

FEATURES

- **Miniature size: 7.0mm x 5mm x 1.2mm height**
- **Gold-plated ceramic base with metal seam-welded lid**
- **To minimize EMI the whole crystal may be grounded**
- **Tight tolerance of ± 10 ppm for telecommunications use**
- **High shock and vibration resistance**
- **Ideal for PDAs, GPS, PCMCIA and hand-held equipment**

DESCRIPTION

Miniature surface-mount MQ crystals are produced using a ceramic substrate and fitted with a hermetically-sealed metal lid. The crystals are competitively priced, well-suited to mass-market electronic applications and may also be produced to close tolerances making this crystal a good choice for applications requiring low mass and tight tolerances. There are two package variants, 4 pad and two pad.

SPECIFICATION

Frequency Range	
AT-Cut Fundamental:	6.0MHz to 45.0MHz
AT-Cut 3rd Overtone:	30.0MHz to 125.0MHz
Calibration Tolerance at 25°C*:	from ± 5 ppm (± 10 , ± 20 or ± 30 ppm standard)
Frequency stability	
-10° to +60°C	from ± 5 ppm
-20° to +70°C	from ± 10 ppm
-40° to +90°C	from ± 15 ppm
-55 to +125°C	from ± 50 ppm
Storage Temperature:	-55°~+105°C
Effective Series Resistance:	See table
Shunt Capacitance (C0):	2pF to 4pF typical, 7pF maximum
Load Capacitance (CL):	Series or from 10pF to 32pF (Customer specified CL)
Ageing:	< ± 3 ppm per year at +25°C
Drive level:	100 μ W maximum
Reflow Soldering:	10s maximum, 260°C twice or 180s at 230°C, once.
Package:	Ceramic base, metal lid, Hermetic seal
Packaging:	16mm EIA tape and reel 1000 pieces per reel

PART NUMBER GENERATION

Example: 12.000MHz MQ/20/30/-10+60/18pF/60R

Nominal Frequency

Package
MQ = 4 pad
MQ2 = 2 pad

Calibration tolerance
at 25°C (\pm ppm)

Temperature Stability
over temp. range (\pm ppm)

Operating Temp. Range (°C)
Lower and upper limits

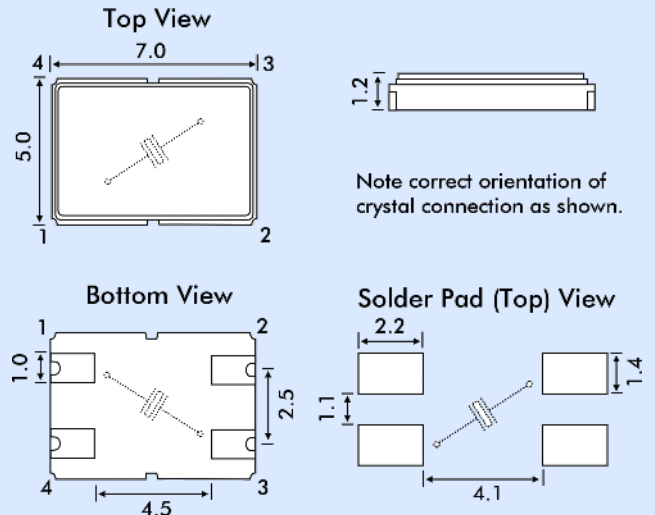
Load Capacitance
Either SR for series or CL in pF

Equivalent Series Resistance
Optional - use when special
value is required



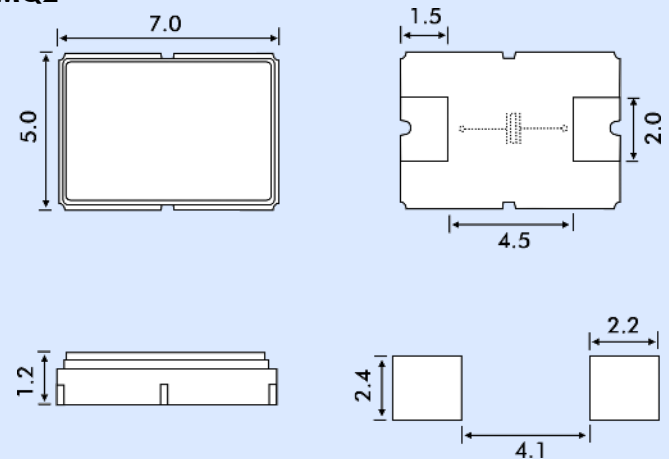
OUTLINE & DIMENSIONS

MQ



* Note: These parts may be supplied with the chamfered pad in different positions. However, the crystal connection is always as shown above.

MQ2



EFFECTIVE SERIES RESISTANCE

Frequency Range MHz	Crystal Cut/ Mode	ESR Ω Max.
6.0 ~ 8.0	AT Fund.	80
8.1 ~ 11.0	AT Fund.	60
11.1 ~ 14.0	AT Fund.	50
14.1 ~ 50.0	AT-Fund.	40
40.1 ~ 50.0	AT 3rd OT	80
50.1 ~ 125.0	AT 3rd OT	90