muRata
INNOVATOR IN ELECTRONICS

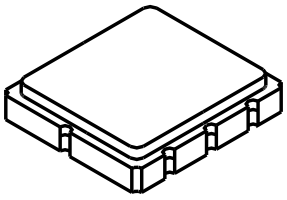
RoHS Compliance
This component is compliant with RoHS directive.
This component was always RoHS compliant from the first date of manufacture.

RO3144C-1/C-2

916.500 MHz SAW Resonator

- ***Ideal for 916.500 MHz Transmitters***
- ***Very Low Series Resistance***
- ***Quartz Stability***

The RO3144C 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 local oscillators operating at approximately 916.500 MHz. This SAW was designed for automotive-keyless-entry applications operating in the USA under FCC Part 15, in Canada under DoC RSS-210, and in Italy.



SM5050-8 Case
5 X 5

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

Electrical Characteristics

Characteristic			Sym	Notes	Minimum	Typical	Maximum	Units
Frequency (+25 °C) Nominal Frequency		RO3144C	f_C	2, 3, 4, 5	916.300		916.700	MHz
		RO3144C-1			916.350		916.650	
		RO3144C-2			916.400		916.600	
Tolerance from 916.500 MHz		RO3144C	Δf_C				±200	kHz
		RO3144C-1					±150	
		RO3144C-2					±100	
Insertion Loss			IL	2, 5, 6		1.2	2.5	dB
Quality Factor	Unloaded Q		Q_U			6975		
	50W Loaded Q		Q_L			900		
Temperature Stability	Turnover Temperature		T_O	6, 7, 8	10	25	40	°C
	Turnover Frequency		f_O			f_C		
	Frequency Temperature Coefficient		FTC			0.032		ppm/°C^2
Frequency Aging	Absolute Value during the First Year		$\|f_A\|$	1, 6		10		ppm/yr
DC Insulation Resistance between Any Two Terminals				5	1.0			MΩ
RF Equivalent RLC Model	Motional Resistance		R_M	5, 7, 9		12.7		Ω
	Motional Inductance		L_M			17.6		μH
	Motional Capacitance		C_M			1.7		fF
	Shunt Static Capacitance		C_O	5, 6, 9		2.2		pF
Test Fixture Shunt Inductance			L_{TEST}	2, 7		13.5		nH
Lid Symbolization			RO3144C 691, RO3144C-1 B12, RO3144C-2 B13 // 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:

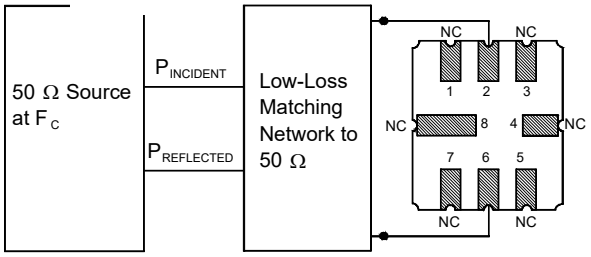
1. Frequency aging is the change in f_C with time and is specified at +65°C or less. Aging may exceed the specification for prolonged temperatures above +65°C. Typically, aging is greatest the first year after manufacture, decreasing in subsequent years.
2. The center frequency, f_C, is measured at the 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 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°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. 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.

Electrical Connections

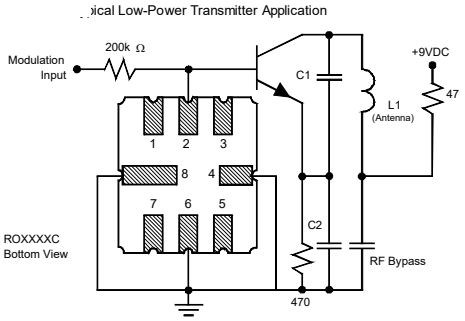
The SAW resonator is bidirectional and may be installed with either orientation. The two terminals are interchangeable and unnumbered. The callout NC indicates no internal connection. The NC pads assist with mechanical positioning and stability. External grounding of the NC pads is recommended to help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

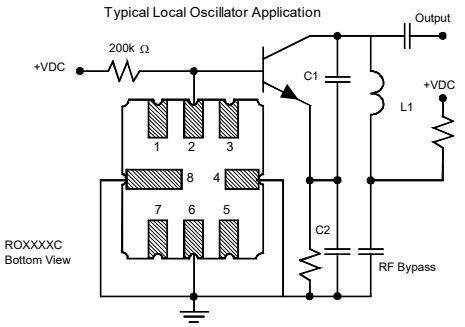
Pin	Connection
1	NC
2	Terminal
3	NC
4	NC
5	NC
6	Terminal
7	NC
8	NC

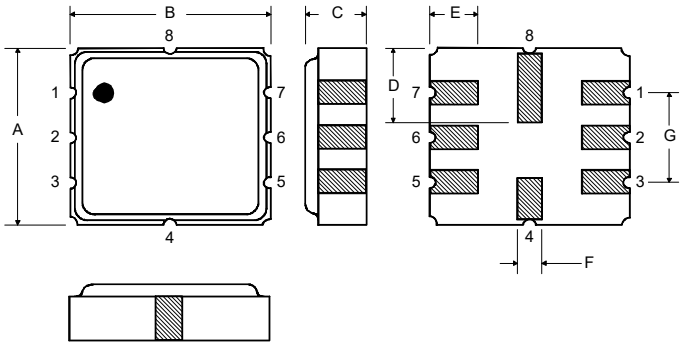
Power Test



Typical Application Circuits







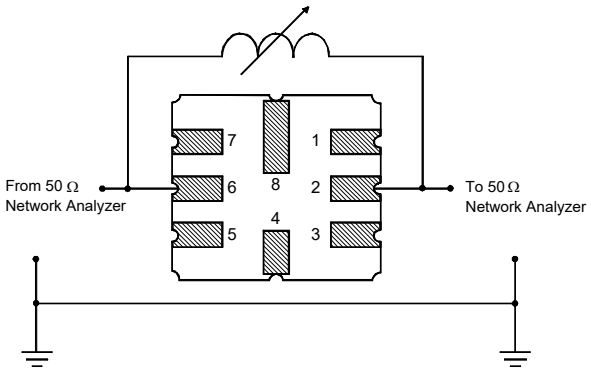
Case Dimensions

Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.8	5.0	5.2	0.189	0.197	0.205
B	4.8	5.0	5.2	0.189	0.197	0.205
C			1.7			0.067
D		2.08			0.082	
E		1.17			0.046	
F		0.64			0.025	
G	2.39	2.54	2.69	0.094	0.100	0.106

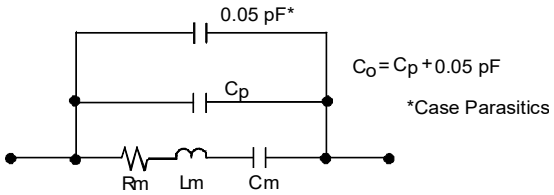
Typical Test Circuit

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