

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](#)

ECS-3X8X, 2X6X, 1X5X



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

DIMENSIONS (mm)

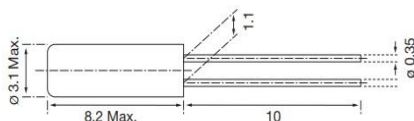


Figure 1) ECS-3X8X

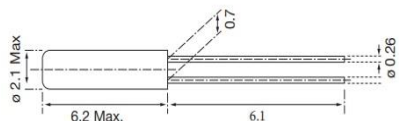


Figure 2) ECS-2X6X

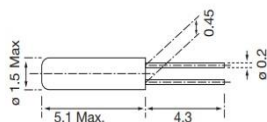
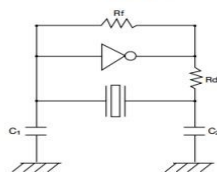


Figure 3) ECS-1X5X

OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS

PARAMETERS		3X8X	2X6X	1X5X	UNITS
Frequency	F_0	32.768	32.768	32.768	KHz
Frequency Tolerance	$\Delta f/f_0$	± 20	± 20	± 20	ppm
Load Capacitance	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)	K Ω
Q-Factor	Q	90,000(typ.)	70,000(typ.)	80,000(typ.)	
Turnover Temperature	T_M	$+25 \pm 5$	$+25 \pm 5$	$+25 \pm 5$	$^{\circ}C$
Temperature Coefficient	β	-0.040ppm/ $^{\circ}C^2$ max.	-0.040ppm/ $^{\circ}C^2$ max.	-0.040ppm/ $^{\circ}C^2$ max.	PPM/ ΔC°
Shunt Capacitance	C_0	1.60 (typ.)	1.35 (typ.)	1.00 (typ.)	pF
Capacitance Ratio		460 (typ.)	450 (typ.)	400 (typ.)	
Operating Temp	T_{opr}	$-10 \sim +60$			$^{\circ}C$
Storage Temperature	T_{stg}	$-40 \sim +85$			$^{\circ}C$
Shock Resistance		Drop 3 times on hard wooden board from height of 75cm / ± 5 ppm max.			PPM
Insulation Resistance	IR	500 M Ω min./DC100V			M Ω
Aging (First Year)	$\Delta f/f_0$	± 3 ppm max. @ $+25^{\circ}C \pm 3^{\circ}C$			ppm
Motional Capacitance	C_1	0.0035(typ.)	0.0030(typ.)	0.0025(typ.)	pF

RECOMMENDED OSCILLATION CIRCUIT

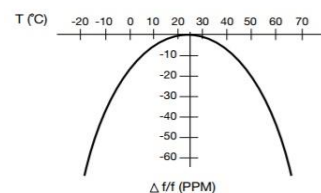


ELECTRICAL CHARACTERISTICS

IC: TC 4069P
 R_f : 10M Ω
 R_d : 330K Ω (As required)
 $C_1 = 22pF$, $C_2 = 22pF$
 $V_{DD} = 3.0V$

In this circuit, low drive level with a maximum of 1 μW 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 $^{\circ}C$?

- 1) Change in T ($^{\circ}C$) = $45 - 25 = 20^{\circ}C$
- 2) Change in frequency = $-0.04 \text{ PPM} \times (\Delta T)^2$
 $= -0.04 \text{ PPM} \times (20)^2$
 $= -16.0 \text{ PPM}$

PART NUMBERING GUIDE:

Manufacturer	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

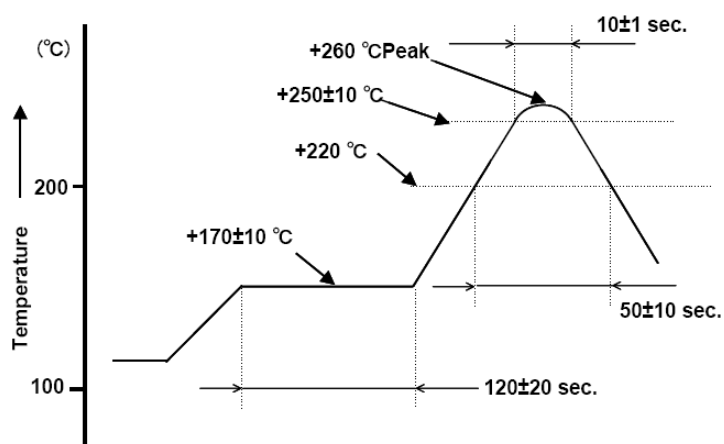


Figure 1) Suggested Solder Profile

Mouser Electronics

Authorized Distributor

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ECS:

[ECS-3X8X](#) [ECS-1X5/ECS-.327-8-14X](#) [ECS-.327-12.5-13X](#) [ECS-.327-6-13X](#) [ECS-.327-8-14X](#) [ECS-10-8-14](#) [ECS-1X5/ECS-.327-8-14](#) [ECS-3X8/ECS-.327-12.5-8](#) [ECS-2X6-FL](#)