CFPT-9025 Series High Performance TCXO/TCVCXO

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Recommended for New Designs

Delivery Options

- Please contact our sales office for current leadtimes

Description

- The CFPT-9025 series of temperature compensated crystal oscillators provide for ultra high stabilities down to ±0.3ppm and operating temperature ranges as wide as –55 to +125°C. The oscillator uses C-MAC's latest custom ASIC "Pluto", a single chip oscillator and analogue compensation circuit. Due to its unique mechanical construction the CFPT-9025 series is able to withstand 20,000 G's acceleration, which makes it the TCXO of choice for gun hardened GPS navigation systems

Standard Frequencies

- 9.6, 10.0, 11.68, 12.504, 12.8, 13.0, 14.4, 16.3676, 19.44, 20.0, 21.73875, 24.5535, 38.88, 40.96, 47.032, 49.152, 51.84 MHz

Non-standard Frequencies in the range 1.0 MHz to 75.0 MHz (see table) are available on request, contact sales office.

Output Waveform

- Square HCMOS 15pF load
- Square ACMOS 50pF max. load
- Sinewave ≥1.0pk-pk, 10kΩ // 10pF load
- Clipped sinewave ≥0.81Vpk-pk, 10kΩ // 10pF load

Sinewave and clipped sinewave signals are superimposed on a DC offset, to remove this offset insert an external coupling capacitor in series with the output

Supply Voltage

- 3.3 and 5.0V, see table, non-standard supply voltages in the range 2.4 to 6.0V are available on request, contact sales office

Current Consumption

- HCMOS Typically ≈ 1+Frequency(MHz)*Supply(V)*{Load(pF)+15}*10^{-3} mA
  E. g. 20MHz, 5V, 15pF ≈ 4mA
- ACMOS Typically ≈ 1+Frequency(MHz)*Supply(V)*{Load(pF)+23}*10^{-3} mA
- Sinewave ≤ 8 mA
- Clipped Sinewave Typically ≈ 1+Frequency(MHz)*1.2*{Load(pF)+30}*10^{-3} mA

Package Outline

- Low Profile, 7.6 x 9.3 x 3.2 mm SMD package with High Temperature Co-fired Ceramic base and metal cover

Ageing

- ±1ppm maximum in first year
- ±5ppm maximum for 10 years

Frequency Stability

- Temperature: see table
- Typical Supply Voltage Variation ±10% ≤ ±0.2 ppm
- Typical Load Coefficient ±10% ≤ ±0.1 ppm

Frequency Adjustment

- Three options with external Control Voltage applied to pad 1:

  A - Ageing adjustment: ≥ ±5ppm (Standard Option)

  B - No frequency adjustment initial calibration @ 25°C ≤ ±0.5 ppm

  C - High Pulling ±10ppm to ±50ppm and non-standard control voltage ranges may 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 Vc=2.5V±2V

  Without reference voltage - Vs=3.3V Vc=1.65V±1V

  With reference voltage - Vc=0V to Vref

Reference Voltage, Vref

- Optional reference voltage output on pad 2, suitable for potentiometer supply or DAC reference.

  1. No output (Standard option)
  2. 2.2V, for Min. Vs>2.4V
  3. 2.75V, for Min. Vs>3.0V
  4. 4.2V, for Min. Vs>4.5V

  Maximum load current 100µA

For manual frequency adjustment connect an external 50kΩ potentiometer between pad 2 (Reference Voltage) and pad 3 (Ground) with wiper connected to pad 1 (Voltage Control). Please specify reference voltage as a part of the ordering code

Tri-state

- Pad 5 open circuit or >0.6Vs output enabled
- Pad 5 < 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)

Storage Temperature Range

- –55 to 125°C

Marking Includes

- C-MAC
- Pin 1 / Static sensitivity identifier (Triangle)
- Part Number (E and Four digits)
- Device date code / Location (YWL)

CMAC YWL
Δ E2795

Environmental Specification

- To be discussed on an individual basis, contact sales office

Minimum Order Information Required

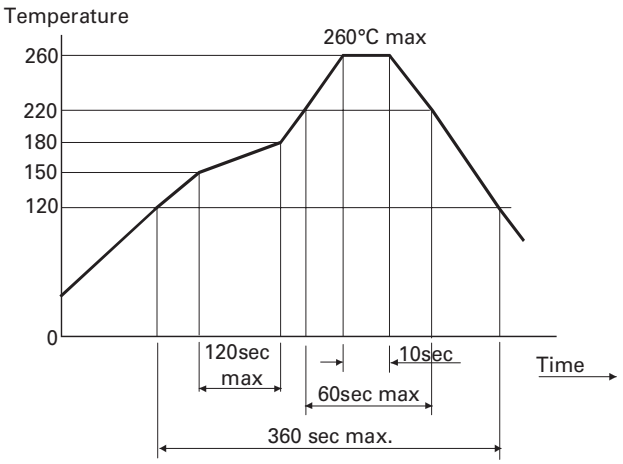
- Frequency + Model Number + Frequency Stability vs Operating Temperature Range Code + Reference Voltage Code + Frequency Adjustment Code

OR

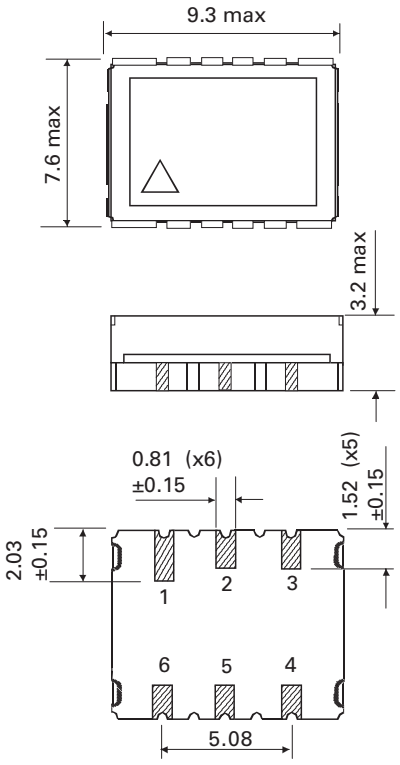
- Discrete part number for repeat orders

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

Reflow Solder Profile



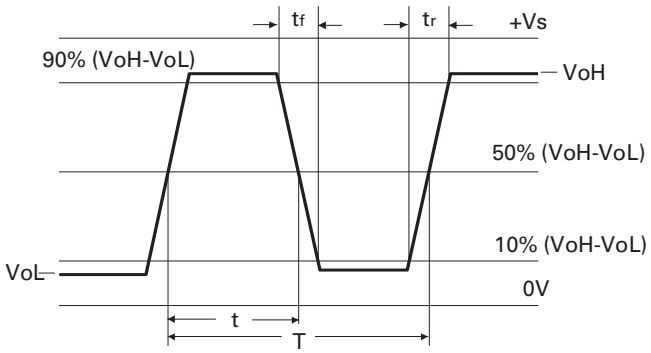
Outline in mm



Pad Connections
1. Voltage Control*
2. Vref*
3. GND
4. Output
5. Tri-state Control (Enable)*
6. +Vs

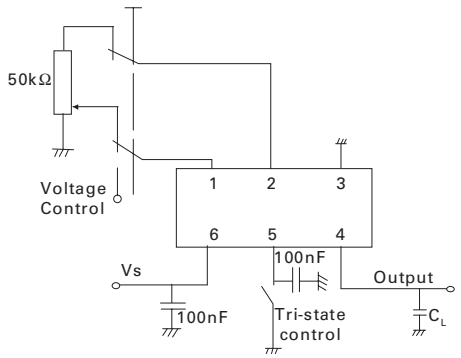
*Leave unconnected if not required

Output Waveform - HCMOS



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

Test Circuit



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
25.0MHz	–85 dBc/Hz	–110 dBc/Hz	–125 dBc/Hz	–135 dBc/Hz	–140 dBc/Hz
50.0MHz	–75 dBc/Hz	–100 dBc/Hz	–120 dBc/Hz	–130 dBc/Hz	–135 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
1.0 to 50.0MHz	3.3V±10%	Square HCMOS 15pF	Voh ≥ 90% Vs Vol ≤ 10% Vs	8ns	8ns	45/55%	CFPT-9026
1.0 to 50.0MHz	5.0V±10%	Square HCMOS 15pF	Voh ≥ 90% Vs Vol ≤ 10% Vs	7ns	7ns	45/55%	CFPT-9027
8.0 to 50.0MHz	3.3V±10%	Sine 10k //10pF	Vpk-pk ≥ 1V	—		—	CFPT-9028
8.0 to 50.0MHz	5.0V±10%	Sine 10k //10pF	Vpk-pk ≥ 1V	—		—	CFPT-9029
1.0 to 75.0MHz	3.3V±10%	Square ACMOS 15pF	Voh ≥ 90% Vs Vol ≤ 10% Vs	3ns	3ns	45/55%	CFPT-9030
1.0 to 75.0MHz	5.0V±10%	Square ACMOS 15pF	Voh ≥ 90% Vs Vol ≤ 10% Vs	2ns	2ns	45/55%	CFPT-9031
8.0 to 50.0MHz	3.3V±10%	Clipped Sinewave 10k //10pF	Vpk-pk ≥ 0.8V	—		—	CFPT-9032
8.0 to 50.0MHz	5.0V±10%	Clipped Sinewave 10k //10pF	Vpk-pk ≥ 0.8V	—		—	CFPT-9033

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
–55 to 95°C			Code FA*	Code CA	Code GA	Code HA
–55 to 125°C					Code GZ*	Code HZ

Ordering Example 10.0MHz CFPT-9026 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; stability of ±3ppm over -40 to 110°C is available as code 'JY' (e.g. 44.0MHz CFPT-9030-JY-1B)