



# HCMOS 7x5mm SMD Oscillator

## O7HS

(former F4500, F4400, F4100 Series)

## DATASHEET

- HCMOS Output
- Stabilities to  $\pm 20$  PPM
- Temperature Ranges as wide as  $-40^{\circ}\text{C}$  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 ~ 160.000 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	$1.8\text{V} \pm 5\%$
Input Current ( $I_{DD}$ )	
0.012 ~ 32.000 MHz	5 mA
$>32.000 \sim 70.000$ MHz	10 mA
$>70.000 \sim 120.000$ MHz	15 mA
$>120.000 \sim 160.000$ MHz	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 ~ 32.000 MHz	5.0 nS
$>32.000 \sim 120.000$ MHz	3.5 nS
$>120.000 \sim 160.000$ MHz	3.0 nS
Output Voltage ( $V_{OL}$ )	20% $V_{DD}$
( $V_{OH}$ )	80% $V_{DD}$ 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 <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<sup>2</sup>

Frequency Stability <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 100\text{PPM}$	$-20 \sim +70$	0.012 ~ 160.000
$\pm 100\text{PPM}$	$-40 \sim +85$	0.012 ~ 160.000
$\pm 50\text{PPM}$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 50\text{PPM}$	$-20 \sim +70$	0.012 ~ 160.000
$\pm 50\text{PPM}$	$-40 \sim +85$	0.012 ~ 160.000
$\pm 25\text{PPM}$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 25\text{PPM}$	$-20 \sim +70$	0.012 ~ 160.000
$\pm 25\text{PPM}$	$-40 \sim +85$	0.012 ~ 160.000
$\pm 20\text{PPM}^*$	$-10 \sim +70$	0.012 ~ 160.000
$\pm 20\text{PPM}^*$	$-20 \sim +70$	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, and one year aging. \*Excludes Shock/Vibration.





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### 2.5V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_0$ )	0.012 ~ 170.000 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	$2.5V \pm 5\%$
Input Current ( $I_{DD}$ )	
0.012 ~ 32.000 MHz	7 mA
$>32.000 \sim 50.000$ MHz	12 mA
$>50.000 \sim 125.000$ MHz	26 mA
$>125.000 \sim 160.000$ MHz	35 mA
$>160.000 \sim 170.000$ MHz	40 mA
Standby Current	10 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ )	
0.012 ~ 50.000 MHz	45 % ~ 55 %
$>50.000 \sim 200.000$ MHz	40 % ~ 60 %
Rise/Fall Time (10%/90% $V_{DD}$ Levels) ( $T_R/T_F$ )	5 nS
Output Voltage ( $V_{OL}$ )	10% $V_{DD}$
( $V_{OH}$ )	90% $V_{DD}$ Min
Output Current ( $I_{OL}$ )	4 mA Min
( $I_{OH}$ )	-4 mA Min
Output Load (HCMOS)	15 pF
Start-up Time ( $T_S$ )	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 $V_{IH} \geq 70\% V_{DD}$	Active
'0' Level $V_{IL} \leq 30\% V_{DD}$	High Z

### • Available Options by Stability & Operating Temp for 2.5V<sup>2</sup>

Frequency Stability <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 100\text{PPM}$	$-20 \sim +70$	0.012 ~ 170.000
$\pm 100\text{PPM}$	$-40 \sim +85$	0.012 ~ 170.000
$\pm 50\text{PPM}$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 50\text{PPM}$	$-20 \sim +70$	0.012 ~ 170.000
$\pm 50\text{PPM}$	$-40 \sim +85$	0.012 ~ 170.000
$\pm 25\text{PPM}$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 25\text{PPM}$	$-20 \sim +70$	0.012 ~ 170.000
$\pm 25\text{PPM}$	$-40 \sim +85$	0.012 ~ 170.000
$\pm 20\text{PPM}^*$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 20\text{PPM}^*$	$-20 \sim +70$	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  $25^{\circ}\text{C}$  tolerance, operating temperature range, input voltage change, load change, reflow, and one year aging. \*Excludes Shock/Vibration.



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Title / Description: O7HS SERIES STANDARD SPECIFICATIONS

Drawing Number: 101147

Size: A

Part Number:

Cage: 61429

Draftsperson: CMR

Approved: BEC

Revision Date: 10/10/2017



# HCMOS 7x5mm SMD Oscillator

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- HCMOS Output
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- Supply Voltages: 1.8V, 2.5V, 3.3V

### 3.3V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range ( $F_0$ )	0.012 ~ 170.000 MHz
Storage Temperature Range ( $T_{STG}$ )	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage ( $V_{DD}$ )	$3.3\text{V} \pm 10\%$
Input Current ( $I_{DD}$ )	
0.012 ~ 0.040 MHz	3 mA
$>0.040 \sim 1.500$ MHz	6 mA
$>1.500 \sim 32.000$ MHz	15 mA
$>32.000 \sim 50.000$ MHz	20 mA
$>50.000 \sim 67.000$ MHz	25 mA
$>67.000 \sim 170.000$ MHz	40 mA
Standby Current	10 $\mu\text{A}$
Output Symmetry (50% $V_{DD}$ )	
0.012 ~ 50.000 MHz	45% ~ 55%
$>50.000 \sim 170.000$ MHz	40% ~ 60%
Rise/Fall Time (10%/90% $V_{DD}$ Levels) ( $T_R/T_F$ )	
0.012 ~ 80.000 MHz	6 nS
$>80.000 \sim 125.000$ MHz	4 nS
$>125.000 \sim 170.000$ MHz	3 nS
Output Voltage ( $V_{OL}$ ) ( $V_{OH}$ )	10% $V_{DD}$ 90% $V_{DD}$ Min
Output Current ( $I_{OL}$ ) ( $I_{OH}$ )	2 mA Min -2 mA Min
Output Load (HCMOS)	15 pF
Start-up Time ( $T_S$ )	10 mS
Output Disable Time <sup>1</sup>	150 nS
Output Enable Time <sup>1</sup>	10 mS
Jitter ( $F_0 \geq 100$ MHz, 12 kHz ~ 20 MHz)	0.3 pS Typ.

### 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<sup>2</sup>

Frequency Stability <sup>2</sup>	Operating Temperature ( $^{\circ}\text{C}$ )	Frequency Range (MHz)
$\pm 100\text{PPM}$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 100\text{PPM}$	$-20 \sim +70$	0.012 ~ 170.000
$\pm 100\text{PPM}$	$-40 \sim +85$	0.012 ~ 170.000
$\pm 50\text{PPM}$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 50\text{PPM}$	$-20 \sim +70$	0.012 ~ 170.000
$\pm 50\text{PPM}$	$-40 \sim +85$	0.012 ~ 170.000
$\pm 25\text{PPM}$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 25\text{PPM}$	$-20 \sim +70$	0.012 ~ 170.000
$\pm 25\text{PPM}$	$-40 \sim +85$	0.012 ~ 170.000
$\pm 20\text{PPM}^*$	$-10 \sim +70$	0.012 ~ 170.000
$\pm 20\text{PPM}^*$	$-20 \sim +70$	0.012 ~ 170.000

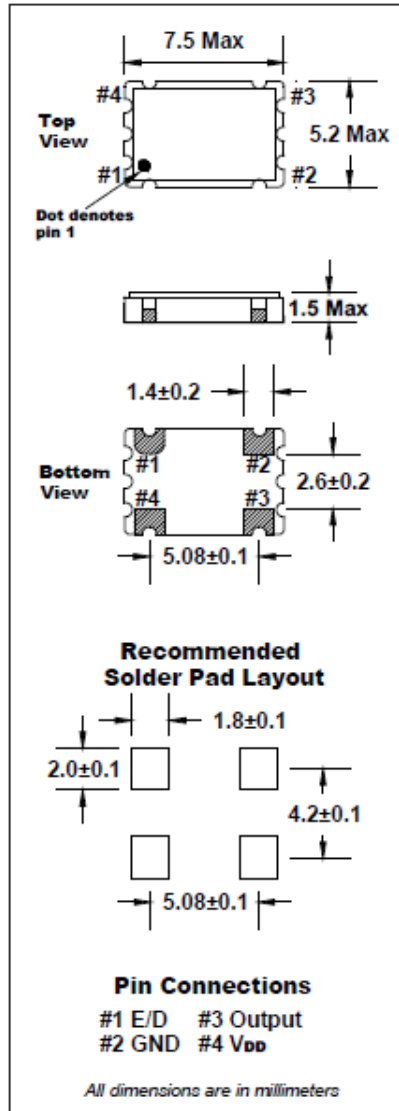
<sup>1</sup> An internal pull-up resistor from pin 1 to pin 4 allows active output if pin 1 is left open

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

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	<b>Drawing Number:</b> 101147	<b>Size:</b> A
	<b>Part Number:</b>	<b>Cage:</b> 61429
	<b>Draftsperson:</b> CMR	<b>Approved:</b> BEC
		<b>Revision Date:</b> 10/10/2017



### DIMENSIONS / MECHANICAL SPECIFICATIONS



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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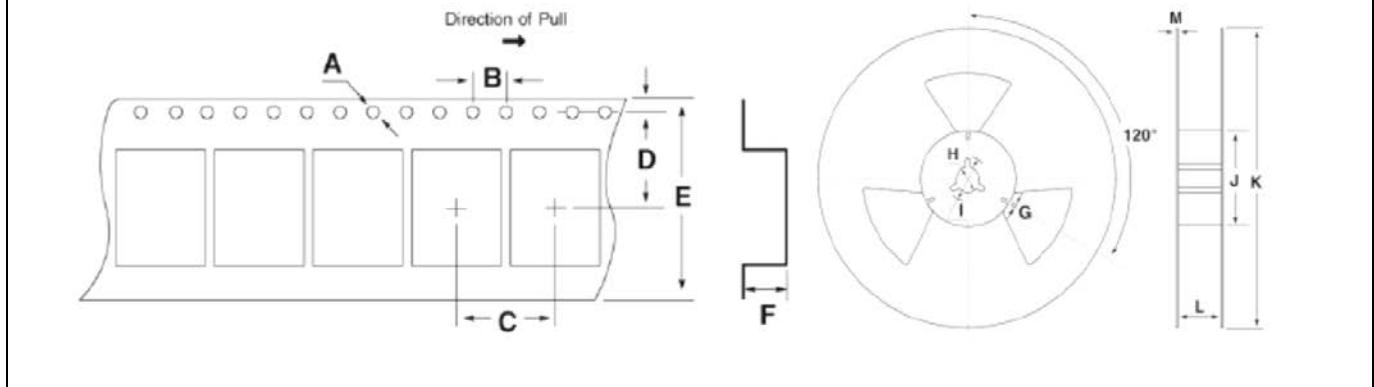
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Tape Specifications (millimeters)							Reel Specifications (millimeters)							
A	B	C	D	E	F	Std Reel Qty	G	H	I	J	K	L	M	
Φ1.5	4.0	8.0	7.5	16.0	2.15	2,000	2.0	Φ13	Φ21	Φ80	Φ255	17.5	2.0	



### Available Options & Part Identification\*

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

F	O7HS	C	B	M	25.0
<b>Fox</b>	<b>Model Number</b>	<b>Voltage</b> K = 1.8V±5% H = 2.5V±5% <b>C = 3.3V±10%</b>	<b>Stability</b> A = 100PPM <b>B = 50PPM</b> D = 25PPM E = 20PPM	<b>Operating Temperature</b> E = -10 to +70°C F = -20 to +70°C <b>M = -40 to +85°C</b>	<b>Frequency</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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