

# CFPT-9050 SMD TCVCXO

ISSUE 8; 1 NOVEMBER 2008 - RoHS 2002/95/EC

## Description

- 0.3ppm TCXO manufactured for us by Rakon utilising their Pluto™ ASIC technology. Its wide frequency range, operating temperature range and drive capability coupled with high stability and linear frequency pulling make it the ideal reference oscillator. Its ability to function down to a supply voltage of 2.4V and low power consumption makes it suitable for mobile applications

## Package Outline

- 14.7 x 9.2mm

## Standard Frequencies

- 9.6, 10, 12.8, 19.44, 20, 38.88, 49.152, 51.84MHz

## Output Compatibility & Load

- HCMOS 15pF max
- ACMOS 50pF max
- Sinewave 10kΩ // 10pF, AC-coupled
- Clipped sinewave 10kΩ // 10pF, AC-coupled

## Frequency Stability

- Temperature: see table
- Typical Supply Voltage Variation  $\pm 10\% < \pm 0.2 \text{ ppm}^*$
- Typical Load Coefficient 15pF  $\pm 5\text{pF} < \pm 0.2 \text{ ppm}^*$   
\*Depending on frequency and output type

## Frequency Adjustment

Three options with external Voltage Control applied to Pad 1:

- A - Ageing adjustment:  $> \pm 5\text{ppm}$  (Standard Option)
- B - No frequency adjustment. Initial calibration @ 25°C  $< \pm 0.5 \text{ ppm}$
- C - High Pulling  $\pm 10\text{ppm}$  to  $\pm 50\text{ppm}$  may be available depending on specification options. Contact our sales office
- Linearity  $< 1\%$  (positive slope)
- Input resistance  $> 100\text{k}\Omega$
- Modulation bandwidth  $> 2\text{kHz}$
- Standard control voltage ranges:  
Without reference voltage -  $V_s = 5.0\text{V} \text{ } 2.5\text{V} \pm 2\text{V}$   
Without reference voltage -  $V_s = 3.3\text{V} \text{ } 1.65\text{V} \pm 1\text{V}$   
With reference voltage -  $V_c = 0\text{V}$  to  $V_{ref}$

## Storage Temperature Range

- 55 to 125°C

## Tri-State Operation

- Logic '1' ( $> 60\% V_s$ ) to Pad 2 enables output
- Logic '0' ( $< 20\% V_s$ ) to Pad 2 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  $< 1\text{mA}$ )

## Supply Voltage

- Standard 3.3V, 5.0V (see table)
- Supply voltages in the range 2.4 to 6.0V available to order, please contact our sales office

## Supply Current

- HCMOS Typically:  
 $1 + \text{Frequency (MHz)} * \text{Supply (V)} * \{\text{Load (pF)} + 15\} * 10^{-3} \text{ mA}$   
eg. 20MHz, 5V, 15pF  $\approx 4\text{mA}$
- ACMOS Typically:  
 $1 + \text{Frequency (MHz)} * \text{Supply (V)} * \{\text{Load (pF)} + 23\} * 10^{-3} \text{ mA}$
- Sinewave, 6 to 12 mA depending on frequency
- Clipped Sinewave, Typically:  
 $1 + \text{Frequency (MHz)} * 1.2 * \{\text{Load (pF)} + 30\} * 10^{-3} \text{ mA}$

## Ageing

- $\pm 1\text{ppm}$  maximum in first year
- $\pm 3\text{ppm}$  maximum for 10 years
- $\pm 1\text{ppm}$  maximum after reflow

## Reference Voltage, $V_{ref}$ (HCMOS/ACMOS only)

- Optional reference voltage output on Pad 5, suitable for potentiometer supply or DAC reference.
  - No output (Standard option)
  - 2.2V, for Min.  $V_s > 2.4\text{V}$
  - 2.7V, for Min.  $V_s > 3.0\text{V}$
  - 4.2V, for Min.  $V_s > 4.5\text{V}$
 Maximum load current (mA) =  $V_{ref}/10$

For manual frequency adjustment (HCMOS/ACMOS output only) connect an external 50kΩ potentiometer between Pad 5 (Reference Voltage) and Pad 3 (GND) with wiper connected to Pad 1 (Voltage Control). Please specify reference voltage as a part of the ordering code.

Note: Please contact our sales office if a reference voltage is required in combination with sine or clipped sinewave output

## Environmental

- Vibration: IEC 60068-2-6 Test Fc Procedure B4, 10-60Hz 1.5mm displacement, 60 – 2000Hz at  $98.1 \text{ ms}^{-2}$ , 30 minutes in each of three mutually perpendicular planes at 1 octave per minute
- Shock: IEC 60068-2-27 Test Ea,  $980\text{ms}^{-2}$  acceleration for 6ms duration, 3 shocks in each direction along three mutually perpendicular planes
- Solderability: MIL-STD-202, Method 208, Category 3

## Marking Includes

- Factory Code + Part Number (E and four digits) + Frequency (MHz) + Pad 1 / Static sensitivity identifier (Triangle) + Date code

## Packaging

- Bulk or Tape & Reel

## Minimum Order Information Required

- Frequency + Model Number + Frequency Stability vs Operating Temperature Range Code + Reference Voltage Code + Frequency Adjustment Code



Registration No. F3546209

### Phase Noise (typical figures)

Frequency	Frequency offset from carrier: 10Hz	Frequency offset from carrier: 100Hz	Frequency offset from carrier: 1kHz	Frequency offset from carrier: 10kHz	Frequency offset from carrier: 100kHz
13.0MHz	-95 dBc/Hz	-120 dBc/Hz	-135 dBc/Hz	-140 dBc/Hz	-145 dBc/Hz

### Electrical Specification - limiting values

Frequency Range	Supply Voltage	Output Voltage	Output Levels	Rise Time (tr)	Fall Time (tf)	Duty Cycle	Model Number
1.0MHz to 50.0MHz	3.3V ±10%	HCMOS 15pF	VoH > 90% Vs VoL < 10% Vs	8ns	8ns	45/55%	CFPT-9058
1.0MHz to 50.0MHz	5.0V ±10%	HCMOS 15pF	VoH > 90% Vs VoL < 10% Vs	7ns	7ns	45/55%	CFPT-9051
8.0MHz to 50.0MHz	3.3V ±10%	Sine 10kΩ//10pF	<20.0MHz: > 1.0Vpp >20.0MHz: > 0.5Vpp	-		-	CFPT-9059
8.0MHz to 50.0MHz	5.0V ±10%	Sine 10kΩ//10pF	<20.0MHz: > 1.0Vpp >20.0MHz: > 0.5Vpp	-		-	CFPT-9053
1.0MHz to 80.0MHz	3.3V ±10%	ACMOS 15pF	VoH > 90% Vs VoL < 10% Vs	3ns	3ns	45/55%	CFPT-9060
1.0MHz to 80.0MHz	5.0V ±10%	ACMOS 15pF	VoH > 90% Vs VoL < 10% Vs	2ns	2ns	45/55%	CFPT-9055
8.0MHz to 50.0MHz	3.3V ±10%	Clipped Sine 10kΩ//10pF	Vpk-pk > 0.8V	-		-	CFPT-9061
8.0MHz to 50.0MHz	5.0V ±10%	Clipped Sine 10kΩ//10pF	Vpk-pk > 0.8V	-		-	CFPT-9057

### Frequency Stability Available over Operating Temperature Ranges

Operating Temperature Ranges	Frequency Stabilities v Operating Temperature Range					
	±0.3ppm	±0.5ppm	±1.0ppm	±1.5ppm	±2.0ppm	±2.5ppm
0 to 50°C	Code AP	Code EP	Code FP	Code CP	Code GP	Code HP
0 to 70°C	Code AC	Code EC	Code FC	Code CC	Code GC	Code HC
-20 to 70°C	Code AS*	Code ES	Code FS	Code CS	Code GS	Code HS
-30 to 75°C	-	Code EU	Code FU	Code CU	Code GU	Code HU
-40 to 85°C	-	Code EX*	Code FX	Code CX	Code GX	Code HX
-55 to 105°C	-	-	Code FY*	Code CY	Code GY	Code HY

Ordering Example 10.0MHz CFPT-9051 CS 1 A

Frequency \_\_\_\_\_

Model Number \_\_\_\_\_

Frequency Stability vs Operating Temperature Code \_\_\_\_\_

Reference Voltage Code \_\_\_\_\_

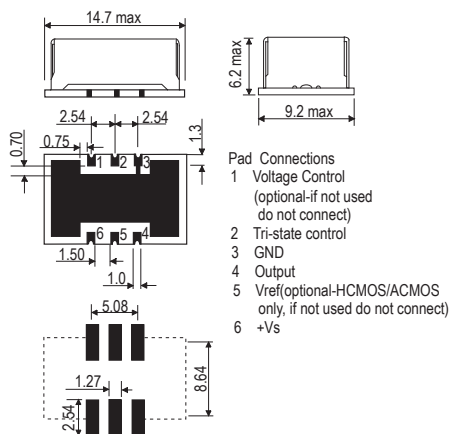
Frequency Adjustment Code \_\_\_\_\_

(For reference voltage and frequency adjustment codes see main text)

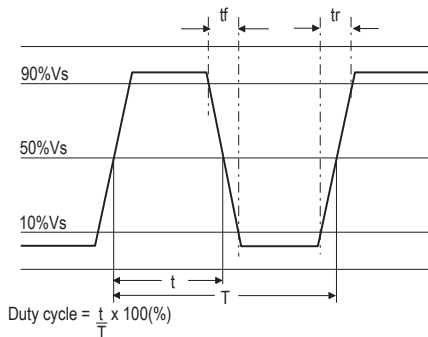
Note: \*Codes may not be available for all frequencies

TCXOs

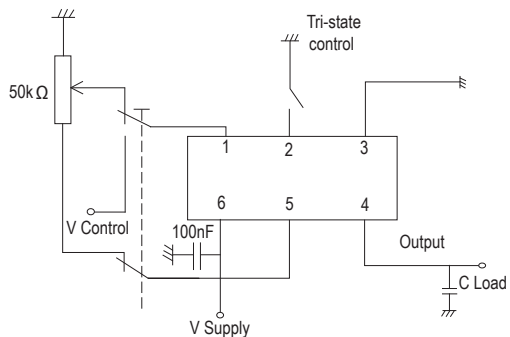
### Outline (mm)



### Output Waveform



### Test Circuit



\*Inclusive of jig and probe capacitance\*\*DC cut capacitor required for AC coupled clipped sinewave