

ISSUE 14; December 2021

## 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

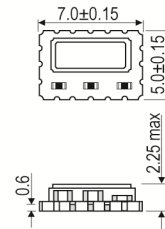
- Frequency: 1.25MHz to 40.0MHz
- Frequency Tolerance:  $\pm 1.00$ ppm
- Frequency Stability:  $\pm 0.30$ ppm to  $\pm 2.50$ ppm
- Acceleration sensitivity (Gamma vector, 3-axes, 30-1500Hz):  $< 2$  ppb/g typ
- Supply Voltage Variation ( $\pm 10\%$  change reference to frequency at nominal supply voltage):  $\pm 0.2$ ppm typ
- Load Variation ( $\pm 5$ pF change reference to frequency at nominal load):  $\pm 0.2$ ppm typ
- Ageing:
  - $\pm 1$ ppm maximum in 1st year, frequency  $< 20$ MHz
  - $\pm 3$ ppm maximum for 10 years (including the 1st year), frequency  $< 20$ MHz
  - $\pm 2$ ppm maximum in 1st year, frequency  $\geq 20$ MHz
  - $\pm 5$ ppm maximum for 10 years (including the 1st year), frequency  $\geq 20$ MHz
- After Reflow:  $\pm 1$ ppm max

## Electrical Parameters

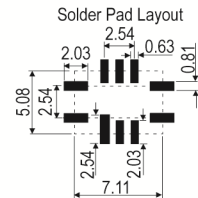
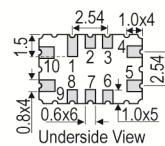
- Supply Voltage: 5.0V  $\pm 10\%$
- Supply Current (typical):
  - HCMOS:  $1 + \text{Frequency(MHz)} * \text{Supply(V)} * \{\text{Load(pF)} + 15\} * 1E-3$ mA
  - i.e @ 20MHz, 5.0V, 15pF  $\approx 4$ mA
  - Calculation:  $1 + (20 \times 5.0 \times (15 + 15) \times 0.001) = 4.0$ mA
- Supply voltages in the range 2.4V to 6.0V available to order, please contact our sales offices



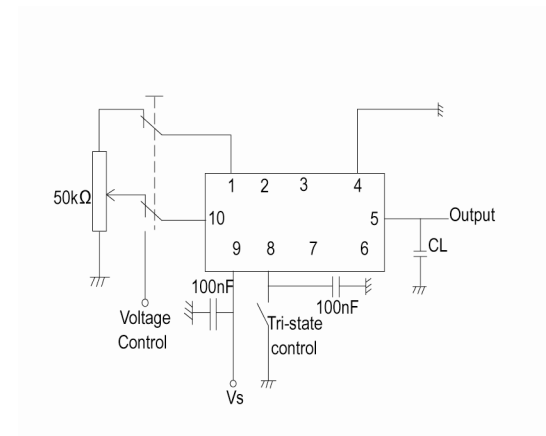
Outline (mm) -4A = Ref voltage = 4.2V, ageing adj option



- Pad Connections
- Vref (N/C if not required)
  - N/C
  - Do not connect
  - GND
  - Output
  - N/C
  - N/C
  - Tri-state Control (Enable)
  - +Vs
  - Voltage Control or N/C



## Test Circuit



## Sales Office Contact Details:

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**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:  
 $\pm 5$ ppm min, frequency <20MHz  
 $\pm 7$ ppm min, frequency >20MHz
  - B. No frequency adjustment initial calibration @ 25°C <  
 $\pm 1.0$ ppm
  - C. High Pulling  $\pm 10$ ppm to  $\pm 20$ 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:  $V_c = 0V$  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                      HCMOS
- Drive Capability                            15pF
- VoH > 90% Vs  
VoL < 10% Vs

**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.  $\leq 1.0$ 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
- Thermal Shock: IEC 60068-2-14, Test Nc Conditions: 15 cycles -55C to +125C
- Mechanical Shock: IEC 60068-2-27, Test Ea Conditions: 15 cycles 1500g 0.5ms 5 pulses/axis
- Vibration: IEC 60068-2-6, Test Fc, Conditions: 20g from 10 – 2000 Hz 12 hours total
- 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-9001-1A  
HCMOS ±1.0ppm -20 to 70C 5.0V
- Note: Certain frequency stability / temperature range combinations may not be available for all frequencies.

### Compliance

- RoHS Status (2015/863/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	Current Draw	Rise and Fall Time	Duty Cycle
		°C	ppm	mA	ns	%
1.25MHz	40.0MHz	0 to 70	±0.5	-	7	45/55%
		0 to 50	±0.3	-	7	45/55%
		-20 to 70	±0.5	-	7	45/55%
		-30 to 75	±1.0	-	7	45/55%
		-40 to 85	±1.0	-	7	45/55%

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