

ISSUE 13; April 2016

**Description**

- Sub 1ppm performance TCXO, 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 = 4.7V, ageing adj option



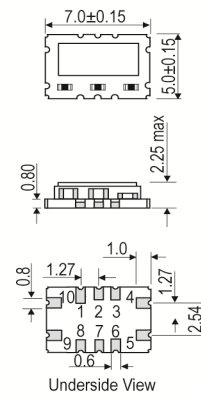
**Frequency Parameters**

- Frequency 10.0MHz to 40.0MHz
- Frequency Stability ±0.30ppm to ±2.50ppm
- Ageing ±2ppm max in 1st year (See Note 2)

**Electrical Parameters**

- Supply Voltage 5.0V ±10%
- Supply Current: 1+Frequency(MHz)  
\*1.2\*{Load(pF)+30}\*10-3mA
- Supply voltages in the range 2.4V to 6.0V available to order, please contact our sales offices
- 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>4.5V
 Maximum load current (mA) = Vref/10
- For manual frequency adjustment connect an external 50kΩ 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.

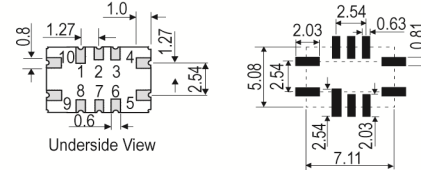
**Outline (mm) -1A = No ref voltage, ageing adj option**



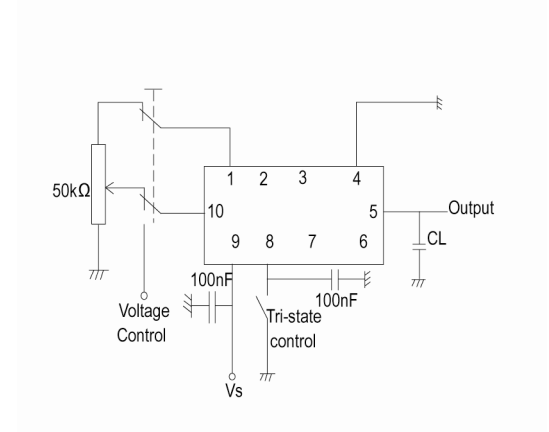
**Pad Connections**

- 1.V ref
  - 2.N/C
  - 3.Do not connect
  - 4.GND
  - 5.Output
  - 6.N/C
  - 7.N/C
  - 8.Tri-state Control \*
  - 9.+Vs
  - 10.Voltage Control\*
- \* Leave unconnected if not required

**Solder Pad Layout**



**Test Circuit**



**Sales Office Contact Details:**

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### Frequency Adjustment

- Pulling  $\pm 10\text{ppm}$  min (See note 1)
- Three options with external Voltage Control applied to pad 10:
  - A. Ageing Adjustment:
    - > $\pm 5\text{ppm}$ , frequency <20MHz
    - > $\pm 7\text{ppm}$ , frequency >20MHz
  - B. No frequency adjustment initial calibration @ 25°C <  
 $\pm 1.0\text{ppm}$
  - C. High Pulling  $\pm 10\text{ppm}$  to  $\pm 50\text{ppm}$  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 $\pm 1\text{V}$
  - With reference voltage:  $V_c = 0\text{V}$  to  $V_{ref}$
- Ageing:
  - $\pm 1\text{ppm}$  maximum in 1st year, frequency <20MHz
  - $\pm 3\text{ppm}$  maximum for 10 years (including the 1st year), frequency <20MHz
  - $\pm 2\text{ppm}$  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

### Operating Temperature Ranges

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

### Output Details

- Output Compatibility  $\text{Clipped Sine}$
- Load: 10k $\Omega$  // 10pF, AC-coupled

### Output Control

- Tri-state Operation:
  - Logic '1' (>60%  $V_s$ ) to pad 8 enables output
  - Logic '0' (<20%  $V_s$ ) to pad 8 disables output
  - When at logic '0' the output stage is disabled for all output options, but the oscillator and compensation circuit are still active (current consumption <1mA)

### Output Levels

- $V_{pk-pk} > 0.8\text{V}$

### Noise Parameters

- Phase Noise Typical (@ 13.0MHz):

Offset	dBc/Hz
10Hz	-95
100Hz	-120
1kHz	-135
10kHz	-140
100kHz	-145

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**Environmental Parameters**

- Storage Temperature Range: -55 to 125°C
- Shock: IEC 60068-2-27, Test Ea: 1500G acceleration for 6ms, 3 shocks in each of 3 mutually perpendicular planes
- Vibration: IEC 60068-2-6, Test Fc, Procedure B4: 10Hz-60Hz, 1.5mm displacement, 60-2000Hz at 98.1m/s<sup>2</sup>, 30mins in 3 mutually perpendicular planes at 1 oct/min
- Solderability: MIL-STD-202, Method 208, Category 3

**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            Loose in 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	±0.3	-	-	-
		-20 to 70	±0.5	-	-	-
		-30 to 75	±1.0	-	-	-
		-40 to 85	±1.0	-	-	-

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