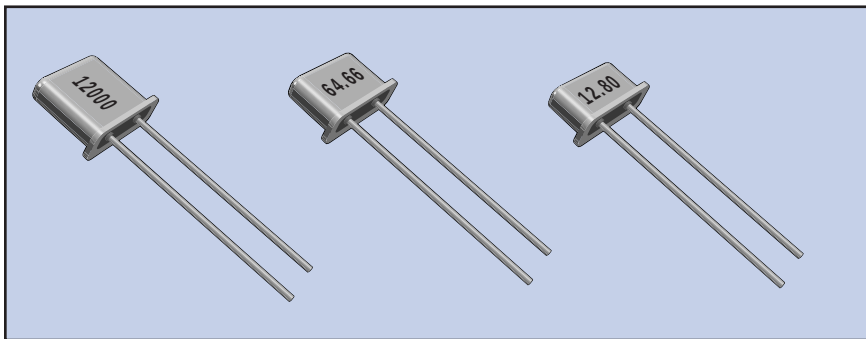




FEATURES

- Cost effective
- Excellent aging
- Wide frequency range
- Low profile
- Excellent reliability
- Tape and Reel (1,000 pcs)

ECS's UM 1,5,4 quartz crystals are ideal for use in compact communication equipment.

PART NUMBERING GUIDE "EXAMPLE"

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

* Load capacitance (xx=xx pF, S= series resonance), ** Package Type examples (22 = UM-1, 21= UM-5, 25 = UM-4)

Note: See Product Selection Guide for additional options.

OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

PARAMETERS		UM-1	UM-5	UM-4
FREQUENCY RANGE	FUNDAMENTAL	10.000 ~ 30.000 MHz		
	3RD OVERTONE	25.000 ~ 90.000 MHz	30.000 ~ 90.000 MHz	
FREQUENCY TOLERANCE (@ +25°C)		See Table 1		
FREQUENCY-TEMPERATURE TOLERANCE (@ +25°C)		See Table 2		
OPERATING TEMPERATURE RANGE	T _{OPR}	See Table 2		
STORAGE TEMPERATURE RANGE	T _{STG}	-40 ~ +90°C		
LOAD CAPACITANCE	(C _L)	10pF – Series (Customer Specified)		
SHUNT CAPACITANCE	(C ₀)	7 pF max.		
DRIVE LEVEL	(D _L)	500 μW max.		
CRYSTAL CUT		AT-cut		

TABLE 1 FREQUENCY TOLERANCE (@ +25°C)

Tolerance (x 10 ⁻⁶)					
±10	±15	±20	±30	±50	
●	●	○	○	○	● recommended ○ available

TABLE 2 FREQUENCY-TEMPERATURE TOLERANCE (@ +25°C)

FREQUENCY	Tolerance (x 10 ⁻⁶)						
	±3.0	±5.0	±7.5	±10	±15	±20	±30
0 ~ +50°C	○	○	○	○			
-10 ~ +60°C		○	○	●	○		
-20 ~ +70°C			○	○	○	○	
-30 ~ +75°C					○	○	○
-30 ~ +80°C					○	○	●
-35 ~ +80°C						○	○
-40 ~ +85°C						○	○

TABLE 3 EQUIVALENT SERIES RESISTANCE / MODE OF OSCILLATION

NOMINAL FREQUENCY (MHz)	MODE	ESR (Ω)	
		UM-1	UM-5, UM-4
10 ~ 15	FUNDAMENTAL	40 max.	50 max.
15 ~ 30	FUNDAMENTAL	25 max.	30 max.
25 ~ 30	3rd	50 max.	60 max.
30 ~ 90	3rd	45 max.	60 max.

PACKAGE DIMENSIONS (mm)

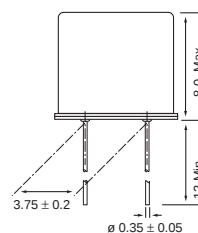


Figure 1) UM-1 Crystal Unit Side and Bottom view

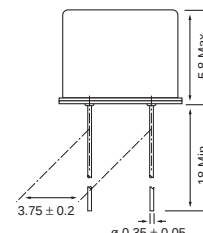


Figure 2) UM-5 Crystal Unit Side and Bottom view

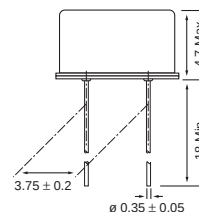


Figure 3) UM-4 Crystal Unit Side and Bottom view