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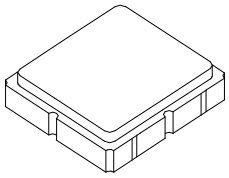
RO3156D/D-1/D-2

868.95 MHz SAW Resonator

- ***Designed for 868.95 MHz SRD Transmitters***
- ***Very Low Series Resistance***
- ***Quartz Stability***
- ***Complies with Directive 2002/95/EC (RoHS)***

The RO3156D is a true one-port, surface-acoustic-wave (SAW) resonator in a surface-mount ceramic case. It provides reliable, fundamental-mode stabilization of fixed-frequency transmitters operating at 868.95 MHz. This SAW is designed specifically for SRD remote control and security transmitters operating under ETSI EN 300 220 regulations.



SM3838-6 Case
3.8 X 3.8

Absolute Maximum Ratings

Rating	Value	Units
Input Power Level	10	dBm
DC Voltage	12	VDC
Storage 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	RO3156D	f_C	2, 3, 4, 5	868.750		869.150	MHz
	RO3156D-1			868.800		869.100	
	RO3156D-2			868.850		869.050	
Tolerance from 916.5 MHz	RO3156D	Δf_C				±200	kHz
	RO3156D-1					±150	
	RO3156D-2					±100	
Insertion Loss		IL	2, 5, 6		1.20	2.5	dB
Quality Factor	Unloaded Q	Q_U	5, 6, 7		6300		
	50 Ω Loaded Q	Q_L			850		
Temperature Stability	Turnover Temperature	T_O	6, 7, 8	10	25	40	°C
	Turnover Frequency	f_O			fc		MHz
	Frequency Temperature Coefficient	FTC			0.032		ppm/°C^2
Frequency Aging	Absolute Value during the First Year	|fA|	1		10		ppm
DC Insulation Resistance between Any Two Terminals			5	1.0			MΩ
RF Equivalent RLC Model	Motional Resistance	R_M	5, 6, 7, 9		15.7		Ω
	Motional Inductance	L_M			18.1		µH
	Motional Capacitance	C_M			1.85		fF
	Transducer Static Capacitance	C_O	5, 6, 9		2.2		pF
Test Fixture Shunt Inductance		L_{TEST}	2, 7		15.2		nH
Lid Symbolization		RO3156D: 715, RO3156D-1: 924, RO3156D-2: 925 //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 ± 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 Per ANSI/EIA 481.

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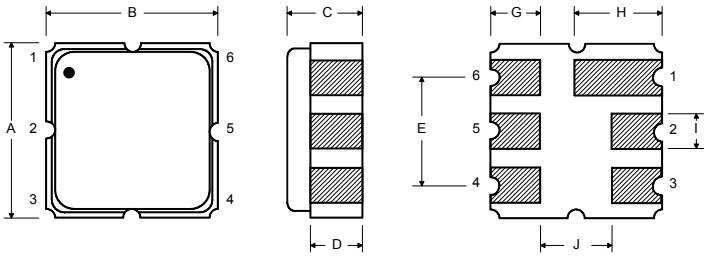
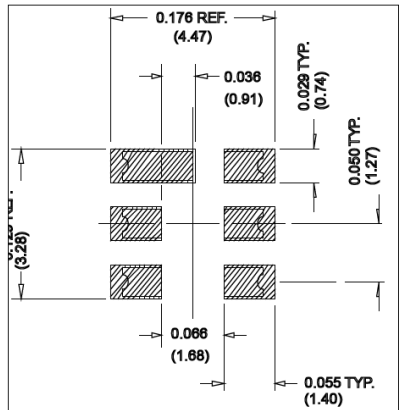
Electrical Connections

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.

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

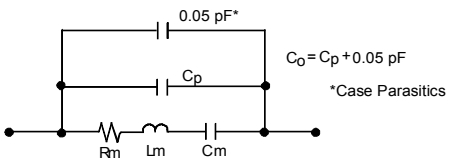




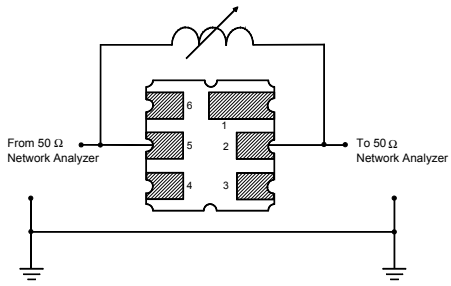
Case Dimensions

Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	3.60	3.80	4.00	0.142	0.150	0.157
B	3.60	3.80	4.00	0.142	0.150	0.157
C	1.10	1.30	1.50	0.043	0.050	0.060
D	0.95	1.10	1.25	0.037	0.043	0.049
E	2.39	2.54	2.69	0.094	0.100	0.106
G	0.90	1.00	1.10	0.035	0.040	0.043
H	1.90	2.00	2.10	0.748	0.079	0.083
I	0.50	0.60	0.70	0.020	0.024	0.028
J	1.70	1.80	1.90	0.067	0.071	0.075

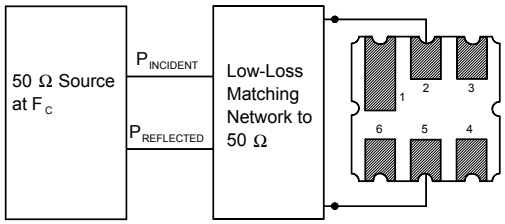
Equivalent RLC Model



Parameter Test Circuit

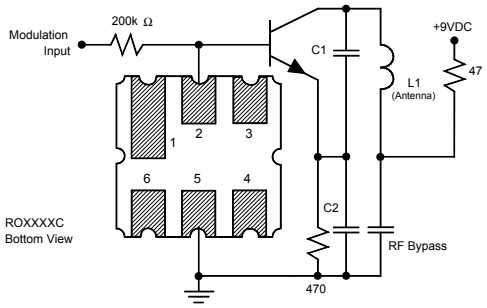


Power Test Circuit

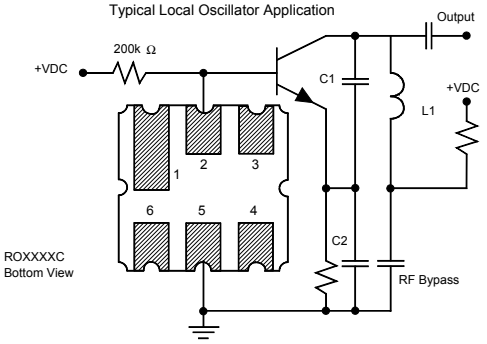


Example Application Circuits

Typical Low-Power Transmitter Application



Typical Local Oscillator Application



Temperature Characteristics

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