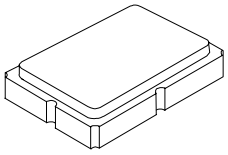
RO3112A

433.42 MHz SAW Resonator

- ***Ideal for European 433.92 MHz Superhet Receiver LOs***
- ***Very Low Series Resistance***
- ***Quartz Stability***
- ***Surface-mount Ceramic Case with 21 mm^2 Footprint***
- ***Complies with Directive 2002/95/EC (RoHS)***

The RO3112A 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 433.42 MHz. This SAW is designed for 433.92 MHz superhet receivers with 500 kHz IF (Philips UAA3201T). Applications include remote-control and wireless security receivers operating in Europe under ETSI I-ETS 300 220.



SM5035-4

Absolute Maximum Ratings

Rating	Value	Units
CW RF Power Dissipation (See Typical Test Circuit)	+0	dBm
DC Voltage Between Terminals (Observe ESD Precautions)	±30	VDC
Case Temperature	-40 to +85	°C
Soldering Temperature (10 seconds / 5 cycles maximum)	260	°C

Electrical Characteristics

Characteristic		Sym	Notes	Minimum	Typical	Maximum	Units
Center Frequency, +25 °C	Absolute Frequency	f_C	2, 3, 4, 5	433.345		433.495	MHz
	Tolerance from 433.42 MHz	Δf_C				±75	kHz
Insertion Loss		IL	2, 5, 6		1.4	1.6	dB
Quality Factor	Unloaded Q	Q_U	5, 6, 7		8000		
	50 Ω Loaded Q	Q_L			1300		
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		≤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		18.6	25	Ω
	Motional Inductance	L_M			54.8		µH
	Motional Capacitance	C_M			2.5		fF
	Transducer Static Capacitance	C_O	5, 6, 9		3.7		pF
Test Fixture Shunt Inductance		L_{TEST}	2, 7		36.8		nH
Lid Symbolization		658 // YYWWS					

CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

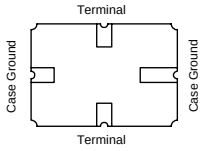
Notes:

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 ± 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 be calculated as: $C_P \approx C_O - 0.05$ pF.
10. Packaged in 500PC Tape carrier.

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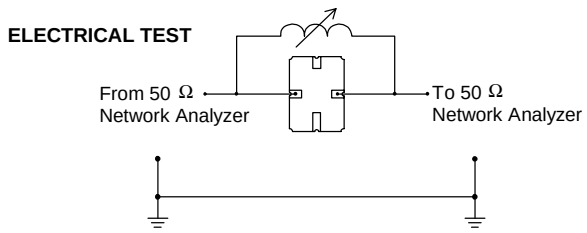
Electrical Connections

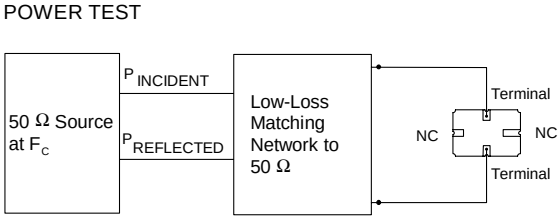
The SAW resonator is bidirectional and may be installed with either orientation. The two terminals are interchangeable and unnumbered. The callout NC indicates no internal connection. The NC pads assist with mechanical positioning and stability. External grounding of the NC pads is recommended to help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



Typical Test Circuit

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

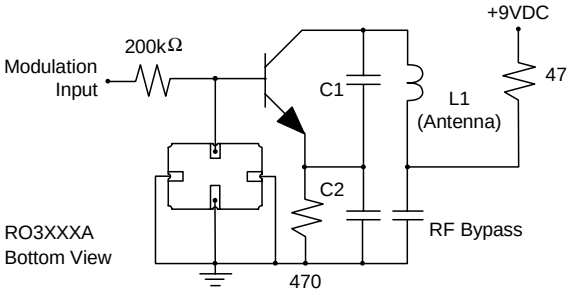




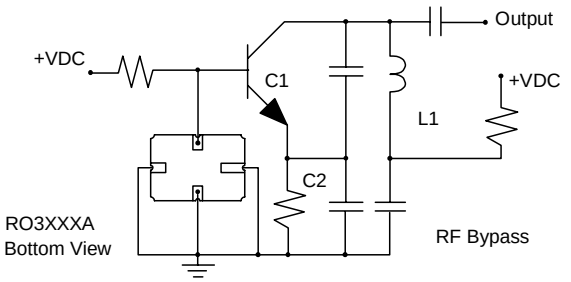
CW RF Power Dissipation = $P_{INCIDENT} - P_{REFLECTED}$

Typical Application Circuits

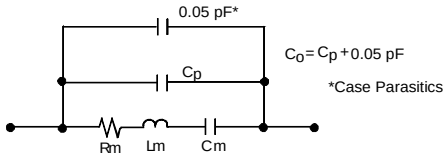
Typical Low-Power Transmitter Application



Typical Local Oscillator Applications

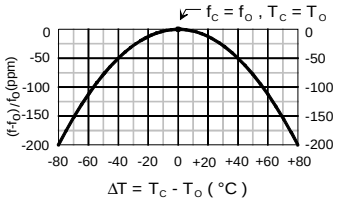


Equivalent Model

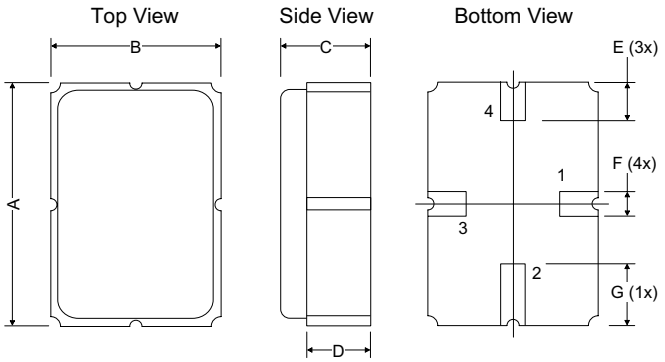


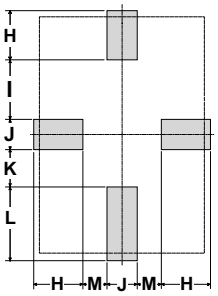
Temperature Characteristics

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



Case





PCB Land Pattern
Top View

Dimensions	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.87	5.00	5.13	0.191	0.196	0.201
B	3.37	3.50	3.63	0.132	0.137	0.142
C	1.45	1.53	1.60	0.057	0.060	0.062
D	1.35	1.43	1.50	0.040	0.057	0.059
E	0.67	0.80	0.93	0.026	0.031	0.036
F	0.37	0.50	0.63	0.014	0.019	0.024
G	1.07	1.20	1.33	0.042	0.047	0.052
H	-	1.04	-	-	0.041	-
I	-	1.46	-	-	0.058	-
J	-	0.50	-	-	0.019	-
K	-	1.05	-	-	0.041	-
L	-	1.44	-	-	0.057	-
M	-	0.71	-	-	0.028	-

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