CFPT-9000　SMD TCXO/TCVCXOs

ISSUE 12; 1 NOVEMBER 2008 - RoHS 2002/95/EC

Description

- Sub 1ppm performance TCXO manufactured for us by Rakon utilising their Pluto™ ASIC technology, 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

Package Outline

- 7 x 5mm

Standard Frequencies

- 3.2, 5, 6.4, 8.192, 9.6, 12.688375, 10, 12.8, 13, 14.4, 14.85, 16.384, 16.367, 16.8, 19.2, 19.44, 19.8, 20, 24.5535, 32.768, 38.88, 40MHz

Output Compatibility & Load

- HCMOS 15pF
- ACMOS 50pF max.
  (available on request, contact sales office)
- Sinewave 10kΩ // 10pF, AC-coupled
- Clipped sinewave 10kΩ // 10pF, AC-coupled

Frequency Stability

- Temperature: see table
- Typical Supply Voltage Variation ±10% < ±0.2 ppm*
- Typical Load Coefficient 15pF ±5pF < ±0.2 ppm*
  *Dependent on frequency and output type

Frequency Adjustment

Three options with external Voltage Control applied to Pad 10:

- A - Ageing adjustment: > ±5ppm, frequency < 20MHz
  (Standard Option)
  > ±7ppm, frequency > 20MHz
- B - No frequency adjustment initial calibration @ 25°C
  < ±1.0 ppm
- C - High Pulling ±10ppm to ±50ppm can be available depending on frequency and stability options. Please consult our sales office
- Linearity: < 1%
- Slope: Positive
- Input resistance: > 100kΩ
- Modulation bandwidth: > 2kHz
- Standard voltage control ranges:
  Without reference voltage - Vs=5.0V 2.5V±1V
  Without reference voltage - Vs=3.3V 1.65V±1V
  With reference voltage - Vc=0V to Vref

Storage Temperature Range

- –55 to 125°C

Tri-State Operation

- Logic '1' (>60%Vs) to Pad 8 enables output
- Logic '0' (<20%Vs) 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)

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+Frequency(MHz)*Supply(V)*{Load(pF)+15}*10^{-3} mA
  e.g. 20MHz, 5V, 15pF ≈ 4mA
- Sinewave <8mA
- Clipped Sinewave Typically:
  1+Frequency(MHz)*1.2*{Load(pF)+30}*10^{-3}mA

Ageing

- ±1ppm maximum in first year, frequency <20MHz
- ±2ppm maximum in first year, frequency > 0MHz
- ±3ppm maximum for 10 years (including the first year), frequency <20MHz
- ±5ppm maximum for 10 years (includng the first year), frequency >20MHz

After Reflow

- ±1ppm max

Reference Voltage, Vref

- 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

Environmental

- Vibration: IEC 60068-2-6 Test Fc Procedure B4, 10-60Hz 1.5mm displacement, 60 –2000Hz at 10gn, 30 minutes in each of three mutually perpendicular planes at 1 octave per minute
- Shock: IEC 60068-2-27 Test Ea, 1500g acceleration for 0.5ms duration, 1/2 sine pulse, 3 shocks in each direction along three mutually perpendicular planes
- Solderabiltiy: MIL-STD-202, Method 208, Category 3

Marking Includes

- Factory code + Manufacturing identifier (xx) + Pad 1 / Static sensitivity identifier (Triangle) + Part Number (Four digits) + Date Code
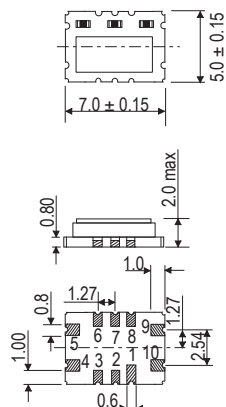
Packaging

- Bulk or Tape & Reel

Minimum Order Information Required

- Frequency + Model Number + Frequency Stability vs Operating Temperature Range Code + Reference Voltage Code + Frequency Adjustment Code
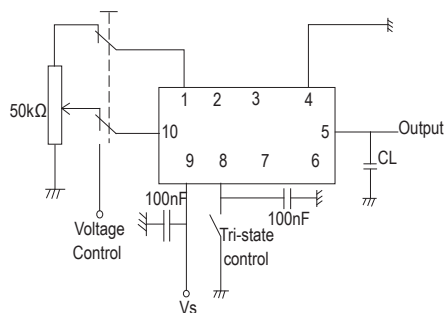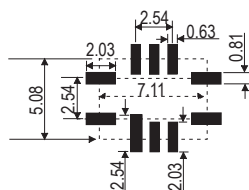
Outline (mm)

Pad Connections
1. V ref
2. N/C
3. DC Coupled Output
   (do not connect)
4. GND
5. Output
6. N/C
7. N/C
8. Tri-state Control (Enable)*
9. +Vs
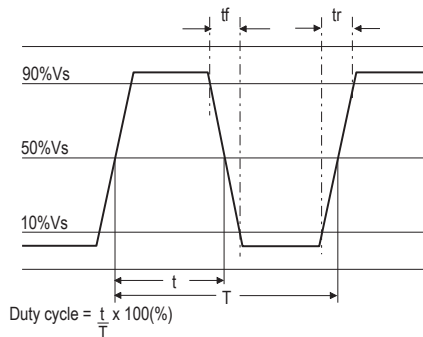10. Voltage Control*
 *leave unconnected if not required.

Test Circuit

Solder pad layout

Output Waveform

Duty cycle = $\frac{t}{T}$ x 100(%)

TCXOs

Registration No. FS540259

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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
1.25 to 40.0MHz	3.3V ±10%	HCMOS 15pF	VoH > 90% Vs VoL < 10% Vs	8ns	8ns	45/55%	CFPT-9006
1.25 to 40.0MHz	5.0V ±10%	HCMOS 15pF	VoH > 90% Vs VoL < 10% Vs	7ns	7ns	45/55%	CFPT-9001
10.0 to 40.0MHz	3.3V ±10%	Sine 10kΩ//10pF	< 20MHz > 1 Vpk-pk > 20MHz > 0.5Vpk-pk	–	–		CFPT-9007
10.0 to 40.0MHz	5.0V ±10%	Sine 10kΩ//10pF	< 20MHz > 1 Vpk-pk > 20MHz > 0.5Vpk-pk	–	–		CFPT-9003
10.0 to 40.0MHz	3.3V ±10%	Clipped Sinewave 10kΩ//10pF	Vpk-pk > 0.8V	–	–		CFPT-9008
10.0 to 40.0MHz	5.0V ±10%	Clipped Sinewave 10kΩ//10pF	Vpk-pk > 0.8V	–	–		CFPT-9005

Frequency Stabilities over Operating Temperature Range

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 AU*	Code EU*	Code FU	Code CU	Code GU	Code HU
–40 to 85°C	Code AX*	Code EX*	Code FX	Code CX	Code GX	Code HX

Ordering Example   10.0MHz   CFPT-9001   CX   1   A   LF
Frequency ————
Model Number ————
Frequency Stability vs Operating Temperature Code ————
Reference Voltage Code ————
Frequency Adjustment Code ————
Lead-Free Version ————
(For reference voltage and frequency adjustment codes see main text)

Note *Codes may not be available for all frequencies