

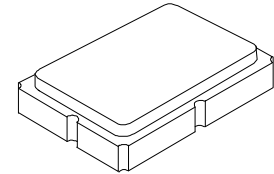
RoHS Compliance

This component is compliant with RoHS directive.

This component was always RoHS compliant from the first date of manufacture.

**RO3156A/A-1/A-2**

**868.95 MHz  
SAW Resonator**



**SM5035-4**

- **Designed for European 868.95 MHz SRD Transmitters**
- **Very Low Series Resistance**
- **Quartz Stability**
- **Surface-mount Ceramic Case**

The RO3156A 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 868.95 MHz. The RO3156A is designed specifically for SRD transmitters operating in Europe 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	RO3156A	$f_C$	2,3,4,5	868.750		869.150	MHz	
	RO3156A-1			868.800		869.100		
	RO3156A-2			868.850		869.050		
Tolerance from 868.95 MHz	RO3156A	$\Delta f_C$				±200	kHz	
	RO3156A-1					±150		
	RO3156A-2					±100		
Insertion Loss		IL	2,5,6		1.2	2.0	dB	
Quality Factor	Unloaded Q	$Q_U$	5,6,7		6200			
	50 Ω Loaded Q	$Q_L$			850			
Temperature Stability	Turnover Temperature	$T_O$	6,7,8	10	25	40	°C	
	Turnover Frequency	$f_O$			$f_C$			kHz
	Frequency Temperature Coefficient	FTC				0.032		ppm/°C <sup>2</sup>
Frequency Aging	Absolute Value during the First Year	fA	1		<±10		ppm/yr	
DC Insulation Resistance between Any Two Terminals			5	1.0			MΩ	
RF Equivalent RLC Model	Motional Resistance	$R_M$	5, 6, 7, 9		14.5		Ω	
	Motional Inductance	$L_M$			18.0		μH	
	Motional Capacitance	$C_M$				2.0		fF
	Shunt Static Capacitance	$C_O$		5, 6, 9		2.1		pF
Test Fixture Shunt Inductance		$L_{TEST}$	2, 7		15.8		nH	
Lid Symbolization	RO3156A: 714, RO3156A-1: 923, RO3156A-2 828, //YYWWWS							



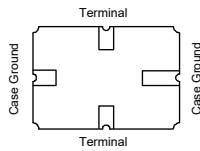
**CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.**

**NOTES:**

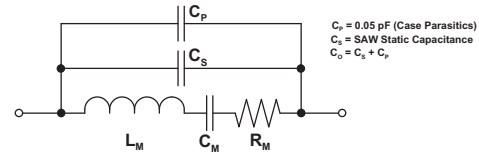
- Frequency aging is the change in  $f_c$  with time and is specified at +65 °C or less. Aging may exceed the specification for prolonged temperatures above +65 °C. Typically, aging is greatest the first year after manufacture, decreasing in subsequent years.
- The center frequency,  $f_c$ , is measured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



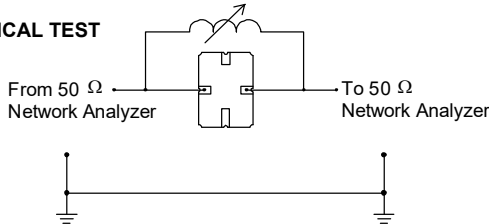
**Equivalent RLC Model**



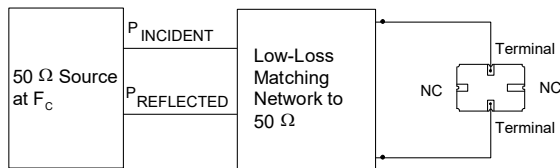
**Typical Test Circuit**

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

**ELECTRICAL TEST**



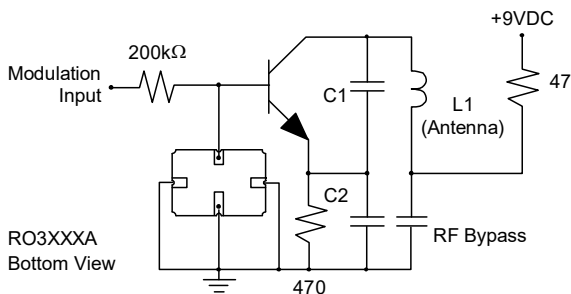
**POWER TEST**



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

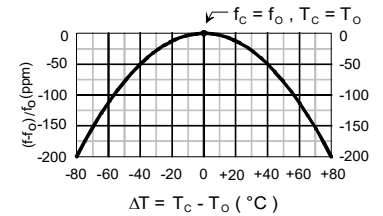
**Typical Application Circuits**

**Typical Low-Power Transmitter Application**

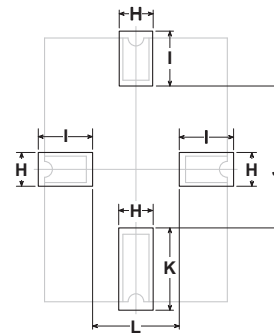
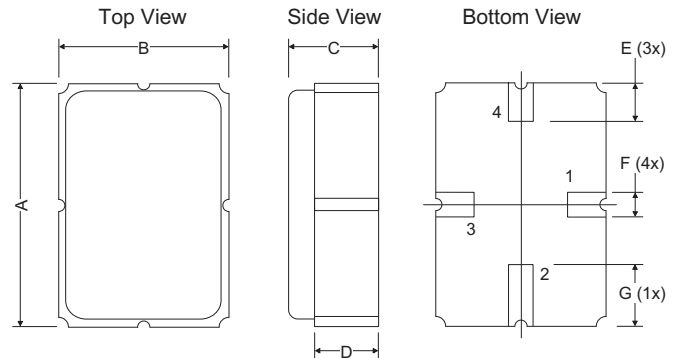


**Temperature Characteristics**

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

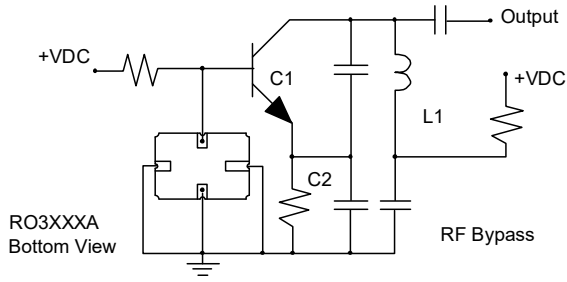


**Case**



**PCB Land Pattern Top View**

### Typical Local Oscillator Applications



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	-

单击下面可查看定价，库存，交付和生命周期等信息

[>>Murata\(村田\)](#)