

# HC49 CRYSTALS

ISSUE 13; 1 NOVEMBER 2008 - RoHS 2002/95/EC

Outline (mm) - HC49 & HC49-3L

## Holder Style

- Resistance welded, hermetically sealed in an inert atmosphere with glass to metal seals securing the lead wires
- Holders suffixed -3L have a centre third wire which grounds the case
- Holder HC49-T has a truncated height of 11.1mm max

## General Specifications

- Load Capacitance (CL): 10pF to 75pF or Series
- Drive Level: 1mW max.
- Static Capacitance (C0): 7pF max.
- Ageing:  $\pm 3$ ppm typical per year

## Packaging

- Loose in bulk pack or tape and reel

## 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
- -10 to 60°C
- -20 to 70°C
- -30 to 80°C
- -40 to 85°C
- -55 to 105°C
- -55 to 125°C

## Storage Temperature Range

- -55 to 125°C

## Environmental Specification

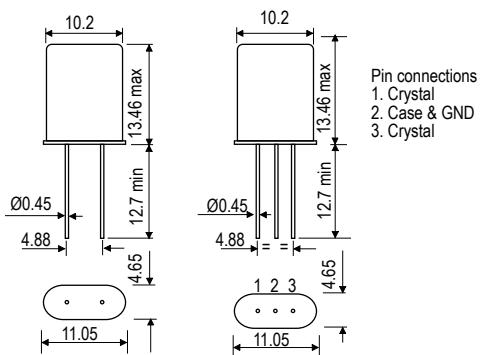
- Shock: 981m/s<sup>2</sup> for 6ms, three shocks in each direction along three mutually perpendicular planes
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 500Hz 98.1m/s<sup>2</sup> acceleration, 30 minutes in each of three mutually perpendicular planes

## Marking Includes

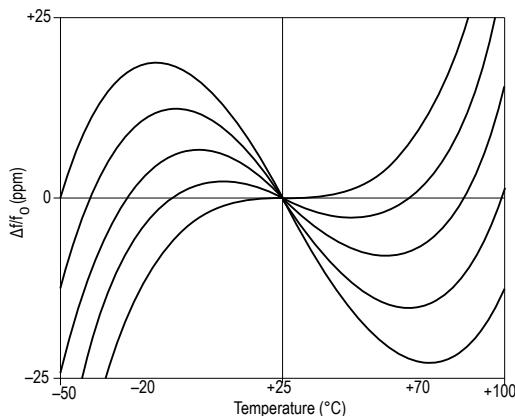
- Frequency

## Minimum Order Information Required

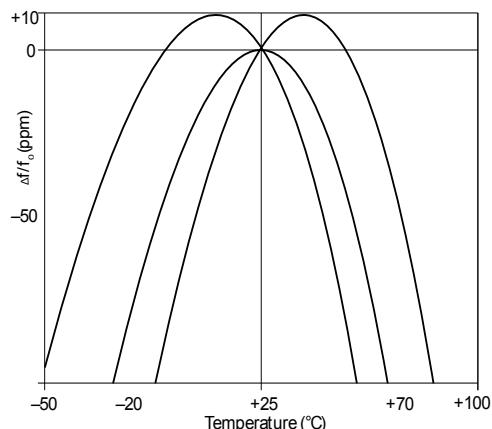
- Frequency + Holder + Frequency Tolerance @ 25°C + Frequency Stability + Operating Temperature Range + Circuit Condition + Overtone Order



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



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



### Electrical Specifications - maximum limiting values

Frequency Range	Frequency Tolerance @25°C ±2°C	Operating Temperature Range	Frequency Stability Available Over Operating Temperature Range		ESR Max	Vibration Mode
			Minimum	Maximum		
1.84320 to <2.0MHz (For lower frequencies, please contact our sales office)	±5ppm to ±100ppm	0 to 50°C	±15ppm	±200ppm	800Ω	Fundamental AT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			
2.0 to <3.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±200ppm	600Ω	Fundamental AT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			
3.0 to <4.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±200ppm	150Ω	Fundamental AT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			
4.0 to <7.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±100ppm	100Ω	Fundamental AT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			
7.0 to <10.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±100ppm	50Ω	Fundamental AT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			

Frequency Range	Frequency Tolerance @25°C ±2°C	Operating Temperature Range	Frequency Stability Available Over Operating Temperature Range		ESR Max	Vibration Mode
			Minimum	Maximum		
10.0 to 36.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±100ppm	35Ω	Fundamental AT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			
20.0 to 45.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±100ppm	35Ω	Fundamental BT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			
21.0 to 90.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±100ppm	40Ω	3rd Overtone AT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
		-40 to 85°C	±30ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±100ppm			
45.0 to 135.0MHz	±5ppm to ±100ppm	0 to 50°C	±15ppm	±100ppm	35Ω	3rd Overtone BT cut
		-10 to 60°C	±20ppm			
		-20 to 70°C	±20ppm			
		-30 to 80°C	±25ppm			
60.0 to 150.0MHz	±5ppm to ±100ppm	0 to 50°C	±10ppm	±100ppm	70Ω	5th Overtone AT cut
		-10 to 60°C	±15ppm			
		-20 to 70°C	±15ppm			
		-30 to 80°C	±20ppm			
		-40 to 85°C	±25ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±50ppm			
90.0 to 225.0MHz	±5ppm to ±100ppm	0 to 50°C	±10ppm	±100ppm		5th Overtone BT cut
		-10 to 60°C	±10ppm			
		-20 to 70°C	±10ppm			
		-30 to 80°C	±20ppm			

Frequency Range	Frequency Tolerance @25°C ±2°C	Operating Temperature Range	Frequency Stability Available Over Operating Temperature Range		ESR Max	Vibration Mode
			Minimum	Maximum		
85.0 to 210.0MHz	±5ppm to ±100ppm	0 to 50°C	±5ppm	±100ppm	100Ω	7th Overtone AT cut
		-10 to 60°C	±5ppm			
		-20 to 70°C	±10ppm			
		-30 to 80°C	±20ppm			
		-40 to 85°C	±25ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±50ppm			
125.0 to 300.0MHz	±5ppm to ±100ppm	0 to 50°C	±50ppm	±100ppm	100Ω	7th Overtone BT cut
		-10 to 60°C	±50ppm			
		-20 to 70°C	±100ppm			
		-30 to 80°C	±100ppm			
110.0 to 270.0MHz	±5ppm to ±100ppm	0 to 50°C	±5ppm	±100ppm	150Ω	9th Overtone AT cut
		-10 to 60°C	±5ppm			
		-20 to 70°C	±10ppm			
		-30 to 80°C	±20ppm			
		-40 to 85°C	±25ppm			
		-55 to 105°C	±50ppm			
		-55 to 125°C	±50ppm			

Note: For other frequency/specification combinations, please contact our sales office