



# HCMOS 3.2x2.5mm SMD Oscillator O3HS DATASHEET

(Former F300, F310, F330, F340 Series)

- HCMOS Output
- Stabilities to  $\pm 20$  PPM
- Temperature Ranges as wide as  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Supply Voltages: 1.0V, 1.8V, 2.5V, 3.3V, Variable (1.7 ~ 3.63V)

## 1.0V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_0$ )	1.800 ~ 50.000 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	$1.0\text{V} \pm 5\%$
Input Current ( $I_{DD}$ )	
1.800 ~ 32.100 MHz	2.5 mA
$>32.100 \sim 50.000$ MHz	3.5 mA
Standby Current	5 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ )	40 % ~ 60 %
Rise/Fall Time (20%/80% $V_{DD}$ Levels) ( $T_R/T_F$ )	
1.800 ~ 32.100 MHz	5 nS
$>32.100 \sim 50.000$ MHz	3.5 nS
Output Voltage ( $V_{OL}$ )	20 % $V_{DD}$
( $V_{OH}$ )	80 % $V_{DD}$ Min
Output Load (HCMOS)	15 pF
Start-up Time ( $T_S$ )	5 mS
Output Disable Time <sup>1</sup>	300 nS
Output Enable Time <sup>1</sup>	5 mS

## ENABLE / DISABLE FUNCTION

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 1.0V

Frequency Stability <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-10 \sim +70$	1.800 ~ 50.000
$\pm 100\text{PPM}$	$-40 \sim +85$	1.800 ~ 50.000
$\pm 50\text{PPM}$	$-10 \sim +70$	1.800 ~ 50.000
$\pm 50\text{PPM}$	$-40 \sim +85$	1.800 ~ 50.000
$\pm 25\text{PPM}$	$-10 \sim +70$	1.800 ~ 50.000
$\pm 25\text{PPM}$	$-40 \sim +85$	1.800 ~ 50.000
$\pm 20\text{PPM}^*$	$-10 \sim +70$	1.800 ~ 50.000

<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  $25^{\circ}\text{C}$  tolerance, operating temperature range, input voltage change, load change, reflow, and one year aging. \*Excludes Shock/Vibration.





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## 1.8V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_O$ )	0.625 ~ 133.000 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	$1.8 \pm 5\%$
Input Current ( $I_{DD}$ )	
1.000 ~ 32.000 MHz	6 mA
$>32.000 \sim 80.000$ MHz	15 mA
$>80.000 \sim 133.000$ MHz	20 mA
Standby Current	10 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ )	40 % ~ 60 %
Rise/Fall Time (20%/80% $V_{DD}$ Levels) ( $T_R/T_F$ )	
0.625 ~ 32.000 MHz	5 nS
$>32.000 \sim 133.000$ MHz	3.5 nS
Output Voltage ( $V_{OL}$ )	20 % $V_{DD}$
( $V_{OH}$ )	80 % $V_{DD}$ Min
Output Load (HCMOS)	15 pF
Start-up Time ( $T_S$ )	10 mS
Output Disable Time <sup>1</sup>	300 nS
Output Enable Time <sup>1</sup>	10 mS

## ENABLE / DISABLE FUNCTION

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 <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-10 \sim +70$	0.625 ~ 133.000
$\pm 100\text{PPM}$	$-40 \sim +85$	0.625 ~ 133.000
$\pm 50\text{PPM}$	$-10 \sim +70$	0.625 ~ 133.000
$\pm 50\text{PPM}$	$-40 \sim +85$	0.625 ~ 133.000
$\pm 25\text{PPM}$	$-10 \sim +70$	0.625 ~ 133.000
$\pm 25\text{PPM}$	$-40 \sim +85$	0.625 ~ 133.000
$\pm 20\text{PPM}^*$	$-10 \sim +70$	0.625 ~ 133.000

<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  $25^{\circ}\text{C}$  tolerance, operating temperature range, input voltage change, load change, reflow, and one year aging. \*Excludes Shock/Vibration.



Title / Description: O3HS SERIES STANDARD SPECIFICATIONS		
Drawing Number: 101165	Size: A	
Part Number:	Cage: 61429	
Draftsperson: CMR	Approved: BEC	Revision Date: 12/14/2018



# HCMOS 3.2x2.5mm SMD Oscillator O3HS DATASHEET

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## 2.5V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_0$ )	0.625 ~ 170.000 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	$2.5 \pm 5\%$
Input Current ( $I_{DD}$ )	
0.625 ~ 32.000 MHz	6 mA
$>32.000 \sim 60.000$ MHz	15 mA
$>60.000 \sim 80.000$ MHz	20 mA
$>80.000 \sim 170.000$ MHz	30 mA
Standby Current	10 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ )	45 % ~ 55 %
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 <sup>1</sup>	150 nS
Output Enable Time <sup>1</sup>	5 mS

### ENABLE / DISABLE FUNCTION

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 2.5V

Frequency Stability <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 100\text{PPM}$	$-20 \sim +70$	0.625 ~ 170.000
$\pm 100\text{PPM}$	$-40 \sim +85$	0.625 ~ 170.000
$\pm 50\text{PPM}$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 50\text{PPM}$	$-20 \sim +70$	0.625 ~ 170.000
$\pm 50\text{PPM}$	$-40 \sim +85$	0.625 ~ 170.000
$\pm 25\text{PPM}$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 25\text{PPM}$	$-20 \sim +70$	0.625 ~ 170.000
$\pm 25\text{PPM}$	$-40 \sim +85$	0.625 ~ 170.000
$\pm 20\text{PPM}^*$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 20\text{PPM}^*$	$-20 \sim +70$	0.625 ~ 170.000

<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  $25^{\circ}\text{C}$  tolerance, operating temperature range, input voltage change, load change, reflow, and one year aging. \*Excludes Shock/Vibration.

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	<b>Part Number:</b>	<b>Cage:</b> 61429
	<b>Draftsperson:</b> CMR	<b>Approved:</b> BEC
		<b>Revision Date:</b> 12/14/2018



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## 3.3V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_O$ )	0.625 ~ 170 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	3.3V $\pm 10\%$
Input Current ( $I_{DD}$ )	
0.625 ~ 20.000 MHz	7 mA
>20.000 ~ 40.000 MHz	13 mA
>40.000 ~ 60.000 MHz	19 mA
>60.000 ~ 75.000 MHz	24 mA
>75.000 ~ 80.000 MHz	30 mA
>80.000 ~ 125.000 MHz	40 mA
>125.000 ~ 170.000 MHz	50 mA
Standby Current	10 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ )	45 % ~ 55 %
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 <sup>1</sup>	150 nS
Output Enable Time <sup>1</sup>	5 mS

## ENABLE / DISABLE FUNCTION

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 3.3V

Frequency Stability <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 100\text{PPM}$	$-20 \sim +70$	0.625 ~ 170.000
$\pm 100\text{PPM}$	$-40 \sim +85$	0.625 ~ 170.000
$\pm 50\text{PPM}$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 50\text{PPM}$	$-20 \sim +70$	0.625 ~ 170.000
$\pm 50\text{PPM}$	$-40 \sim +85$	0.625 ~ 170.000
$\pm 25\text{PPM}$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 25\text{PPM}$	$-20 \sim +70$	0.625 ~ 170.000
$\pm 25\text{PPM}$	$-40 \sim +85$	0.625 ~ 170.000
$\pm 20\text{PPM}^*$	$-10 \sim +70$	0.625 ~ 170.000
$\pm 20\text{PPM}^*$	$-20 \sim +70$	0.625 ~ 170.000

<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  $25^{\circ}\text{C}$  tolerance, operating temperature range, input voltage change, load change, reflow, and one year aging. \*Excludes Shock/Vibration.

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## VARIABLE VOLTAGE ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_0$ )	1.25 ~ 156.25 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ ) 1.25 ~ 135.0 MHz >135.0 ~ 156.25 MHz	1.7 ~ 3.63V 2.25 ~ 3.63V
Input Current ( $I_{DD}$ ) 1.25 ~ 19.999 MHz 20.000 ~ 39.999 MHz 40.000 ~ 59.999 MHz 60.000 ~ 84.999 MHz 85.000 ~ 135.000 MHz >135.000 ~ 156.250 MHz	4 mA 6 mA 10 mA 15 mA 23 mA 30 mA
Standby Current	10 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ ) 1.25 ~ 84.999 MHz 85.0 ~ 156.25 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 <sup>1</sup>	150 nS
Output Enable Time <sup>1</sup>	5 mS

## ENABLE / DISABLE FUNCTION

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 3.3V

Frequency Stability <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-20 \sim +70$	1.25 ~ 156.25
$\pm 100\text{PPM}$	$-40 \sim +85$	1.25 ~ 156.25
$\pm 50\text{PPM}$	$-20 \sim +70$	1.25 ~ 156.25
$\pm 50\text{PPM}$	$-40 \sim +85$	1.25 ~ 156.25
$\pm 25\text{PPM}$	$-20 \sim +70$	1.25 ~ 156.25
$\pm 25\text{PPM}$	$-40 \sim +85$	1.25 ~ 156.25
$\pm 20\text{PPM}^*$	$-20 \sim +70$	1.25 ~ 156.25

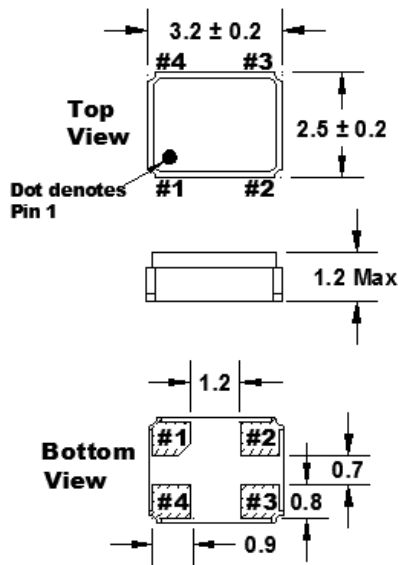
<sup>1</sup> An internal pull-up resistor from pin 1 to pin 4 allows active output if pin 1 is left open

<sup>2</sup> Inclusive of  $25^{\circ}\text{C}$  tolerance, operating temperature range, input voltage change, load change, reflow, and one year aging. \*Excludes Shock/Vibration.

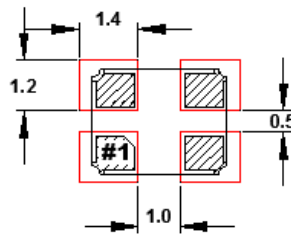
	<b>Title / Description:</b> O3HS SERIES STANDARD SPECIFICATIONS	
	<b>Drawing Number:</b> 101165	<b>Size:</b> A
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## DIMENSIONS / MECHANICAL SPECIFICATIONS



### Recommended Solder Pad Layout



### Pin Connections

#1 E/D    #3 Output  
#2 GND    #4 V<sub>DD</sub>

Maximum Soldering Temp / Time	260°C / 10 Seconds
Moisture Sensitivity Level (MSL)	1
Termination Finish	Au over Ni
Seal Method	Seam Seal
Lead (Pb) Free	Yes
ROHS/REACH Compliant	Yes

#### Notes:

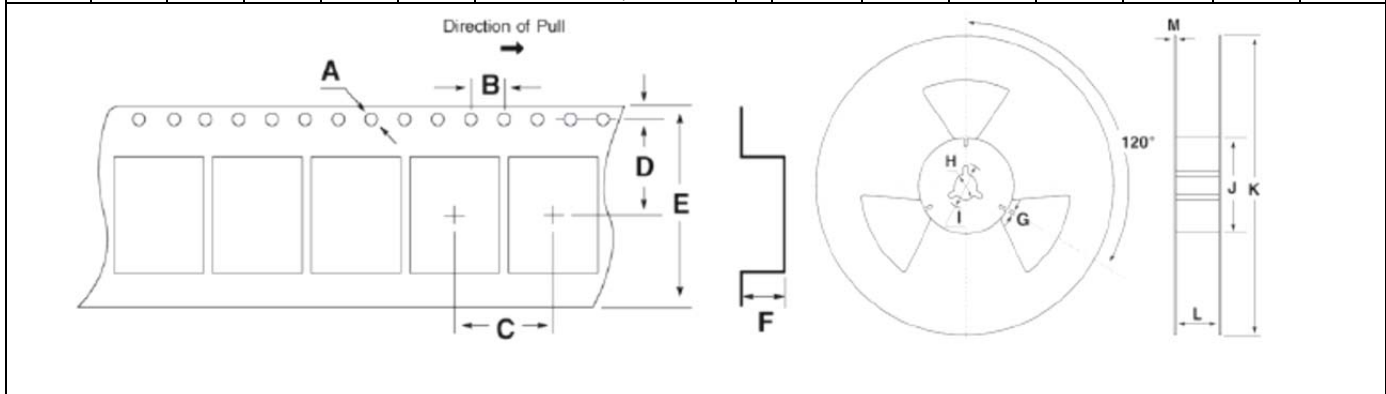
- \*A 0.01μF capacitor should be placed between V<sub>DD</sub> (Pin 4) and GND (Pin2) to minimize power supply line noise.
- \*Dimensional drawing is for reference to critical specifications defined by size measurements.
- Certain non-critical visual attributes, such as side castellations, reference 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
Φ1.5	4.0	4.0	3.5	8.0	1.4	-T2 = 2,000 (default) -T1 = 1,000 -T3 = 3,000	2.0	Φ13	Φ21	Φ60	Φ180	9.0	1.2



## Available Options & Part Identification\*

Example: **F O3HS C B M 25.0**

F	O3HS	C	B	M	25.0
<b>Fox</b>	<b>Model Number</b>	<b>Voltage</b>	<b>Stability</b>	<b>Operating Temperature</b>	<b>Frequency (MHz)</b>
		M = 1.0V±5% K = 1.8V±5% H = 2.5V±5% <b>C = 3.3V±10%</b> V = 1.7 to 3.63V W = 2.25 to 3.63V	A= 100 PPM <b>B = 50 PPM</b> D = 25 PPM E = 20 PPM	E = -10 to +70°C F = -20 to +70°C <b>M = -40 to +85°C</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>.



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