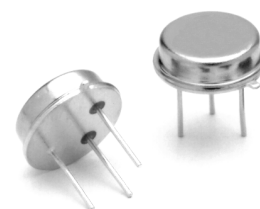


RO3023

433.97 MHz SAW Resonator



TO39-3 Case

- **Ideal for European 433.92 MHz Transmitters**
- **Low Series Resistance**
- **Quartz Stability**
- **Rugged, Hermetic, Low-Profile TO39 Case**

The RO3023 is a true one-port, surface-acoustic-wave (SAW) resonator in a low-profile TO39 case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency transmitters operating at 433.92 MHz. The RO3023 is designed specifically for remote-control and wireless security devices operating in Europe under ETSI I-ETS 300 220 and in Germany under FTZ 17 TR 2100.

Absolute Maximum Ratings

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

Electrical Characteristics

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Center Frequency at +25 °C Absolute Frequency Tolerance from 433.970 MHz	f_C	2, 3, 4, 5	433.895		434.045	MHz
	Δf_C				±75	kHz
Insertion Loss	IL	2, 5, 6		2.5	4.8	dB
Quality Factor Unloaded Q 50 W Loaded Q	Q_U	5, 6, 7		8,500		
	Q_L			2200		
Temperature Stability Turnover Temperature Turnover Frequency Frequency Temperature Coefficient	T_O	6, 7, 8	10	25	40	°C
	f_O			$f_C + 2.3$		kHz
	FTC			0.037		ppm/°C ²
Frequency Aging Absolute Value during the First Year	fA	1		≤10		ppm/yr
DC Insulation Resistance between Any Two Pins		5	1.0			MΩ
RF Equivalent RLC Model Motional Resistance Motional Inductance Motional Capacitance Pin 1 to Pin 2 Static Capacitance	R_M	5, 7, 9		34.5		Ω
	L_M			107		μH
	C_M			1.3		fF
	C_O	5, 6, 9		2.1		pF
Transducer Static Capacitance	C_P	5, 6, 7, 9		1.8		pF
Test Fixture Shunt Inductance	L_{TEST}	2, 7		68.2		nH
Lid Symbolization	RFM RO3023 Datecode					

CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

NOTES:

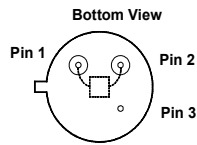
- Frequency aging is the change in f_C with time and is specified at +65°C or less. Aging may exceed the specification for prolonged temperatures above +65°C. Typically, aging is greatest the first year after manufacture, decreasing in subsequent years.
- The center frequency, f_C , is measured at the minimum insertion loss point, IL_{MIN} , with the resonator in the 50 Ω test system (VSWR ≤ 1.2:1). The shunt inductance, L_{TEST} , is tuned for parallel resonance with C_O at 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 $T_C = +25°C \pm 2°C$.
- 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 20°C less than 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 Pin1 and Pin 2 measured at low frequency (10 MHz) with a capacitance meter. The measurement includes case parasitic capacitance with a floating case. For usual grounded case applications (with ground connected to either Pin 1 or Pin 2 and to the case), add approximately 0.25 pF to C_O .

Discontinued

Electrical Connections

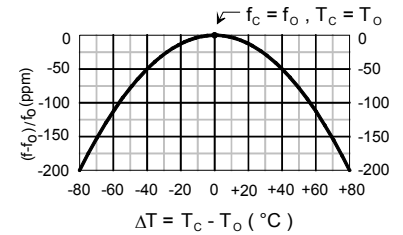
This one-port, two-terminal SAW resonator is bidirectional. The terminals are interchangeable with the exception of circuit board layout.

Pin	Connection
1	Terminal 1
2	Terminal 2
3	Case Ground



Temperature Characteristics

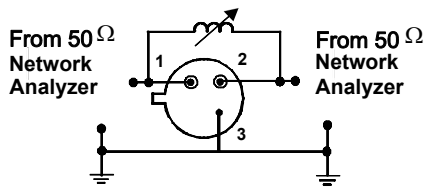
The curve shown on the right accounts for resonator contribution only and does not include oscillator temperature characteristics.



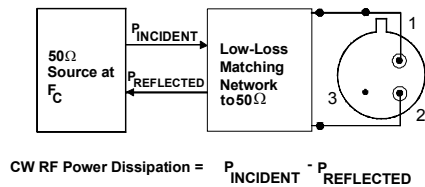
Typical Test Circuit

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

Electrical Test:

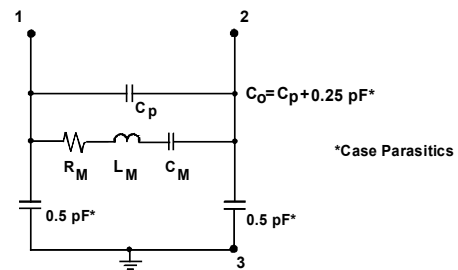


Power Test:

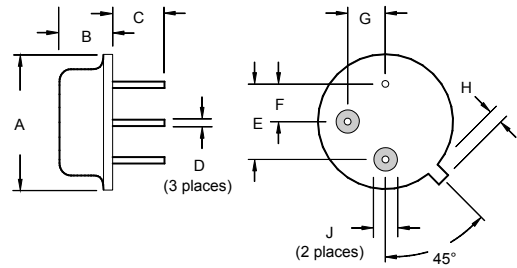


Equivalent LC Model

The following equivalent LC model is valid near resonance:

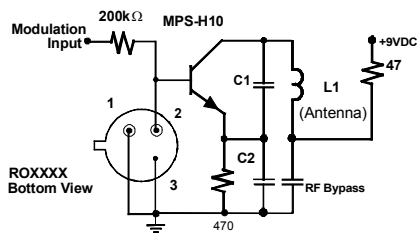


Case Design

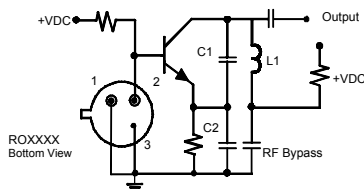


Typical Application Circuits

Typical Low-Power Transmitter Application:



Typical Local Oscillator Application:



Dimensions	Millimeters		Inches	
	Min	Max	Min	Max
A		9.30		0.366
B		3.18		0.125
C	2.50	3.50	0.098	0.138
D	0.46 Nominal		0.018 Nominal	
E	5.08 Nominal		0.200 Nominal	
F	2.54 Nominal		0.100 Nominal	
G	2.54 Nominal		0.100 Nominal	
H		1.02		0.040
J	1.40		0.055	