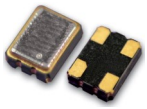
PLETRONICS UHE4 Series CMOS TCXO



UHE4
3.2 x 2.5 x 0.9 mm
LCC Ceramic Package

Features

- Temperature Compensated Crystal Oscillator
- CMOS Output
- 1.8V to 3.3V nominal Supply Voltage
- 9.5 - 40 MHz Frequency

Applications

GPS
WiMAX, Wi-Fi, Wi-LAN
Handsets
Broadband Access
Point to point radios
Seismic Exploration
Wireless Communications
Base Stations
Test Equipment

Electrical Characteristics

Parameter	**Min**	**Typ**	**Max**	**Unit**	**Condition** (Consult factory for other options)
Frequency Range [2]	9.5	-	40	MHz	Specified by part number
Frequency Stability vs. Temperature [2]	-	-	±2.5	ppm	Specified by part number (f_{max} - f_{min}) / 2
Frequency Initial Calibration	-	-	±2.0	ppm	
Operating Temperature Range [2]	-40	-	+85	°C	Specified by part number, Consult factory for wider range
Supply Voltage [1, 2] V_{CC}	1.7	-	3.63	Volts	± 5%, Specified by part number
Supply Current I_{CC}	-	-	See	mA	Load: 15 pF, V_{CC} ± 5%
Frequency Stability vs. Supply	-	-	±0.2	ppm	Load: 15 pF, V_{CC} ± 5%
Frequency Stability vs. Load	-	-	±0.2	ppm	Load: 15 pF ± 5%
Output Waveform		CMOS			
Duty Cycle	45	50	55	%	Load: 15 pF Vth: T_R and T_F 10% and 90% of Vcc Vth: D.C. 50% of Vcc
Output V_{HIGH}	90	-	-	%Vdd	
Output V_{LOW}	-	-	10	%Vdd	
Output T_{RISE} and T_{FALL}	-	-	5.0	ns	
Startup Time	-	-	5.0	ms	Within ± 2.0 ppm of final frequency
$V_{DISABLE}$	-	-	30	%	Of V_{CC} applied to Pad 1
V_{ENABLE}	70	-	-	%	
Enable Time	-	-	5	ms	
Disable Time	-	-	150	ns	
Long Term Stability (Aging)	-	-	±1.0	ppm	First year at 25°C ± 2°C
Phase Noise 100 Hz 1 kHz 10 kHz 100 kHz	-	-110 -130 -145 -145	-	dBc/Hz	25°C ± 2°C at 26.0 MHz
Storage Temperature Range	-55	-	+125	°C	

Input Current

Vcc	Icc max
3.3V	6mA
2.5V	5.5mA
1.8V	5mA

Notes:
[1] Place an appropriate power supply bypass capacitor next to device for correct operation
[2] Specified by part number

Part Number

Series Model	V_{CC} Supply Voltage [1]		Operating Temperature		Stability [1]	Pullability	Frequency
	Lowest	Highest	Lowest	Highest	(ppm)	(ppm)	(MHz)
UHE4	**031**	**035**	**G**	**K**	**015**	**000**	**-19.44M**
	031 = 3.1 for 3.3 volts nominal **029** = 2.9 for 3.0 volts nominal **027** = 2.7 for 2.8 volts nominal **024** = 2.4 for 2.5 volts nominal **017** = 1.7 for 1.8 volts nominal	**035** = 3.5 for 3.3 volts nominal **031** = 3.1 for 3.0 volts nominal **029** = 2.9 for 2.8 volts nominal **026** = 2.6 for 2.5 volts nominal **019** = 1.9 for 1.8 volts nominal	**E** = -10°C **G** = -20°C **J** = -30°C **K** = -35°C **L** = -40°C	**G** = +70°C **J** = +80°C **K** = +85°C	**025** = ± 2.5	**000** = TCXO	9.5 - 40 MHz

[1] Contact Factory for non-standard specifications

Device Marking

P*ff.ff*
- ***YMD*xxx**

P = Pletronics
ff.ff = Frequency in MHz
YMD = Date Code (year month day) See below for YMD codes
x = internal factory codes

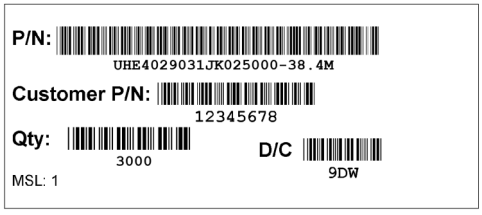
Note: Specifications such as frequency stability, supply voltage and operating temperature range, etc. are not identified from marking.
External packaging labels and packing list will correctly identify the ordered Pletronics part number.

Code	3	4	5	6	7	Code	1	2	3	4	5	6	7	8	9	O	N	D
Year	2023	2024	2025	2026	2027	Month	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

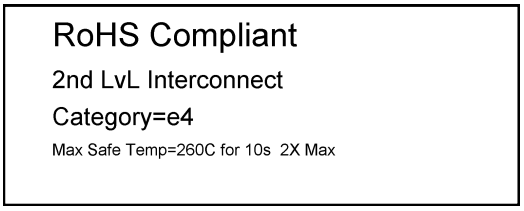
Code	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	V	W	X	Y
Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

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



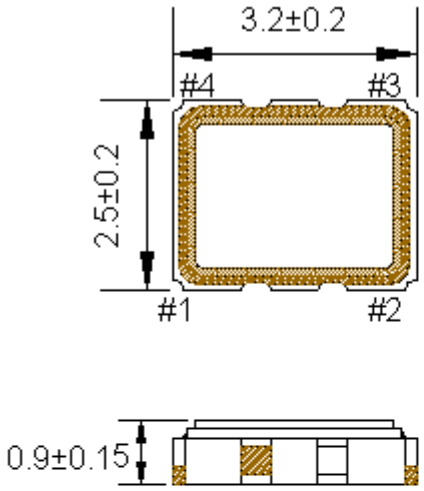
RoHs Label is 1" x 2.6" (25.4mm x 66.7mm)
Font is Arial



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: 0.032 grams
Moisture Sensitivity Level: 1 As defined in J-STD-020D
Second Level Interconnect code: e4

Mechanical Dimensions

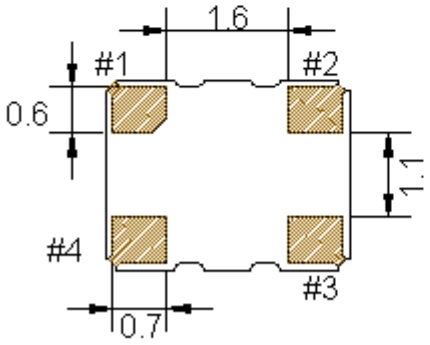


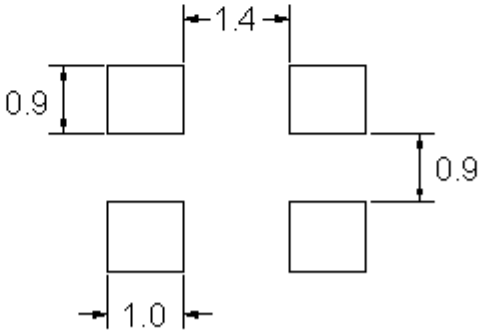
Pad Connections

1	Enable/Disable
2	Ground
3	Output
4	Vcc

Enable/Disable	
Pad 1	Output
High*	Active
Low or Ground	Disabled-Tristate

*Pad 1 shall be pulled high externally for proper operation if E/D function is unused.





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

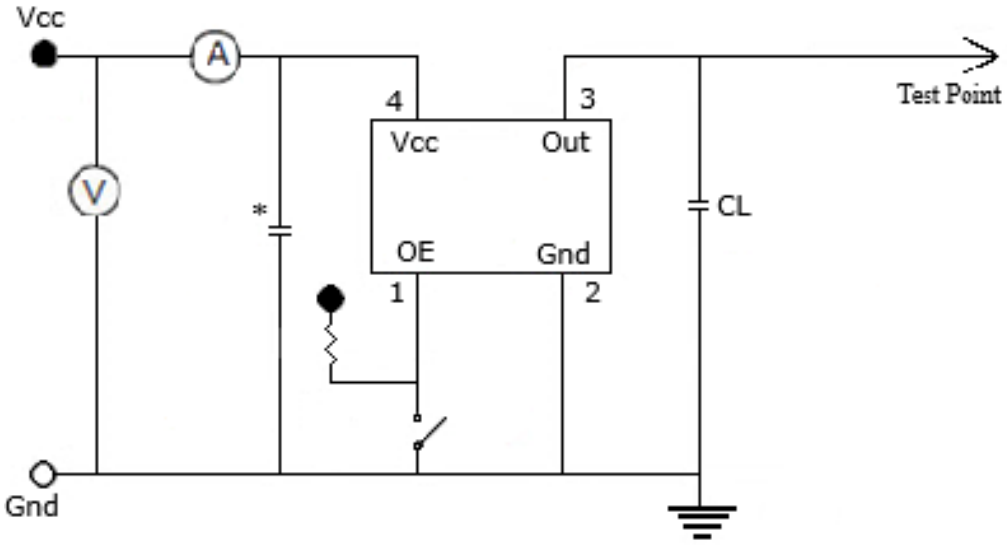
Dimensions in mm
Non-critical items such as castellation location and pad one shape may vary.

Contacts (pads): Gold (0.3 to 1.0 µm) over Nickel (1.27 to 8.89 µm)

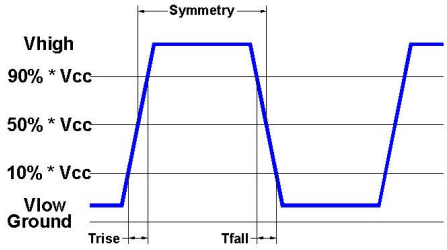
For Optimum Jitter Performance, Pletronics recommends:

- 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

Electrical Test / Load Circuit



Notes:
CL: Includes the input capacitance of oscilloscope
* 0.01µF external by-pass filter is recommended



Environmental / ESD Ratings

Reliability: Environmental

Parameter	Condition
Mechanical Shock	JESD22-B104
Vibration	JESD22-B103
Solderability	IPC J-STD-002
Thermal Shock	MIL-STD-883 Method 1011, Condition A

ESD Rating

Model	Min. Voltage	Condition
Human Body Model	2000V	JESD22-A114
Machine Model	200V	JESD22-A115

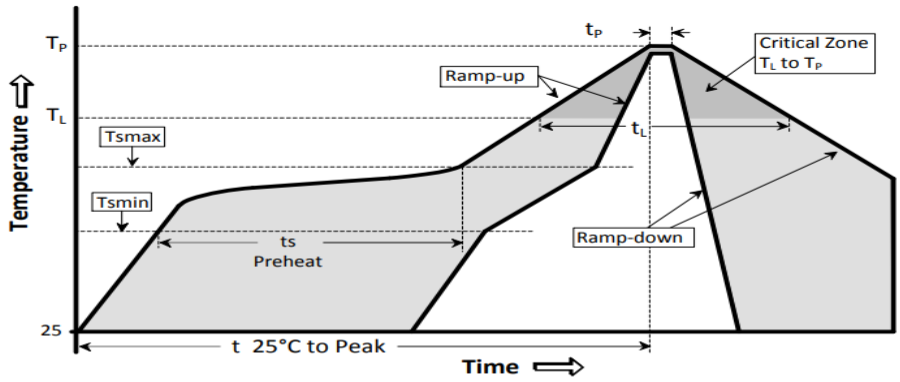
Thermal Characteristics:
The maximum die or junction temperature is 150°C

Absolute Maximum Ratings

Parameter	Unit
V_{CC} Supply Voltage	-0.6V to +4.6V
Vi Input Voltage	-0.6V to V_{CC} + 0.6V
Io Output Current	-10mA to +10mA

Reflow Cycle

Maximum Reflow Conditions in accordance with IPC/JEDEC J-STD-020C "Pb-free"

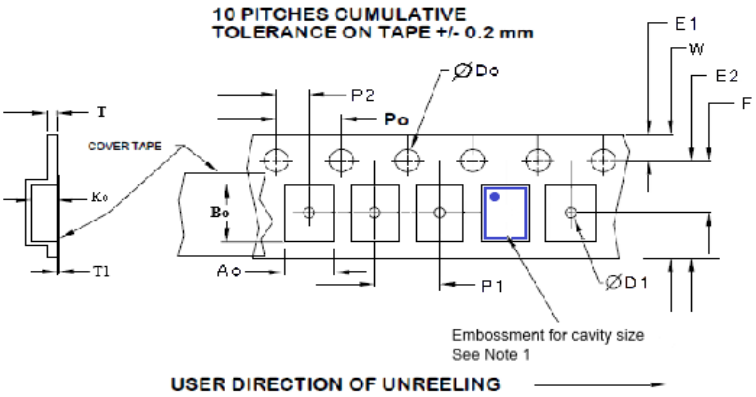


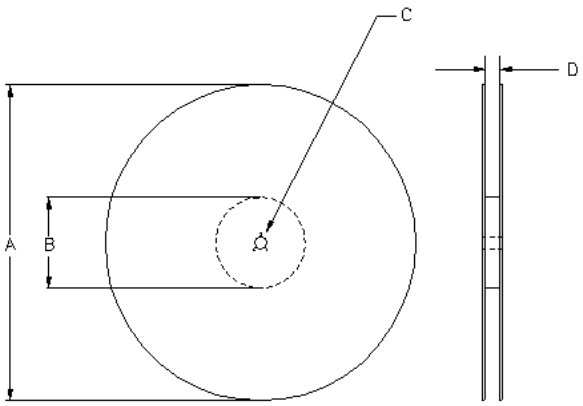
Temperature Profile	Symbol	Condition	Unit
Average ramp-up rate	(Ts_{max} to T_P)	3°C / second max	°C / s
Ramp down Rate	T_{cool}	6°C / second max	°C / s
Time 25°C to Peak Temperature	$T_{to\text{-}peak}$	8 minutes max	min
Preheat			
Temperature min	Ts_{min}	150	°C
Temperature max	Ts_{max}	200	°C
Time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

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

Tape and Reel

Tape and Reel available for quantities of 250 to 3000 per reel, cut tape for < 250. 8mm tape, 4mm pitch.





Tape Variable Dimensions Table 2							
Tape Size	E2 typ	F	P1	W max	Ao	Bo	Ko
8mm	6.25	3.5 ±0.05	4.0 ±0.1	8.2	2.7±0.1	3.4±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	T max	T1 max
8mm	1.5 +0.1 -0.0	1.0	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	0.3	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

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