

ECS-3X8X, 2X6X, 1X5X

32.768 KHz Tuning Fork Crystal



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.

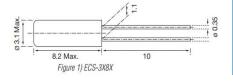
Request a Sample

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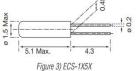


- Cost Effective
- Tight Tolerance
- Long Term Stability
- Excellent Resistance and **Environmental Characteristics**
- Pb Free/RoHS Compliant

DIMENSIONS (mm)



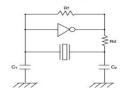




OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS

PARAMETERS		3X8X	2X6X	1X5X	UNITS
Frequency	Fo	32.768	32.768	32.768	KHz
Frequency Tolerance	Δf/fo	±20	±20	± 20	ppm
Load Capacitance	C _L	12.5	12.5	8.0	рF
Drive Level (max)	D_L	1	1	1	μW
Resistance At Series Resonance	R_1	35(max)	35(max)	40(max)	ΚΩ
Q-Factor	Q	90,000(typ.)	70,000(typ.)	80,000(typ.)	
Turnover Temperature	T _M	+25 ±5	+25 ±5	+25 ±5	°C
Temperature Coefficient	ß	-0.040ppm/°C² max.	-0.040ppm/°C² max.	-0.040ppm/°C² max.	PPM/ΔC°
Shunt Capacitance	Co 1.60 (typ.)		1.35 (typ.)	1.00 (typ.)	pF
Capacitance Ratio		460 (typ.)	450 (typ.)	400 (typ.)	
Operating Temp	Topr	-10 ~ +60			°C
Storage Temperature	Tstg		°C		
Shock Resistance		Drop 3 times height o	PPM		
Insulation Resistance	IR	500	ΜΩ		
Aging (First Year)	Δf/fo	±3 ppr	ppm		
Motional Capacitance	C ₁	0.0035(typ.)	0.0030(typ.)	0.0025(typ.)	pF

RECOMMENDED OSCILLATION CIRCUIT

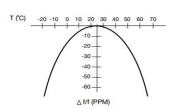


ELECTRICAL CHARACTERISTICS

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 rec-ommended. If excessive drive is applied, irregular oscillation or quartz element fractures may occur.

PARABOLIC TEMPERATURE CURVE



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 = $-0.04 \text{ PPM x } (\Delta T)^2$

= 45 -25 = 20°C

 $= -0.04 PPM \times (20)^2$ = -16.0 PPM

PART NUMBERING GUIDE:

TART HOMBERING GOIDE.								
Manufa	cturer	Frequency		Load Capacitance		Package Type*		
ECS	-	.327	-	12.5	-	8X		
ECS	-	.327	-	12.5	-	13X		
ECS	-	.327	-	12.5	-	14X		

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



SOLDER PROFILE					
Peak solder Temp +260°C Max 10 sec Max.					
2 Cycles Max.					
MSL 1, Lead Finish Sn/Cu Matte					

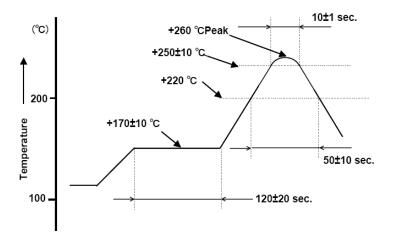


Figure 1) Suggested Solder Profile