

# PRESSURE SENSING QUARTZ CRYSTAL RESONATOR RKMA-P

## APPLICATIONS

RKMA-P is a quartz crystal resonator whose construction consist of measuring quartz crystal packaged to rectangular quartz crystal case. Frequency of oscillation of RKMA-P varies with pressure-induced stress. The crystal designed for function as a component of the precision electronic pressure transducers, manometers and controllers with a frequency output for conversion the current values of absolute pressure to frequency.

## FEATURES

- High resolution and accuracy
- Long term quartz crystal stability
- Wide temperature range (-55...+80 °C)
- Low power consumption
- Suitable for precision pressure equipment



Standard line of RKMA-P is made. See the following tables (page 1) and drawings (page 2), please.

## ELECTRICAL CHARACTERISTICS (at normal climatic conditions) / OPERATING CONDITIONS

PARAMETERS		SPECIFICATIONS AND REMARKS				UNITS
Electrical characteristics						
Model of the crystal		RKMA-P-1	RKMA-P-3	RKMA-P-4	RKMA-P-2(21)	
Frequency Range, f <sub>0</sub>		32.000...48.000				kHz
Series Resistance typ./max., R <sub>S</sub>		120; 150 / 200			150; 200 / 250	kOhm
Drive Level max., D <sub>L</sub>		4.0				μW
Insulation Resistance min., I <sub>R</sub>		400				M
Motional characteristics						
F(P)=f <sub>0</sub> +A <sub>1</sub> *P +A <sub>2</sub> *P <sup>2</sup> + A <sub>3</sub> *P <sup>3</sup> ,						
There: F(P) – crystal's frequency at current value of pressure P (Hz),						
f <sub>0</sub> – crystal's frequency at zero value of pressure P (Hz),						
P – current value of pressure (MPa), A <sub>1</sub> – the first degree linear coefficient,						
A <sub>2</sub> , A <sub>3</sub> – the second and the third degree coefficients. They are determinate a nonlinearity which value less than 0.4% FS. *						
Operation conditions						
Model of the crystal	Pressure Range, P MPa	UNIT	Sensitivity (Linear Coefficient A <sub>1</sub> )	UNIT	Overall Dimensions	UNIT
RKMA-0.1-1 (3;4)	0 – 0.10	MPa	21350.00 ± 5...20%FS	Hz/MPa	25 x 23 x 3.0 (5.0)	mm
RKMA-0.25-1 (3;4)	0 – 0.25	MPa	7853.14 ± 5...20%FS	Hz/MPa	25 x 23 x 3.2 (5.1)	mm
RKMA-0.4-1 (3;4)	0 – 0.40	MPa	5415.45 ± 5...20%FS	Hz/MPa	25 x 23 x 3.3 (5.2)	mm
RKMA-0.6-1 (3;4)	0 – 0.60	MPa	3144.25 ± 5...20%FS	Hz/MPa	25 x 23 x 3.5 (5.45)	mm
RKMA-1.0-1 (3;4)	0 – 1.00	MPa	1518.88 ± 5...20%FS	Hz/MPa	25 x 23 x 4.45 (6.4)	mm
RKMA-1.6-1 (3)	0 – 1.60	MPa	1092.84 ± 5...20%FS	Hz/MPa	25 x 23 x 3.65 (5.6)	mm
RKMA-2.5-1 (3)	0 – 2.50	MPa	678.055 ± 5...20%FS	Hz/MPa	25 x 23 x 4.55 (6.5)	mm
RKMA-4.0-1 (3)	0 – 4.00	MPa	434.55 ± 5...20%FS	Hz/MPa	25 x 23 x 4.8 (6.75)	mm
RKMA-6.0-1 (3)	0 – 6.00	MPa	294.77 ± 5...20%FS	Hz/MPa	25 x 23 x 5.5 (7.45)	mm
RKMA-10.0-1 (3)	0 – 10.0	MPa	160.06 ± 5...20%FS	Hz/MPa	25 x 23 x 5.15 (7.1)	mm
RKMA-16.0-1 (3)	0 – 16.0	MPa	127.51 ± 5...20%FS	Hz/MPa	25 x 23 x 5.6 (7.5)	mm
RKMA-25.0-1 (3)	0 – 25.0	MPa	58.76 ± 5...20%FS	Hz/MPa	25 x 23 x 6.1 (8.1)	mm
RKMA-60.0-1 (3)	0 – 25.0	MPa	33.30 ± 5...20%FS	Hz/MPa	25 x 23 x 6.1 (8,8)	mm
PKMA-0.1-2 (21)	0 – 0.10	MPa	17551.76 ± 5...20%FS	Hz/MPa	11 x 12 x 1.15 (dia 14.5 x 1.15)	mm
PKMA-0.15-2 (21)	0 – 0.15	MPa	11251.13 ± 5...20%FS	Hz/MPa	11 x 12 x 1.19 (dia 14.5 x 1.19)	mm
PKMA-0.2-2 (21)	0 – 0.20	MPa	8025.80 ± 5...20%FS	Hz/MPa	11 x 12 x 1.19 (dia 14.5 x 1.19)	mm
PKMA-0.4-2 (21)	0 – 0.40	MPa	3975.40 ± 5...20%FS	Hz/MPa	11 x 12 x 1.19 (dia 14.5 x 1.19)	mm
PKMA-0.45-2 (21)	0 – 0.45	MPa	3675.37 ± 5...20%FS	Hz/MPa	11 x 12 x 1.20 (dia 14.5 x 1.20)	mm
PKMA-1.2-2 (21)	0 – 1.20	MPa	1275.13 ± 5...20%FS	Hz/MPa	11 x 12 x 1.30 (dia 14.5 x 1.30)	mm
Operating Temperature, T <sub>OPR</sub> (typ/max)		-55...+80 / -40...+100; -196...+250**				°C
Storage Temperature, T <sub>STR</sub>		-55...+85				°C
Maximum Deviation Over Temperature		0.75				%
Relative Deviation of linear coefficient A <sub>1</sub> from its average value (gets out at the request)		± 5...± 20				%
Aging first year/next years max.		± 5 / ± 25				PPM
FS Pressure Hysteresis no more		0.02				%
Dependence Of Frequency Of The Crystal On Temperature f <sub>T</sub> =f <sub>0</sub> +A <sub>1</sub> *T +A <sub>2</sub> *T <sup>2</sup> is reproduced with accuracy		0.05				%
Vibration Resistance, DF/F <sub>0</sub>		5g / 10-2000 Hz, 8 hours / ±7 PPM max.				PPM

\* $A_1, A_2$  and  $A_3$  coefficients are specified on request.

\*\*Temperature range can be increased from -196 to +250 °C on request.

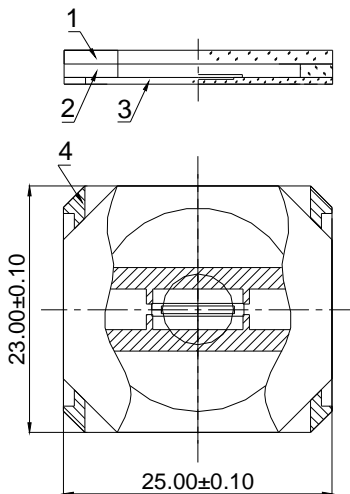
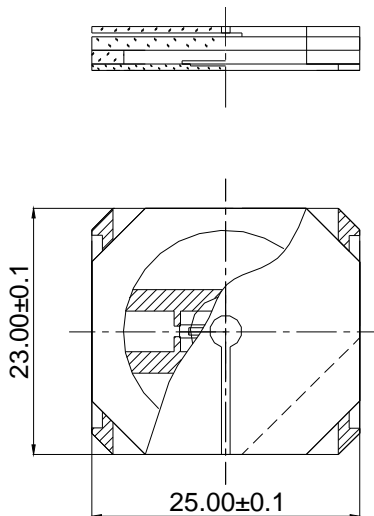
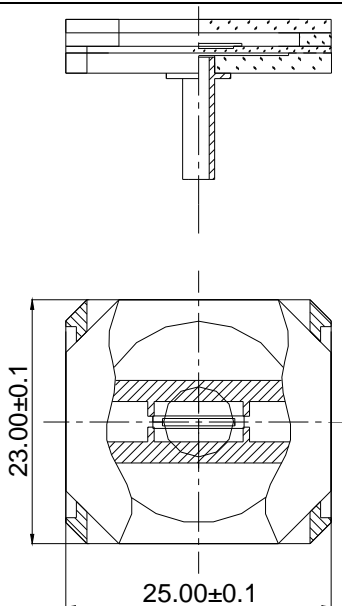
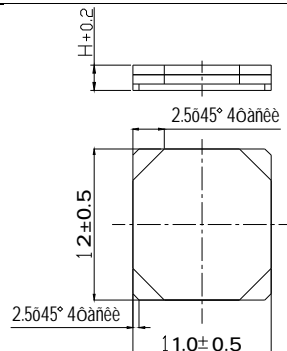
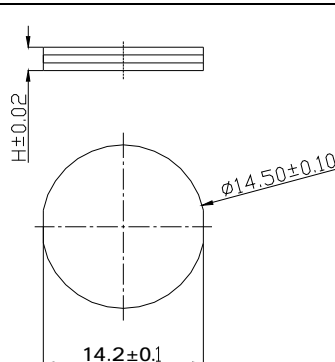
Temperature sensing quartz crystal RKT206 is used for compensation of a temperature deviation of RKMA-P.

Based on the pressure sensing quartz crystal resonators RKMA-P the pressure transducers, manometers and controllers with a compensation of the temperature error (accuracy class up to 0.03) are developed and made.

## EXTERNAL DIMENSIONS

There are 4 basic variants of model of a pressure sensing quartz crystal resonator RKMA-P.  
 RKMA-P-1 after fastening to a transducer's case is in a free condition.  
 RKMA-P-2 is small size variant (see "Operation Conditions" table).  
 RKMA-P-3 has an additional cover by which it is glued to surface for temperature isolation.  
 RKMA-P-4 has the metal connecting pipe through which the measured pressure acts.

UNITS: millimeters

RKMA-P-1	RKMA-P-3	RKMA-P-4
		
RKMA-P-2	RKMA-P-21	
		
1- Cover; 2- Gasket; 3- Diaphragm; 4- Contact surfaces.		