

**Customer Part:**



**Description**

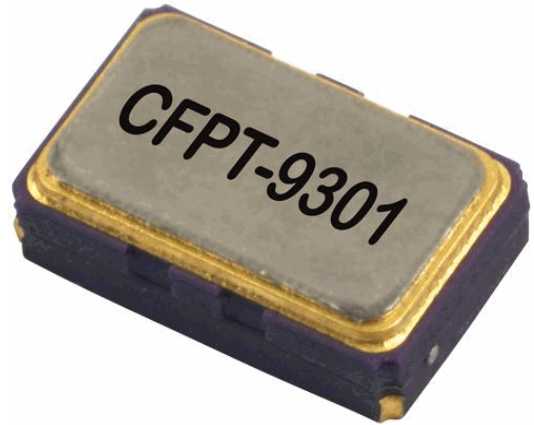
- Surface mount temperature compensated voltage controlled crystal oscillator.
- Freq Adj option  
Option A (standard):  
Ageing adjustment by means of external Control Voltage applied to pad 1  
Range (frequency ≤ 20MHz) ≥ ±5ppm  
Range (frequency > 20MHz) ≥ ±7ppm  
Linearity ≤2%  
Slope Positive  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

**Frequency Parameters**

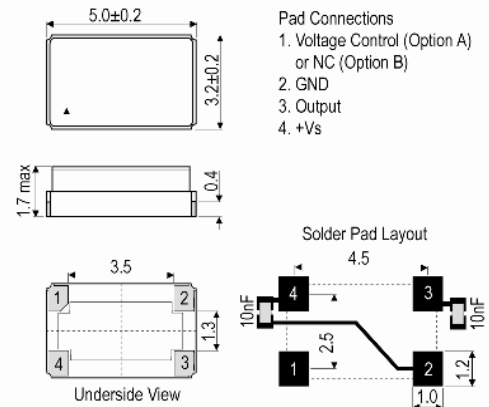
- Frequency 16.3840MHz
- Frequency Tolerance ±1.00ppm
- Frequency Stability ±1.00ppm
- Operating Temperature Range -40.00 to 85.00°C
- Ageing ±1ppm max in 1st year (see Note 1)
- Supply Voltage Variation (@ ±5% change):  
Frequency <20MHz: ±0.1ppm typ  
Frequency 20MHz to <35MHz: ±0.3ppm typ  
Frequency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

**Electrical Parameters**

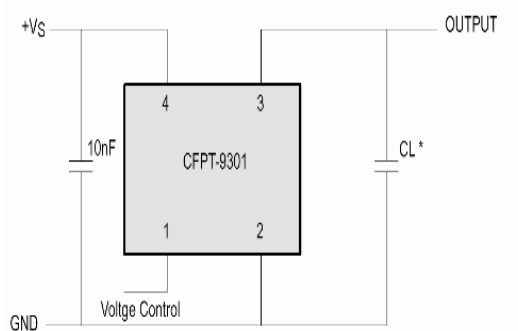
- Supply Voltage 3.3V ±10%
- Supply Current (typical):  
HCMOS:  $1 + \text{Frequency(MHz)} * \text{Supply(V)} * \{ \text{Load(pF)} + 15 \} * 1E-3 \text{mA}$   
i.e @ 20MHz, 3.3V, 15pF ≈ 3mA  
Calculation:  $1 + (20 \times 3.3 \times (15 + 15) \times 0.001) = 2.98 \text{mA}$
- Supply Voltage Tolerance: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



**Outline (mm)**



**Test Circuit**



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

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**Customer Part:****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:  $\geq 100\text{k}\Omega$   
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 15pF max
- Rise and Fall Time 8.0ns max
- Duty Cycle 45/55%

**Output Levels**

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

**Environmental Parameters**

- Storage Temperature Range:  $-55$  to  $125^\circ\text{C}$
- 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

**Compliance**

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

**Packaging Details**

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

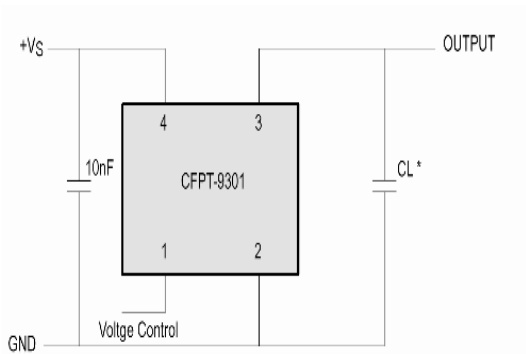
**Test Circuit****Typical Phase Noise at 14.4MHz****Sales Office Contact Details:**

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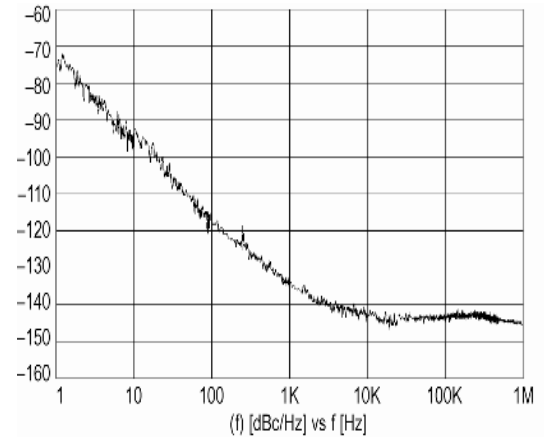
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**Customer Part:**



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



**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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