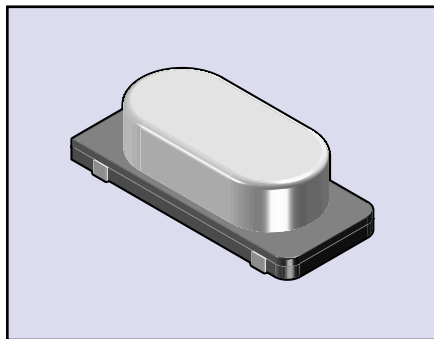




The CSM-4A SMD version of the HC-49US leaded crystal. The CSM-4A has a case height of 5 mm maximum in a resistance-weld metal package. The CSM-4A is also pin out compatible with the EPSON MA-506.

## FEATURES

- Cost effective
- Resistance-weld sealing
- Extended Temp range available
- Tape & Reel (1,000 pcs)

## PART NUMBERING GUIDE "EXAMPLE"

| MANUFACTURER | FREQUENCY (4.000 MHz) | LOAD CAPACITANCE* | PACKAGE TYPE |
|--------------|-----------------------|-------------------|--------------|
| ECS          | 40                    | 20                | 28A          |

\* Load capacitance (xx=xx pF, S=series resonance) Package Type examples (-28A = 5.0 mm max. height, -28AL = 4.0 mm max. height)

Note: See Product Selection Guide for additional options including tighter tolerances or extended temperature range.

## OPERATING CONDITIONS/ELECTRICAL CHARACTERISTICS

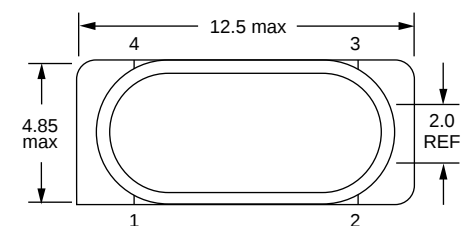
| PARAMETERS                       | CONDITIONS                          | MINIMUM  | TYPICAL       | MAXIMUM | UNITS |
|----------------------------------|-------------------------------------|----------|---------------|---------|-------|
| FREQUENCY RANGE                  |                                     | 3.579545 |               | 70.000  | MHz   |
| CALIBRATION TOLERANCE            | @ +25°C                             |          |               | ±30*    | PPM   |
| FREQUENCY STABILITY ref @25°C    | -10 ~ +70°C                         |          |               | ±50*    | PPM   |
| SHUNT CAPACITANCE                |                                     |          |               | 7       | pF    |
| LOAD CAPACITANCE                 | C <sub>L</sub> (Customer Specified) | 10       | 20.0 standard | Series  | pF    |
| DRIVE LEVEL                      | DL                                  |          |               | 500     | μW    |
| OPERATING TEMPERATURE            | T <sub>OPR</sub> **                 | -10      |               | +70     | °C    |
| STORAGE TEMPERATURE              | T <sub>STG</sub>                    | -30      |               | +85     | °C    |
| AGING CHARACTERISTICS (Per Year) | @ +25°C ± 3°C per year              |          |               | ±5      | PPM   |

\* Tighter specifications are available. \*\*Extended temperature range available.

## EQUIVALENT SERIES RESISTANCE / MODE OF OSCILLATION

| FREQUENCY RANGE (MHz) | MODE OF OSC | MAX ESR Ω | FREQUENCY RANGE (MHz) | MODE OF OSC | MAX ESR Ω |
|-----------------------|-------------|-----------|-----------------------|-------------|-----------|
| 3.579545 ~ 4.999      | Fundamental | 200       | 9.000 ~ 12.000        | Fundamental | 60        |
| 5.000 ~ 5.999         | Fundamental | 150       | 13.000 ~ 19.999       | Fundamental | 40        |
| 6.000 ~ 6.999         | Fundamental | 100       | 20.000 ~ 30.000       | Fundamental | 30        |
| 7.000 ~ 8.999         | Fundamental | 80        | 27.000 ~ 80.000       | 3rd O/T     | 100       |

## PACKAGE DIMENSIONS (mm)



| Height "H" (max.) |        |
|-------------------|--------|
| -28A              | 5.0 mm |
| -28AL             | 4.0 mm |

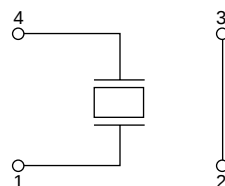


Figure 2) CSM-4A Internal Connections

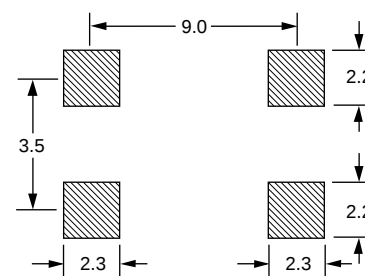


Figure 3) Land Pattern

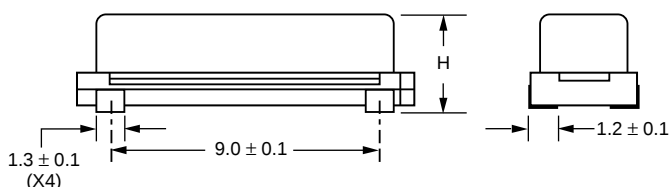


Figure 1) CSM-4A - Top, Side and End views