}\text{C}$  tolerance and operating temperature range.

2.5V ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range (F <sub>0</sub> )	1.25 ~ 170.0 MHz
Temperature Range	
Storage (T <sub>STG</sub> )	-55°C ~ +150°C
Supply Voltage (V <sub>DD</sub> )	2.5V±10%
Input Current (I <sub>DD</sub> )	
1.25 ~ 19.999999MHz	5 mA
20.0 ~ 39.999999MHz	9 mA
40.0 ~ 50.0MHz	11 mA
>50.0 ~ 170MHz	30 mA
Standby Current	10µA
Output Symmetry (50% V <sub>DD</sub> )	
1.25 ~ 50.0 MHz	45 % ~ 55 %
>50.0 MHz	40 % ~ 60 %
Rise/Fall Time (10%/90% V <sub>DD</sub> Levels) (T <sub>R</sub> /T <sub>F</sub> )	10nS
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>	200 nS
Output Enable Time <sup>1</sup>	10 mS

ENABLE / DISABLE FUNCTION <sup>1</sup>	
Pin1	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 for 2.5V		
Frequency Stability <sup>2</sup>	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM <sup>2</sup>	-20 ~ +70	1.25 ~ 170.0
±100PPM <sup>2</sup>	-40 ~ +85	1.25 ~ 170.0
±50PPM <sup>2</sup>	-20 ~ +70	1.25 ~ 170.0
±50PPM <sup>2</sup>	-40 ~ +85	1.25 ~ 170.0
±25PPM <sup>2</sup>	-20 ~ +70	1.25 ~ 170.0
±25PPM <sup>3</sup>	-40 ~ +85	1.25 ~ 170.0

<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 and operating temperature range.



3.3V ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range (F <sub>0</sub> )	1.25 ~ 170.0MHz
Temperature Range	
Storage (T <sub>STG</sub> )	-55°C ~ +125°C
Supply Voltage (V <sub>DD</sub> )	3.3V±5%
Input Current (I <sub>DD</sub> )	
1.25 ~ 19.999999MHz	7 mA
20.0 ~ 39.999999MHz	13 mA
40.0 ~ 50.0 MHz	19 mA
>50.0 ~ 170.0 MHz	40 mA
Standby Current	10µA
Output Symmetry (50% V <sub>DD</sub> )	
1.25 ~ 50.0 MHz	45% ~ 55%
>50.0 MHz	40% ~ 60%
Rise/Fall Time (10%/90% V <sub>DD</sub> Levels) (T <sub>R</sub> /T <sub>F</sub> )	10 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>	200 nS
Output Enable Time <sup>1</sup>	10 mS
Aging (per year @ 25°C)	±5 PPM

ENABLE / DISABLE FUNCTION	
Pin1	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 for 3.3V		
Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM <sup>2</sup>	-20 ~ +70	1.25 ~ 170.0
±100PPM <sup>2</sup>	-40 ~ +85	1.25 ~ 170.0
±50PPM <sup>2</sup>	-20 ~ +70	1.25 ~ 170.0
±50PPM <sup>2</sup>	-40 ~ +85	1.25 ~ 170.0
±25PPM <sup>2</sup>	-20 ~ +70	1.25 ~ 170.0
±25PPM <sup>3</sup>	-40 ~ +85	1.25 ~ 170.0

<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 and operating temperature range.

VARIABLE VOLTAGE ELECTRICAL CHARACTERISTICS	
PARAMETERS	MAX (Unless otherwise noted)
Frequency Range (F <sub>0</sub> )	0.75 ~ 156.25 MHz
Temperature Range	
Storage (T <sub>STG</sub> )	-55°C ~ +125°C
Supply Voltage (V <sub>DD</sub> )	
0.75 ~ 135. MHz	1.6V ~ 3.63V
>135.0 ~ 156.25MHz	2.25V ~ 3.63V
Input Current (I <sub>DD</sub> )	
0.75 ~ 19.999MHz	4 mA
20.0 ~ 39.999MHz	6 mA
40.0 ~ 59.999MHz	10 mA
60.0 ~ 84.999MHz	15 mA
85.0 ~ 135.0MHz	30 mA
>135.0 ~ 156.250MHz	40 mA
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> )	
0.75 ~ 80MHz	45 % ~ 55 %
80.0 ~ 135 MHz	40 % ~ 60 %
Rise/Fall Time (10%/90% V <sub>DD</sub> Levels) (T <sub>R</sub> /T <sub>F</sub> )	6 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> )	5 mS
Output Disable Time <sup>1</sup>	200nS
Output Enable Time <sup>1</sup>	5 mS

ENABLE / DISABLE FUNCTION	
Pin1	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

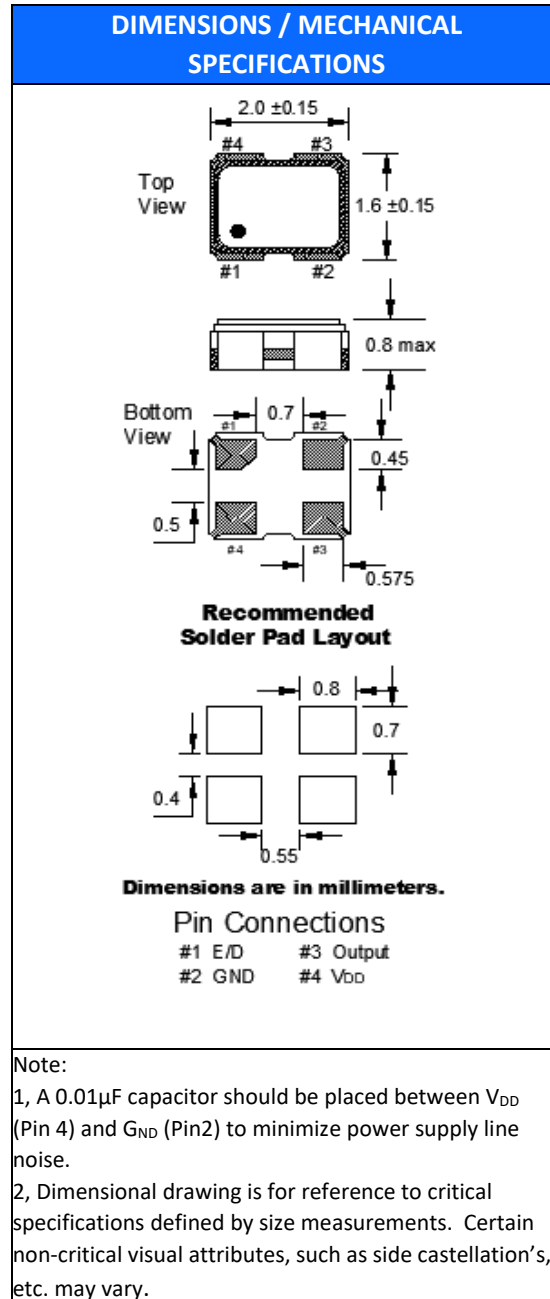


Available Options by Stability & Operating Temp For Variable Voltage		
Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM <sup>2</sup>	-20 ~ +70	0.75 ~ 156.25
±100PPM <sup>2</sup>	-40 ~ +85	0.75 ~ 156.25
±100PPM <sup>2</sup>	-40 ~ +105	1.25 ~ 135.0
±100PPM <sup>2</sup>	-40 ~ +125	1.25 ~ 135.0
±50PPM <sup>2</sup>	-20 ~ +70	0.75 ~ 156.25
±50PPM <sup>2</sup>	-40 ~ +85	0.75 ~ 156.25
±50PPM <sup>2</sup>	-40 ~ +105	1.25 ~ 135.0
±50PPM <sup>2</sup>	-40 ~ +125	1.25 ~ 135.0
±25PPM <sup>2</sup>	-20 ~ +70	0.75 ~ 156.25
±25PPM <sup>3</sup>	-40 ~ +85	0.75 ~ 156.25
±20PPM <sup>3</sup>	-20 ~ +70	0.75 ~ 156.25

<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>2</sup> Inclusive of 25°C tolerance and operating temperature range.



<b>STANDARD SPECIFICATIONS</b>	
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

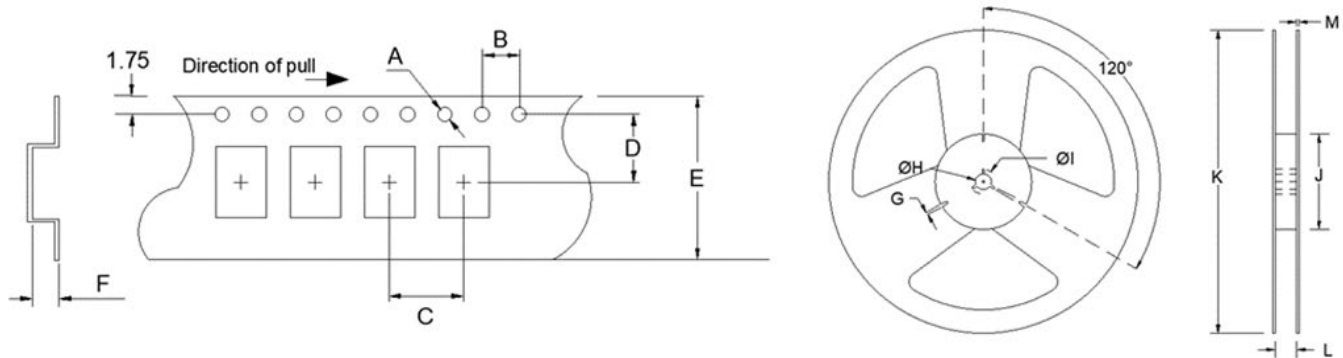
# FO1HS

(Former F110, F130, F140)

2.0mm x 1.6mm  
**HCMOS SMD Oscillator**



TAPE SPECIFICATIONS (mm)						REEL SPECIFICATIONS (mm)							
A	B	C	D	E	F	REEL QTY	G	H	I	J	K	L	M
ø1.55	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\*

Sample PN: **FO1HSCBM25.0-T3**

F	O1HS	C	B	M	25.0	-T3
<b>Fox</b>	<b>Model Number</b>	<b>Voltage</b> L = 1.8V±10% J = 2.5V±10% <b>C = 3.3V±10%</b> V = 1.6V to 3.63V W = 2.25V to 3.63V	<b>Stability</b> A = ±100 PPM <b>B = ±50 PPM</b> D = ±25 PPM E = ±20 PPM	<b>Operating Temperature</b> F = -20 to +70°C <b>M = -40 to +85°C</b> I = -40 to +125°C P = -40 to +105°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

Please contact Abracon Quality Assurance department