



Approved by:
Checked by:
Issued by:

Surface-Acoustic-Wave Resonator

SPECIFICATION

R315T2

SMD 7.5X3.5

Low Series Resistance**Quartz Stability****Rugged, Hermetic, Low-profile SMD7.5X3.5 Case**

The R315T2 is a true one-port, surface-acoustic-wave (SAW) resonator in low-profile SMD case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency transmitters operating at 315 MHz. The R315T2 is designed specifically for remote-controls and wireless security transmitters. Operating in the Europe under ETS11-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

Electrical Characteristics

Characteristics	Sym	Notes	Minimum	Typical	Maximum	Units
Center Frequency (+25°C) Absolute Frequency	f_c	2,3,4,5	314.025		315.075	MHz
	Δf_c				±75	KHz
Tolerance from 433.920MHz						
Insertion Loss	IL	2,5,6		1.5	2.0	dB
Quality Factor	Unloaded Q	5,6,7		12.800		
	50 Ω loaded Q			2.000		
Temperature Stability	Turnover Temperature	5,7,8	24	39	54	°C
	Turnover Frequency			$f_c + 2.7$		KHz
	Frequency Temperature Coefficient			0.037		ppm/°C ²
Frequency Aging	Absolute Value during the First Year	1		≤ 10		ppm/y
DC Insulation Resistance between Any Two Pins		5	1.0			M Ω
RF Equivalent RLC Model	Motional Resistance	5,7,9		18	26	Ω
	Motional Inductance			86.0075		μ H
	Motional Capacitance			1.56417		pF
	Pin 1 to Pin 2 Static Capacitance	5,6,9	1.7	2.0	2.3	pF
Transducer Static Capacitance		5,6,7,9		1.7		pF
Test Fixture Shunt Inductance	L _{TEST}	2,7		78		nH
Lid Symbolization (in Addition to Lot and/or Date Code)	R315T2					

CAUTION: electrostatic Sensitive Device, Observe precautions for handling.

Notes:

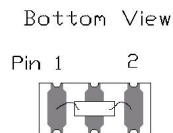
- Frequency aging is the change in f_c with time and is specified at +65°C or less. Aging may exceed the specification for prolonged temperatures above +65°C. Typically, aging is greatest the first year after manufacture, decreasing significantly in subsequent years.
- The center frequency, f_c , is 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 turned for parallel resonator with C₀ at f_c . Typically, f_{OSCILLATOR} OR f_{TRANSMITTER} is less than the resonator f_c .
- One or more of following United States patents apply: 4,454,488 and 4,616,197 and others pending.
- Typically, equipment designs utilizing this device require emissions testing and government approval, which is the responsibility of the equipment manufacturer.
- Unless noted otherwise, case temperature T_c = 25°C ± 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 parameter: f_c , IL, 3dB bandwidth, f_c versus T_c, and C₀.
- 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 resonators performance near the resonant frequency and is provided for reference only. The capacitance C₀ is the static (non-motional) capacitance between pin 1 and pin 2 measured at low frequency (10MHz) 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 0.25pF to C₀.

Electrical Connections

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

Pin	Connection
1	Terminal 1
2	Terminal 2

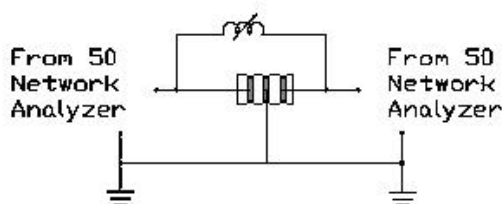


Typical Test Circuit

The test circuit inductor, L_{TEST} , is turned to resonate with the static capacitance, C_0 at F_0 .

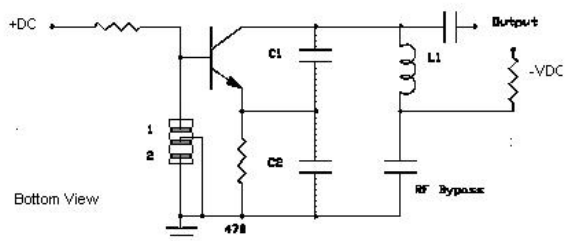
Electrical Test:

Power Test:

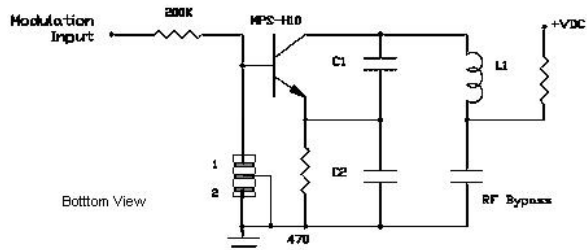


Typical Application Circuits

Typical Low-Power Transmitter Application:

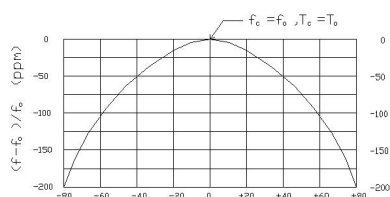


Typical Local Oscillator Application:



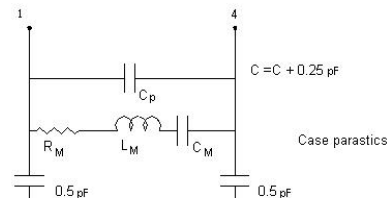
Temperature Characteristics

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

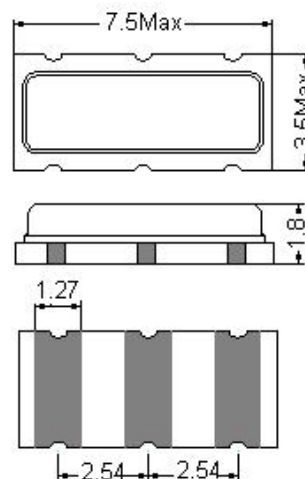


Equivalent LC Model

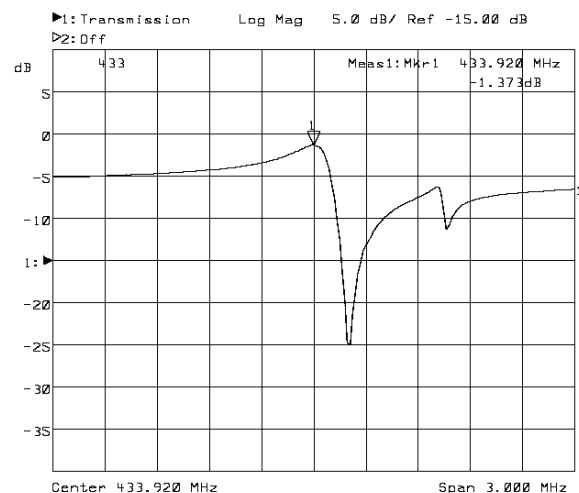
The following equivalent LC model is valid near resonance:



Case Design



Frequency Response



Taping structure

Componet load per 7' reel: 1000pcs

