

# HC49 CRYSTALS

ISSUE 9; 7 SEPTEMBER 1999

## Delivery Options

- Common frequencies are available from stock. Please see p4 for details
- 3 day Express Manufacturing Service, subject to piece part stock availability

## Holder Style

- HC49 crystals are resistance welded, hermetically sealed in an inert atmosphere with glass to metal seals securing the lead wires; HC49/T is truncated version; HC50 is plug-in version
- HC43 crystals are cold welded; HC43/T is truncated version; HC42 is plug-in version
- Holders suffixed '-3L have a centre third wire which grounds the case; this is not applicable to the HC50 and HC42
- Truncated versions are only available in the frequency range 4.0 to 300.0MHz

## General Specifications

- Load Capacitance ( $C_L$ ): 10pF to 75pF or Series
- Drive Level: 1mW max.
- Static Capacitance ( $C_0$ ): 7pF max.
- Ageing:  $\pm 3$ ppm typical per year

## Standard Frequency Tolerances and Stabilities

- $\pm 5$ ppm,  $\pm 10$ ppm,  $\pm 15$ ppm,  $\pm 20$ ppm,  $\pm 30$ ppm,  $\pm 50$ ppm,  $\pm 100$ ppm

## Operating Temperature Ranges

- 0 to 50°C    -40 to 90°C
- 10 to 60°C    -55 to 105°C
- 20 to 70°C    -55 to 125°C
- 30 to 80°C

## Storage Temperature Range

- 55 to 125°C

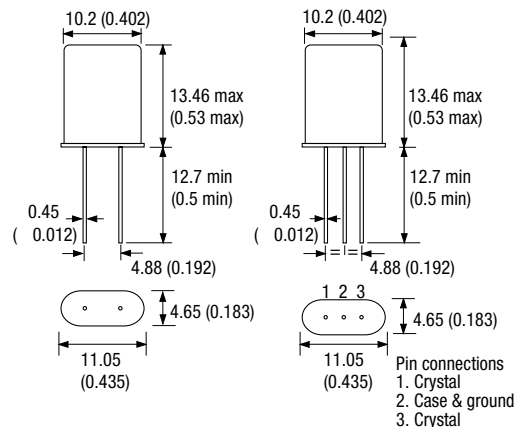
## Environmental Specification

- Shock:  $981\text{m/s}^2$  for 6ms, three shocks in each direction along three mutually perpendicular planes
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 500Hz  $98.1\text{m/s}^2$  acceleration, 30 minutes in each of three mutually perpendicular planes

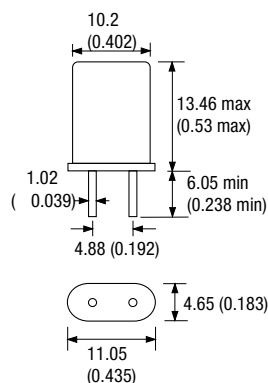
## Marking

- Includes Frequency

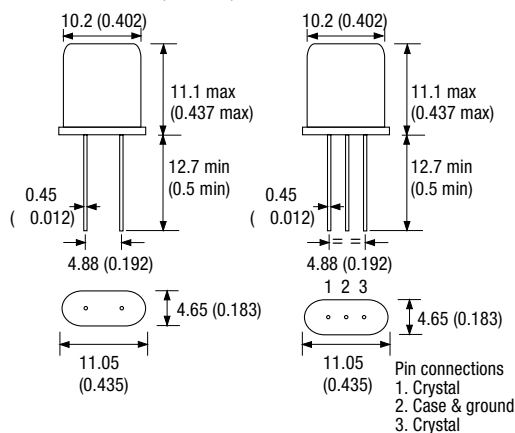
## Outline in mm (inches) - HC49 & HC49-3L



## Outline in mm (inches) - HC50 & HC42



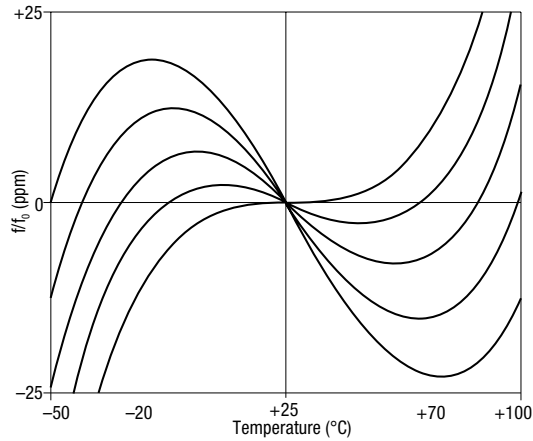
## Outline in mm (inches) - HC49/T & HC49/T-3L



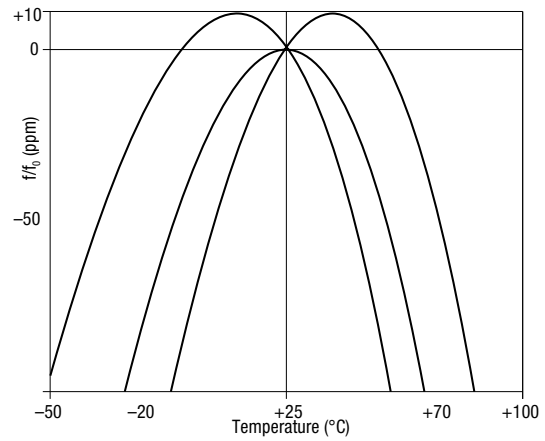
### Minimum Order Information Required

- Frequency + Holder + Frequency Tolerance @ 25°C + Frequency Stability + Operating Temperature Range + Circuit Condition + Overtone Order

**Typical Frequency vs Temperature Curves for various angles of AT-cut crystals**



**Typical Frequency vs Temperature Curves for various angles of BT-cut crystals**



QUARTZ  
CRYSTALS

### Electrical Specification - maximum limiting values

Frequency Range	Frequency Tolerance @ 25°C ±2°C	Operating Temperature Range	Frequency Stability Available Over Operating Temperature		ESR max.	Vibration Mode
			Minimum	Maximum		
1.84320 to < 2.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±200ppm	800	Fundamental AT cut
		-10 to 60°C	±20ppm	±200ppm		
		-20 to 70°C	±20ppm	±200ppm		
		-30 to 80°C	±25ppm	±200ppm		
		-40 to 90°C	±30ppm	±200ppm		
		-55 to 105°C	±50ppm	±200ppm		
		-55 to 125°C	±100ppm	±200ppm		
2.0 to < 3.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±200ppm	600	Fundamental AT cut
		-10 to 60°C	±20ppm	±200ppm		
		-20 to 70°C	±20ppm	±200ppm		
		-30 to 80°C	±25ppm	±200ppm		
		-40 to 90°C	±30ppm	±200ppm		
		-55 to 105°C	±50ppm	±200ppm		
		-55 to 125°C	±100ppm	±200ppm		
3.0 to < 4.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±200ppm	150	Fundamental AT cut
		-10 to 60°C	±20ppm	±200ppm		
		-20 to 70°C	±20ppm	±200ppm		
		-30 to 80°C	±25ppm	±200ppm		
		-40 to 90°C	±30ppm	±200ppm		
		-55 to 105°C	±50ppm	±200ppm		
		-55 to 125°C	±55ppm	±200ppm		

Frequency Range	Frequency Tolerance @ 25°C ±2°C	Operating Temperature Range	Frequency Stability Available Over Operating Temperature		ESR max.	Vibration Mode
			Minimum	Maximum		
4.0 to < 7.0MHz	±5ppm to ±100ppm	0 to 50°C	±10ppm	±100ppm	100	Fundamental AT cut
		-10 to 60°C	±15ppm	±100ppm		
		-20 to 70°C	±15ppm	±100ppm		
		-30 to 80°C	±20ppm	±100ppm		
		-40 to 90°C	±25ppm	±100ppm		
		-55 to 105°C	±50ppm	±100ppm		
		-55 to 125°C	±50ppm	±100ppm		
7.0 to < 10.0MHz	±5ppm to ±100ppm	0 to 50°C	±10ppm	±100ppm	50	Fundamental AT cut
		-10 to 60°C	±10ppm	±100ppm		
		-20 to 70°C	±10ppm	±100ppm		
		-30 to 80°C	±20ppm	±100ppm		
		-40 to 90°C	±25ppm	±100ppm		
		-55 to 105°C	±50ppm	±100ppm		
		-55 to 125°C	±50ppm	±100ppm		
10.0 to 36.0MHz	±5ppm to ±100ppm	0 to 50°C	±5ppm	±100ppm	35	Fundamental AT cut
		-10 to 60°C	±5ppm	±100ppm		
		-20 to 70°C	±10ppm	±100ppm		
		-30 to 80°C	±20ppm	±100ppm		
		-40 to 90°C	±25ppm	±100ppm		
		-55 to 105°C	±50ppm	±100ppm		
		-55 to 125°C	±50ppm	±100ppm		
20.0 to 45.0MHz	Inclusive with Frequency Stability	0 to 50°C	±50ppm	±100ppm	35	Fundamental BT cut
		-10 to 60°C	±50ppm	±100ppm		
		-20 to 70°C	±100ppm	±100ppm		
		-30 to 80°C	±100ppm	±100ppm		
21.0 to 90.0MHz	±5ppm to ±100ppm	0 to 50°C	±5ppm	±100ppm	40	3rd Overtone AT cut
		-10 to 60°C	±5ppm	±100ppm		
		-20 to 70°C	±10ppm	±100ppm		
		-30 to 80°C	±20ppm	±100ppm		
		-40 to 90°C	±25ppm	±100ppm		
		-55 to 105°C	±50ppm	±100ppm		
		-55 to 125°C	±50ppm	±100ppm		
45.0 to 135.0MHz	Inclusive with Frequency Stability	0 to 50°C	±50ppm	±100ppm	35	3rd Overtone BT cut
		-10 to 60°C	±50ppm	±100ppm		
		-20 to 70°C	±100ppm	±100ppm		
		-30 to 80°C	±100ppm	±100ppm		
60.0 to 150.0MHz	±5ppm to ±100ppm	0 to 50°C	±5ppm	±100ppm	70	5th Overtone AT cut
		-10 to 60°C	±5ppm	±100ppm		
		-20 to 70°C	±10ppm	±100ppm		
		-30 to 80°C	±20ppm	±100ppm		
		-40 to 90°C	±25ppm	±100ppm		
		-55 to 105°C	±50ppm	±100ppm		
		-55 to 125°C	±50ppm	±100ppm		

Frequency Range	Frequency Tolerance @ 25°C ±2°C	Operating Temperature Range	Frequency Stability Available Over Operating Temperature		ESR max.	Vibration Mode
			Minimum	Maximum		
90.0 to 225.0MHz	Inclusive with Frequency Stability	0 to 50°C	±50ppm	±100ppm	70	5th Overtone BT cut
		-10 to 60°C	±50ppm	±100ppm		
		-20 to 70°C	±100ppm	±100ppm		
		-30 to 80°C	±100ppm	±100ppm		
85.0 to 210.0MHz	±5ppm to ±100ppm	0 to 50°C	±5ppm	±100ppm	100	7th Overtone AT cut
		-10 to 60°C	±5ppm	±100ppm		
		-20 to 70°C	±10ppm	±100ppm		
		-30 to 80°C	±20ppm	±100ppm		
		-40 to 90°C	±25ppm	±100ppm		
		-55 to 105°C	±50ppm	±100ppm		
		-55 to 125°C	±50ppm	±100ppm		
125.0 to 300.0MHz	Inclusive with Frequency Stability	0 to 50°C	±50ppm	±100ppm	100	7th Overtone BT cut
		-10 to 60°C	±50ppm	±100ppm		
		-20 to 70°C	±100ppm	±100ppm		
		-30 to 80°C	±100ppm	±100ppm		
110.0 to 270.0MHz	±5ppm to ±100ppm	0 to 50°C	±5ppm	±100ppm	150	9th Overtone AT cut
		-10 to 60°C	±5ppm	±100ppm		
		-20 to 70°C	±10ppm	±100ppm		
		-30 to 80°C	±20ppm	±100ppm		
		-40 to 90°C	±25ppm	±100ppm		
		-55 to 105°C	±50ppm	±100ppm		
		-55 to 125°C	±50ppm	±100ppm		