

HC49 Crystals

ISSUE 11; 6 OCTOBER 2004

Delivery Options

- Common frequencies maybe available from stock

Holder Style

- HC49 crystals are 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

General Specifications

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

Standard Frequency Tolerances and Stabilities

- ± 5 ppm, ± 10 ppm, ± 15 ppm, ± 20 ppm, ± 30 ppm, ± 50 ppm, ± 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: 981m/s² for 6ms, three shocks in each direction along three mutually perpendicular planes
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 500Hz 98.1m/s² acceleration, 30 minutes in each of three mutually perpendicular planes

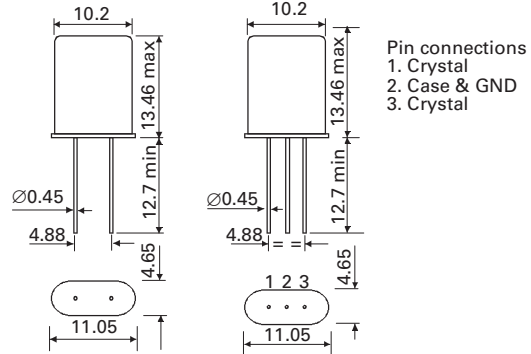
Marking

- Includes Frequency

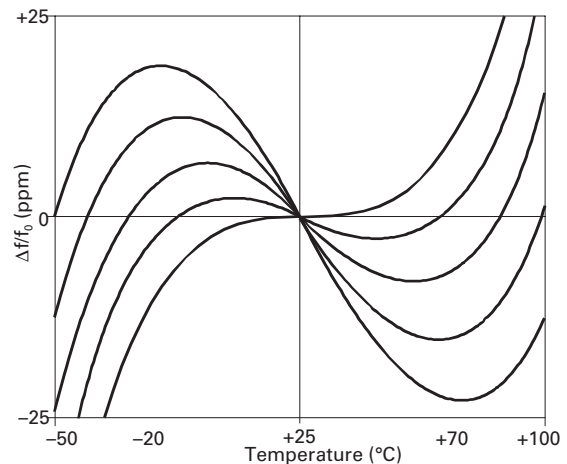
Minimum Order Information Required

- Frequency + Holder + Frequency Tolerance @ 25°C + Frequency Stability + Operating Temperature Range + Circuit Condition + Overtone Order + Tape & Reel Packaging Available

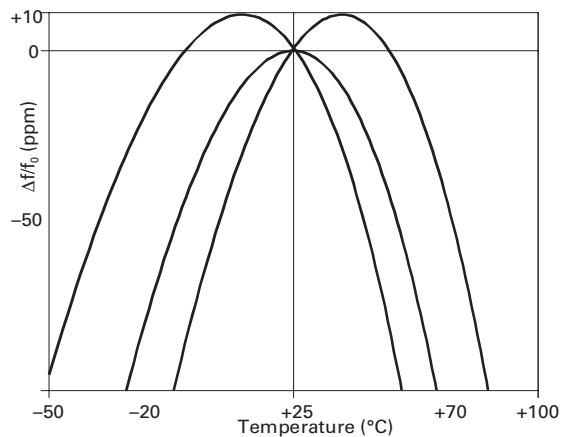
Outline in mm - HC49 & HC49-3L



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 Specification – maximum limiting values

| Frequency Range <i>(For lower Freq's, please contact sales office)</i> | 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 | 800Ω | 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 | 600Ω | 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 | 150Ω | 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 | | |
| 4.0 to < 7.0MHz | ±5ppm to ±100ppm | 0 to 50°C | ±10ppm | ±100ppm | 100Ω | 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 | 50Ω | 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 | 35Ω | 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 | | |

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| Frequency Range | Frequency Tolerance @ 25°C ±2°C | Operating Temperature Range | Frequency Stability Available Over Operating Temperature | | ESR max. | Vibration Mode |
|-------------------|---------------------------------------|--------------------------------|---|---------|-------------|------------------------|
| | | | Minimum | Maximum | | |
| 20.0 to 45.0MHz | Inclusive with Frequency stability | 0 to 50°C | ±50ppm | ±100ppm | 35Ω | 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 | 40Ω | 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 | 35Ω | 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 | 70Ω | 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 | | |
| 90.0 to 225.0MHz | Inclusive with Frequency Stability | 0 to 50°C | ±50ppm | ±100ppm | 70Ω | 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 | 100Ω | 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 | | |
| 125.0 to 300.0MHz | Inclusive with Frequency Stability | 0 to 50°C | ±50ppm | ±100ppm | 100Ω | 7th Overtone BT cut |
| | | -10 to 60°C | ±50ppm | ±100ppm | | |
| | | -20 to 70°C | ±100ppm | ±100ppm | | |
| | | -30 to 80°C | ±100ppm | ±100ppm | | |



| Frequency Range | Frequency Tolerance @ 25°C ±2°C | Operating Temperature Range | Frequency Stability Available Over Operating Temperature | | ESR max. | Vibration Mode |
|-------------------|------------------------------------|--------------------------------|---|---------|-------------|------------------------|
| | | | Minimum | Maximum | | |
| 110.0 to 270.0MHz | ±5ppm to ±100ppm | 0 to 50°C | ±5ppm | ±100ppm | 150Ω | 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 | | |

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