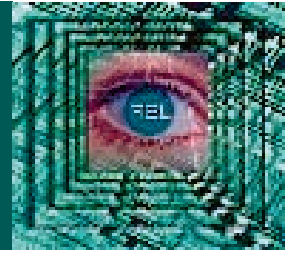
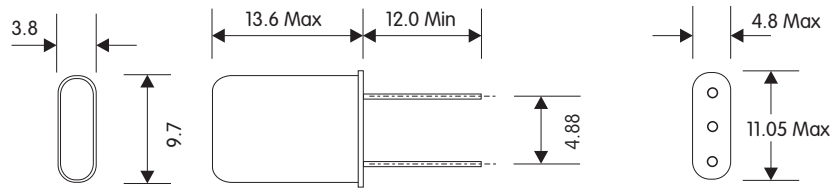
HC-49/U Standard Height Crystal



Quartz Crystal Resonators



HC-49/U

FEATURES

- Wide Frequency Range
- Additional EMI Protection
- Custom Manufacturing Capability
- Fast Turnaround Options

APPLICATIONS

- Microprocessor Systems
- Datacommunications
- Consumer Electronics
- Automotive Electronics

STANDARD SPECIFICATION

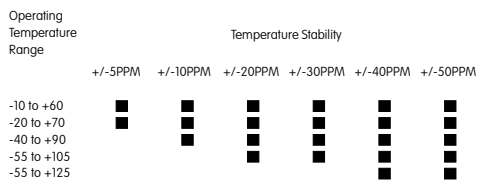
Frequency Range:	300 kHz to 225 MHz
Adjustment Tolerance at 25°C:	± 30PPM Max.
Frequency Stability:	± 50PPM Max.
Operating Temperature Range:	-10°C to +60°C
Load Capacity:	30pF
E.S.R:	See Table
Drive level:	500 MicroWatt
Ageing:	± 5PPM 1st Year Max.

Frequency Range			E.S.R
300kHz	~	800 kHz	3000 Ω
800kHz	~	1.3 MHz	5000 Ω
1.8 MHz	~	2.0 MHz	800 Ω
2.0MHz	~	2.4 MHz	300 Ω
2.4MHz	~	3.0 MHz	250 Ω
3.0MHz	~	3.2 MHz	120 Ω
3.2MHz	~	4.0 MHz	90 Ω
4.0MHz	~	4.2 MHz	100 Ω
4.2MHz	~	6.0 MHz	50 Ω
6.0MHz	~	8.0 MHz	40 Ω
8.0MHz	~	36 MHz	25 Ω
36MHz	~	64 MHz	40 Ω
64MHz	~	125 MHz	80 Ω
125MHz	~	200 MHz	140 Ω

AVAILABLE OPTIONS

Frequency Range:	300 kHz ~ 225 MHz
Adjustment Tolerance	±5PPM ~ ± 100PPM
Load Capacity:	Series or 9pF ~ 50pF
Shunt Capacity (C0):	4.5pF ~ 7pF (Typ.)
Dynamic Capacity (C1):	18fF ~ 20fF (Typ.)

Frequency Stability vs Operating Temperature Range



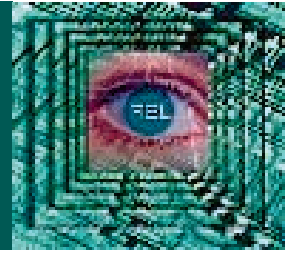
Value Added Services

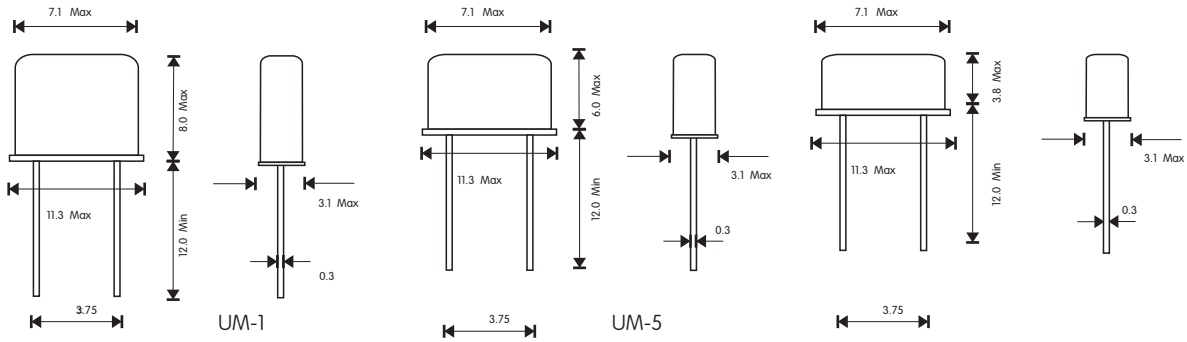
In addition, AEL Crystals Ltd are able to offer our customers the following value added services:-

- Fitted Insulators
- Radial Taping
- Lead Pre-Forming
- Lead Cropping
- Earth Lead
- Bar-Coding

Specify AEL

UM-1 UM-5 & UM-4 Miniature Crystals





Quartz Crystal Resonators

FEATURES

- Small Size
- Wide Frequency Range
- High Stability
- Fast Turnaround Options

APPLICATIONS

- Pagers
- Radio Communications
- Telemetry Systems
- Automotive Electronics

STANDARD SPECIFICATION

Frequency Range:	4.00 MHz to 300.00 MHz*
Adjustment Tolerance at 25°C:	± 30PPM Max.
Frequency Stability:	± 50PPM Max.
Operating Temperature Range:	-10°C to +60°C
Load Capacity:	30pF
E.S.R:	See Table
Drive level:	100 MicroWatt
Ageing:	± 3PPM 1st Year Max.
	(*UM-4/UM-5 From 10MHz)

Frequency Range			E.S.R	Mode
4.00 MHz	~	4.99 MHz	200 Ω	Fund
5.00 MHz	~	5.99 MHz	150 Ω	Fund
6.00 MHz	~	6.99 MHz	120 Ω	Fund
7.00 MHz	~	8.99 MHz	100 Ω	Fund
8.00 MHz	~	9.99 MHz	90 Ω	Fund
10.00 MHz	~	15.99 MHz	40 Ω	Fund
16.00 MHz	~	22.99 MHz	30 Ω	Fund
23.00 MHz	~	39.99 MHz	60 Ω	3 O/T
40.00 MHz	~	100.00 MHz	60 Ω	3 O/T
50.00 MHz	~	150.00 MHz	90 Ω	5 O/T
100.0 MHz	~	300.00 MHz	150 Ω	7 O/T

AVAILABLE OPTIONS

Frequency Range:	4.00MkHz ~ 300 MHz
Adjustment Tolerance	±5PPM ~ ±30PPM
Load Capacity:	Series or 9pF ~ 50pF
Shunt Capacity (C0):	4.5pF ~ 7pF (Typ.)
	18fF ~ 20fF (Typ.)

Also available with SMD Metal Clip (UM-1 & UM-5)

Frequency Stability vs Operating Temperature Range

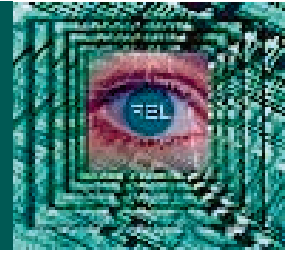
Operating Temperature Range	Temperature Stability					
	+/-3PPM	+/-5PPM	+/-10PPM	+/-15PPM	+/-20PPM	+/-50PPM
0 to +50	■	■	■	■	■	■
-10 to +60		■	■	■	■	■
-20 to +70			■	■	■	■
-30 to +80				■	■	■
-40 to + 85					■	■

Value Added Services

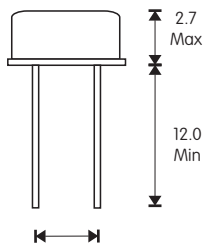
In addition, AEL Crystals Ltd are able to offer our customers the following value added services:-

- Fitted Insulators
- Radial Taping
- Lead Pre-Forming
- Lead Cropping
- Earth Lead
- Bar-Coding

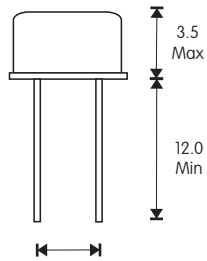
HC-49/S Low Profile Crystal



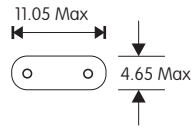
Quartz Crystal Resonators



HC-49/SS



HC-49/S



FEATURES

- Standard Frequencies Ex-Stock
- Low Cost Solution
- Standard I.C Height
- Standard HC49U Base

APPLICATIONS

- Microprocessor Systems
- Datacommunications
- Consumer Electronics
- Automotive Electronics

STANDARD SPECIFICATION

Frequency Range:	3.20 MHz to 70.00 MHz
Adjustment Tolerance at 25°C:	±30PPM Max.
Frequency Stability:	± 50PPM Max.
Operating Temperature Range:	-10°C to +60°C
Load Capacity:	30pF
E.S.R:	See Table
Drive level:	100 MicroWatt
Ageing:	±5PPM 1st Year Max.

Frequency Range			E.S.R	
3.2 MHz	~	3.49 MHz	200 Ω	Fund
3.5 MHz	~	3.99 MHz	140 Ω	Fund
4.0 MHz	~	4.39 MHz	120 Ω	Fund
4.4 MHz	~	4.89 MHz	100 Ω	Fund
4.9 MHz	~	5.99 MHz	80 Ω	Fund
6.0 MHz	~	6.99 MHz	60 Ω	Fund
7.0 MHz	~	7.99 MHz	50 Ω	Fund
8.0 MHz	~	10.99 MHz	45 Ω	Fund
11.0 MHz	~	11.99 MHz	40 Ω	Fund
12.0 MHz	~	14.99 MHz	35 Ω	Fund
15.0 MHz	~	36.00 MHz	30 Ω	Fund
27.0 MHz	~	70.00 MHz	100 Ω	3 O/T

AVAILABLE OPTIONS

Frequency Range:	3.2 MHz ~ 70.0 MHz
Adjustment Tolerance	±10PPM ~ ±100PPM
Load Capacity:	Series or 9pF ~ 50pF
Shunt Capacity (C0):	4.5pF ~ 7pF (Typ.)
Dynamic Capacity (C1):	18fF ~ 20fF (Typ.)

Frequency Stability vs Operating Temperature Range

Operating Temperature Range	Temperature Stability			
	+/-10PPM	+/-20PPM	+/-50PPM	+/-100PPM
-10 to +60	■	■	■	■
-20 to +70		■	■	■
-40 to +90			■	■
-55 to +105				■

e e Se ice

In addition, AEL Crystals Ltd are able to offer our customers the following value added services:-

- Fitted Insulators
- Radial Taping
- Lead Pre-Forming
- Lead Cropping
- Earth Lead
- Bar-Coding

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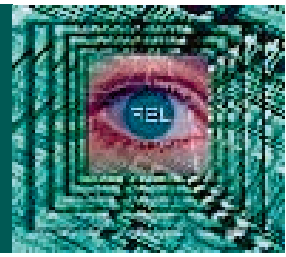
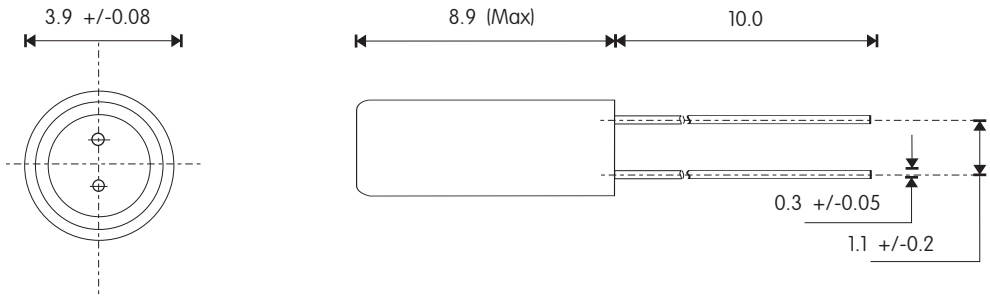
Specify AEL

3x9mm AT-Cut Crystals





All Dims. in mm

Quartz Crystal Resonators

FEATURES

- Small Size
- Wide Frequency Range
- High Shock Tolerance
- Good Frequency Stability

APPLICATIONS

- Instrumentation
- Microprocessor Systems
- Process Control
- Automotive Electronics

STANDARD SPECIFICATION

Frequency Range:	3.579 MHz to 70.00 MHz
Adjustment Tolerance at 25°C:	± 30PPM Max.
Frequency Stability:	± 50PPM Max.
Operating Temperature Range:	-10°C to +60°C
Load Capacity:	30pF
E.S.R:	See Table
Drive level:	100 MicroWatt
Ageing:	±3PPM 1st Year Max.

Frequency Range		E.S.R	Mode
3.57 MHz	3.00 MHz	200 Ω	Fund
4.00 MHz	4.49 MHz	150 Ω	Fund
4.50 MHz	4.99 MHz	120 Ω	Fund
5.00 MHz	5.99 MHz	100 Ω	Fund
6.00 MHz	8.99 MHz	80 Ω	Fund
9.00 MHz	9.99 MHz	60 Ω	Fund
10.00 MHz	12.99 MHz	50 Ω	Fund
13.00 MHz	18.99 MHz	35 Ω	Fund
19.00 MHz	29.99 MHz	25 Ω	Fund
30.00 MHz	33.00 MHz	20 Ω	Fund
30.00 MHz	34.99 MHz	80 Ω	3 O/T
35.00 MHz	39.99 MHz	70 Ω	3 O/T
40.00 MHz	44.99 MHz	65 Ω	3 O/T
45.00 MHz	49.99 MHz	60 Ω	3 O/T
50.00 MHz	70.00 MHz	80 Ω	3 O/T

AVAILABLE OPTIONS

Frequency Range:	3.57MHz ~ 70 MHz
Adjustment Tolerance	±10PPM ~ ±30PPM
Load Capacity:	Series or 9pF ~ 50pF
Shunt Capacity (C0):	4.5pF ~ 7pF (Typ.)
	18fF ~ 20fF (Typ.)

Frequency Stability vs Operating Temperature Range

Operating Temperature Range	Temperature Stability +/-10PPM	+/-20PPM	+/-30PPM	+/-50PPM
0 to +50	■	■	■	■
-10 to +60		■	■	■
-20 to +70			■	■
-40 to + 85				■

Value Added Services

In addition, AEL Crystals Ltd are able to offer our customers the following value added services:-

- Lead Cropping
- Bar-Coding
- Lead Pre-Forming

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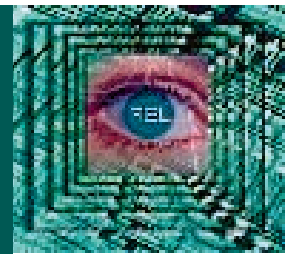
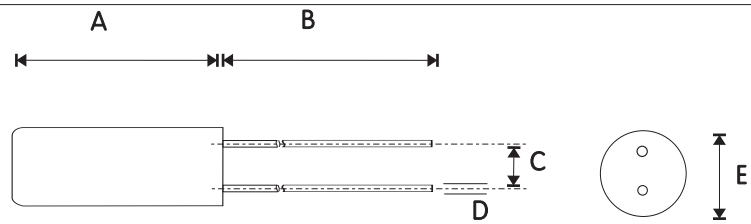
Specify AEL

Cylindrical Watch Crystals



Quartz Crystal Resonators



Package Style	A	B	C	D	E
3x8	8.2	9.0	1.10	0.35	3.10
2x6	6.2	9.0	0.70	0.26	2.10
1x5	5.1	4.0	0.45	0.15	1.50

FEATURES

- Range of Sizes
- Low Cost
- High Shock Resistance
- Extensive UK Stocks

APPLICATIONS

- Time Keeping
- Datacommunications
- Consumer Electronics
- Automotive Electronics

STANDARD SPECIFICATION

Frequency Range:	32.768 kHz
Adjustment Tolerance at 25°C:	± 20PPM
Frequency Stability:	-0.038PPM/°C²
Operating Temperature Range:	-10°C to +60°C
Load Capacity:	12.5pF
E.S.R:	35 kOhm
Drive level:	1MicroWatt
Ageing:	±1PPM 1st Year Typ.

Frequency Range		E.S.R
20.0 kHz	29.9 kHz	55k Ω
30.0 kHz	39.9 kHz	45k Ω
40.0 kHz	59.9 kHz	20k Ω
60.0 kHz	69.9 kHz	15k Ω
70.0 kHz	119.9 kHz	12k Ω
120.0 kHz	164.9 kHz	10k Ω
307.20 kHz		6k Ω

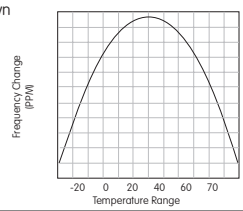
AVAILABLE OPTIONS

Frequency Range:	20 kHz to 165 kHz & 307.2kHz
Adjustment Tolerance	± 20PPM ± 50PPM ±100PPM
Load Capacity:	6pF ~ ∞
Shunt Capacity (C0):	4.0pF Max

Also available from stock is a 32.768 kHz crystal specifically designed for the Dallas Semiconductor RTC

Frequency Stability vs Operating Temperature Range

Tuning fork crystals exhibit a parabolic temperature coefficient with a response curve typically as shown



Handling Note

Crystals utilising a tuning fork element should not be subjected to ultrasonic cleaning. This is because the blank can be damaged due to the frequency of the ultrasonic bath being in resonance with the crystal itself.

AEL Crystals Limited quartz based frequency control components

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