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Discontinued

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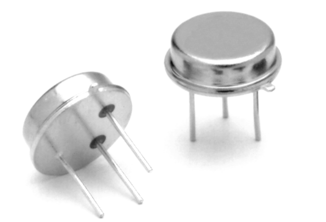
RP1236-1

312.0 MHz SAW Resonator



TO39-3 Case

- ***Designed for 312 MHz Low-Power Superhet Transmitters***
- ***Nominal Insertion Phase Shift of 180° at Resonance***
- ***Quartz Stability***
- ***Rugged, Hermetic, Low-Profile TO39 Case***

The RP1236-1 is a two-port, 180° surface-acoustic-wave (SAW) resonator in a low-profile TO39 case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency transmitters operating at 312 MHz. Typical applications include wireless security and remote-control receivers operating in the USA under FCC Part 15 and in Canada under DoC RSS-210.

Absolute Maximum Ratings

Rating	Value	Units
CW RF Power Dissipation (See: Typical Test Circuit)	+0	dBm
DC Voltage Between Any Two Pins (Observe ESD Precautions)	±30	VDC
Case Temperature	-40 to +85	°C

Characteristic		Sym	Notes	Minimum	Typical	Maximum	Units
Center Frequency	Absolute Frequency	f_C	2, 3, 4, 5,	311.750		312.250	MHz
	Tolerance from 312.000 MHz	Δf_C				±250	kHz
Insertion Loss		IL	2, 5, 6		8.1	13.0	dB
Quality Factor	Unloaded Q	Q_U	5, 6, 7		14,000		
	50 Ω Loaded Q	Q_L			8,500		
Temperature Stability	Turnover Temperature	T_O	6, 7, 8	24	39	54	°C
	Turnover Frequency	f_O			f_C+2.3		kHz
	Frequency Temp. Coefficient	FTC			0.037		ppm/°C^2
Frequency Aging	Absolute Value during First Year	$\|f_A\|$	6		≤ 10		ppm/yr
DC Insulation Resistance	between Any Two Pins		5	1.0			MΩ
RF Equivalent RLC	Motional Resistance	R_M	5, 7, 9		154	347	Ω
	Motional Inductance	L_M			1.09824		µH
	Motional Capacitance	C_M			0.236938		fF
	Shunt Static Capacitance	C_O	5, 6, 9	1.3	1.6	1.9	pF
Lid Symbolization (in addition to Lot and/or Date Codes)		RFM P1236					

CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

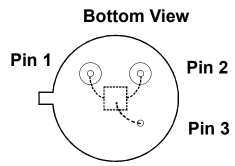
Notes:

1. Frequency aging is the change in f_C with time and is specified at +65°C or less. Aging may exceed the specification for prolonged temperatures above +65°C. Typically, aging is greatest the first year after manufacture, decreasing significantly in subsequent years.
2. The frequency f_C is the frequency of minimum IL with the resonator in the specified test fixture in a 50 Ω test system with VSWR ≤ 1.2:1. Typically, $f_{OSCILLATOR}$ or $f_{TRANSMITTER}$ is less than the resonator f_C.
3. One or more of the following United States patents apply: 4,454,488; 4,616,197.
4. Typically, equipment utilizing this device requires emissions testing and government approval, which is the responsibility of the equipment manufacturer.
5. Unless noted otherwise, case temperature T_C = +25°C± 5°C
6. The design, manufacturing process, and specifications of this device are subject to change without notice.
7. Derived mathematically from one or more of the following directly measured parameters: f_C, IL, 3 dB bandwidth, f_C versus T_C, and C_O.
8. Turnover temperature, T_O, is the temperature of maximum (or turnover) frequency, f_O. The nominal frequency at any case temperature, T_C, may be calculated from: $f = f_O [1 - FTC (T_O - T_C)^2]$. Typically, *oscillator* T_O is 20° less than the specified *resonator* T_O.
9. This equivalent RLC model approximates resonator performance near the resonant frequency and is provided for reference only. The capacitance C_O is the measured static (nonmotional) capacitance between either pin 1 and ground or pin 2 and ground. The measurement includes case parasitic capacitance.

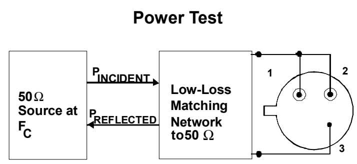
Electrical Connections

This two-port, three-terminal SAW resonator is bidirectional. However, impedances and circuit board parasitics may not be symmetrical, requiring slightly different oscillator component-matching values.

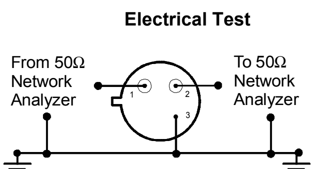
Pin	Connection
1	Input or Output
2	Output or Input
3	Case Ground



Typical Test Circuit



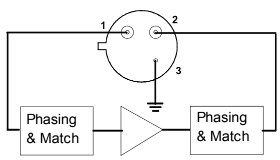
CW RF Power Dissipation = $P_{INCIDENT} - P_{REFLECTED}$



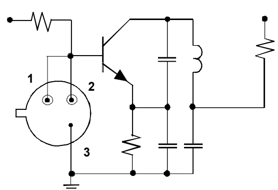
Typical Application Circuits

This SAW resonator can be used in oscillator or transmitter designs that require 180° phase shift at resonance in a two-port configuration. One-port resonators can be simulated, as shown, by connecting pins 1 and 2 together. However, for most low-cost consumer products, this is only recommended for retrofit applications and not for new designs.

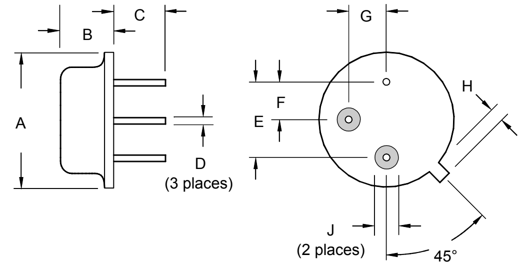
Conventional Two-Port Design:



Simulated One-Port Design:

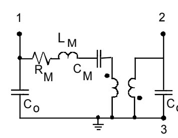


Case Design



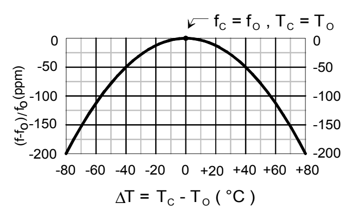
Equivalent LC Model

The following equivalent LC model is valid near resonance:



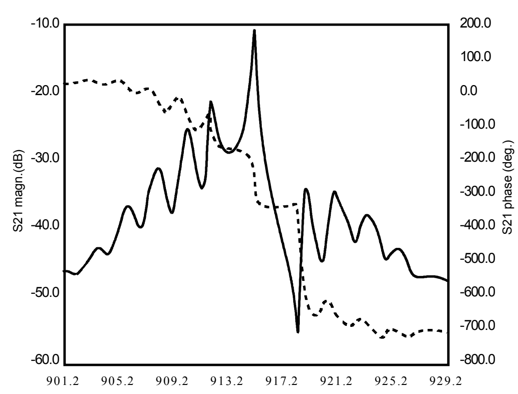
Temperature Characteristics

The curve shown on the right accounts for resonator contribution only and does not include LC component temperature contributions.



Typical Frequency Response

The plot shown below is a typical frequency response for the RP series of two-port resonators. The plot is for RP1094.



Dimensions	Millimeters		Inches	
	Min	Max	Min	Max