RO2001

567.15 MHz SAW Resonator

- ***Ideal for Baseband CATV Downconverter LOs***
- ***True One-Port Configuration***
- ***Quartz Stability***
- ***Rugged, Hermetic, Low-Profile TO39 Case***

The RO2001 is a true one-port, surface-acoustic-wave (SAW) resonator in a low-profile TO39 case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency oscillators operating at 567.15 MHz. Although it is suitable for a wide variety of oscillator applications, this resonator is designed for the second LO in CATV downconverters with the high IF at 612 MHz and the output at 45 MHz (baseband).

TO39-3 Case

Absolute Maximum Ratings

Rating	Value	Units
CW RF Power Dissipation	+10	dBm
DC Voltage Between Terminals	±30	VDC
Case Temperature	-40 to +85	°C

Electrical Characteristics

Characteristic		Sym	Notes	Minimum	Typical	Maximum	Units
Center Frequency at 25 °C	Absolute Frequency	f_C	2, 3, 4, 5	567.050		576.250	MHz
	Tolerance from 567.150 MHz	Δf_C				±100	kHz
Insertion Loss		IL	2, 5, 6		6.0	7.0	dB
Quality Factor	Unloaded Q	Q_U	5, 6, 7		9,600		
	50 Ω Loaded Q	Q_L			4,800		
Temperature Stability	Turnover Temperature	T_O	6, 7, 8	56	71	86	°C
	Turnover Frequency	f_O			f_c + 44		kHz
	Frequency Temperature Coefficient	FTC			0.037		ppm/°C^2
Frequency Aging	Absolute Value during the First Year	|fA|	1		≤10		ppm/yr
DC Insulation Resistance between Any Two Pins			5	1.0			MΩ
RF Equivalent RLC Model	Motional Resistance	R_M	5, 7, 9		100	124	Ω
	Motional Inductance	L_M			269.397		µH
	Motional Capacitance	C_M			0.292315		fF
	Pin 1 to Pin 2 Static Capacitance	C_O	5, 6, 9	0.8	1.1	1.4	pF
	Transducer Static Capacitance	C_P	5, 6, 7, 9		0.8		pF
Test Fixture Shunt Induc-		L_{TEST}	2, 7		72		nH
Lid Symbolization		RFM RO2001					

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 center frequency, f_C, is measured at the minimum insertion loss point, IL_{MIN}, with the resonator in the 50 Ω test system (VSWR ≤ 1.2:1). The shunt inductance, L_{TEST}, is tuned for parallel resonance with C_O at f_C. 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 and 4,616,197 and others pending.
4. Typically, equipment designs utilizing this device require emissions testing and government approval, which is the responsibility of the equipment manufacturer.
5. Unless noted otherwise, case temperature T_C = +25°C±2°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. The turnover temperature, T_O, is the temperature of maximum (or turnover) frequency, f_O. The nominal center frequency at any case temperature, TC, may be calculated from: $f = f_O [1 - FTC (T_O - T_C)^2]$.
9. This equivalent RLC model approximates resonator performance near the resonant frequency and is provided for reference only. The capacitance C_O is the static (nonmotional) capacitance between pin1 and pin 2 measured at low frequency (10 MHz) with a capacitance meter. The measurement includes case parasitic capacitance with a floating case. For usual grounded case applications (with ground connected to either pin 1 or pin 2 and to the case), add approximately 0.25pF to C_O.

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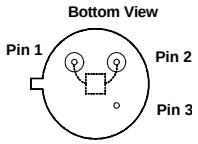
Electrical Connections

This one-port, two-terminal SAW resonator is bidirectional. The terminals are interchangeable with the exception of circuit board layout.

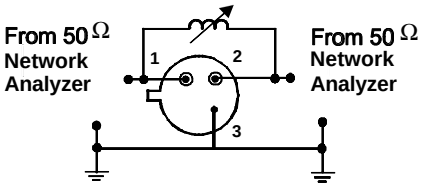
Pin	Connection
1	Terminal 1
2	Terminal 2
3	Case Ground



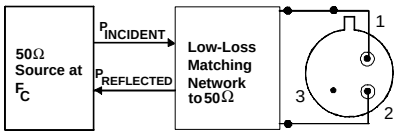
Typical Test Circuit

The test circuit inductor, L_{TEST}, is tuned to resonate with the static capacitance, C_O at F_C.

Electrical Test:



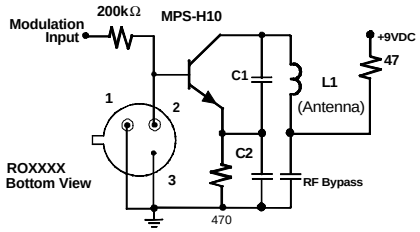
Power Test:



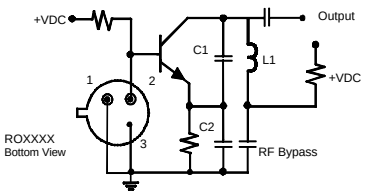
CW RF Power Dissipation = $P_{INCIDENT} - P_{REFLECTED}$

Typical Application Circuits

Typical Low-Power Transmitter Application:

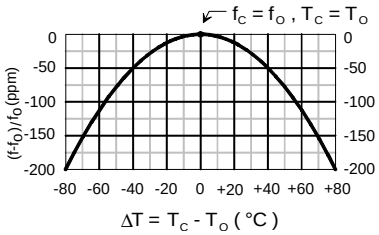


Typical Local Oscillator Application:



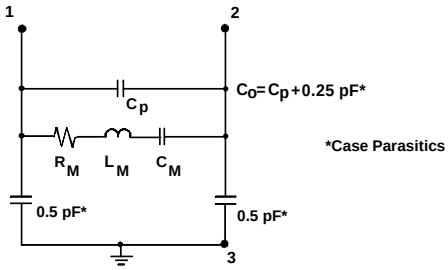
Temperature Characteristics

The curve shown on the right accounts for resonator contribution only and does not include oscillator temperature characteristics.

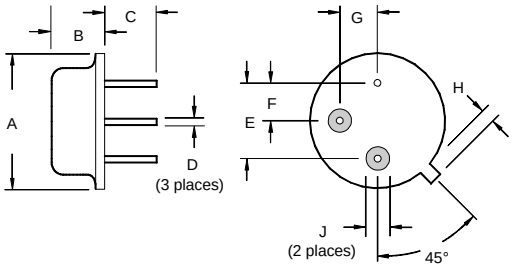


Equivalent LC Model

The following equivalent LC model is valid near resonance:



Case Design



Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A		9.30		0.366
B		3.18		0.125
C	2.50	3.50	0.098	0.138
D	0.46 Nominal		0.018 Nominal	
E	5.08 Nominal		0.200 Nominal	
F	2.54 Nominal		0.100 Nominal	
G	2.54 Nominal		0.100 Nominal	
H		1.02		0.040
J	1.40		0.055	