

SMD Temperature Compensated Crystal Oscillator (PLUTO)

A series of surface mountable 7.0x5.0mm Temperature Compensated Voltage Controlled Crystal Oscillators (TCVCXOs) for medium to high volume applications where small size and high performance are prerequisites.

Product description

The CFPT9000 uses Rakon's proprietary ASIC 'Pluto™', a single chip oscillator and analogue compensation circuit, capable of sub 0.2ppm performance over an extended temperature range. Its ability to function down to a supply voltage of 2.4V and low power consumption makes it particularly suitable for mobile applications.

**Applications**

- Communications
- Other

Features

- Sub 0.2ppm stability over extended temperature range
- Wide frequency range

Specifications**1.0 SPECIFICATION REFERENCES**

Line	Parameter	Description
1.1	Model description	CFPT9000
1.2	Part number format	Exxxx(LF)(T), issue A (YYYY-MM-DD)
1.3	RoHS compliant	Yes, part numbers with suffix 'LF' (non-RoHS version available upon request)
1.4	Package size	7.0mm x 5.0 x 2.25 mm. Please select footprint version P1~P4 in model code builder (for details see model drawings). P1: 10 pad (default) P2: 10 pad (inline) P3: 8 pad P4: 4 pad

2.0 FREQUENCY CHARACTERISTICS

Line	Parameter	Test Condition	Value	Unit
2.1	Nominal frequency range	Frequency range available (note 1)	1.2 to 40	MHz
2.2	Frequency calibration	Initial calibration @ 25°C	±1 max	ppm
2.3	Reflow shift	Measured ≥ 60 minutes after reflow	±1 max	ppm
2.4	Frequency stability over temperature	Reference to (Fmax + Fmin)/2	±0.2 to 2.5	ppm
2.5	Temperature range	Operating temperature range over which temperature stability is measured (wider than -40 to 85°C available on request)	-40 to 85	°C
2.6	Supply voltage stability	±10% variation, reference to frequency at nominal supply voltage, typical value	±0.2	ppm
2.7	Load sensitivity	HCMOS, AC MOS: ±5pF variation, clipped sinewave / sinewave: ±10% variation, reference to frequency at nominal load, typical value	±0.2	ppm
2.8	Long term stability	First year, ≤ 20MHz	±1 max	ppm
2.9	Long term stability	First year, > 20MHz	±2 max	ppm
2.10	Long term stability	10 years, ≤ 20MHz	±3 max	ppm
2.11	Long term stability	10 years, > 20MHz	±5 max	ppm
2.12	Acceleration sensitivity	Gamma vector, 3-axes, 30-1500Hz, typically less than...	2	ppb/g

3.0 POWER SUPPLY

Line	Parameter	Test Condition	Value	Unit
3.1	Supply voltage	Nominal supply voltage ($\pm 10\%$) to be specified as part of model code	2.4 to 6	V
3.2	Current Clipped Sinewave	typically: $1 + \text{frequency(MHz)} * 1.2 * \{\text{load(pF)} + 30\} * 10^{-3} \text{mA}$		mA
3.3	Current Sinewave		8 max	mA
3.4	Current HCMOS	typically: $1 + \text{frequency(MHz)} * \text{supply(V)} * \{\text{load(pF)} + 15\} * 10^{-3} \text{mA}$ e.g 20MHz, 5V, 15pF = 4mA		mA

4.0 CONTROL VOLTAGE

Line	Parameter	Test Condition	Value	Unit
4.1	Control voltage range	Without reference voltage; $V_s = 5.0\text{V}$	1.5 to 3.5	V
4.2	Control voltage range	Without reference voltage; $V_s = 3.3\text{V}$	0.65 to 2.65	V
4.3	Control voltage range	With reference voltage (when specified as part of the model code): 0 to V_{ref} [V]		V
4.4	Frequency tuning (standard)	$\leq 20\text{MHz}$ (note 3)	± 5 min	ppm
4.5	Frequency tuning (standard)	$> 20\text{MHz}$ (note 3)	± 7 min	ppm
4.6	Slope	Positive		
4.7	Linearity		1 max	%
4.8	Port input impedance	Measured between control voltage and GND pin	100 min	k Ω
4.9	Modulation bandwidth		2 min	kHz

5.0 OSCILLATOR OUTPUT - CLIPPED SINEWAVE

Line	Parameter	Test Condition	Value	Unit
5.1	Output waveform	AC coupled clipped sinewave		
5.2	Output voltage level	Peak to peak voltage	0.8 min	V
5.3	Output load resistance		10	k Ω
5.4	Output load capacitance		10	pF

6.0 OSCILLATOR OUTPUT - SINEWAVE

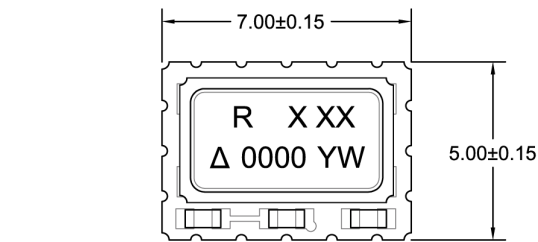
Line	Parameter	Test Condition	Value	Unit
6.1	Output waveform	AC coupled sinewave		
6.2	Output voltage level	Peak to peak voltage $\leq 20\text{MHz}$	1 min	V
6.3	Output voltage level	Peak to peak voltage $> 20\text{MHz}$	0.5 min	V
6.4	Output load resistance		10	k Ω
6.5	Output load capacitance		10	pF

7.0 OSCILLATOR OUTPUT - HCMOS

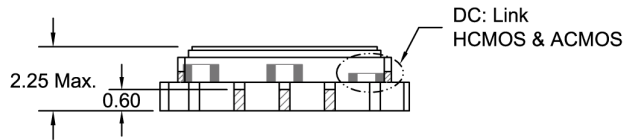
Line	Parameter	Test Condition	Value	Unit
7.1	Output waveform	HCMOS (note HCMOS available upon request)		
7.2	Output voltage level low (VoL)		0.1 max	Vs
7.3	Output voltage level high (VoH)		0.9 min	Vs
7.4	Rise and fall times	Measured with $V_{\text{cc}} = 3.3\text{V}$	8 max	ns
7.5	Rise and fall times	Measured with $V_{\text{cc}} = 5.0\text{V}$	7 max	ns
7.6	Duty cycle	Measured at 50% level	45 to 55	%
7.7	Load	Nominal	15	pF

Drawing Name: CFPT9000 Model Drawing - P1

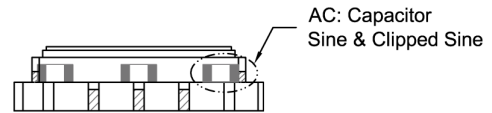
MODEL DRAWING



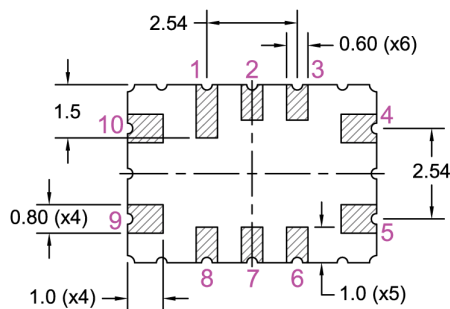
1
TOP VIEW



FRONT VIEW (DC)



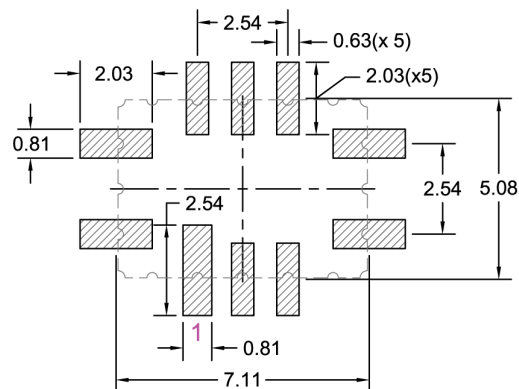
FRONT VIEW (AC)



BOTTOM VIEW

NOTE:
Pin connections are detailed
in the specification.

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: CFPT9000 Model 10P Standard (P1)

RELATED DRAWINGS:

FILENAME: CAT704

REVISION: A

DATE: 03-Aug-12

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX = ± 0.5

X.X = ± 0.2

X.XX = ± 0.10

X.XXX = ± 0.05

X° = $\pm 1.0^\circ$

Hole = ± 0.10

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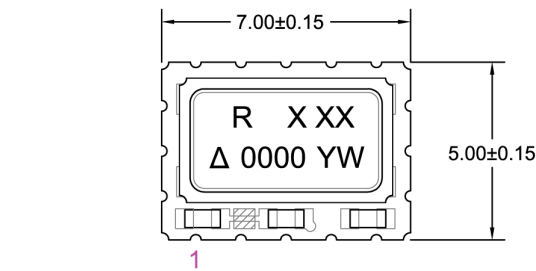
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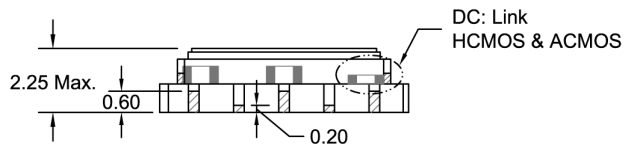
<http://www.smdcrystal.com>

Drawing Name: CFPT9000 Model Drawing - P2

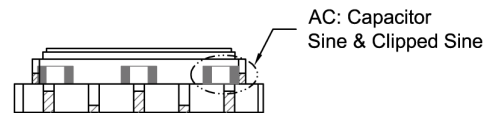
MODEL DRAWING



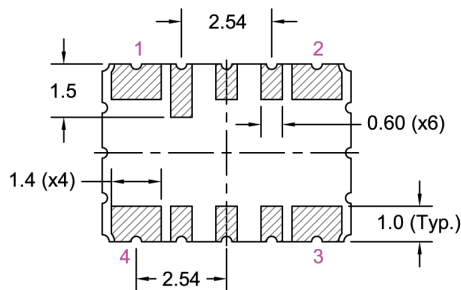
TOP VIEW



FRONT VIEW (DC)



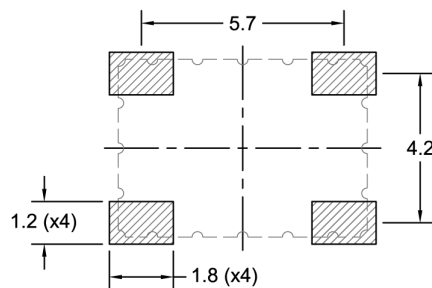
FRONT VIEW (AC)



BOTTOM VIEW

NOTE:
Pin connections are detailed
in the specification.

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: CFPT9000 Model 10P Inline (P2)

RELATED DRAWINGS:

FILENAME: CAT705

REVISION: A

DATE: 03-Aug-12

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX = ± 0.5

X.X = ± 0.2

X.XX = ± 0.10

X.XXX = ± 0.05

X° = $\pm 1.0^\circ$

Hole = ± 0.10

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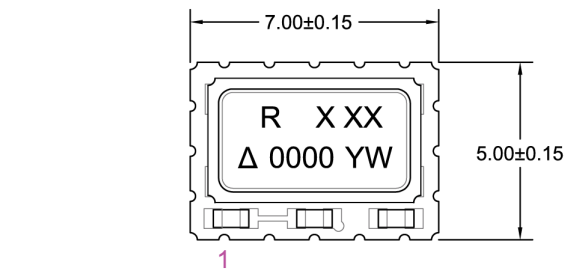
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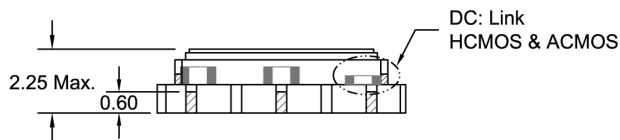
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Drawing Name: CFPT9000 Model Drawing - P3

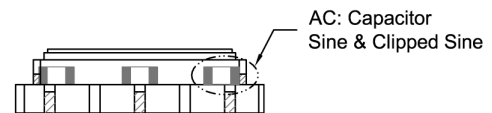
MODEL DRAWING



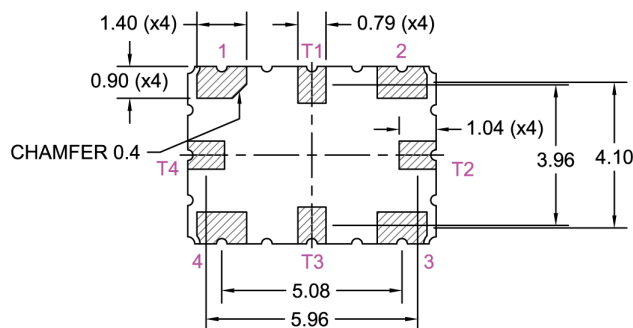
TOP VIEW



FRONT VIEW (DC)



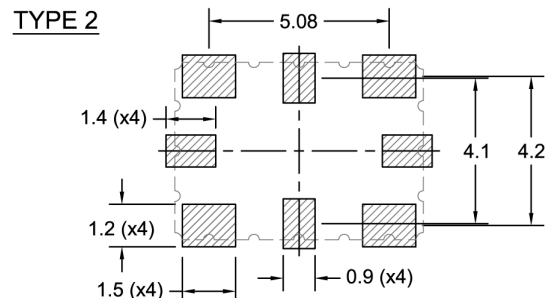
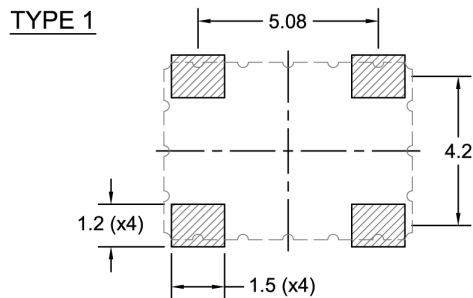
FRONT VIEW (AC)



BOTTOM VIEW

NOTE:
Pin connections are detailed
in the specification.

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: CFPT9000 Model 8P (P3)

RELATED DRAWINGS:

FILENAME: CAT706

REVISION: A

DATE: 03-Aug-12

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX = ±0.5

X.X = ±0.2

X.XX = ±0.10

X.XXX = ±0.05

X° = ±1.0°

Hole = ±0.10

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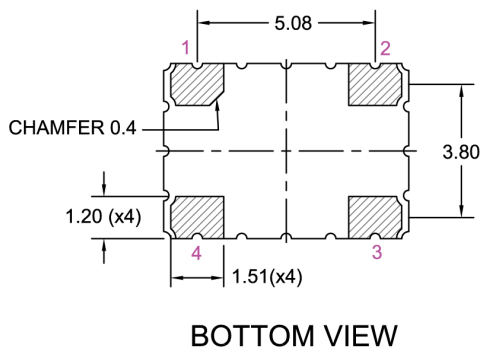
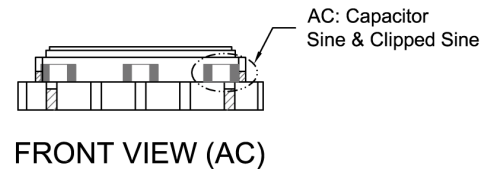
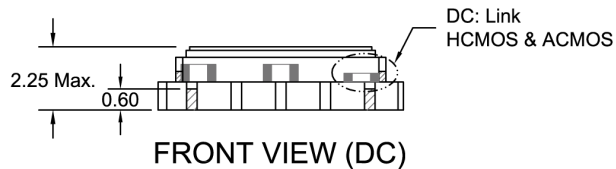
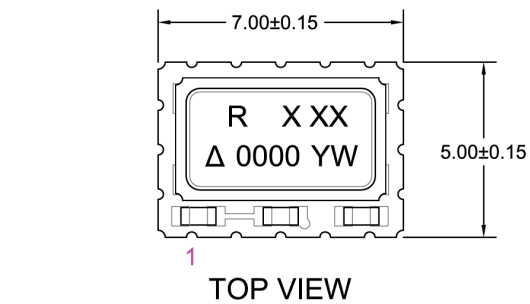
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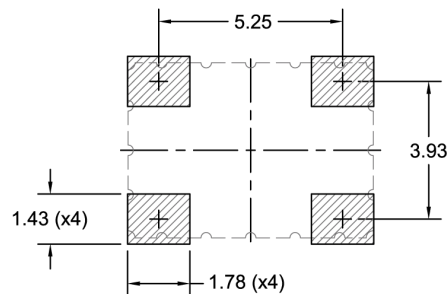
Drawing Name: CFPT9000 Model Drawing - P4

MODEL DRAWING



NOTE:
Pin connections are detailed
in the specification.

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: CFPT9000 Model 4P (P4)

RELATED DRAWINGS:

FILENAME: CAT707

REVISION: A

DATE: 03-Aug-12

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX = ±0.5

X.X = ±0.2

X.XX = ±0.10

X.XXX = ±0.05

X° = ±1.0°

Hole = ±0.10

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