

## Crystals in HC-52/U and UM-1 cases

### Typical application

Microcomputers, audio-/video-applications, wireless phones, communication device

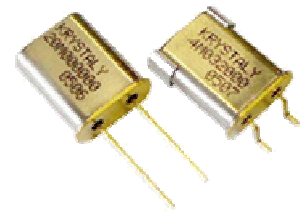
### Features

Cases HC-52 and UM-1 series are highly reliable, hermetic sealing by seam welding. Crystals can be supplied in slim cases, see table dimensions at bottom of page.

### Assembly, taping

Cases HC-52 and UM-1 series are through hole types, but can be shaped for SMD.

Crystals in SMD modification can be delivered in tapes wound on reels, suitable for automatic assembly.



### Typical specifications

Type	HC-52/U, UM-1				
Overtone	1.	3.	5.	7.	9.
Frequency range [MHz]	3.5-45	16-135	60-190	60-190	120-190
Freq. adjustment tolerance at 25°C	$\pm 5, \pm 7, \pm 10, \pm 15, \pm 20, \pm 50 \times 10^{-6}$				
Frequency stability	see table 1				
Equivalent series resistance	see table 2				
Aging	$\pm 1, \pm 2, \pm 3$ ppm/year				
Storage temperature range	-40 ... +90 °C				
Load capacitance	series resonance, $C_L = 5 \dots 50$ pF				
Drive level	10 - 1000 $\mu$ W				

Differences from standard values and other parameters can be consulted.

### Frequency stability in temperature ranges (table 1)

Temperature range [°C]	Frequency stability [ppm]											
	$\pm 2$	$\pm 3$	$\pm 4$	$\pm 5$	$\pm 7$	$\pm 10$	$\pm 15$	$\pm 20$	$\pm 25$	$\pm 30$	$\pm 40$	$\pm 50$
+15 ... +35	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
+10 ... +40	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
+5 ... +45		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
0 ... +50		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-5 ... +55		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-10 ... +60			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-15 ... +65			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-20 ... +70				✓	✓	✓	✓	✓	✓	✓	✓	✓
-25 ... +75				✓	✓	✓	✓	✓	✓	✓	✓	✓
-30 ... +80					✓	✓	✓	✓	✓	✓	✓	✓
-40 ... +90						✓	✓	✓	✓	✓	✓	✓
-55 ... +105							✓	✓	✓	✓	✓	✓

### Equivalent series resistance ( $ESR_{max}$ ) (table 2)

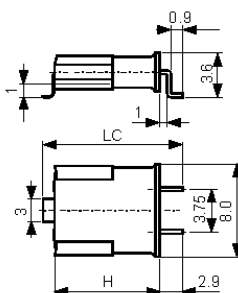
for first overtone

Overtone	Frekvence [MHz]							
	3.5	4	5	7	10	15	20	45
1.	300 $\Omega$	200 $\Omega$	100 $\Omega$	80 $\Omega$	50 $\Omega$	40 $\Omega$	30 $\Omega$	

for higher overtones

Overtone	Frekvence [MHz]							
	16	25	50	60	90	120	190	
3.	130 $\Omega$	80 $\Omega$		40 $\Omega$				
5.					60 $\Omega$			
7.						120 $\Omega$		
9.							200 $\Omega$	

### Outline dimensions [mm]

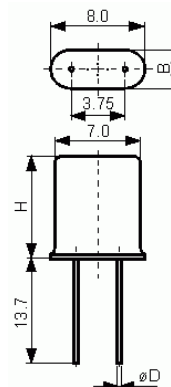


### SMD modification

	H	LC	$B_{max}$	D	Note
HC 52/SMD	8.8	12.6	0.45	with clip**	
UM 1 SMD*	8.0	11.9	0.35	with clip**	
UM 1 SMD*	8.8	12.6	0.35	with clip**	

\* available in 3-pin version

\*\* clip means solderable metal cable sleeve



### through hole modification

	H	T	$B_{max}$	D	Note
HC 52/U	8.8	2.3	3.0	0.45	
UM 1	8.0	2.3	3.0	0.35	cap 7.5mm
UM 1	8.8	2.3	3.0	0.35	cap 8.2mm
UM 1-3	8.0	2.3	3.0	0.35	3 pins, central pin is connected with the case
UM 1-3	8.8	2.3	3.0	0.35	
UM 1-SLIM	7.7	1.65	2.3	0.35	
UM 1-S	8.0	2.3	3.0	0.35	3 - point mounting for higher resistivity to shock and vibrations
UM 1-S	8.8	2.3	3.0	0.35	