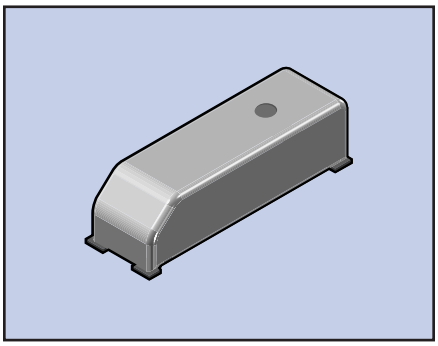
ECX-26X/ECX-15X 32.768 KHz SMD TUNING FORK CRYSTAL



The miniature ECX-26X and the sub-miniature ECX-15X are compact, cost effective SMD tuning fork crystals. The slimline molded package requires less space than other SMD tuning fork crystals.

FEATURES

- **Cost effective**
- **Low profile**
- **RoHS Compliant w/exemption for Pb in high temp solder**
- **Tape & Reel packaging**

PART NUMBERING GUIDE *"EXAMPLE"*

MANUFACTURER		FREQUENCY (32.768 MHz)		LOAD CAPACITANCE*		PACKAGE TYPE
ECS	–	.327	–	12.5	–	26X

** Package type examples (26X=ECX-26X, 27X=ECX-15X) Sample Part Number: ECS-.327-12.5-26X*

OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

PARAMETERS	CONDITIONS	ECX-26X			ECX-15X			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
FREQUENCY RANGE	F_O		32.768			32.768		KHz
FREQUENCY TOLERANCE	$\Delta f/fo$			±20			±20	PPM
LOAD CAPACITANCE	Optional CL available		12.5			12.5		pF
DRIVE LEVEL	D_L			1.0			1.0	µW
EQUIV. SERIES RESISTANCE	R_1			50K			55K	Ω
Q-FACTOR	Q		70K			70K		Q
TURNOVER TEMPERATURE		+20	+25	+30	+20	+25	+30	˚C
TEMPERATURE COEFFICIENT	β		-0.35	-0.04		-0.35	-0.04	PM/˚C
SHUNT CAPACITANCE	C_O		0.9			0.95		pF
CAPACITANCE RATIO			360			380		
OPERATING TEMP RANGE	T_{OPR}	-20		+70	-20		+70	˚C
STORAGE TEMP RANGE	T_{STG}	-40		+125	-40		+125	˚C
INSULATION RESISTANCE	@ 100V DC ±15V	500M			500M			Ω
AGING (FIRST YEAR)	@ +25˚C ±3˚C			±3			±3	PPM
MOTION CAPACITANCE	C_1		0.0025			+0.0025		PF

PACKAGE DIMENSIONS (mm)

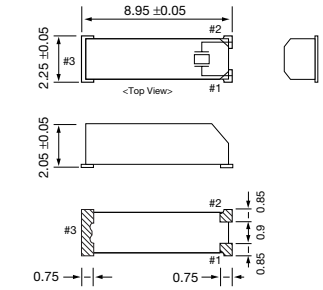


Figure 1) ECX-26X Top, Side Bottom & End views

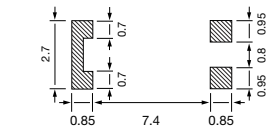


Figure 2) ECX-26X Land Pattern

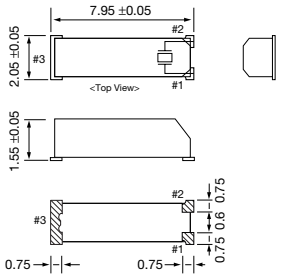


Figure 3) ECX-15X Top, Side Bottom & End views

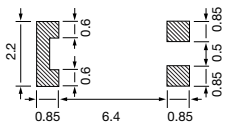
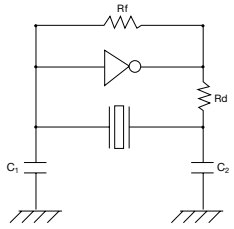


Figure 4) ECX-15X Land Pattern

RECOMMENDED OSCILLATION CIRCUIT

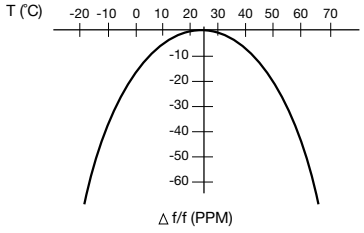


ELECTRICAL CHARACTERISTICS

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 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 x $(\Delta T)^2$
= -0.04 PPM x $(20)^2$
= -16.0 PPM

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