

High Temperature Microbalance Resonator

- ✓ Excellent frequency stability from 0°C up to 450°C
- ✓ High temperature stability up to 550°C
- ✓ Electrode design compatible with industry standard
- ✓ High Q-factor of 70000

R-25 sensor crystals are optimised for use in thin film deposition systems at higher temperatures as required in PVD, CVD, ALD and OLED. The excellent temperature stability of gallium phosphate crystals in combination with a temperature compensation at 240°C allows precise measurements in a wide temperature range from 0°C to 450°C with 550°C being the limit. Compared to the R-20, a platinum layer improves the resonator stability at highest temperatures. The electrode design is compatible with the industrial standard (Inficon, Maxtec, Sycon and Sigma).

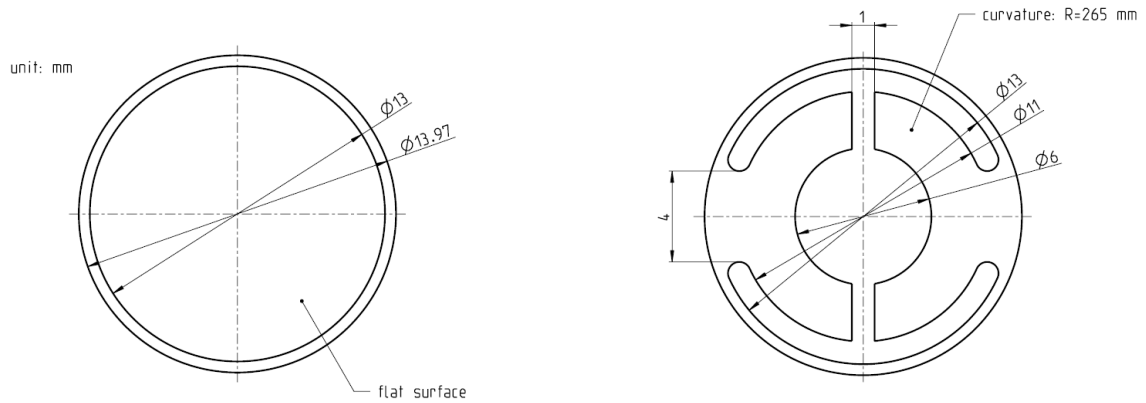


Operating principle	Piezoelectric, single crystalline
Sensing element	GaPO ₄ (gallium phosphate)
Resonance frequency	5.6 ± 0.1 MHz
Diameter	13.97 mm (0.550 inch)
Thickness	0.2 mm (0.008 inch)
Sensitivity	0.3 Hz/ng
Operating temperature	up to 850°C (1562°F)
Frequency temperature dependence $f_s(T)^1$	a = 0.00717 ppm/°C b = -0.00976 ppm/°C ² c = 7.2·10 ⁻⁶ ppm/°C ³
Front side	fully metallized, flat
Back side	double anchor, curvature = 2 dioptre (R = 265 mm)
Electrode material (T < 900°C)	1000 nm platinum (no adhesion layer)
Surface	fine lapped (#4000)
Dynamic resistance R ₁	< 10 Ω
Dynamic capacitance C ₁	0.08 pF
Static capacitance C ₀	32 pF

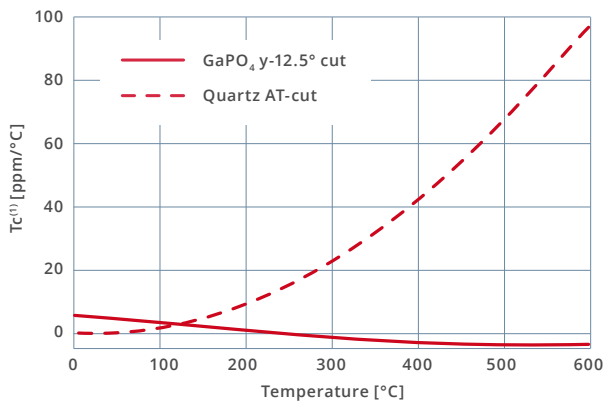


¹ $f_s(T) = f_s(T_0) [1 + a(T - T_0) + b(T - T_0)^2 + c(T - T_0)^3]$ with $T_0 = 240^\circ\text{C}$

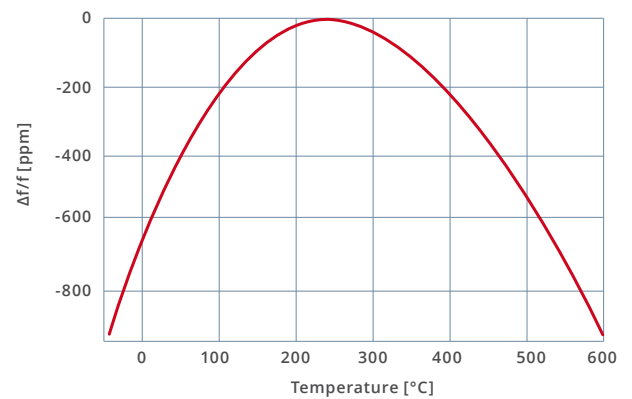
Resonator Dimensions



Frequency Temperature Dependence



First temperature coefficient of resonant frequency $Tc^{(1)}$



Relative frequency deviation of resonant frequency $\Delta f/f$ of $GaPO_4$ y-12.5° cut

Modifications (on request)

Electrode design	wrapped around design, both contacts at back side
Temperature compensation	from -50°C up to 550°C (-58°F to 1022°F)
Electrode material	Palladium, Platinum, Gold
Resonator shape	plano-convex, beveled, plano-plano, biconvex

Piezocryst reserves the right to change specifications and accessories without notice.

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