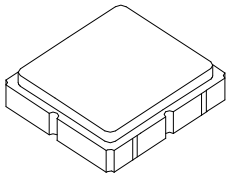
RO2166E
RO2166E-1
RO2166E-2

857.65 MHz SAW Resonator

- ***Ideal for European 857.65 MHz Transmitters***
- ***Very Low Series Resistance***
- ***Quartz Stability***
- ***Surface-Mount Ceramic Case with 21 mm^2 Footprint***
- ***Complies with Directive 2002/95/EC (RoHS)***

The RO2166E 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 857.65 MHz. This SAW is designed for 857.65 MHz superhet receivers with 10.7 MHz IF. Applications include remote-control and wireless security receivers operating under ETSI-ETS 300 220 in Europe and under FTZ 17 TR 2100 in Germany.



SM3030-6 Case
3.0 X 3.0

Absolute Maximum Ratings

CW RF Power Dissipation	+0	dBm
DC Voltage Between Terminals	±12	VDC
Case Temperature	-40 to +125	°C
Operating Temperature Range	-40 to +125	°C
Soldering Temperature (10 seconds / 5 cycles max.)	260	°C

Electrical Characteristics

Characteristic			Sym	Notes	Minimum	Typical	Maximum	Units
Frequency (+25 °C)	Nominal Frequency	RO2166E	f_C	2, 3, 4, 5	857.500		857.800	MHz
		RO2166E-1			857.550		857.750	
		RO2166E-2			857.575		857.725	
	Tolerance from 857.65 MHz	RO2166E	Δf_C				±150	kHz
		RO2166E-1					±100	
		RO2166E-2					±75	
Insertion Loss			IL	2, 5, 6		0.9	1.6	dB
Quality Factor	Unloaded Q		Q_U	5, 6, 7		5607		
	50 Ω Loaded Q		Q_L			310		
Temperature Stability	Turnover Temperature		T_O	6, 7, 8	15	25	35	°C
	Turnover Frequency		f_O			f_C		kHz
	Frequency Temperature Coefficient		FTC			0.032		ppm/°C^2
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		5.9	17	Ω
	Motional Inductance		L_M			6.1		µH
	Motional Capacitance		C_M			5.6		fF
	Transducer Static Capacitance		C_O	5, 6, 9		1.64		pF
Test Fixture Shunt Inductance			L_{TEST}	2, 7		21.00		nH
Lid Symbolization (in addition to Lot and/or Date Codes)			514 / YWWS					
Standard Reel Quantity	Reel Size 7 Inch			10	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.
10. Tape and Reel Standard for ANSI / EIA 481.
11. This product complies with directive 2002/95/EC of the European Parlament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

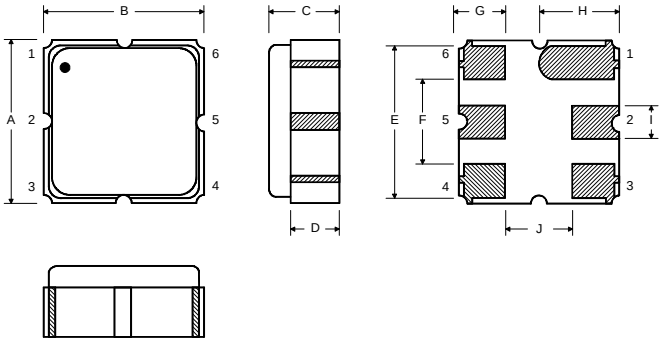
RF Monolithics, Inc. Phone: (972) 233-2903 Fax: (972) 387-8148 E-mail: info@rfm.com
RFM Europe Phone: 44 1963 251383 Fax: 44 1963 251510 http://www.rfm.com

857.650 MHz SAW Resonator

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



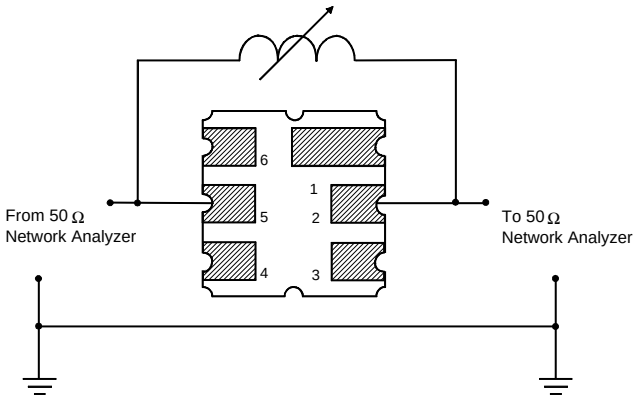
Case Dimensions

Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	2.87	3.0	3.13	0.113	0.118	0.123
B	2.87	3.0	3.13	0.113	0.118	0.123
C	1.12	1.25	1.38	0.044	0.049	0.054
D	0.77	0.90	1.03	0.030	0.035	0.040
E	2.67	2.80	2.93	0.105	0.110	0.115
F	1.47	1.6	1.73	0.058	0.063	0.068
G	0.72	0.85	0.98	0.028	0.033	0.038
H	1.37	1.5	1.63	0.054	0.059	0.064
I	0.47	0.60	0.73	0.019	0.024	0.029
J	1.17	1.30	1.43	0.046	0.051	0.056

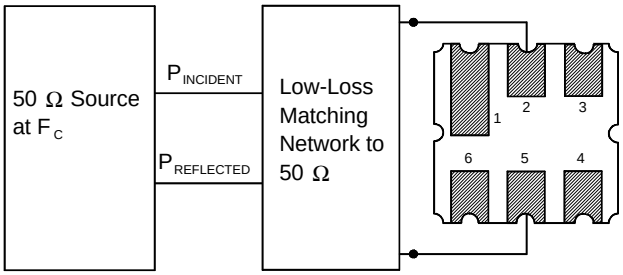
Typical Test Circuit

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

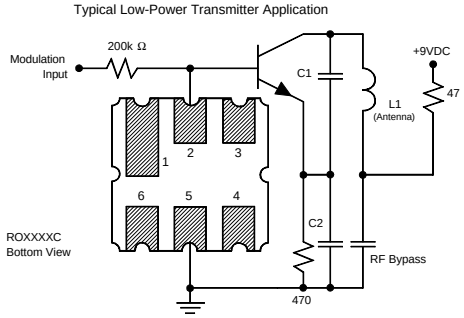
Electrical Test

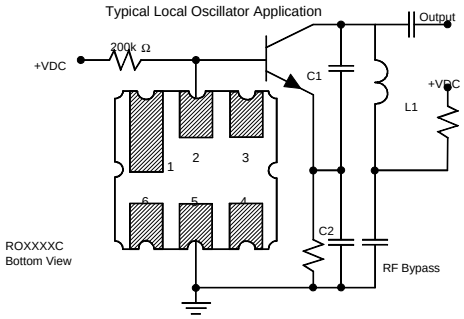


Power Test

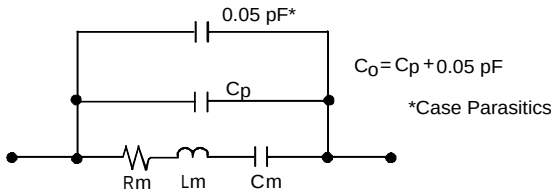


Typical Application Circuits





Equivalent LC Model



Temperature Characteristics

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