

- Ideal for 303.825 MHz Transmitters
- Very Low Series Resistance
- Quartz Stability
- Surface-Mount, Ceramic Case with 21 mm² Footprint
- Complies with Directive 2002/95/EC (RoHS)



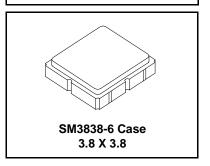
The RO3104D is a true one-port, surface-acoustic-wave (SAW) resonator in a surface-mount, ceramic case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency transmitters operating at 303.825 MHz. This SAW is designed specifically for AM transmitters in wireless security and remote control applications operating in the USA under FCC Part 15, in Australia, in Japan, and in Korea.

Absolute Maximum Ratings

Absolute maximum ratings						
Rating	Value	Units				
CW RF Power Dissipation (See Typical Test Circuit)	0	dBm				
DC Voltage Between Terminals (Observe ESD Precautions)	12	VDC				
Case Temperature	-40 to +85	°C				
Soldering Temperature (10 seconds / 5 cycles max.)	260	°C				

RO3104D

303.825 MHz SAW Resonator



Electrical Characteristics

	Sym	Notes	Minimum	Typical	Maximum	Units
Nominal Frequency	f _C	2215	303.750		303.900	MHz
Tolerance from 303.825 MHz	Δf_{C}	2, 3, 4, 3			±75	kHz
	IL	2, 5, 6		1.4	2.0	dB
Unloaded Q	Q _U	5, 6, 7		9500		
50 Ω Loaded Q	Q_L			1400		
Turnover Temperature	T _O		10	25	40	°C
Turnover Frequency	f _O	6, 7, 8		f _C		
Frequency Temperature Coefficient	FTC			0.032		ppm/°C ²
Absolute Value during the First Year	f _A	1, 6		10		ppm/yr
DC Insulation Resistance between Any Two Terminals		5	1.0			MΩ
Motional Resistance	R_{M}	5, 6, 7,		16.7		Ω
Motional Inductance	L _M			82.8		μH
Motional Capacitance	C _M	,		3.3		fF
Transducer Static Capacitance	Co	5, 6, 9		3.4		pF
е	L _{TEST}	2, 7		80.4		nH
Lid Symbolization			689 // YWWS			
Reel Size 7 Inch		500 Pieces/Reel				
Reel Size 13 Inch		1 10	3000 Pieces/Reel			
	Tolerance from 303.825 MHz Unloaded Q 50 Ω Loaded Q Turnover Temperature Turnover Frequency Frequency Temperature Coefficient Absolute Value during the First Year ween Any Two Terminals Motional Resistance Motional Inductance Motional Capacitance Transducer Static Capacitance	Nominal Frequency f _C Tolerance from 303.825 MHz Δf_C Unloaded Q Q _U 50 Ω Loaded Q Q _L Turnover Temperature T _O Turnover Frequency f _O Frequency Temperature Coefficient FTC Absolute Value during the First Year $ f_A $ ween Any Two Terminals R _M Motional Resistance R _M Motional Inductance L _M Transducer Static Capacitance C _O E L _{TEST}	Nominal Frequency Tolerance from 303.825 MHz	Nominal Frequency Tolerance from 303.825 MHz IL 2, 5, 6	Nominal Frequency Tolerance from 303.825 MHz Afc 2, 3, 4, 5 303.750	Nominal Frequency Tolerance from 303.825 MHz Tolerance from 303.825 MHz Afc Afc L _M Solute Value during the First Year Motional Inductance Motional Capacitance C _O S, 6, 9 Capacitance Capacitance C _O S, 6, 9 Capacitance Capacitance C _O S, 6, 9 Capacitance Capacitance

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

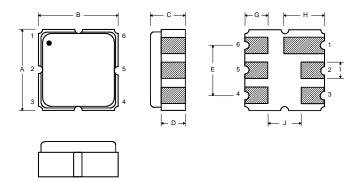
- Frequency aging is the change in f_C with time and is specified at +65°C or less. Aging may exceed the specification for prolonged temperatures above +65°C. Typically, aging is greatest the first year after manufacture, decreasing in subsequent years.
- The center frequency, f_C, is measured at the 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 approximately equal to the resonator f_C.
- One or more of the following United States patents apply: 4,454,488 and 4,616,197.
- 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±2°C.
- 6. The design, manufacturing process, and specifications of this device are

- subject to change.
- 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.
- 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.
- Tape and Reel Standard Per ANSI / EIA 481.

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			



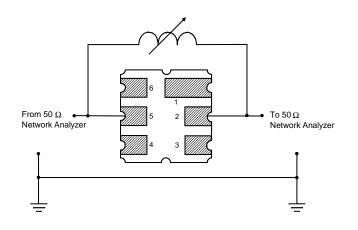
Case Dimensions

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	0.033	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

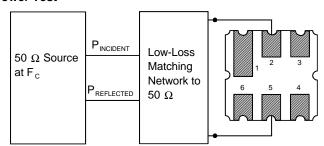
Typical Test Circuit

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

Electrical Test

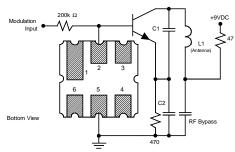


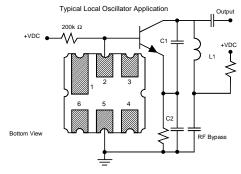
Power Test



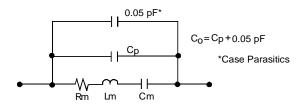
Typical Application Circuits

Typical Low-Power Transmitter Application





Equivalent LC Model



Temperature Characteristics

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

