



## 2 Lead Metal Package Quartz Crystal, 4.7 mm x 11 mm



## HC49US Series

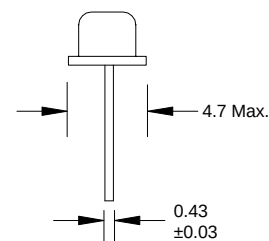
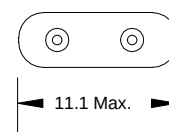
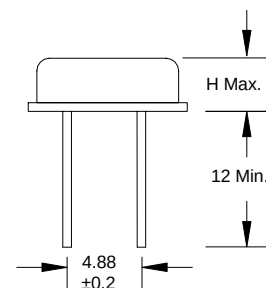
### Product Features:

Low Cost Package  
RoHs Compliant  
Compatible with Leadfree Processing

### Applications:

Fibre Channel  
Server & Storage  
Sonet /SDH  
802.11 / Wifi  
T1/E1, T3/E3

|                                             |                                                                  |
|---------------------------------------------|------------------------------------------------------------------|
| <b>Frequency</b>                            | 3.2 MHz to 100.000 MHz                                           |
| <b>ESR (Equivalent Series Resistance)</b>   |                                                                  |
| 3.2 MHz – 3.49 MHz                          | 300 $\Omega$ Max.                                                |
| 3.5 MHz – 3.99 MHz                          | 200 $\Omega$ Max.                                                |
| 4.0 MHz – 4.99 MHz                          | 150 $\Omega$ Max.                                                |
| 5.0 MHz – 5.99 MHz                          | 120 $\Omega$ Max.                                                |
| 6.0 MHz – 6.99 MHz                          | 100 $\Omega$ Max.                                                |
| 7.0 MHz – 8.9 MHz                           | 80 $\Omega$ Max.                                                 |
| 9.0 MHz – 12.9 MHz                          | 60 $\Omega$ Max.                                                 |
| 13 MHz – 19.9 MHz                           | 40 $\Omega$ Max.                                                 |
| 20 MHz – 36 MHz                             | 30 $\Omega$ Max.                                                 |
| 27 MHz – 100 MHz (3 <sup>rd</sup> O.T.)     | 100 $\Omega$ Max.                                                |
| <b>Shunt Capacitance (C0)</b>               | 7 pF Max.                                                        |
| <b>Frequency Tolerance @ 25° C</b>          | $\pm 30$ ppm Standard (see Part Number Guide for more options)   |
| <b>Frequency Stability over Temperature</b> | $\pm 50$ ppm Standard (see Part Number Guide for more options)   |
| <b>Crystal Cut</b>                          | AT Cut Standard                                                  |
| <b>Load Capacitance</b>                     | 18 pF Standard (see Part Number Guide for more options)          |
| <b>Drive Level</b>                          | 1 mW Max.                                                        |
| <b>Aging</b>                                | $\pm 5$ ppm Max. / Year Standard                                 |
| <b>Temperature</b>                          |                                                                  |
| <b>Operating</b>                            | 0° C to +70° C Standard (see Part Number Guide for more options) |
| <b>Storage</b>                              | -40° C to +85° C Standard                                        |



HC49US, H Max. = 3.5  
HC49US2, H Max. = 2.5  
HC49US3, H Max. = 2.0

Dimension Units: mm

| Part Number Guide                                                   |                                     | Sample Part Number: HC49US - FB1F18 - 20.000 |                             |                              |                              |              |
|---------------------------------------------------------------------|-------------------------------------|----------------------------------------------|-----------------------------|------------------------------|------------------------------|--------------|
| Package                                                             | Tolerance (ppm) at Room Temperature | Stability (ppm) over Operating Temperature   | Operating Temperature Range | Mode (overtone)              | Load Capacitance (pF)        | Frequency    |
| HC49US - (3.5 mm H)<br>HC49US2 - (2.5 mm H)<br>HC49US3 - (2.0 mm H) | B = $\pm 50$ ppm                    | B = $\pm 50$ ppm                             | 0 = 0° C to +50° C          | F = Fundamental              | 18 pF Standard<br>Or Specify | - 20.000 MHz |
|                                                                     | F = $\pm 30$ ppm                    | F = $\pm 30$ ppm                             | 1 = 0° C to +70° C          | 3 = 3 <sup>rd</sup> overtone |                              |              |
|                                                                     | G = $\pm 25$ ppm                    | G = $\pm 25$ ppm                             | 2 = -10° C to +60° C        |                              |                              |              |
|                                                                     | H = $\pm 20$ ppm                    | H = $\pm 20$ ppm                             | 3 = -20° C to +70° C        |                              |                              |              |
|                                                                     | I = $\pm 15$ ppm                    | I = $\pm 15$ ppm**                           | 5 = -40° C to +85° C        |                              |                              |              |
|                                                                     | J = $\pm 10$ ppm*                   | J = $\pm 10$ ppm**                           | 9 = -10° C to +50° C        |                              |                              |              |

\* Not available at all frequencies. \*\* Not available for all temperature ranges.



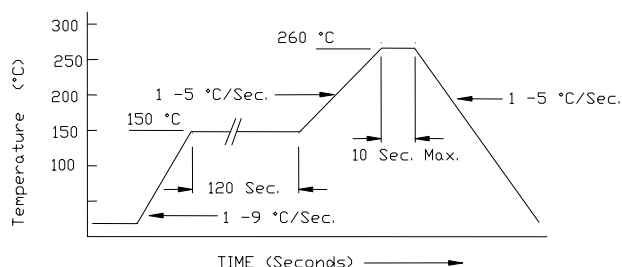
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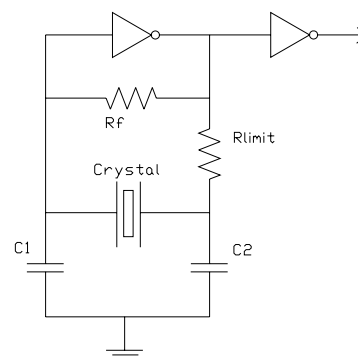
HC49US Series

#### Pb Free Solder Reflow Profile:

#### Typical Circuit:



\*Units are backward compatible with 240C reflow processes



#### Package Information:

MSL = 1

Termination = e1 (Sn / Cu / Ag over Ni over Kovar base metal).

#### Environmental Specifications

|                              |                                                             |
|------------------------------|-------------------------------------------------------------|
| Thermal Shock                | MIL-STD-883, Method 1011, Condition A                       |
| Moisture Resistance          | MIL-STD-883, Method 1004                                    |
| Mechanical Shock             | MIL-STD-883, Method 2002, Condition B                       |
| Mechanical Vibration         | MIL-STD-883, Method 2007, Condition A                       |
| Resistance to Soldering Heat | J-STD-020C, Table 5-2 Pb-free devices (except 2 cycles max) |
| Hazardous Substance          | Pb-Free / RoHS / Green Compliant                            |
| Solderability                | JESD22-B102-D Method 2 (Preconditioning E)                  |
| Terminal Strength            | MIL-STD-883, Method 2004, Test Condition D                  |
| Gross Leak                   | MIL-STD-883, Method 1014, Condition C                       |
| Fine Leak                    | MIL-STD-883, Method 1014, Condition A2, R1=2x10-8 atm cc/s  |
| Solvent Resistance           | MIL-STD-202, Method 215                                     |

#### Marking

Line 1 ILSI, Frequency, Date Code (yww)