CFPT-9000 Series

ISSUE 6; 8 MAY 2003

Recommended for New Designs

Delivery Options

- Please contact our sales office for current leadtimes

Description

- A series of surface mountable 7.0 × 5.0mm TCVCXOs for medium to high volume applications where small size and high performance are pre-requisites. This oscillator uses C-MAC's latest custom ASIC "Pluto", a single chip oscillator and analogue compensation circuit, capable of sub 1 ppm performance 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

Standard Frequencies

- 3.2, 5.0, 6.4, 8.192, 9.6, 10.0, 12.8, 13.0, 14.4, 14.85, 16.384, 16.8, 19.2, 19.44, 19.8, 20.0, 32.768, 38.88 and 40.0 MHz

Output Waveform

- Square HCMOS 15pF load

- Square ACMOS 50pF max. load
  (Available on request, contact sales office)

- Sinewave 10kΩ // 10pF, AC-coupled

- Clipped sinewave 10kΩ // 10pF, AC-coupled

Supply Voltage

- Operating range 2.4 to 6.0V, see table

Current Consumption

- HCMOS Typically ≈
  $1+Frequency(MHz)*Supply(V)*\{Load(pF)+15\}*10^{-3}$ mA
  E. g. 20MHz, 5V, 15pF ≈ 4mA

- Sinewave Typically ≤ 8mA

- Clipped Sinewave Typically ≈
  $1+Frequency(MHz)*1.2*\{Load(pF)+30\}*10^{-3}$ mA

Package Outline

- 7.0 x 5.0 x 2.0mm SMD (Surface mount device) ceramic carrier

Ageing

- ±1ppm maximum in first year, frequency ≤ 20MHz

- ±2ppm maximum in first year, frequency > 20MHz

- ±3ppm maximum for 10 years, frequency ≤ 20MHz

- ±5ppm maximum for 10 years, frequency > 20MHz

- ±1ppm maximum after reflow

Frequency Stability

- Temperature: see table

- Typical Supply Voltage Variation ±10% ≤ ±0.2 ppm*

- Typical Load Coefficient 15pF ±5pF ≤ ±0.2 ppm*

  *Dependant on frequency and output type

Frequency Adjustment

- Three options with external Control Voltage 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 control voltage 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

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 (Ground) with wiper connected to pad 10 (Voltage Control). Please specify reference voltage as part of the ordering code

Tri-state

- Pad 8 open circuit or >0.6Vs output enabled

- < 0.2Vs Tri-state

- When Tri-stated, the output stage is disabled for all output options, but the oscillator and compensation circuit are still active
  (Current consumption <1mA)

SURFACE MOUNT TCXOs

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Vibration: IEC 60068-2-6 Test Fc Procedure B4, 10-60Hz 1.5mm displacement, 60 –2000Hz at 98.1 ms^{-2}, 30 minutes in each of three mutually perpendicular axes at 1 octave per minute

- Shock: IEC 60068-2-27 Test Ea, 980ms^{-2} acceleration for 6ms duration, 3 shocks in each direction along three mutually perpendicular axes

- Soldering: SMD product suitable for Convection Reflow soldering. Peak temperature 260°C. Maximum time above 220°C, 60 secs.

- Solderabiltiy: MIL-STD-202, Method 208, Category 3

- Marking: Laser Marked

Marking Includes

- C-MAC

- Manufacturing identifier (xx)

- Pad 1 / Static sensitivity identifier (Triangle)

- Part Number (Four digits)

- Device date code (YW)

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CMAC xx
Δ  0000 YW
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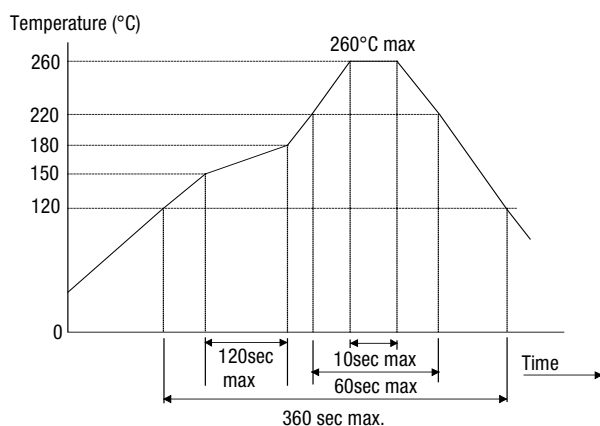
Minimum Order Information Required

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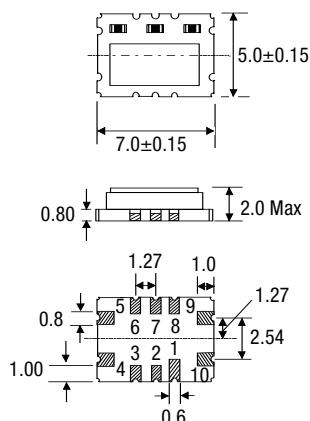
OR

- Discrete part number for repeat orders

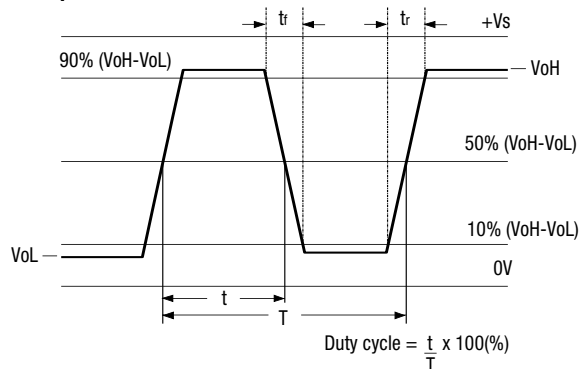Please supply full information for non-standard options, if required
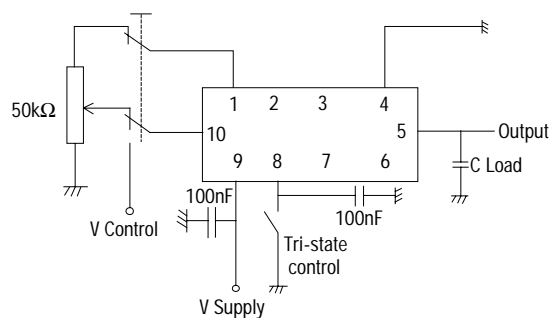
Reflow Solder Profile

Outline in mm - (scale 2:1)

Pad Connections.
1. V ref
2. NC
3. DC Coupled Output (Do not connect)
4. Gnd
5. Output
6. NC
7. NC
8. Tri State Control (Enable)*
9. Supply,+Vs
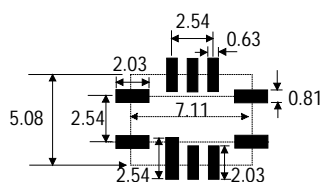10. Voltage Control*
*leave unconnected if not required.

Output Waveform - HCMOS

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

Test Circuit

Pad layout

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 when measured in test circuit

Frequency Range	Supply Voltage	Output Waveform	Output levels	Rise Time(tr)	Fall Time (tf)	Duty Cycle	Model Number
1.25 to 40.0MHz	3.3V±10%	Square HCMOS 15pF	Voh ≥ 90% Vs Vol ≤ 10% Vs	8ns	8ns	45/55%	CFPT-9006
1.25 to 40.0MHz	5.0V±10%	Square 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	Vpk-pk ≥ 1V	—	—	CFPT-9007
10.0 to 40.0MHz	5.0V±10%	Sine 10kΩ//10pF	Vpk-pk ≥ 1V	—	—	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 Stability Available Over Operating Temperature Ranges

Operating Temperature Ranges	Frequency Stabilities Vs 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

Ordering Example 10.0MHz CFPT-9001 CX 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	