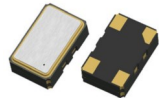




# PLETRONICS UHD4 Series TCXO / VCTCXO



UHD4  
5.0 x 3.2 x 1.85 mm  
LCC Ceramic Package

## Features

- Pletronics' UHD4 Series Temperature Compensated Crystal Oscillator
- Optional Voltage Control Function
- Low Power / Fast Warm Up
- CMOS Output
- 2.5V to 3.3V nominal Supply Voltage
- Not all combinations possible - contact factory

## Applications

SONET / SDH / DWDM  
Test & Measurement  
Telecom Transmission & Switching Equipment  
Base Stations / Picocell  
Wireless Communication Equipment

## Electrical Characteristics

Parameter	Min	Typ	Max	Unit	Condition (Consult factory for other options)	
Frequency Range <sup>2</sup>	10	-	40	MHz	See table below for developed frequencies	
Frequency Stability vs. Temperature <sup>2</sup>	-	-	±0.5 ±1.0	ppm	Over -30°C to +85°C Over -40°C to +85°C	at fixed V <sub>CC</sub> + load (reference to midpoint min/max frequency) See factory for other options
Frequency Initial Calibration		-	±2.0	ppm	Referenced to the value 25°C ± 2°C ; V <sub>c</sub> =1.5V if VCTCXO	
Operating Temperature Range <sup>2</sup>	-40	-	+85	°C	Contact factory for wider ranges	
Supply Voltage <sup>1,2</sup> V <sub>CC</sub>	2.5	-	3.3	Volts	± 5%	
Supply Current I <sub>CC</sub>	-	2.5 3.0 4.0	-	mA	13 MHz 26 MHz 40 MHz	Load: 15 pF, V <sub>CC</sub> ± 5%
Frequency Stability vs. Supply	-	-	±0.2	ppm	V <sub>CC</sub> ± 5%	
Frequency Stability vs. Load	-	-	±0.2	ppm	Load: 15 pF ±10%	
V <sub>control</sub> Range	0.5	-	2.5	Volts	1.50 volts nominal for V <sub>CC</sub>	
Frequency Pullability <sup>2</sup>	0	±8.0	±12.0	ppm	Positive Slope	
Output Waveform	CMOS					
Duty Cycle	40	50	60	%	Load: 15 pF; at 50% V <sub>DD</sub> level	
Output V <sub>HIGH</sub> - V <sub>OH</sub>	90	-	-	%V <sub>DD</sub>		
Output V <sub>LOW</sub> - V <sub>OL</sub>	-	-	10	%V <sub>DD</sub>		
Output T <sub>RISE</sub> /T <sub>FALL</sub>			6.5	ns	Load: 15pF; 10%~90%V <sub>DD</sub> Levels	
Startup Time	-	-	10.0	mS	Within ± 2.0 ppm of final frequency	
Long Term Stability (Aging)	-	-	±1.0	ppm	First year at 25°C ± 2°C	
Phase Noise	100 Hz 1 kHz 10 kHz 100 kHz	-120 -134 -148 -150	-	dBc/Hz	25°C ± 2°C at 26.0 MHz	
Storage Temperature Range	-55	-	+95	°C		

Note: <sup>1</sup> Place a 10nF power supply bypass capacitor next to device for correct operation

<sup>2</sup> Specified by part number.

The following is a list of developed frequencies. Consult factory for other options.

10.0M, 12.8M, 13.0M, 19.20M, 20.0M, 25.0M, 26.0M, 30.72M



# PLETRONICS UHD4 Series TCXO / VCTCXO

## Part Number (Possible Options shown)

Series Model	V <sub>CC</sub> Supply Voltage <sup>1</sup>		Operating Temperature		Stability <sup>1, 2</sup>	Pullability <sup>1</sup>	Frequency
	Lowest	Highest	Lowest	Highest	(ppm * 100)	(ppm)	(MHz)
UHD4	031	035	J	K	050	008	-20.0M
	<b>031</b> = 3.1 for 3.3 volts nominal <b>029</b> = 2.9 for 3.0 volts nominal <b>027</b> = 2.7 for 2.8 volts nominal <b>024</b> = 2.4 for 2.5 volts nominal	<b>035</b> = 3.5 for 3.3 volts nominal <b>031</b> = 3.1 for 3.0 volts nominal <b>029</b> = 2.9 for 2.8 volts nominal <b>026</b> = 2.6 for 2.5 volts nominal	<b>J</b> = -30°C <b>L</b> = -40°C	<b>J</b> = +80°C <b>K</b> = +85°C	<b>050</b> = ± 0.5 <b>100</b> = ± 1.0	<b>000</b> = TCXO <b>005</b> = ± 5 <b>008</b> = ± 8 <b>012</b> = ± 12	10 - 40MHz

<sup>1</sup> Contact Factory for non-standard specifications

<sup>2</sup> Not all stabilities are available with all operating temperature ranges. Contact Factory for exact combinations available.

## Device Marking

<b>Pff.fM</b>  • YMDxxx	ff.fM	= Frequency in MHz	Specifications such as part number, frequency stability, supply voltage and operating temperature range, etc. are not identified from marking.  External packaging labels and packing list will correctly identify the ordered Pletronics part number.
	YMD	= Date code (see table below)	
	P	= Pletronics	
	x	= Internal Factory Codes	

Code	3	4	5	6	7	Code	A	B	C	D	E	F	G	H	J	K	L	M
Year	2023	2024	2025	2026	2027	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	T	U	V	W	X	Y	Z
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

## Package Labeling

P/N Label is 1" x 2.6" (25.4mm x 66.7mm)  
 Font is Courier New  
 Bar code is 39-Full ASCII

RoHS Label is 1" x 2.6" (25.4mm x 66.7mm)  
 Font is Arial

P/N:   
 PLE Part Number  
 Customer P/N:   
 12345678  
 Qty:   
 1000  
 D/C:   
 1DW  
 MSL: 1

RoHS Compliant

2nd LvL Interconnect

Category=e4

Max Safe Temp=260C for 10s 2X Max

Pletronics Inc. certifies this device is in accordance with the RoHS and REACH directives.

Pletronics Inc. guarantees the device does not contain the following: Cadmium, Hexavalent Chromium, Lead, Mercury, PBB's, PBDE's

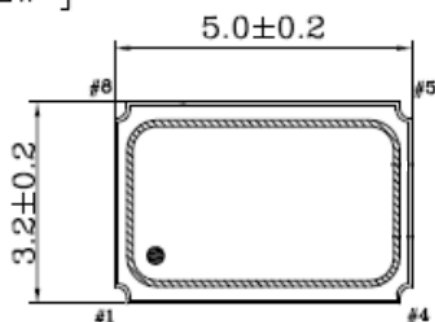
Weight of the Device: 0.10 grams

Moisture Sensitivity Level: 1 As defined in J-STD-020D

Second Level Interconnect code: e4

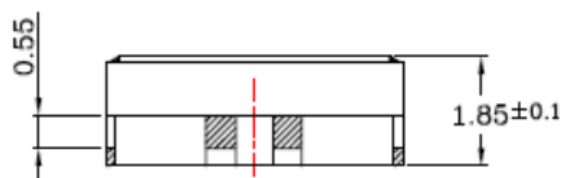
### Mechanical Dimensions (mm)

[ TOP VIEW ]

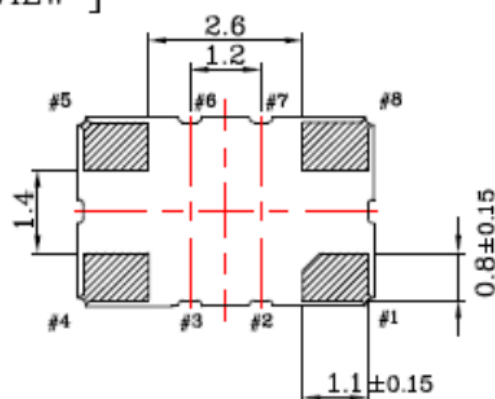


Pin 1 Mark

[ SIDE VIEW ]

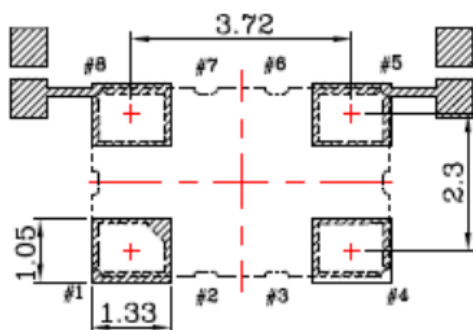


[ BOTTOM VIEW ]



### Recommended soldering pattern

★To ensure optimal oscillator performance, place a by-pass capacitor of 0.1uF as close to the part as possible between Vdd and GND pads.



### Pad Layout

Disclaimer: Recommended layout shown.  
Adjust layout as needed for individual  
process requirements.

PIN#	FUNCTION
1	VCON:VC-TCXO NC:TCXO
4	GND
5	Fout
8	VDD

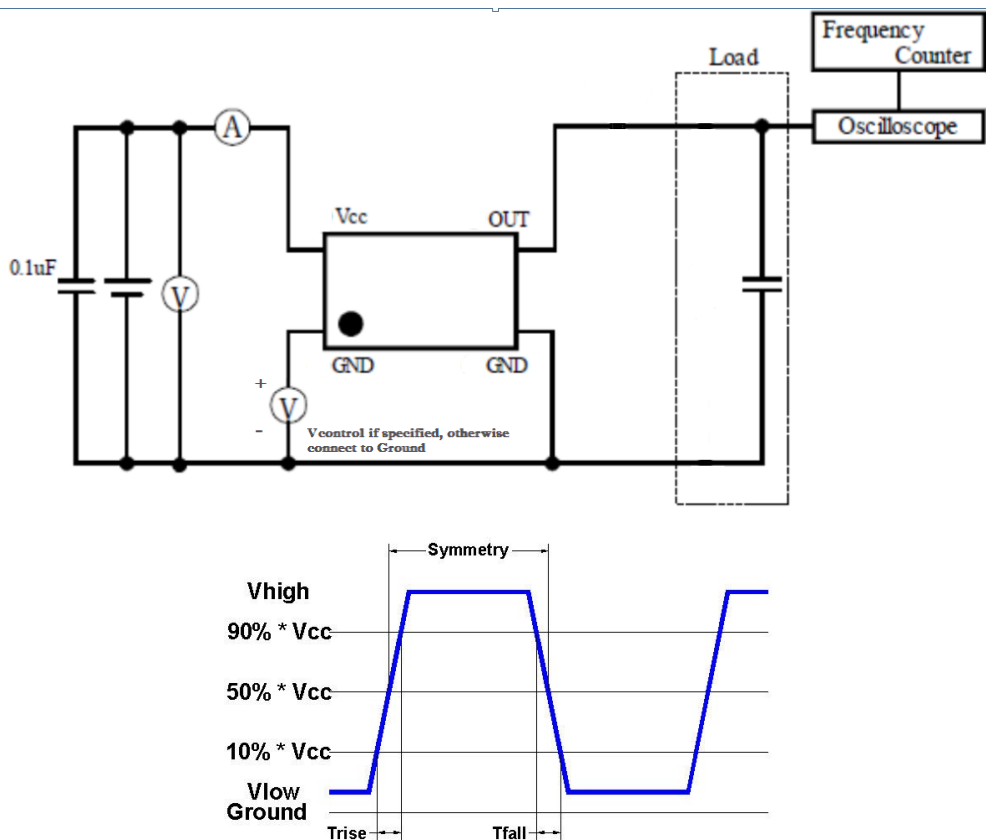
Contacts (pads): Gold (0.3 to 1.0  $\mu$ m) over Nickel (1.27 to 8.89  $\mu$ m)

All connection points in the designated region have solder mask cover to avoid any electrical connections (top view shown)

For Optimum Jitter Performance, Pletronics recommends:

- A ground plane under the device
- Do not route large transient signals (both current and voltage) under the device
- Do not place near a large magnetic field such as a high frequency switching power supply
- Do not place near piezoelectric buzzers or mechanical fans
- Minimize air flow across the device

### Electrical Test /Load Circuit



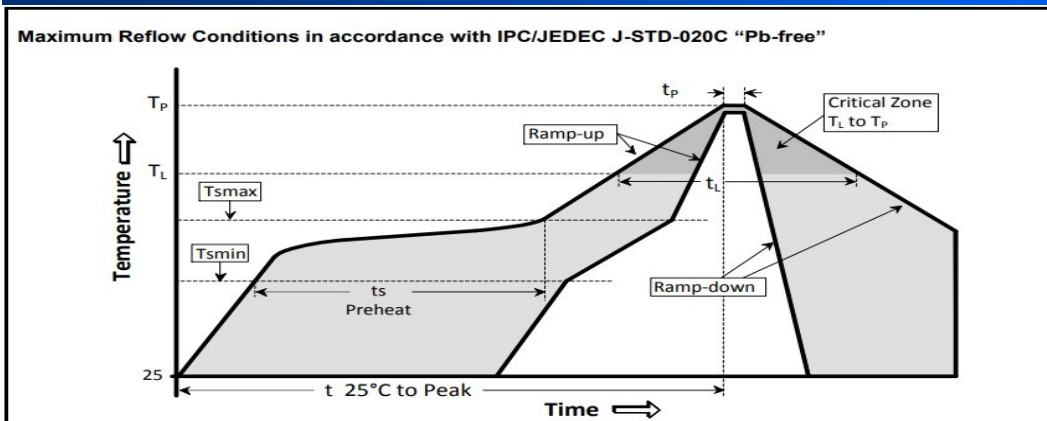
### Absolute Maximum Ratings

Parameter	Unit
V <sub>CC</sub> Supply Voltage	-0.6V to +4.6V
V <sub>i</sub> Input Voltage	-0.6V to V <sub>CC</sub> + 0.6V and less than 4.6V
I <sub>o</sub> Output Current	-10mA to +10mA

### Thermal Characteristics:

The maximum die or junction temperature is 125°C

## Reflow Cycle

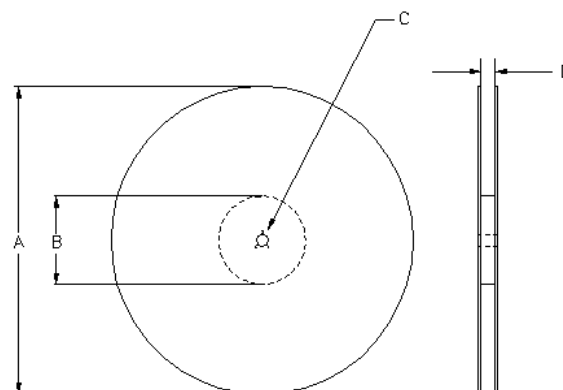
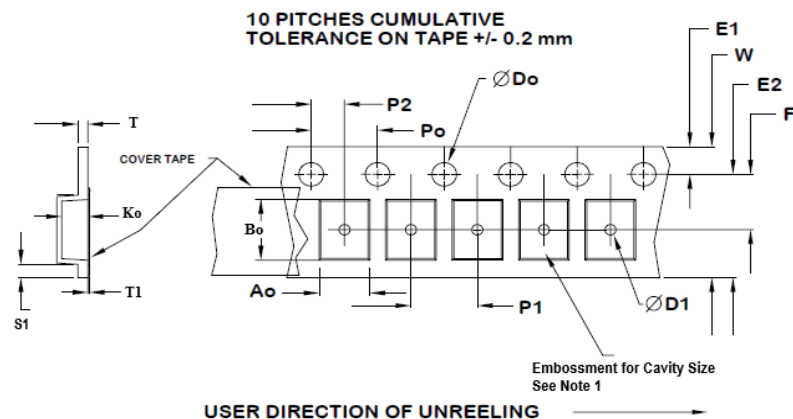


The part may be reflowed 2 times without degradation (typical for lead free processing).

Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	$(T_{S_{max}} \text{ to } T_P)$	3°C / second max	°C / s
Ramp down Rate	$T_{cool}$	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to-peak}$	8 minutes max	min
<b>Preheat</b>			
Temperature min	$T_{S_{min}}$	150	°C
Temperature max	$T_{S_{max}}$	200	°C
Time $T_{S_{min}}$ to $T_{S_{max}}$	$t_s$	60 – 180	sec
<b>Soldering above liquidus</b>			
Temperature liquidus	$T_L$	217	°C
Time above liquidus	$t_L$	60 – 150	sec
<b>Peak temperature</b>			
Peak Temperature	$T_P$	260	°C
Time within 5°C of peak temperature	$t_P$	20 – 40	sec

## Tape and Reel

Tape and Reel available for quantities of 250 to 1000 per reel, cut tape for < 250. 12mm or 16mm tape, 8mm pitch.



Tape Variable Dimensions Table 2							
Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
12mm	10.25	5.5 ±0.05	8.0 ±0.1	12.2	3.6±0.1	5.4±0.1	1.4±0.1
16mm	14.25	7.5 ±0.05	8.0 ± 0.1	16.3	3.6±0.1	5.4±0.1	1.4±0.1

Dimensions in mm      Drawing Not to scale

Note 1: Embossed cavity to conform to EIA-481-B

Tape Constant Dimensions Table 1								
Tape Size	Do	D1 min	E1	Po	P2	S1 min	T max	T1 max
12mm	1.5	1.5	1.75	4.0	2.0 ±0.05	0.6	0.3	0.1
16mm	+0.1 -0.0	1.5	±0.1	±0.1	2.0 ±0.1			

Reel Dimensions (may vary) Table 3						
	A		B		C	D
Reel Size	Inches	mm	Inches	mm	mm	mm
7	7.0	177.8	2.50	63.5	13.0 +0.5 -0.2	Tape size +0.4  +2.0 -0.0
10	10.0	254.0	4.00	101.6		
13	13.0	330.2	3.75	95.3		



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