

ECS offers all characteristics of the UM-1 with a metal jacket for surface mount applications. This crystal has a very wide frequency range from 3.6864MHz to 225MHz for use in wireless communication applications requiring tight tolerance specifications such as  $\pm 5$  PPM over  $-10^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ .

## FEATURES

- 3.6864MHz to 225MHz frequency range
- Very small foot print for critical space applications
- Resistance weld enclosure
- RoHS Compliant
- Tape & Reel (1,000 pcs)

## PART NUMBERING GUIDE "EXAMPLE"

	FREQUENCY (16.0000 MHz)	LOAD CAPACITANCE*	PACKAGE TYPE
ECS	- 160	- 20	- 22 SMJ

\* Load capacitance (xx=xx pF, S= series resonance)  
 Note: See Product Selection Guide for additional options.

## OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

PARAMETERS	CONDITIONS	MINIMUM	TYPICAL	MAXIMUM	UNITS
FREQUENCY RANGE	$f_0$	3.6864		225.000	MHz
FREQUENCY TOLERANCE	3.6864MHz ~ 9.99MHz 10.000MHz ~ 225MHz	-50 -30		+50 +30	PPM
FREQUENCY STABILITY REFERENCE @ $+25^{\circ}\text{C}$	3.6864MHz ~ 9.99MHz 10.000MHz ~ 225MHz	-100 -50		+100 +50	PPM
SHUNT CAPACITANCE	$C_0$			5.0	pF
LOAD CAPACITANCE	$C_L$ (Customer Specified)	10.0	20.0 standard	Series	pF
DRIVE LEVEL	3.6864MHz ~ 9.99MHz 10.000MHz ~ 225MHz	0.5 0.1		1.0 0.5	mW
AGING (@ $+25^{\circ}\text{C}$ per year)	3.6864MHz ~ 9.99MHz 10.000MHz ~ 225MHz	-5 -3		+5 +3	PPM
OPERATING TEMPERATURE	$T_{OPR}$	-10		+60	$^{\circ}\text{C}$
STORAGE TEMPERATURE	$T_{STG}$	-40		+85	$^{\circ}\text{C}$

## EQUIVALENT SERIES RESISTANCE / MODE OF OSCILLATION

FREQUENCY RANGE (MHz)	MODE	MAX ESR $\Omega$	FREQUENCY RANGE (MHz)	MODE	MAX ESR $\Omega$
3.686 ~ 3.999	Fundamental	250	8.000 ~ 9.999	Fundamental	80
4.000 ~ 4.999	Fundamental	150	10.000 ~ 10.999	Fundamental	60
5.000 ~ 5.999	Fundamental	120	11.000 ~ 45.000	Fundamental	40
6.000 ~ 6.999	Fundamental	100	30.000 ~ 135.000	3rd O/T	40
7.000 ~ 7.999	Fundamental	90	100.000 ~ 225.000	5th O/T	80

## PACKAGE DIMENSIONS (mm)

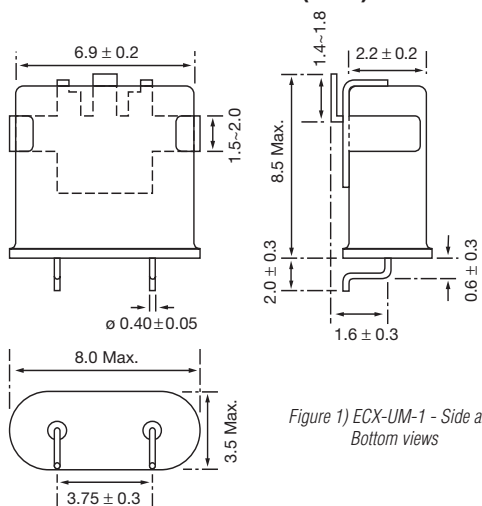


Figure 1) ECX-UM-1 - Side and Bottom views

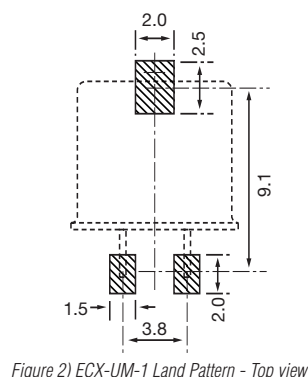


Figure 2) ECX-UM-1 Land Pattern - Top view

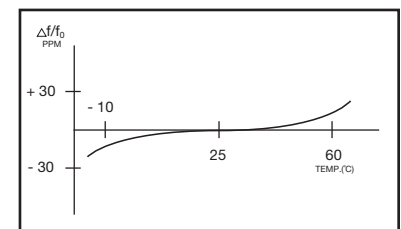


Figure 3) Frequency vs Temperature Curve