



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



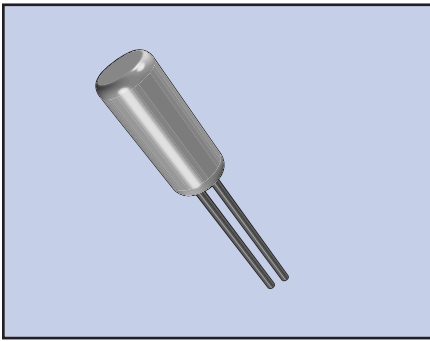
Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





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

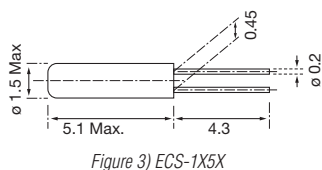
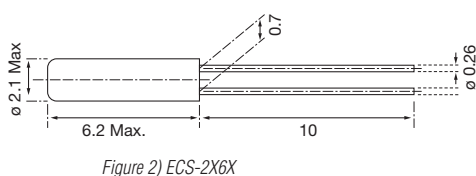
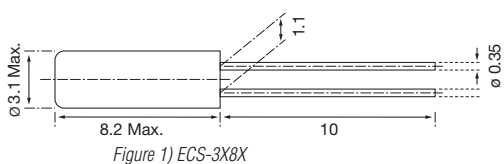
* Package type examples (8X=3x8, 13X=2x6, 14X=1x5)

OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

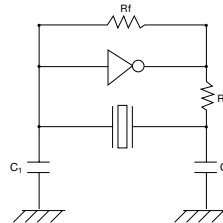
PARAMETERS		ECS-3X8X	ECS-2X6X	ECS-1X5X	UNITS
NOMINAL FREQUENCY	F ₀	32.768	32.768	32.768	KHz
FREQUENCY TOLERANCE	Δf/f ₀	±20	±20	±20	PPM
LOAD CAPACITANCE (typ.)	C _L	12.5	12.5	8.0	pF
DRIVE LEVEL (max.)	D _L	1	1	1	μW
RESISTANCE AT SERIES RESONANCE	R ₁	35 (max.)	35 (max.)	40 (max.)	KΩ
Q-FACTOR	Q	90,000 (typ.)	70,000 (typ.)	80,000 (typ.)	
TURNOVER TEMPERATURE	T _M	+25 ±5	+25 ±5	+25 ±5	°C
TEMPERATURE COEFFICIENT	β	-0.040ppm/°C ² max.	-0.040ppm/°C ² max.	-0.040ppm/°C ² max.	PPM/(ΔC ²)
SHUNT CAPACITANCE	C ₀	1.60 (typ.)	1.35 (typ.)	1.00 (typ.)	pF
CAPACITANCE RATIO		460 (typ.)	450 (typ.)	400 (typ.)	
OPERATING TEMP. RANGE	T _{OPR}		-10~+60		°C
STORAGE TEMP. RANGE	T _{STG}		-40~+85		°C
SHOCK RESISTANCE		Drop test 3 times on hard wooden board from height of 75cm / ±5 PPM max.			PPM
INSULATION RESISTANCE	IR	500MΩ min./DC100V			MΩ
AGING (FIRST YEAR)	Δf/f ₀	±3 PPM max. @ +25°C ±3°C			PPM
MOTIONAL CAPACITANCE	C ₁	0.0035 (typ.)	0.0030 (typ.)	0.0025 (typ.)	pF

Note: Contact factory for optional load capacitance.

PACKAGE DIMENSIONS (mm)



RECOMMENDED OSCILLATION CIRCUIT

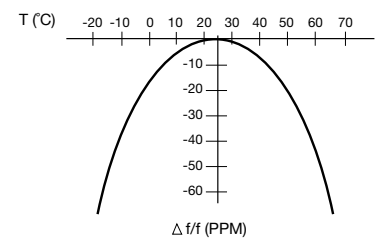


ELECTRICAL CHARACTERISTICS

IC: TC 4069P
 R_f: 10MΩ
 R_d: 330KΩ (As required)
 C₁ = 22pF, C₂ = 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.

PARABOLIC TEMPERATURE CURVE



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

- 1) Change in T (°C) = 45 - 25 = 20°C
- 2) Change in frequency = -0.04 PPM × (ΔT)²
 = -0.04 PPM × (20)²
 = -16.0 PPM