



# HCMOS 7x5mm SMD Oscillator

## O7HS

(former F4500, F4400, F4100 Series)

### DATASHEET

- HCMOS Output
- Stabilities to  $\pm 20$  PPM
- Temperature Ranges to  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Supply Voltages: 1.8V, 2.5V, 3.3V

## 1.8V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_0$ )	0.012 ~ 160.000MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	$1.8V \pm 5\%$
Input Current ( $I_{DD}$ )	
0.012 ~ 32.000MHz	5 mA
>32.000 ~ 70.000MHz	10 mA
>70.000 ~ 120.000MHz	15 mA
>120.000 ~ 160.000MHz	30 mA
Standby Current	10 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ )	40% ~ 60%
Rise/Fall Time (20%/80% $V_{DD}$ Levels) ( $T_R/T_F$ )	
0.012 ~ 32.000MHz	5.0 nS
>32.000 ~ 120.000MHz	3.5 nS
>120.000 ~ 160.000MHz	3.0 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	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}^2$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 100\text{PPM}^2$	$-20 \sim +70$	0.012 ~ 160.000
$\pm 100\text{PPM}^2$	$-40 \sim +85$	0.012 ~ 160.000
$\pm 50\text{PPM}^2$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 50\text{PPM}^2$	$-20 \sim +70$	0.012 ~ 160.000
$\pm 50\text{PPM}^2$	$-40 \sim +85$	0.012 ~ 160.000
$\pm 25\text{PPM}^2$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 25\text{PPM}^2$	$-20 \sim +70$	0.012 ~ 160.000
$\pm 25\text{PPM}^3$	$-40 \sim +85$	0.012 ~ 160.000
$\pm 20\text{PPM}^3$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 20\text{PPM}^3$	$-20 \sim +70$	0.012 ~ 160.000

<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, one-year aging, shock, and vibration.

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



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<b>Title / Description:</b> O7HS SERIES STANDARD SPECIFICATIONS		
<b>Drawing Number:</b> O7HS-DOC-1		<b>Size:</b> A
<b>Part Number:</b>		<b>Cage:</b> 61429
<b>Draftsperson:</b> BEC	<b>Approved:</b> MAJ	<b>Revision Date:</b> 01/13/2020



# HCMOS 7x5mm SMD Oscillator

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### DATASHEET

#### 2.5V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F <sub>o</sub> )	0.012 ~ 170.000MHz
Storage Temperature Range (T <sub>STG</sub> )	-55 ~ +125°C
Supply Voltage (V <sub>DD</sub> )	2.5V±5%
Input Current (I <sub>DD</sub> )	
0.012 ~ 32.000MHz	7mA
>32.000 ~ 50.000MHz	12mA
>50.000 ~ 125.000MHz	26mA
>125.000 ~ 160.000MHz	35mA
>160.000 ~ 170.000MHz	40mA
Standby Current	10µA
Output Symmetry (50% V <sub>DD</sub> )	
0.012 ~ 50.000MHz	45% ~ 55%
>50.000 ~ 200.000MHz	40% ~ 60%
Rise/Fall Time (10%/90% V <sub>DD</sub> Levels) (T <sub>R</sub> /T <sub>F</sub> )	5nS
Output Voltage (V <sub>OL</sub> )	10%V <sub>DD</sub>
(V <sub>OH</sub> )	90%V <sub>DD</sub> Min
Output Load (HCMOS)	15pF
Start-up Time (T <sub>s</sub> )	10mS
Output Disable Time <sup>1</sup>	150nS
Output Enable Time <sup>1</sup>	10mS

#### 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 2.5V

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM <sup>2</sup>	-10 ~ +70	0.012 ~ 170.000
±100PPM <sup>2</sup>	-20 ~ +70	0.012 ~ 170.000
±100PPM <sup>2</sup>	-40 ~ +85	0.012 ~ 170.000
±50PPM <sup>2</sup>	-10 ~ +70	0.012 ~ 170.000
±50PPM <sup>2</sup>	-20 ~ +70	0.012 ~ 170.000
±50PPM <sup>2</sup>	-40 ~ +85	0.012 ~ 170.000
±25PPM <sup>2</sup>	-10 ~ +70	0.012 ~ 170.000
±25PPM <sup>2</sup>	-20 ~ +70	0.012 ~ 170.000
±25PPM <sup>2</sup>	-40 ~ +85	0.012 ~ 170.000
±25PPM <sup>3</sup>	-10 ~ +70	0.012 ~ 170.000
±25PPM <sup>3</sup>	-20 ~ +70	0.012 ~ 170.000
±25PPM <sup>3</sup>	-40 ~ +85	0.012 ~ 170.000
±20PPM <sup>3</sup>	-10 ~ +70	0.012 ~ 170.000
±20PPM <sup>3</sup>	-20 ~ +70	0.012 ~ 170.000
±20PPM <sup>3</sup>	-40 ~ +85	0.012 ~ 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°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, operating temperature range.



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### DATASHEET

### 3.3V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F <sub>o</sub> )	0.012 ~ 170.000MHz
Storage Temperature Range (T <sub>STG</sub> )	-55 ~ +125°C
Supply Voltage (V <sub>DD</sub> )	3.3V±10%
Input Current (I <sub>DD</sub> )	
0.012 ~ 0.040MHz	3 mA
>0.040 ~ 1.500MHz	6 mA
>1.500 ~ 32.000MHz	15 mA
>32.000 ~ 50.000MHz	20 mA
>50.000 ~ 67.000MHz	25 mA
>67.000 ~ 170.000MHz	40 mA
Standby Current	10 μA
Output Symmetry (50% V <sub>DD</sub> )	
0.012 ~ 50.000MHz	45% ~ 55%
>50.000 ~ 170.000MHz	40% ~ 60%
Rise/Fall Time (10%/90% V <sub>DD</sub> Levels) (T <sub>R</sub> /T <sub>F</sub> )	
0.012 ~ 80.000MHz	6 nS
>80.000 ~ 125.000MHz	4 nS
>125.000 ~ 170.000MHz	3 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>	150 nS
Output Enable Time <sup>1</sup>	10 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 3.3V

Frequency Stability	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM <sup>2</sup>	-10 ~ +70	0.012 ~ 170.000
±100PPM <sup>2</sup>	-20 ~ +70	0.012 ~ 170.000
±100PPM <sup>2</sup>	-40 ~ +85	0.012 ~ 170.000
±50PPM <sup>2</sup>	-10 ~ +70	0.012 ~ 170.000
±50PPM <sup>2</sup>	-20 ~ +70	0.012 ~ 170.000
±50PPM <sup>2</sup>	-40 ~ +85	0.012 ~ 170.000
±25PPM <sup>2</sup>	-10 ~ +70	0.012 ~ 170.000
±25PPM <sup>2</sup>	-20 ~ +70	0.012 ~ 170.000
±25PPM <sup>3</sup>	-40 ~ +85	0.012 ~ 170.000
±20PPM <sup>3</sup>	-10 ~ +70	0.012 ~ 170.000
±20PPM <sup>3</sup>	-20 ~ +70	0.012 ~ 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°C tolerance, operating temperature range, input voltage change, load change, reflow, one-year aging, shock, and vibration.

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## DIMENSIONS / MECHANICAL SPECIFICATIONS



### Recommended Solder Pad Layout



Dimensions in mm

### Pin Connections

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

Maximum Soldering Temp / Time	260°C / 10 Seconds x 2
Moisture Sensitivity Level (MSL)	1
Termination Finish	Au over Ni
Seal Method	Seam
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		G	H	I	J	K	L	M
Ø1.5	4.0	8.0	7.5	16.0	2.15	-T1 = 1,000	-T2 = 2,000	2.0	Ø13	Ø21	Ø80	Ø255	17.5	2.0



### Available Options & Part Identification\*

Example: **F O7HS C B M 25.0**

F	O7HS	C	B	M	25.0
Fox	Model Number	Voltage	Stability	Operating Temperature	Frequency(MHz)
		K = 1.8V±5% H = 2.5V±5% <b>C = 3.3V±10%</b>	A = ±100PPM <b>B = ±50PPM</b> D = ±25PPM E = ±20PPM	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 VDD.



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