



HCMOS 5.0x3.2mm SMD Oscillator

O5HS DATASHEET

(Former F510L, F540L, F530L, F550L Series)

- HCMOS Output
- Stabilities to ± 20 PPM
- Temperature Ranges to -40°C to $+85^{\circ}\text{C}$
- Supply Voltages: 1.8V; 2.5V; 3.3V; 1.7~3.63V; 5.0V

1.8V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1 ~ 160MHz
Storage Temperature Range (T_{STG})	$-55 \sim +125^{\circ}\text{C}$
Supply Voltage (V_{DD})	1.8V $\pm 5\%$
Input Current (I_{DD})	
1.000 ~ 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 μA
Output Symmetry (50% V_{DD})	40% ~ 60%
Rise/Fall Time (20%/80% V_{DD} Levels) (T_R/T_F)	
1.000 ~ 32.000MHz	5 nS
>32.000 ~ 120.000MHz	3.5 nS
>120.000 ~ 160.000MHz	3 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 ¹	300 nS
Output Enable Time ¹	10 mS

ENABLE / DISABLE FUNCTION

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)
$\pm 100\text{PPM}^2$	$-10 \sim +70$	1.000 ~ 160.000
$\pm 100\text{PPM}^2$	$-20 \sim +70$	1.000 ~ 160.000
$\pm 100\text{PPM}^2$	$-40 \sim +85$	1.000 ~ 160.000
$\pm 50\text{PPM}^2$	$-10 \sim +70$	1.000 ~ 160.000
$\pm 50\text{PPM}^2$	$-20 \sim +70$	1.000 ~ 160.000
$\pm 50\text{PPM}^2$	$-40 \sim +85$	1.000 ~ 160.000
$\pm 25\text{PPM}^2$	$-10 \sim +70$	1.000 ~ 160.000
$\pm 25\text{PPM}^2$	$-20 \sim +70$	1.000 ~ 160.000
$\pm 25\text{PPM}^3$	$-40 \sim +85$	1.000 ~ 160.000
$\pm 20\text{PPM}^3$	$-10 \sim +70$	1.000 ~ 160.000
$\pm 20\text{PPM}^3$	$-20 \sim +70$	1.000 ~ 160.000

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.



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Title / Description: O5HS SERIES STANDARD SPECIFICATIONS

Drawing Number: O5HS-DOC-1

Size: A

Part Number:

Cage: 61429

Draftsperson: BEC

Approved: MAJ

Revision Date: 7/21/2020



2.5V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1 ~ 160 MHz
Storage Temperature Range (T_{STG})	-55 ~ +125°C
Supply Voltage (V_{DD})	2.5V±5%
Input Current (I_{DD})	
1.000 ~ 32.000MHz	7 mA
>32.000 ~ 50.000MHz	12 mA
>50.000 ~ 125.000MHz	26 mA
>125.000 ~ 160.000MHz	35 mA
Standby Current	10 μ A
Output Symmetry (50% V_{DD})	
1.000 ~ 50.000MHz	45% ~ 55%
> 50.000 ~ 160.000MHz	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 Load (HCMOS)	15 pF
Start-up Time (T_S)	10 mS
Output Disable Time ¹	150 nS
Output Enable Time ¹	10 mS

ENABLE / DISABLE FUNCTION

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 ²	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-10 ~ +70	1.000 ~ 160.000
±100PPM ²	-20 ~ +70	1.000 ~ 160.000
±100PPM ²	-40 ~ +85	1.000 ~ 160.000
±50PPM ²	-10 ~ +70	1.000 ~ 160.000
±50PPM ²	-20 ~ +70	1.000 ~ 160.000
±50PPM ²	-40 ~ +85	1.000 ~ 160.000
±25PPM ²	-10 ~ +70	1.000 ~ 160.000
±25PPM ²	-20 ~ +70	1.000 ~ 160.000
±25PPM ³	-40 ~ +85	1.000 ~ 160.000
±20PPM ³	-10 ~ +70	1.000 ~ 160.000
±20PPM ³	-20 ~ +70	1.000 ~ 160.000

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.





3.3V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F _O)	1 ~ 170MHz
Storage Temperature Range (T _{STG})	-55 ~ +125°C
Supply Voltage (V _{DD})	3.3V±10%
Input Current (I _{DD})	
1.000 ~ 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 _{DD})	
1.000 ~ 50.000MHz	45% ~ 55%
>50.000 ~ 170.000MHz	40% ~ 60%
Rise/Fall Time (10%/90% V _{DD} Levels) (T _R /T _F)	
1.000 ~ 80.000MHz	6 nS
>80.000 ~ 125.000MHz	4 nS
>125.000 ~ 170.000MHz	3 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	150 nS
Output Enable Time ¹	10 mS

ENABLE / DISABLE FUNCTION

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 3.3V

Frequency Stability ²	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM ²	-10 ~ +70	1.000 ~ 170.000
±100PPM ²	-20 ~ +70	1.000 ~ 170.000
±100PPM ²	-40 ~ +85	1.000 ~ 170.000
±50PPM ²	-10 ~ +70	1.000 ~ 170.000
±50PPM ²	-20 ~ +70	1.000 ~ 170.000
±50PPM ²	-40 ~ +85	1.000 ~ 170.000
±25PPM ²	-10 ~ +70	1.000 ~ 170.000
±25PPM ²	-20 ~ +70	1.000 ~ 170.000
±25PPM ³	-40 ~ +85	1.000 ~ 170.000
±20PPM ³	-10 ~ +70	1.000 ~ 170.000
±20PPM ³	-20 ~ +70	1.000 ~ 170.000

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.





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(Former F510L, F540L, F530L, F550L Series)

VARIABLE VOLTAGE ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	0.500 ~ 54.0 MHz
Storage Temperature Range (T_{STG})	-55 ~ +125°C
Supply Voltage (V_{DD})	1.7 ~ 3.63V
Input Current (I_{DD})	
0.500 ~ 19.999 MHz	7 mA
20.000 ~ 31.999 MHz	12 mA
32.000 ~ 49.999 MHz	20 mA
50.000 ~ 54.0 MHz	25 mA
Standby Current	10 μ A
Output Symmetry (50% V_{DD})	45 % ~ 55 %
Rise/Fall Time (10%/90% V_{DD} Levels) (T_R/T_F)	
0.500 ~ 49.999 MHz	10 nS
50.000 ~ 54.0 MHz	8 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 ¹	200 nS
Output Enable Time ¹	5 mS

ENABLE / DISABLE FUNCTION

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 ²	Operating Temperature (°C)	Frequency Range (MHz)
±100PPM	-20 ~ +70	0.5 ~ 54.0
±100PPM	-40 ~ +85	0.5 ~ 54.0
±50PPM	-20 ~ +70	0.5 ~ 54.0
±50PPM	-40 ~ +85	0.5 ~ 54.0
±25PPM	-20 ~ +70	0.5 ~ 54.0
±25PPM ³	-40 ~ +85	0.5 ~ 54.0
±20PPM ³	-20 ~ +70	0.5 ~ 54.0

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

³ Inclusive of 25°C tolerance and operating temperature range





5.0 V ELECTRICAL CHARACTERISTICS

PARAMETERS	MAX (unless otherwise noted)
Frequency Range (F_o)	1.544 ~ 50MHz
Storage Temperature Range (T_{STG})	-55 ~ +125°C
Supply Voltage (V_{DD})	5.0V $\pm$ 10%
Input Current (I_{DD})	35 mA
Output Symmetry (50% V_{DD})	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	100 nS
Output Enable Time ¹	100 nS

ENABLE / DISABLE FUNCTION

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 5.0V

Frequency Stability ²	Operating Temperature (°C)	Frequency Range (MHz)
$\pm 100\text{PPM}^2$	-10 ~ +70	1.544 ~ 50.000
$\pm 100\text{PPM}^2$	-40 ~ +85	1.544 ~ 50.000
$\pm 50\text{PPM}^2$	-10 ~ +70	1.544 ~ 50.000
$\pm 50\text{PPM}^2$	-40 ~ +85	1.544 ~ 50.000
$\pm 25\text{PPM}^2$	-10 ~ +70	1.544 ~ 50.000
$\pm 25\text{PPM}^3$	-40 ~ +85	1.544 ~ 50.000
$\pm 20\text{PPM}^3$	-10 ~ +70	1.544 ~ 50.000

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

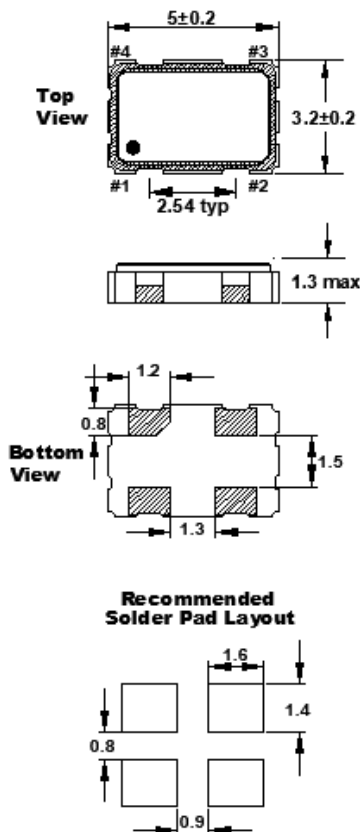
² Inclusive of 25°C tolerance, operating temperature range, input voltage change, load change, reflow, one-year aging, shock, and vibration.

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





DIMENSIONS / MECHANICAL SPECIFICATIONS



Dimensions in millimeters

Pin Connections

#1 E/D #3 Output
#2 GND #4 VDD

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/REACH Compliant	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	G	H	I	J	K	L	M
Ø1.5	4.0	8.0	5.5	12.0	1.5	1,000	2.0	Ø13	Ø21	Ø62	Ø180	13.5	2.0

Available Options & Part Identification*

Example: **F O5HS C B M 25.0**

F	O5HS	C	B	M	25.0
Fox	Model Number	Voltage K = 1.8V±5% H = 2.5V±5% C = 3.3V±10% A = 5.0V±10%	Stability A = ±100 PPM B = ±50 PPM D = ±25 PPM E = ±20 PPM	Operating Temperature E = -10 to +70°C F = -20 to +70°C M = -40 to +85°C	Frequency

*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_{DD}.



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