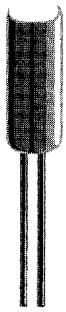


ECS-3X8, ECS-31, ECS-1X5, ECS-2X6

ECS tuning fork type crystals can be used as a clock source in communication equipment, AV equipment and measuring instruments. Their low power consumption makes these units ideal for portable equipment.

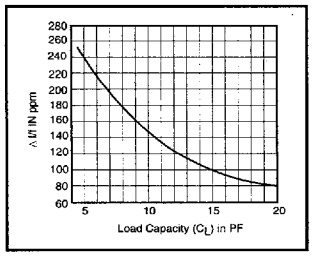
FEATURES:
- Cost effective
- Tight tolerance
- Long term stability

SPECIFICATIONS

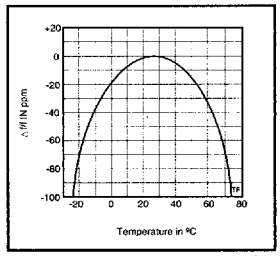
ITEM \ TYPE	ECS-3X8	ECS-31	ECS-1X5, ECS-2X6
Frequency Range	32.768kHz	20.0-350kHz	32.768kHz
Frequency Tolerance	Grade A ±20ppm/Grade B ±30ppm	*	Grade A ±20ppm/Grade B ±30ppm
Load Capacitance	12.5pF (typ.)		
Drive Level	1μW max.		
Series Resistance	30kΩ max.	*	45kΩ max.
Q-Factor	80,000 (typ.)/50,000 min.	*	70,000 (typ.)/40,000 min.
Turnover Temperature	25°C ±5°C	*	25°C ±5°C
Parabolic Curveture Constant	-0.042ppm/°C² (max.)		
Shunt Capacitance	1.3pF (typ.)/2.0pF max.	*	1.1pF (typ.)/1.8pF max.
Capacitance Ratio	460 (typ.)/650 max.	*	430 (typ.)/650 max.
Operating Temp. Range	-10~+60°C		
Storage Temp. Range	-30~+70°C		
Shock Resistance	±3ppm max. natural drop 3 times on hard wooden board from height of 75cm		
Insulation Resistance	500MΩ min./DC100V		

** Frequency Dependent*

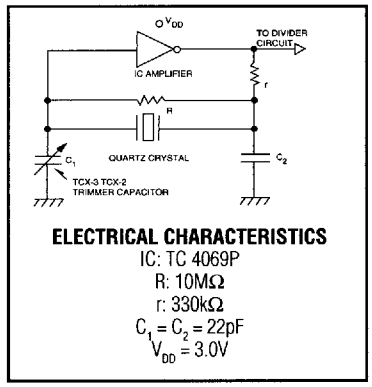
FREQUENCY DEVIATION VS. LOAD CAPACITANCE (TYPICAL)



TEMPERATURE CHARACTERISTICS (TYPICAL)



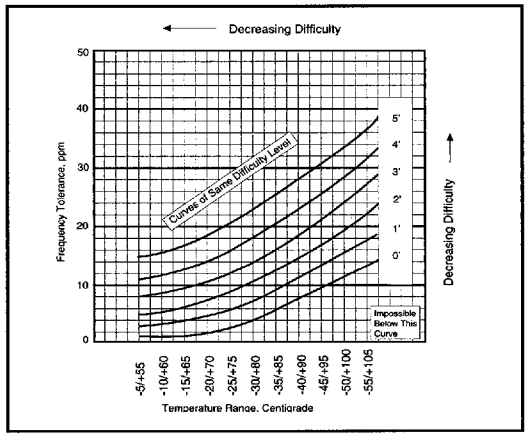
RECOMMENDED OSCILLATION CIRCUIT



ELECTRICAL CHARACTERISTICS
IC: TC 4069P
R: 10MΩ
r: 330kΩ
$C_1 = C_2 = 22pF$
$V_{DD} = 3.0V$

In this circuit, low drive levels with a maximum of 1μW are recommended. If excessive drive is applied, irregular oscillation or quartz element fractures may occur.

FREQUENCY TOLERANCE VS TEMPERATURE



This is the deviation in ppm of the crystal over a temperature range as referenced to the 25° C reading. Decreasing tolerances of the angle of cut result in greater precision but correspondingly higher cost of manufacture. In general, temperature ranges should be specified which are symmetrical about 25° C with the highest temperature being the controlling factor for the lowest. The wider the temperature range and the tighter stability required, the more expensive will be the crystal. In addition, for each temperature range, there will exist an absolute minimum value of achievable frequency stability. Not all specifications can be met over all desired temperature ranges. (See chart above.)