

**Description**

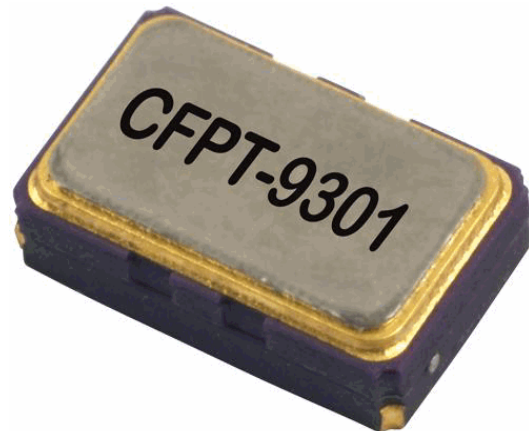
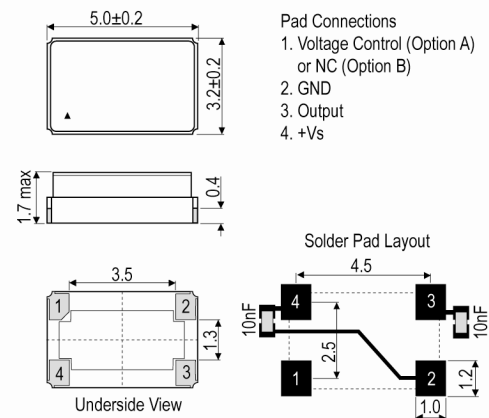
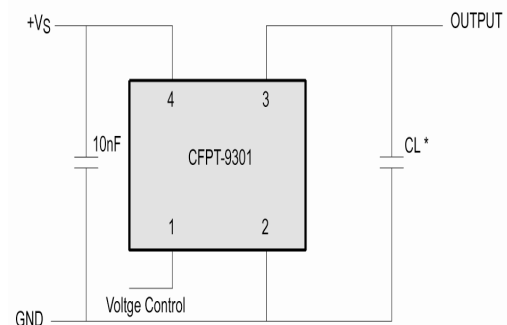
- Surface mount temperature compensated voltage controlled crystal oscillator.
- Freq Adj option  
Option A (standard):  
Ageing adjustment by means of external Control Voltage applied to pad 1  
Range (frequency  $\leq 20\text{MHz}$ )  $\geq \pm 5\text{ppm}$   
Range (frequency  $> 20\text{MHz}$ )  $\geq \pm 7\text{ppm}$   
Linearity  $\leq 2\%$   
Slope Positive  
Input resistance  $\geq 100\text{k}\Omega$   
Modulation bandwidth  $\geq 2\text{kHz}$   
Standard control voltage range  $1.5\text{V} \pm 1\text{V}$
- Model CFPT-9301-A
- Model Issue number 7

**Frequency Parameters**

- Frequency 16.3840MHz
- Frequency Tolerance  $\pm 1.00\text{ppm}$
- Frequency Stability  $\pm 1.00\text{ppm}$
- Operating Temperature Range  $-40.00$  to  $85.00^\circ\text{C}$
- Ageing  $\pm 1\text{ppm}$  max in 1st year (see Note 1)
- Supply Voltage Variation (@  $\pm 5\%$  change):  
Frequency  $< 20\text{MHz}$ :  $\pm 0.1\text{ppm}$  typ  
Frequency  $20\text{MHz}$  to  $< 35\text{MHz}$ :  $\pm 0.3\text{ppm}$  typ  
Frequency  $35\text{MHz}$  to  $52\text{MHz}$ :  $\pm 0.5\text{ppm}$  typ
- Load Variation (@  $\pm 5\text{pF}$  change):  
Frequency  $< 20\text{MHz}$ :  $\pm 0.2\text{ppm}$  typ  
Frequency  $20\text{MHz}$  to  $< 35\text{MHz}$ :  $\pm 0.3\text{ppm}$  typ  
Frequency  $35\text{MHz}$  to  $52\text{MHz}$ :  $\pm 0.5\text{ppm}$  typ
- Note 1 Ageing:  
Frequency  $\leq 20\text{MHz}$ :  $\pm 1\text{ppm}$  max in 1st year  
Frequency  $\leq 20\text{MHz}$ :  $\pm 3\text{ppm}$  max for 10 years (including the 1st year)  
Frequency  $> 20\text{MHz}$ :  $\pm 2\text{ppm}$  max in 1st year  
Frequency  $> 20\text{MHz}$ :  $\pm 5\text{ppm}$  max for 10 years (including the 1st year)

**Electrical Parameters**

- Supply Voltage  $3.3\text{V} \pm 10\%$
- Supply Current (typical):  
HCMOS:  
 $1 + \text{Frequency}(\text{MHz}) * \text{Supply}(\text{V}) * \{\text{Load}(\text{pF}) + 15\} * 10^{-3} \text{mA}$   
e.g.  $20\text{MHz}$ ,  $3.3\text{V}$ ,  $15\text{pF} \approx 3\text{mA}$
- 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:  $\leq \pm 1.0\text{ppm}$


**Outline (mm)**

**Test Circuit**


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

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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  $\leq 20\text{MHz}$ ):  $\geq \pm 5\text{ppm}$   
Range (frequency  $> 20\text{MHz}$ ):  $\geq \pm 7\text{ppm}$   
Linearity:  $\leq 2\%$   
Slope: Positive  
Input resistance:  $\geq 100\text{k}\Omega$   
Modulation bandwidth:  $\geq 2\text{kHz}$   
Standard control voltage range:  $1.5\text{V} \pm 1\text{V}$

### Output Details

- Output Compatibility HCMOS
- Drive Capability  $15\text{pF}$  max
- Rise and Fall Time  $8.0\text{ns}$  max
- Duty Cycle  $45/55\%$

### Output Levels

- Output Level:  
 $V_{OH} \geq 90\% V_S$   
 $V_{OL} \leq 10\% V_S$

### Environmental Parameters

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

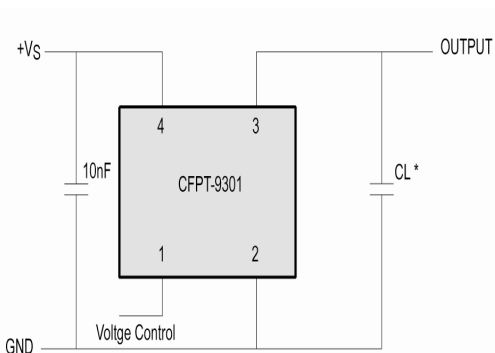
### Compliance

- RoHS Status (2011/65/EU) Compliant
- REACH Status Compliant
- MSL Rating (JDEC-STD-033): Not Applicable

### Packaging Details

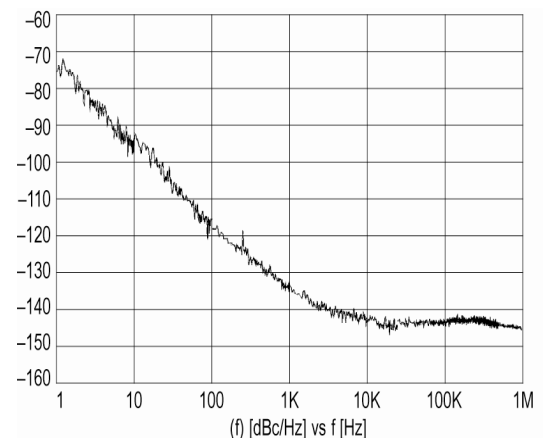
- Pack Style: Bulk Loose in bulk pack  
Pack Size: 10
- Alternative packing option available

### Test Circuit



\* Load  $15\text{pF}$  (HCMOS), inclusive of probe and jig capacitance

### Typical Phase Noise at 14.4MHz



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**Chipset Approval Table**

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

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