

## Excellent Integrated System Limited

Stocking Distributor

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[Murata Electronics North America](#)  
[RO3164A](#)

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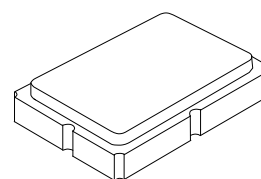
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RFM products are now  
Murata products.

**RO3164A/A-1/A-2**

**868.35 MHz  
SAW Resonator**



**SM5035-4**

- **Designed for European 868.35 MHz SRD Transmitters**
- **Very Low Series Resistance**
- **Quartz Stability**
- **Surface-mount Ceramic Case**
- **Complies with Directive 2002/95/EC (RoHS)** 

The RO3164A is a one-port surface-acoustic-wave (SAW) resonator packaged in a surface-mount ceramic case. It provides reliable, fundamental-mode quartz frequency stabilization of fixed-frequency transmitters operating at 868.35 MHz. The RO3164A is designed specifically for remote control and wireless security SRD transmitters operating under ETSI EN 300 220-2.

#### Absolute Maximum Ratings

Rating	Value	Units
CW RF Power Dissipation	+5	dBm
DC Voltage Between Terminals	±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
Frequency, +25 °C	RO3164A RO3164A-1 RO3164A-2	$f_C$	868.150 868.200 868.250		868.550 868.500 868.450	MHz
Tolerance from 868.35 MHz	RO3164A RO3164A-1 RO3164A-2	$\Delta f_C$			±200 ±150 ±100	kHz
Insertion Loss	IL	2,5,6		1.3	2.0	dB
Quality Factor	Unloaded Q 50 Ω Loaded Q	$Q_U$ $Q_L$		6600 800		
Temperature Stability	Turnover Temperature Turnover Frequency Frequency Temperature Coefficient	$T_O$ $f_O$ FTC	10	25 $f_C$ 0.032	40	°C kHz ppm/°C <sup>2</sup>
Frequency Aging	Absolute Value during the First Year	fA		<±10		ppm/yr
DC Insulation Resistance between Any Two Terminals		5	1.0			MΩ
RF Equivalent RLC Model	Motional Resistance Motional Inductance Motional Capacitance Shunt Static Capacitance	$R_M$ $L_M$ $C_M$ $C_O$		13.8 16.8 2.0 1.8		Ω μH fF pF
Test Fixture Shunt Inductance	$L_{TEST}$	2, 7		18.3		nH
Lid Symbolization (in addition to Lot and/or Date Codes)	RO3164A: 660, RO3164A-1: 780, RO3164A-2: 868 // YYWWS					



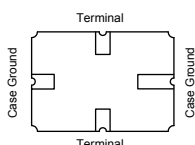
**CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.**

## 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  $\Omega$  test system (VSWR  $\leq 1.2:1$ ). The shunt inductance,  $L_{TEST}$ , is tuned for parallel resonance with  $C_O$  at  $f_C$ . Typically,  $f_{OSCILLATOR}$  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. Unless noted otherwise, case temperature  $T_C = +25 \pm 2$  °C.
- The design, manufacturing process, and specifications of this device are subject to change without notice.
- 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  $T_O$ .
- 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.

## Electrical Connections

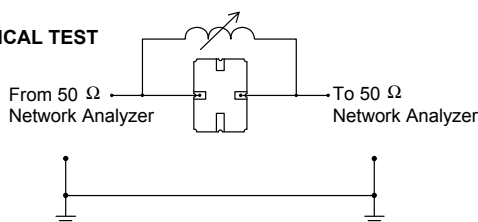
The SAW resonator is bidirectional and may be installed with either orientation. The two terminals are interchangeable and unnumbered. The callout NC indicates no internal connection. The NC pads assist with mechanical positioning and stability. External grounding of the NC pads is recommended to help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



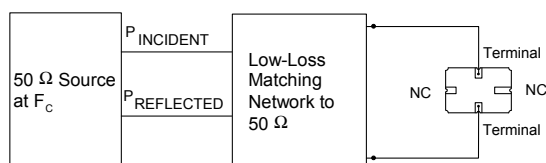
## Typical Test Circuit

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

### ELECTRICAL TEST

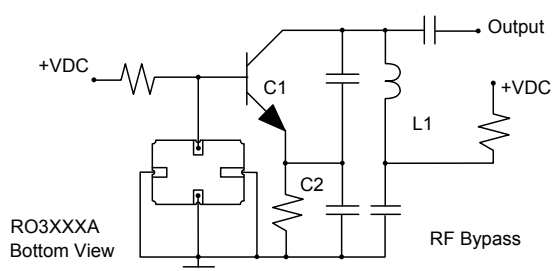


### POWER TEST



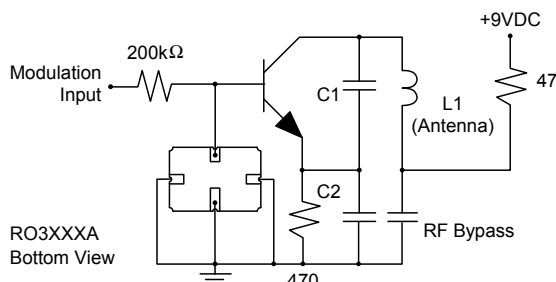
$$CW \text{ RF Power Dissipation} = P_{INCIDENT} - P_{REFLECTED}$$

## Typical Local Oscillator Applications

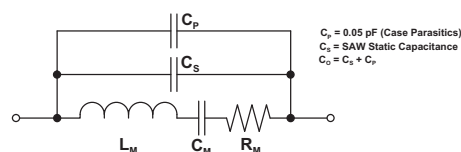


## Typical Application Circuits

### Typical Low-Power Transmitter Application

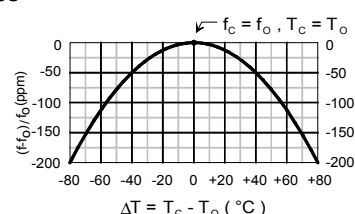


## Equivalent RLC Model

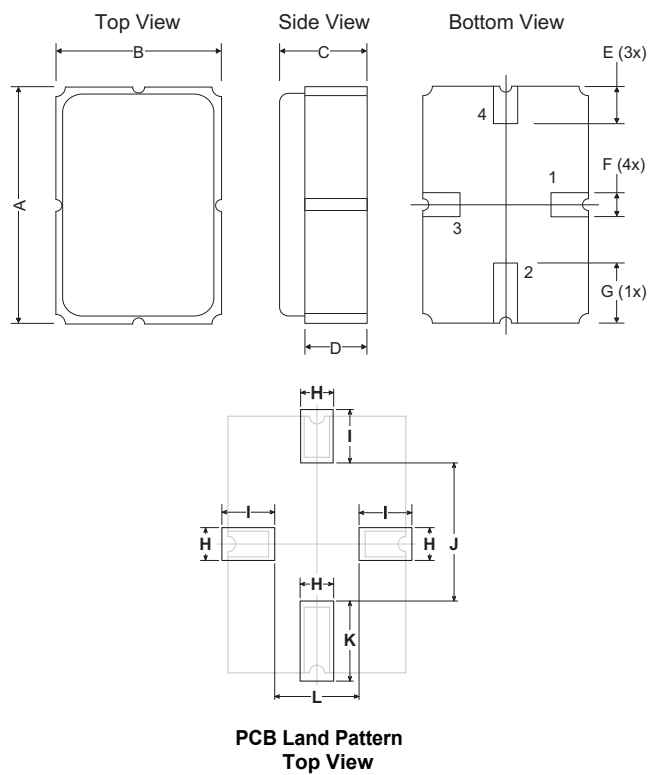


## Temperature Characteristics

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



## Case



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	-	3.01	-	-	0.119	-
K	-	1.44	-	-	0.057	-
L	-	1.92	-	-	0.076	-