FRIF IM.

- Ideal for European 906.00 MHz Transmitters
- Very Low Series Resistance
- Quartz Stability
- Complies with Directive 2002/95/EC (RoHS)



The RO2216D is a true one-port, surface-acoustic-wave (SAW) resonator in a surface-mount, ceramic case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency transmitters operating at 906.00 MHz. This SAW is designed specifically for remote-control and wireless security transmitters operating in Europe under ETSI I-ETS 300 220 and in Germany under FTZ 17 TR 2100.

Absolute Maximum Ratings

Rating	Value	Units
Input Power Level	0	dBm
DC voltage	12	VDC
Storage Temperature	-40 to +85	°C
Soldering Temperature (10 seconds / 5 cycles max.)	260	°C

906.00 MHz SAW Resonator

RO2216D



3.8 X 3.8

Electrical Characteristics

Characteristic			Notes	Minimum	Typical	Maximum	Units	
Center Frequency (+25 °C)	Absolute Frequency	f _C	2245	905.900		906.100	MHz	
	Tolerance from 906.00 MHz	Δf_{C}	2,3,4,5			±100	kHz	
Insertion Loss		IL	2,5,6		1.6	2.5	dB	
Quality Factor	Unloaded Q	QU	5,6,7		7300			
	50 Ω Loaded Q	QL			1500			
Temperature Stability	nperature Stability Turnover Temperature To	Т _О		10	25	40	°C	
	Turnover Frequency	f _O	6,7,8		f _C			
	Frequency Temperature Coefficient	FTC			0.032		ppm/°C ²	
Frequency Aging	Absolute Value during the First Year	f _A	1		≤10		ppm/yr	
DC Insulation Resistance between Any Two Terminals			5	1.0			MΩ	
RF Equivalent RLC Model	Motional Resistance	R _M			28		Ω	
	Motional Inductance	L _M	5, 7, 9		38		μH	
	Motional Capacitance	C _M			0.8		fF	
	Shunt Static Capacitance	CO	5, 6, 9		1.8		pF	
Test Fixture Shunt Inductance		L _{TEST}	2, 7		17		nH	
Lid Symbolization (in addition	to Lot and/or Date Codes)	567 // YWWS						
Standard Reel Quantity	Reel Size 7 Inch	500 Pieces/Reel						
Reel Size 13 Inch			3000 Pieces/Reel					

CAUTION: Electrostatic Sensitive Device. Observe precautions for handling. Notes:

- 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 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 \leq 1.2:1). The shunt inductance, L_{TEST}, is tuned for parallel resonance with C_O at f_C. Typically, f_{OS-CILLATOR} or f_{TRANSMITTER} is approximately equal to the resonator f_C.
- 3. One or more of the following United States patents apply: 4,454,488 and 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 $T_C = +25^{\circ}C \pm 2^{\circ}C$.
- 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 approximately equal to 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 static (nonmotional) capacitance between the two terminals measured at low frequency (10 MHz) with a capacitance meter. The measurement includes parasitic capacitance with "NC" pads unconnected. Case parasitic capacitance is approximately 0.05 pF. Transducer parallel capacitance can by calculated as: $C_P \approx C_O 0.05$ pF.

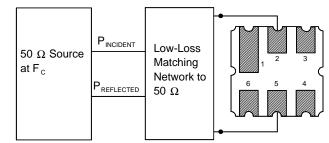
SAW Resonator

Electrical Connections

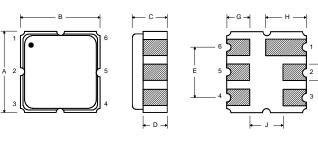
The SAW resonator is bidirectional and may be installed with either orientation. The two terminals are interchangeable and unnumbered. The callout NC indicates no internal connection. The NC pads assist with mechanical positioning and stability. External grounding of the NC pads is recommended to help reduce parasitic capacitance in the circuit.

Pin	Connection			
1	NC			
2	Terminal			
3	NC			
4	NC			
5	Terminal			
6	NC			

Power Test



Typical Application Circuits





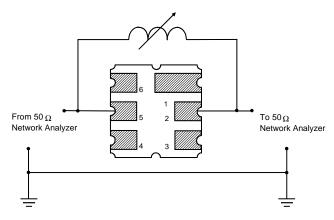
Case Dimensions

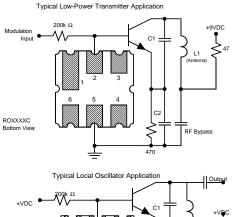
Dimension	mm			Inches			
	Min	Nom	Max	Min	Nom	Max	
Α	3.60	3.80	4.0	0.14	0.15	0.16	
В	3.60	3.80	4.0	0.14	0.15	0.16	
С	1.00	1.20	1.40	0.04	0.05	0.055	
D	0.95	1.10	1.25	0.037	0.043	0.05	
E	2.39	2.54	2.69	0.090	0.10	0.110	
G	0.90	1.0	1.10	0.035	0.04	0.043	
Н	1.90	2.0	2.10	0.75	0.08	0.83	
I	0.50	0.6	0.70	0.020	0.024	0.028	
J	1.70	1.8	1.90	0.067	0.07	0.075	

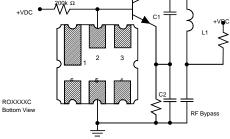
Typical Test Circuit

The test circuit inductor, L_{TEST} , is tuned to resonate with the static capacitance, C_{O} , at $\text{F}_{\text{C}}.$

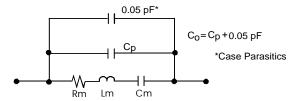
Electrical Test







Equivalent LC Model



Temperature Characteristics

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

