<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	

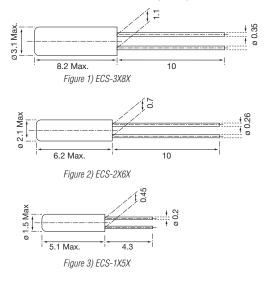
* Package type examples (8X=3x8, 13X=2x6, 14X=1x5)

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	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	TM	+25 ±5	+25 ±5	+25 ±5	°C
TEMPERATURE COEFFICIENT	В	-0.040ppm/°C ² max.	-0.040ppm/°C ² max.	-0.040ppm/°C ² 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		°C		
STORAGE TEMP. RANGE	T _{STG}		°C		
SHOCK RESISTANCE		Drop test 3 t	PPM		
INSULATION RESISTANCE	IR		MΩ		
AGING (FIRST YEAR)	∆f/fo		PPM		
MOTIONAL CAPACITANCE	C1	0.0035 (typ.)	0.0030 (typ.)	0.0025 (typ.)	pF

Note: Contact factory for optional load capacitance.

PACKAGE DIMENSIONS (mm)



RECOMMENDED OSCILLATION

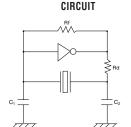
PARABOLIC TEMPERATURE CURVE

-10 -20

-30

T (°C)

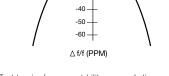
-20 -10 0 10 20 30 40 50 60 70



ELECTRICAL CHARACTERISTICS IC: TC 4069P Rf: 10MΩ

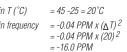
Rd: 330KΩ (As required) $C_1 = 22pF, C_2 = 22pF$ $V_{DD} = 3.0V$

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



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