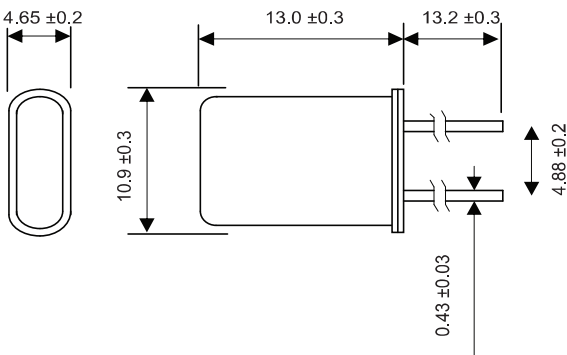


Crystal Unit - HC-49/U

Outline Drawing
Dimension (Unit=mm)



Features & Applications:

- General, industrial, microcontrollers
- RoHS Compliant
- Cost Effective
- Well established product
- Wide frequency range
- Superior resistance weld HC-49/U metal case

Supplied loose as standard.
Taped product available to special order.

Specification

| | | | |
|------------------------------|---|-------------------|-------------------|
| Nominal Frequency Range | 1.8 to 32MHz | 24 to 75MHz | 75 to 200MHz |
| Vibration Mode | Fundamental (AT) | 3rd Overtone (AT) | 5th Overtone (AT) |
| Frequency Tolerance @25°C | ±20 or ± 30 ppm | | |
| Temperature Stability | ±30 or ± 50 ppm | | |
| Operating Temperature Range | -10°C to +60°C (Option: -20°C to +70°C) | | |
| Storage Temperature Range | -20°C to +70°C (Option: -30°C to +80°C) | | |
| Load Capacitance | 8pF to 32pF or series | | |
| Equivalent Series Resistance | see ESR table below | | |
| Shunt Capacitance | 5pF max.(≤18MHz) or 7pF max. (>18MHz) | | |
| Drive Level | 200 μW max (≤5MHz) 100μW max (>5MHz) | | |
| Insulation Resistance | 500MΩmin @ 100V DC | | |
| Aging | ±5ppm per year | | |

ESR Table

| Case Frequency | Vibration Mode | HC 49U Ω Max |
|----------------|----------------|--------------|
| 1.0-1.8MHz | F | 3000 |
| 1.8-2.00MHz | F | 500 |
| 2.01-2.399MHz | F | 450 |
| 2.4-2.99MHz | F | 300 |
| 3.0-3.5MHz | F | 150 |
| 3.5-3.99MHz | F | 90 |
| 4.0-4.99MHz | F | 80 |
| 5.0-5.99MHz | F | 70 |
| 6.0-6.99MHz | F | 60 |
| 7.0-7.99MHz | F | 50 |
| 8.0-9.99MHz | F | 40 |
| 10-13.99MHz | F | 35 |
| 14-23.99MHz | F | 25 |
| 24-25.0MHz | F/3 | 25/50 |
| 25-30.0MHz | F/3 | 25/50 |
| 30-75.0MHz | 3 | 50 |
| 75-125.0MHz | 5 | 80 |
| 125-150MHz | 5 | 100 |
| 150-200MHz | 5 | 120 |

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Part Number Guide:

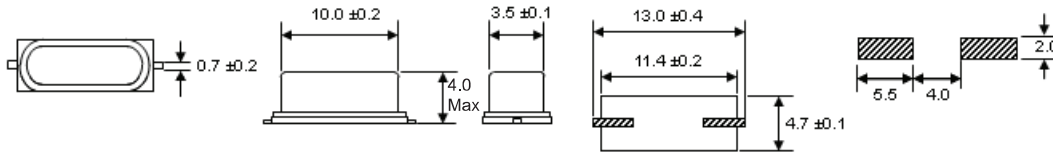
| Case | Frequency (MHz) | Freq. Tol (PPM) | Temp Stab (PPM) | Temp Range 60 = -10~+60 70 = -20~+70 | Load Cap pf 00 = Series | Vibration Mode AT Cut F=Fund.3 Overtone | Ant Part No. |
|-------|-----------------|-----------------|-----------------|--|-------------------------------|---|--------------|
| HC49U | 1.8432 | 20 | 50 | 60 | 30 | ATF | XTL-1012 |
| HC49U | 2 | 50 | 100 | 60 | 20 | ATF | XTL-1014 |
| HC49U | 2.4576 | 20 | 50 | 60 | 30 | ATF | XTL-1017 |
| HC49U | 3.2768 | 20 | 30 | 60 | 12 | ATF | XTL-1020 |
| HC49U | 3.579545 | 20 | 50 | 60 | 20 | ATF | XTL-1021 |
| HC49U | 3.6864 | 20 | 50 | 60 | 30 | ATF | XTL-1023 |
| HC49U | 3.6864 | 30 | 50 | 70 | 30 | ATF | XTL-1024 |
| HC49U | 4 | 20 | 10 | 70 | 30 | ATF | XTL-1027 |
| HC49U | 4 | 20 | 50 | 60 | 30 | ATF | XTL-1028 |
| HC49U | 4 | 30 | 50 | 70 | 30 | ATF | XTL-1029 |
| HC49U | 4.096 | 20 | 20 | 70 | 30 | ATF | XTL-1031 |
| HC49U | 4.096 | 30 | 50 | 70 | 30 | ATF | XTL-1032 |
| HC49U | 4.194304 | 20 | 30 | 60 | 12 | ATF | XTL-1033 |
| HC49U | 4.608 | 20 | 50 | 60 | 30 | ATF | XTL-1037 |
| HC49U | 4.9152 | 20 | 50 | 60 | 30 | ATF | XTL-1040 |
| HC49U | 4.9152 | 30 | 50 | 70 | 30 | ATF | XTL-1041 |
| HC49U | 5 | 20 | 50 | 60 | 30 | ATF | XTL-1043 |
| HC49U | 5.0688 | 20 | 50 | 60 | 00 | ATF | XTL-1044 |
| HC49U | 6 | 20 | 50 | 60 | 30 | ATF | XTL-1051 |
| HC49U | 6 | 30 | 50 | 70 | 30 | ATF | XTL-1053 |
| HC49U | 6.144 | 20 | 50 | 60 | 30 | ATF | XTL-1055 |
| HC49U | 6.5536 | 20 | 30 | 60 | 12 | ATF | XTL-1057 |
| HC49U | 7.3728 | 20 | 50 | 60 | 30 | ATF | XTL-1059 |
| HC49U | 8 | 20 | 50 | 60 | 30 | ATF | XTL-1062 |
| HC49U | 8 | 30 | 50 | 70 | 30 | ATF | XTL-1064 |
| HC49U | 10 | 20 | 10 | 70 | 30 | ATF | XTL-1069 |
| HC49U | 10 | 20 | 50 | 60 | 30 | ATF | XTL-1070 |
| HC49U | 11 | 20 | 30 | 60 | 30 | ATF | XTL-1073 |
| HC49U | 11.0592 | 20 | 30 | 60 | 20 | ATF | XTL-1074 |
| HC49U | 12 | 20 | 30 | 60 | 30 | ATF | XTL-1079 |
| HC49U | 12.288 | 20 | 50 | 60 | 30 | ATF | XTL-1081 |
| HC49U | 14.31818 | 20 | 50 | 60 | 00 | ATF | XTL-1083 |
| HC49U | 14.7456 | 20 | 30 | 60 | 30 | ATF | XTL-1087 |
| HC49U | 16 | 20 | 30 | 60 | 30 | ATF | XTL-1089 |
| HC49U | 19.6608 | 20 | 50 | 60 | 30 | ATF | XTL-1096 |
| HC49U | 20 | 20 | 30 | 60 | 00 | ATF | XTL-1098 |
| HC49U | 22.1184 | 20 | 50 | 60 | 30 | ATF | XTL-1114 |
| HC49U | 24 | 20 | 50 | 60 | 00 | ATF | XTL-1120 |
| HC49U | 32 | 20 | 30 | 60 | 00 | ATF | XTL-1131 |

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Crystal Unit - HC-49/SM

Outline Drawing

Dimension (Unit=mm)



Features & Applications:

Designed for applications where board height is critical

- General, industrial, microcontrollers
- Cost effective
- Surface mount
- Low profile (4mm height)
- Superior resistance weld HC49/4SMX metal case
- Supplied taped and reeled.

Specification

| | | |
|------------------------------|--|-------------------|
| Nominal Frequency Range | 3.5 to 32MHz | 24 to 70MHz |
| Vibration Mode | Fundamental (AT) | 3rd Overtone (AT) |
| Frequency Tolerance @25°C | ±20, ± 30 or ±50ppm (Options: ±10, ±15ppm) | |
| Temperature Stability | ±30 or ± 50 ppm | |
| Operating Temperature Range | -10°C to +60°C or -20°C to +70°C | |
| Storage Temperature Range | -20°C to +70°C or -30°C to +80°C | |
| Load Capacitance | 8pF to 33pF or series | |
| Equivalent Series Resistance | see ESR table below | |
| Shunt Capacitance | 5pF max.(≤18MHz) or 7pF max. (>18MHz) | |
| Drive Level | 200 μW max (≤5MHz) 100μW max (>5MHz) | |
| Insulation Resistance | 500MΩmin @ 100VDC | |
| Aging | ±5ppm per year | |

ESR Table

| Case | Vibration | HC 49SM |
|-------------|-----------|---------|
| Frequency | Mode | Ω Max |
| 3.5-3.99MHz | F | 150 |
| 4.0-4.99MHz | F | 120 |
| 5.0-5.99MHz | F | 100 |
| 6.0-6.99MHz | F | 80 |
| 7.0-7.99MHz | F | 80 |
| 8.0-9.99MHz | F | 70 |
| 10-13.99MHz | F | 50 |
| 14-23.99MHz | F | 40 |
| 24-25.0MHz | F/3 | 40/80 |
| 25-30.0MHz | F/3 | 40/80 |
| 30-70.0MHz | 3 | 80 |

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Part Number Guide:

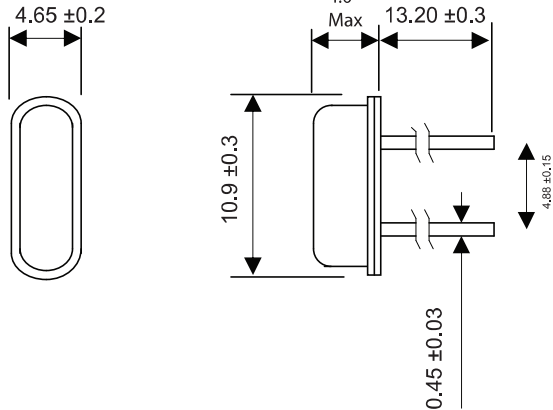
| Case | Frequency (MHz) | Freq. Tol (PPM) | Temp Stab (PPM) | Temp Range 60 = -10~+60 70 = -20~+70 | Load Cap pf 00 = Series | Vibration Mode AT Cut F=Fund.3 Overtone | Ant Part No. |
|--------|-----------------|-----------------|-----------------|--|-------------------------------|---|--------------|
| HC49SM | 3.579545 | 30 | 50 | 60 | 16 | ATF | XTL-5014 |
| HC49SM | 3.6864 | 30 | 50 | 60 | 16 | ATF | XTL-5014 |
| HC49SM | 4 | 30 | 50 | 60 | 16 | ATF | XTL-5021 |
| HC49SM | 4.9152 | 30 | 50 | 60 | 16 | ATF | XTL-5025 |
| HC49SM | 6 | 30 | 50 | 60 | 30 | ATF | XTL-5032 |
| HC49SM | 8 | 30 | 50 | 60 | 16 | ATF | XTL-5038 |
| HC49SM | 10 | 30 | 50 | 60 | 16 | ATF | XTL-5043 |
| HC49SM | 11.0592 | 30 | 50 | 60 | 16 | ATF | XTL-5048 |
| HC49SM | 12 | 30 | 50 | 60 | 16 | ATF | XTL-5050 |
| HC49SM | 16 | 30 | 50 | 60 | 16 | ATF | XTL-5055 |
| HC49SM | 20 | 30 | 50 | 60 | 16 | ATF | XTL-5062 |

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Crystal Unit - HC-49/S

Outline Drawing

Dimension (Unit=mm)



Features & Applications:

Designed for applications where board height and space is critical

- General, industrial, microcontrollers
- Cost effective
- Low profile (4mm height)
- Superior resistance weld HC49/4H metal case

Supplied loose as standard. Taped product available to special order.

Specification

| | | |
|------------------------------|---|-------------------|
| Nominal Frequency Range | 3.5 to 32MHz | 24 to 70MHz |
| Vibration Mode | Fundamental (AT) | 3rd Overtone (AT) |
| Frequency Tolerance @25°C | ±20, ±30 or ±50ppm (Options: ±10, ±15ppm) | |
| Temperature Stability | ±30 or ±50 ppm | |
| Operating Temperature Range | -10°C to +60°C (Option: -20°C to +70°C) | |
| Storage Temperature Range | -20°C to +70°C (Option: -30°C to +80°C) | |
| Load Capacitance | 8pF to 32pF or series | |
| Equivalent Series Resistance | see ESR table below | |
| Shunt Capacitance | 5pF max.(≤18MHz) or 7pF max. (>18MHz) | |
| Drive Level | 200 μW max (≤5MHz) 100μW max (>5MHz) | |
| Insulation Resistance | 500MΩmin @ 100VDC | |
| Aging | ±5ppm per year | |

ESR Table

| Case Frequency | Vibration Mode | HC 49S Ω Max |
|----------------|----------------|--------------|
| 3.5-3.99MHz | F | 150 |
| 4.0-4.99MHz | F | 120 |
| 5.0-5.99MHz | F | 100 |
| 6.0-6.99MHz | F | 80 |
| 7.0-7.99MHz | F | 80 |
| 8.0-9.99MHz | F | 70 |
| 10-13.99MHz | F | 50 |
| 14-23.99MHz | F | 40 |
| 24-25.0MHz | F/3 | 40/80 |
| 25-30.0MHz | F/3 | 40/80 |
| 30-70.0MHz | 3 | 80 |

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Part Number Guide:

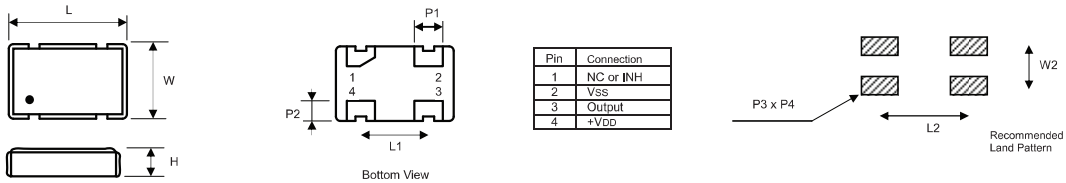
| Case | Frequency (MHz) | Freq. Tol (PPM) | Temp Stab (PPM) | Temp Range 60 = -10~+60 70 = -20~+70 | Load Cap pf 00 = Series | Vibration Mode AT Cut F=Fund.3 Overtone | Ant Part No. |
|-------|-----------------|-----------------|-----------------|--|-------------------------------|---|--------------|
| HC49S | 3.579545 | 30 | 50 | 70 | 20 | ATF | XTL-3012 |
| HC49S | 3.6864 | 30 | 50 | 70 | 30 | ATF | XTL-3015 |
| HC49S | 4 | 20 | 50 | 60 | 30 | ATF | XTL-3018 |
| HC49S | 4.194304 | 30 | 50 | 60 | 30 | ATF | XTL-3024 |
| HC49S | 4.433619 | 30 | 50 | 60 | 20 | ATF | XTL-3026 |
| HC49S | 4.9152 | 30 | 50 | 70 | 30 | ATF | XTL-3028 |
| HC49S | 6 | 30 | 50 | 60 | 30 | ATF | XTL-3035 |
| HC49S | 7.3728 | 15 | 30 | 60 | 18 | ATF | XTL-3039 |
| HC49S | 7.68 | 30 | 50 | 60 | 30 | ATF | XTL-3042 |
| HC49S | 8 | 30 | 50 | 70 | 30 | ATF | XTL-3044 |
| HC49S | 9.8304 | 30 | 50 | 60 | 30 | ATF | XTL-3048 |
| HC49S | 10 | 30 | 50 | 70 | 30 | ATF | XTL-3052 |
| HC49S | 11.0592 | 30 | 50 | 70 | 30 | ATF | XTL-3060 |
| HC49S | 12 | 30 | 50 | 70 | 30 | ATF | XTL-3064 |
| HC49S | 16 | 30 | 50 | 70 | 30 | ATF | XTL-3069 |
| HC49S | 18.432 | 30 | 50 | 60 | 30 | ATF | XTL-3074 |
| HC49S | 20 | 30 | 50 | 70 | 12 | ATF | XTL-3078 |
| HC49S | 24 | 50 | 50 | 60 | 30 | ATF | XTL-3085 |

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SMD Clock Oscillator - DXO-57

Outline Drawing

Dimension (Unit=mm)

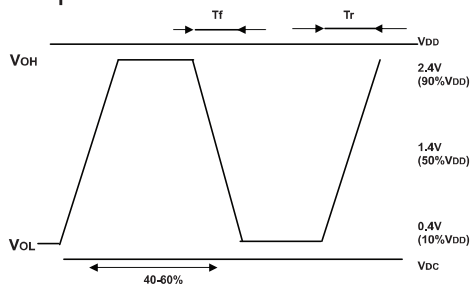


| Type | L | W | H | L1 | P1 | P2 | L2 | W2 | P3 | P4 |
|--------|-----------|-----------|----------|------------|----------|----------|-----------|------------|----------|----------|
| DXO-75 | 7.0 ±0.15 | 5.0 ±0.15 | 1.4 ±0.2 | 5.08 ±0.15 | 1.4 ±0.1 | 1.2 ±0.1 | 6.4 ±0.15 | 2.54 ±0.15 | 2.2 ±0.1 | 1.4 ±0.1 |

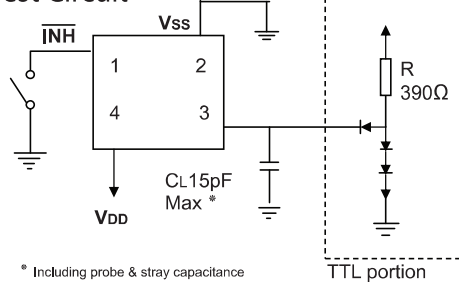
Quartz crystal oscillators house a small 5x7mm package. Choice of 3.3V and 5V supply versions.

- General, Microprocessor • Ultra Thin Ceramic Package • Cost effective • Surface mount •
- HCMOS/TTL output • Tri-state option • Supplied taped and reeled.

Output Waveform



Test Circuit



Specification

| | | | |
|---|--|----------------|-------------|
| Nominal Frequency Range | 1.5 to 23.99MHz | 24 to 49.99MHz | 50 to 80MHz |
| Frequency Tolerantion | ±50ppm (Options: ±25, ±100ppm) | | |
| Operating Temperature Range | 0°C to +70°C | | |
| Storage Temperature Range | -40°C to +85°C | | |
| Supply Voltage (V _{DD}) | 3.3V or 5V ±10% | | |
| Current Consumption (max.) | 25mA | 40mA | 50mA |
| Output Symmetry at 1/2V _{DD} | 40% to 60% (standard), 45% to 55% tight | | |
| Output Load | 15pF HCMOS or 10TTL | | |
| Output Level "L" (max.) | 10% V _{DD} HCMOS or +0.4VDC TTL | | |
| Output Level "H" (min.) | 90% V _{DD} HCMOS or +2.4VDC TTL | | |
| Rise/Fall Time (10%-90% V _{DD})(max.) | 10ms | | |
| Start up Time (max.) | 10ms | | |
| Stand by function | Tri State | | |

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Part Number Guide:

| Case | Frequency (MHz) | Freq.Tol (PPM) | Symmetry | Input Voltage | Ant Part No. |
|-------|-----------------|----------------|----------|---------------|--------------|
| DXO57 | 4 | 50 | T | 3.3 | DXO-2014 |
| DXO57 | 8 | 50 | T | 3.3 | DXO-2022 |
| DXO57 | 10 | 50 | T | 3.3 | DXO-2028 |
| DXO57 | 12 | 50 | T | 3.3 | DXO-2033 |
| DXO57 | 16 | 50 | T | 3.3 | DXO-2026 |
| DXO57 | 20 | 50 | T | 3.3 | DXO-2034 |
| DXO57 | 24 | 50 | T | 3.3 | DXO-2037 |
| DXO57 | 32.768 | 50 | T | 3.3 | DXO-2041 |
| DXO57 | 40 | 50 | T | 3.3 | DXO-2052 |
| DXO57 | 50 | 50 | T | 3.3 | DXO-2059 |
| DXO57 | 60 | 50 | T | 3.3 | DXO-2066 |
| DXO57 | 80 | 50 | T | 3.3 | DXO-2070 |
| DXO57 | 100 | 50 | T | 3.3 | DXO-2081 |

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Crystal Unit - DX-57

Outline Drawing
Dimension (Unit=mm)

Features & Applications:

- Communication Equipment, PDA's, Wireless security systems
- Cost Effective
- Surface Mount
- Ultra thin ceramic package
- Size 5 x 7mm
- Height 1.4mm max.

Supplied taped and reeled.

| Pin | Connection |
|-----|------------|
| 1 | Xtal |
| 2 | GND |
| 3 | Xtal |
| 4 | GND |

Bottom View

Recommended Land Pattern

Specification

| | | |
|------------------------------|-----------------------|-------------------|
| Nominal Frequency Range | 10 to 30MHz | 30 to 60MHz |
| Vibration Mode | Fundamental (AT) | 3rd Overtone (AT) |
| Frequency Tolerance @25°C | ±20, ± 30 or ±50ppm | |
| Temperature Stability | ±30 or ± 50 ppm | |
| Operating Temperature Range | -20°C to +70°C | |
| Storage Temperature Range | -30°C to +80°C | |
| Load Capacitance | 8pF to 32pF or series | |
| Equivalent Series Resistance | see ESR table below | |
| Shunt Capacitance | 7pF max | |
| Drive Level | 100 µW max | |
| Insulation Resistance | 500MΩmin @ 100VDC | |
| Aging | ±5ppm per year | |

ESR Table

| Case | Vibration | DX-57 |
|--------------|-----------|-------|
| Frequency | Mode | Ω Max |
| 10-13.99 MHz | F | 60 |
| 14-30.0 MHz | F | 50 |
| 30-60.0MHz | 3 | 100 |

Part Number Guide:

| Case | Frequency (MHz) | Freq. Tol (PPM) | Temp Stability (PPM) | Temp Range 60 = -10~+60 70 = -20~+70 | Load Cap pf 00 = Series | Vibration Mode AT Cut F=Fund.3 Overtone | Ant Part No. |
|------|-----------------|-----------------|----------------------|--|-------------------------------|---|--------------|
| DX57 | 10 | 30 | 50 | 70 | 20 | ATF | XTL-7024 |
| DX57 | 11.0592 | 30 | 50 | 70 | 20 | ATF | XTL-7026 |
| DX57 | 12 | 30 | 50 | 70 | 20 | ATF | XTL-7029 |
| DX57 | 18.432 | 30 | 50 | 70 | 20 | ATF | XTL-7036 |
| DX57 | 19.6608 | 30 | 50 | 70 | 20 | ATF | XTL-7040 |
| DX57 | 24 | 30 | 50 | 70 | 20 | ATF | XTL-7047 |
| DX57 | 27 | 30 | 50 | 70 | 20 | ATF | XTL-7052 |
| DX57 | 32 | 30 | 50 | 70 | 20 | AT3 | XTL-7056 |

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