



HCMOS 2.0x1.6mm SMD Oscillator

O1HS

(former F110, F130, F140 Series)

DATASHEET

- HCMOS Output
- Stabilities to ± 20 PPM
- Temperature Ranges as wide as -40°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 ~ 133.0MHz
Storage Temperature Range (T_{STG})	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage (V_{DD})	1.8V $\pm 10\%$
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 μA
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})	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	10 μS
Output Enable Time ¹	10 mS

ENABLE / DISABLE FUNCTION ¹

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

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

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, reflow, one year aging, shock, and vibration.

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

7-29-2020- Updated Termination finish and MSL info
 11/11/2020 - Corrected variable voltage
 12/17/2020 - Added -40/105 and -40/125 to variable Vdd

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Title / Description: O1HS SERIES STANDARD SPECIFICATIONS

Drawing Number: O1HS-DOC-1

Revision: G

Part Number:

Cage: 61429

Draftsperson: BEC

Approved: MAJ

Revision Date: 12/17/2020



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2.5V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1.25 ~ 170.0MHz
Storage Temperature Range (T_{STG})	-55 ~ +125°C
Supply Voltage (V_{DD})	2.5V±10%
Input Current (I_{DD})	
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_{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)	10nS
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

ENABLE / DISABLE FUNCTION ¹

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

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-20 ~ +70	1.25 ~ 170.0
±100PPM ²	-40 ~ +85	1.25 ~ 170.0
±50PPM ²	-20 ~ +70	1.25 ~ 170.0
±50PPM ²	-40 ~ +85	1.25 ~ 170.0
±25PPM ²	-20 ~ +70	1.25 ~ 170.0
±25PPM ³	-40 ~ +85	1.25 ~ 170.0

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

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

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3.3V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1.25 ~ 170.0MHz
Storage Temperature Range (T_{STG})	-55 ~ +125°C
Supply Voltage (V_{DD})	3.3V±10%
Input Current (I_{DD})	
1.25 ~ 19.999999MHz	7 mA
20.0 ~ 39.999999MHz	13 mA
40.0 ~ 50.0MHz	19 mA
>50.0 ~ 170.0MHz	40 mA
Standby Current	10 μ 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})	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

ENABLE / DISABLE FUNCTION ¹

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

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-20 ~ +70	1.25 ~ 170.0
±100PPM ²	-40 ~ +85	1.25 ~ 170.0
±50PPM ²	-20 ~ +70	1.25 ~ 170.0
±50PPM ²	-40 ~ +85	1.25 ~ 170.0
±25PPM ²	-20 ~ +70	1.25 ~ 170.0
±25PPM ³	-40 ~ +85	1.25 ~ 170.0

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

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VARIABLE VOLTAGE ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F _o)	0.75 ~ 156.25MHz
Storage Temperature Range (T _{STG})	-55 ~ +125°C
Supply Voltage (V _{DD}) 0.75 ~ 135. MHz >135.0 ~ 156.25MHz	1.6V ~ 3.63V 2.25V ~ 3.63V
Input Current (I _{DD}) 0.75 ~ 19.999MHz 20.0 ~ 39.999MHz 40.0 ~ 59.999MHz 60.0 ~ 84.999MHz 85.0 ~ 135.0MHz >135.0 ~ 156.250MHz	4 mA 6 mA 10 mA 15 mA 30 mA 40 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}) 0.75 ~ 84.999MHz 85.0 ~ 156.25MHz	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	200 nS
Output Enable Time ¹	5 mS

ENABLE / DISABLE FUNCTION ¹

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 Variable Voltage

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-20 ~ +70	0.75 ~ 156.25
±100PPM ²	-40 ~ +85	0.75 ~ 156.25
±100PPM ²	-40 ~ +105	1.25 ~ 135.0
±100PPM ²	-40 ~ +125	1.25 ~ 135.0
±50PPM ²	-20 ~ +70	0.75 ~ 156.25
±50PPM ²	-40 ~ +85	0.75 ~ 156.25
±50PPM ²	-40 ~ +105	1.25 ~ 135.0
±50PPM ²	-40 ~ +125	1.25 ~ 135.0
±25PPM ²	-20 ~ +70	0.75 ~ 156.25
±25PPM ³	-40 ~ +85	0.75 ~ 156.25
±20PPM ³	-20 ~ +70	0.75 ~ 156.25

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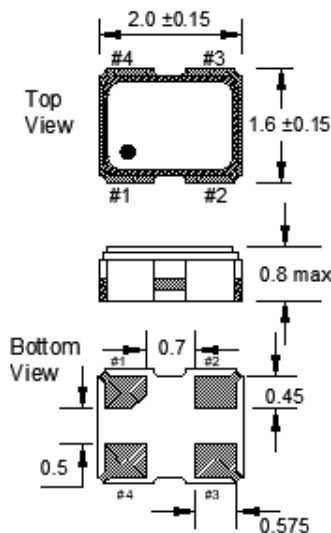
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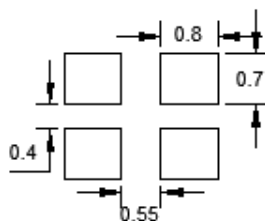
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DIMENSIONS / MECHANICAL SPECIFICATIONS



Recommended Solder Pad Layout



Dimensions are in millimeters.

Pin Connections

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

Maximum Soldering Temp / Time	260°C / 10 Seconds x 2
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 (latest version)	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.



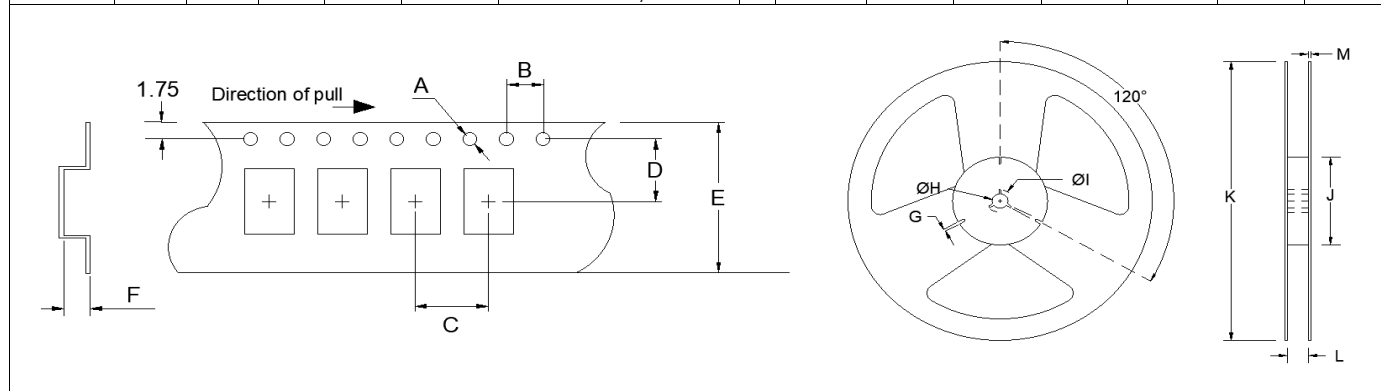
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Tape Specifications (millimeters)							Reel Specifications (millimeters)						
A	B	C	D	E	F	Reel Qty Options	G	H	I	J	K	L	M
Ø1.55	4.0	4.0	3.5	8.0	1.15	-T3 = 3,000 -T2 = 2,000 -T1 = 1,000	2.0	Ø13	Ø21	Ø60	Ø180	9.0	1.7



Available Options & Part Identification*

Example: **F O1HS C B M 25.0**

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

*Not all frequencies in the frequency range, or every combination of stability, temp range, and voltage available. See stabilities and op temps for each VDD.



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