

ISSUE 14; January 2018

### Description

- Sub 1ppm performance TCXO/VCTCXO, a single chip oscillator and analogue compensation circuit operating over an extended temperature range. Its ability to function down to a supply voltage of 2.4V and low power consumption make it particularly suitable for mobile applications.
- -1A No ref voltage, ageing adj option
- -1B No ref voltage, no freq adj option
- -2A Ref voltage = 2.2V, ageing adj option
- -3A Ref voltage = 2.7V, ageing adj option
- -4A Ref voltage = 4.2V, ageing adj option



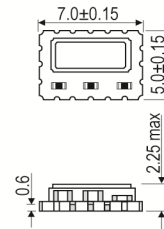
### Frequency Parameters

- Frequency: 10.0MHz to 40.0MHz
- Frequency Tolerance:  $\pm 1.00\text{ppm}$
- Frequency Stability:  $\pm 0.30\text{ppm}$  to  $\pm 2.50\text{ppm}$
- Acceleration sensitivity (Gamma vector, 3-axes, 30-1500Hz):  $< 2\text{ ppb/g typ}$
- Supply Voltage Variation ( $\pm 10\%$  change reference to frequency at nominal supply voltage):  $\pm 0.2\text{ppm typ}$
- Load Variation ( $\pm 5\text{pF}$  change reference to frequency at nominal load):  $\pm 0.2\text{ppm typ}$
- Ageing:
  - $\pm 1\text{ppm}$  maximum in 1st year, frequency  $< 20\text{MHz}$
  - $\pm 3\text{ppm}$  maximum for 10 years (including the 1st year), frequency  $< 20\text{MHz}$
  - $\pm 2\text{ppm}$  maximum in 1st year, frequency  $\geq 20\text{MHz}$
  - $\pm 5\text{ppm}$  maximum for 10 years (including the 1st year), frequency  $\geq 20\text{MHz}$
- After Reflow:  $\pm 1\text{ppm max}$

### Electrical Parameters

- Supply Voltage:  $5.0\text{V} \pm 10\%$
- Current Draw:  $1 + \text{Frequency(MHz)} * 1.2 * \{\text{Load(pF)} + 30\} * 10^{-3}\text{mA}$
- Supply voltages in the range 2.4V to 6.0V available to order, please contact our sales offices

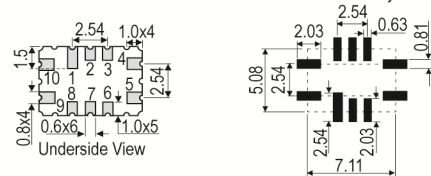
Outline (mm) -4A = Ref voltage = 4.2V, ageing adj option



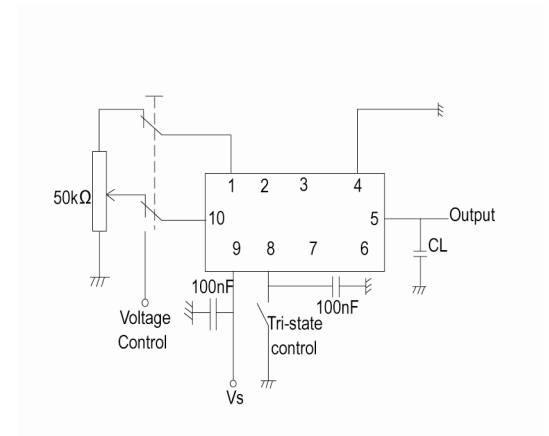
Pad Connections

1. Vref (N/C if not required)
2. N/C
3. Do not connect
4. GND
5. Output
6. N/C
7. N/C
8. Tri-state Control (Enable)
9. +Vs
10. Voltage Control or N/C

Solder Pad Layout



### Test Circuit



### Sales Office Contact Details:

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Web: [www.iqdfrequencyproducts.com](http://www.iqdfrequencyproducts.com)

### Frequency Adjustment

- Optional reference voltage output on pad 1, suitable for potentiometer supply or DAC reference:
  1. No output (standard option)
  2. 2.2V, for Min. VS>2.4V
  3. 2.7V, for Min. VS>3.0V
  4. 4.2V, for Min. VS>4.5VMaximum load current (mA) =  $V_{ref}/10$
- For manual frequency adjustment connect an external 50k $\Omega$  potentiometer between pad 1 (Reference Voltage) and pad 4 (GND) with wiper connected to pad 10 (Voltage Control). Please specify reference voltage as part of the ordering code.
- Three options with external Voltage Control applied to pad 10:
  - A. Standard Pulling Adjustment:  
 $\pm 5\text{ppm}$  min, frequency  $\leq 20\text{MHz}$   
 $\pm 7\text{ppm}$  min, frequency  $> 20\text{MHz}$
  - B. No frequency adjustment initial calibration @ 25°C <  
 $\pm 1.0\text{ppm}$
  - C. High Pulling  $\pm 10\text{ppm}$  to  $\pm 20\text{ppm}$  can be available depending on frequency and stability options (please contact our sales offices)
- Linearity: <1%
- Slope: Positive
- Input Resistance: >100k $\Omega$
- Modulation Bandwidth: >2kHz
- Voltage Control Range:  
Without reference voltage: 2.5V $\pm$ 1V  
With reference voltage:  $V_c = 0\text{V}$  to  $V_{ref}$

### Operating Temperature Ranges

- 0 to 50°C
- 0 to 70°C
- -20 to 70°C
- -30 to 75°C
- -40 to 85°C

### Output Details

- Output Compatibility                      Clipped Sine
- Drive Capability                            10k $\Omega$ //10pF
- AC-coupled clipped sine
- 0.8V pk-pk min

### Output Control

- Tri-state Operation:  
Logic '1' (>60% Vs) to pad 8 enables output  
Logic '0' (<20% Vs) to pad 8 disables output  
The tristate control (enable) pin has a internal 100k $\Omega$  pull up resistor which allows the pin to be left unconnected if not required. When in tristate mode, the output stage is disabled, but the oscillator and compensation circuit are still active (current consumption typ.  $\leq 1.0\text{mA}$ ).

### Noise Parameters

- Phase Noise (typical @ 13.0MHz):  
-65dBc/Hz @ 1Hz  
-95dBc/Hz @ 10Hz  
-120dBc/Hz @ 100Hz  
-135dBc/Hz @ 1kHz  
-140dBc/Hz @ 10kHz  
-145dBc/Hz @ 100kHz

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**Environmental Parameters**

- Storage Temperature Range: -55 to 125°C
- Shock: IEC 60068-2-27, Test Ea: 1500g acceleration for 0.5ms, 1/2 sine pulse, 3 shocks in each of 3 mutually perpendicular axes.
- Vibration: IEC 60068-2-6, Test Fc, 10Hz-60Hz at 10g 30mins in 3 mutually perpendicular axes at 1 octave per minute.
- Solderability: MIL-STD-202, Method 208, Category 3

**Manufacturing Details**

- RoHS Terminations                      NiCoAu
- RoHS Reflow                                260degC 30s

**Ordering Information**

- Frequency\*  
Model\*  
Reference Voltage + Frequency Adjustment Options\*  
Output  
Frequency Stability (over operating temperature range)\*  
Operating Temperature Range\*  
Supply Voltage  
(\*minimum required)
- Example  
10.0MHz CFPT-9005-1A  
Clipped Sine ±1.0ppm -20 to 70C 5.0V
- Note: Certain frequency stability / temperature range combinations may not be available for all frequencies.

**Compliance**

- RoHS Status (2011/65/EU)            Compliant
- REACH Status                            Compliant
- MSL Rating (JDEC-STD-033):        1

**Packaging Details**

- Pack Style: Reel            Tape & reel in accordance with EIA-481-D  
Pack Size: 1,000
- Pack Style: Bulk            Bulk pack  
Pack Size: 10

**Electrical Specification - maximum limiting values 5.0V ±10%**

Frequency Min	Frequency Max	Temperature Range	Stability (Min)	Current Draw	Rise and Fall Time	Duty Cycle
		°C	ppm	mA	ns	%
10.0MHz	40.0MHz	0 to 70	±0.5	-	-	-
		0 to 50	±0.3	-	-	-
		-20 to 70	±0.5	-	-	-
		-30 to 75	±1.0	-	-	-
		-40 to 85	±1.0	-	-	-

*This document was correct at the time of printing; please contact your local sales office for the latest version.*  
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