# <u>ECS-3X8X, 2X6X, 1X5X</u> 32.768 KHz TUNING FORK



ECS tuning fork type crystals are used as a clock source in communication equipment, measuring instruments, microprocessors and other time management applications. Their low power consumption makes these crystals ideal for portable equipment.

### **FEATURES**

- Cost effective
- Tight tolerance
- Long term stability
- Excellent resistance and
- environmental characteristics • PbFree/RoHS Compliant



# PART NUMBERING GUIDE "EXAMPLE"

MANUFACTURER		FREQUENCY		LOAD CAPACITANCE		PACKAGE TYPE*	
ECS	-	.327	-	12.5	_	8X	
ECS	_	.327	_	12.5	_	13X	
ECS	-	.327	_	8	-	14X	

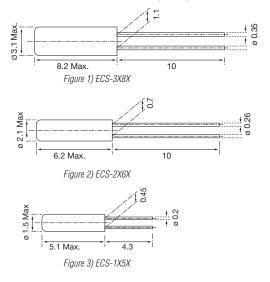
\* Package type examples (8X=3x8, 13X=2x6, 14X=1x5)

# **OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS**

PARAMETERS		ECS-3X8X	ECS-2X6X	ECS-1X5X	UNITS		
NOMINAL FREQUENCY	Fo	32.768	32.768	32.768	KHz		
FREQUENCY TOLERANCE	∆f/fo	±20 ±20 ±20		PPM			
LOAD CAPACITANCE (typ.)	CL	12.5	12.5 12.5 8.0		pF		
DRIVE LEVEL (max.)	DL	1	1	1	μW		
RESISTANCE AT SERIES RESONANCE	R <sub>1</sub>	35 (max.)	35 (max.)	40 (max.)	KΩ		
Q-FACTOR	Q	90,000 (typ.)	70,000 (typ.)	80,000 (typ.)			
TURNOVER TEMPERATURE	Τ <sub>M</sub>	+25 ±5	+25 ±5	+25 ±5	°C		
TEMPERATURE COEFFICIENT	в	-0.040ppm/°C <sup>2</sup> max.	-0.040ppm/°C <sup>2</sup> max.	-0.040ppm/°C <sup>2</sup> max.	PPM/(∆C°)		
SHUNT CAPACITANCE	Co	1.60 (typ.)	1.35 (typ.)	1.00 (typ.)	pF		
CAPACITANCE RATIO		460 (typ.)	450 (typ.)	400 (typ.)			
OPERATING TEMP. RANGE	TOPR	-10~+60					
STORAGE TEMP. RANGE	T <sub>STG</sub>		°C				
SHOCK RESISTANCE		Drop test 3	PPM				
INSULATION RESISTANCE	IR	· · · · · ·	MΩ				
AGING (FIRST YEAR)	∆f/fo	±3 PPM max. @ +25°C ±3°C					
MOTIONAL CAPACITANCE	C <sub>1</sub>	0.0035 (typ.)	0.0030 (typ.)	0.0025 (typ.)	pF		

Note: Contact factory for optional load capacitance.

# **PACKAGE DIMENSIONS (mm)**



### **RECOMMENDED OSCILLATION**

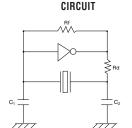
#### PARABOLIC TEMPERATURE CURVE

-10 -20

-30

T (°C)

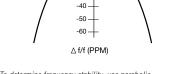
-20 -10 0 10 20 30 40 50 60 70



### **ELECTRICAL CHARACTERISTICS** IC: TC 4069P Rf: 10MΩ

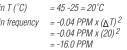
Rd: 330KΩ (As required)  $C_1 = 22pF, C_2 = 22pF$  $V_{DD} = 3.0V$ 

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



To determine frequency stability, use parabolic curvature. For example: What is the stability at 45°C?

1) Change in T (°C) 2) Change in frequency



ECS, INC. INTERNATIONAL 1105 S. RIDGEVIEW, OLATHE, KS 66062 • 913-782-7787 • 800-237-1041 • FAX 913-782-6991 • WWW.ECSXTAL.COM