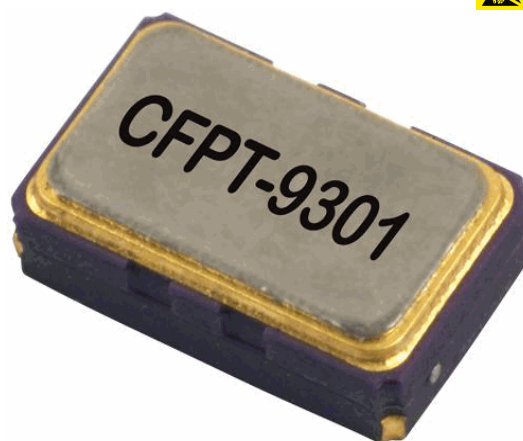


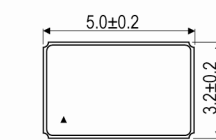
ISSUE 7; February 2022

Description

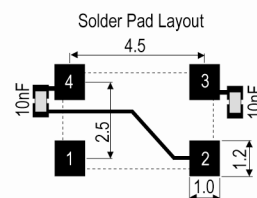
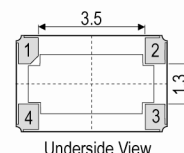
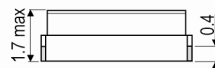
- Surface mount temperature compensated voltage controlled crystal oscillators for medium to high volume applications where small size and high performance are prerequisites. Capable of sub 0.3ppm performance over an extended temperature range. Its ability to function down to a supply voltage of 2.4V and low power consumption makes it particularly suitable for mobile applications.
- -A Freq Adj option
- Option A (standard):
Ageing adjustment by means of external Control Voltage applied to pad 1
Range (frequency \leq 20MHz) $\geq \pm 5$ ppm
Range (frequency $>$ 20MHz) $\geq \pm 7$ ppm
Linearity $\leq 2\%$
Slope Positive
Input resistance $\geq 100k\Omega$
Modulation bandwidth $\geq 2kHz$
Standard control voltage range $1.5V \pm 1V$
- -B No Freq Adj
- Option B:
No frequency adjustment
Initial Calibration $\leq \pm 1.0$ ppm



Outline (mm) -B = No Freq Adj



- Pad Connections
1. Voltage Control (Option A) or NC (Option B)
 2. GND
 3. Output
 4. +Vs



Frequency Parameters

- Frequency: 1.5MHz to 52.0MHz
- Frequency Tolerance: ± 1.00 ppm
- Frequency Stability: ± 0.20 ppm to ± 2.00 ppm
- Ageing: ± 1 ppm max in 1st year (see Note 1)
- Supply Voltage Variation (@ $\pm 5\%$ change):
Frequency $<$ 20MHz: ± 0.1 ppm typ
Frequency 20MHz to $<$ 35MHz: ± 0.3 ppm typ
Frequency 35MHz to 52MHz: ± 0.5 ppm typ
- Load Variation (@ $\pm 5pF$ change):
Frequency $<$ 20MHz: ± 0.2 ppm typ
Frequency 20MHz to $<$ 35MHz: ± 0.3 ppm typ
Frequency 35MHz to 52MHz: ± 0.5 ppm typ
- Note 1 Ageing:
Frequency \leq 20MHz: ± 1 ppm max in 1st year
Frequency \leq 20MHz: ± 3 ppm max for 10 years (including the 1st year)
Frequency $>$ 20MHz: ± 2 ppm max in 1st year
Frequency $>$ 20MHz: ± 5 ppm max for 10 years (including the 1st year)

Electrical Parameters

- Supply Voltage: $3.3V \pm 10\%$
- Supply Current (typical):
HCMOS: $1 + \text{Frequency(MHz)} * \text{Supply(V)} * \{\text{Load(pF)} + 15\} * 1E-3$ mA
i.e @ 20MHz, 3.3V, 15pF ≈ 3 mA
Calculation: $1 + (20 \times 3.3 \times (15 + 15) \times 0.001) = 2.98$ mA
- Supply Voltage Tolerance: Parts will operate correctly with $\pm 10\%$ supply voltage variation but supply coefficient is measured with $\pm 5\%$ variation
- Frequency Adjustment - option B
No frequency adjustment
Initial calibration: $\leq \pm 1.0$ ppm

Sales Office Contact Details:

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Frequency Adjustment

- Pulling Optional
- Frequency Adjustment - option A (standard):
Ageing adjustment by means of external Control Voltage applied to pad 1
Range (frequency \leq 20MHz): $\geq \pm 5$ ppm
Range (frequency $>$ 20MHz): $\geq \pm 7$ ppm
Linearity: $\leq 2\%$
Slope: Positive
Input resistance: $\geq 100k\Omega$
Modulation bandwidth: ≥ 2 kHz
Standard control voltage range: 1.5V \pm 1V

Operating Temperature Ranges

- -20 to 70°C
- -40 to 85°C

Output Details

- Output Compatibility HCMOS
- Drive Capability 15pF max

Output Levels

- Output Level:
VoH $\geq 90\%$ VS
VoL $\leq 10\%$ VS

Environmental Parameters

- Storage Temperature Range: -55 to 125°C
- Shock: IEC 60068-2-27, Test Ea: 1500G acceleration for 0.5ms, 3 shocks in each of 3 mutually perpendicular planes
- Vibration: IEC 60068-2-6, Test Fc: 10-60Hz 1.5mm displacement, 60-2000Hz at 20G, 4 hours in each of three mutually perpendicular axes at 1oct/min

Manufacturing Details

- RoHS Terminations NiAu

Ordering Information

- Frequency*
Model*
Frequency Adjustment Option*
Output
Frequency Stability (over operating temperature range)*
Operating Temperature Range*
Supply Voltage
(*minimum required)
- Example
20.0MHz CFPT-9301-A
HCMOS ± 1 ppm -20 to 70C 3.3V
- Stability/Temperature Range combinations may not be available for all frequencies, please contact our sales offices
- Supply Voltages in the range 2.4V to 6.0V are available to order, please contact our sales offices
- Low profile option (1.4mm max height) is available, please contact our sales offices
- Non standard requirements may be available upon request, please contact our sales offices

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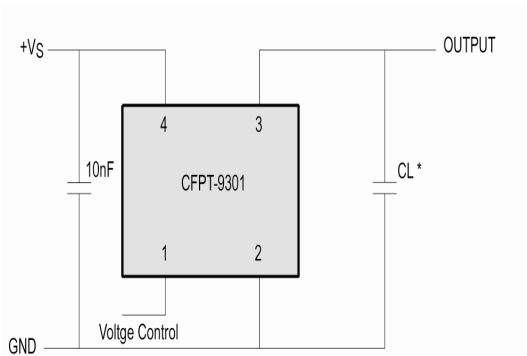
Compliance

- RoHS Status (2015/863/EU) Compliant
- REACH Status Compliant
- MSL Rating (JDEC-STD-033): 3

Packaging Details

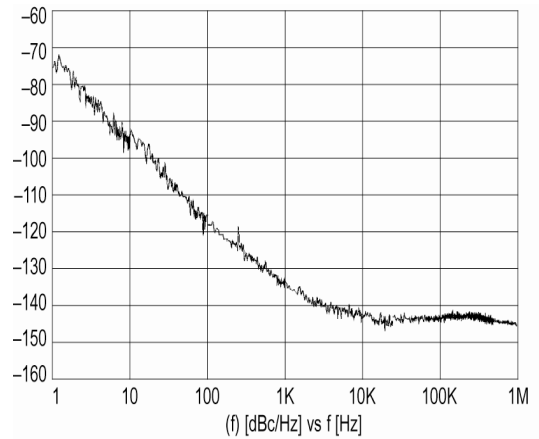
- Pack Style: Cutt In tape, cut from a reel
Pack Size: 100
- Pack Style: Bulk Loose in bulk pack
Pack Size: 10
- Pack Style: Reel Tape & reel in accordance with EIA-481-D
Pack Size: 1,000

Test Circuit



* Load 15pF (HCMOS), inclusive of probe and jig capacitance

Typical Phase Noise at 14.4MHz



Electrical Specification - maximum limiting values 3.3V ±10%

Frequency Min	Frequency Max	Temperature Range	Stability (Min)	Current Draw	Rise and Fall Time	Duty Cycle
		°C	ppm	mA	ns	%
1.5MHz	52.0MHz	-20 to 70	±0.2	-	8	45/55%
		-40 to 85	±0.3	-	8	45/55%

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Chipset Approval Table

Ref No.		Frequency	Chipset Type	IC Supplier	
E4190LF		12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech	
E4191LF		12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech	
E4437LF		12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech	
E4438LF		20MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Microsemi	
E4439LF		20MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Microsemi	
E4441LF		20MHz	ZL30152, ZL30155, ZL30157, ZL30159, ZL30160, ZL30165	Microsemi	
E4698LF		12.8MHz	ACS1790T, ACS9510, ACS9520T, ACS9522T, ACS9550, ACS9593T, ACS8522BT, ACS8509, ACS8510, ACS8514, ACS8515, ACS8520, ACS8520A, ACS8522	Semtech	

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