



# 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

## O7HS

(former F4500, F4400, F4100 Series)

### 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>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.

<sup>3</sup> Inclusive of 25°C tolerance, operating temperature range.



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| <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

## O7HS

(former F4500, F4400, F4100 Series)

### 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

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| <b>Part Number:</b>   |                      | <b>Cage:</b> 61429               |
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### DATASHEET

## DIMENSIONS / MECHANICAL SPECIFICATIONS



### Recommended Solder Pad Layout



Dimensions in mm

### Pin Connections

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

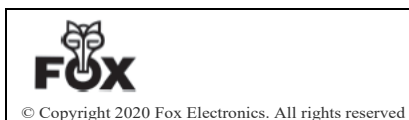
|                                  |                        |
|----------------------------------|------------------------|
| Maximum Soldering Temp / Time    | 260°C / 10 Seconds x 2 |
| Moisture Sensitivity Level (MSL) | 1                      |
| Termination Finish               | Au over Ni             |
| 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<br>-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%<br>H = 2.5V±5%<br><b>C = 3.3V±10%</b> | A = ±100PPM<br><b>B = ±50PPM</b><br>D = ±25PPM<br>E = ±20PPM | E = -10 to +70°C<br>F = -20 to +70°C<br><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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|  | <b>Part Number:</b>   | <b>Cage:</b> 61429   |                                  |
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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