RoHS

Approved by:
Checked by:
Issued by:

Surface-Acoustic-Wave Resonator

SPECIFICATION

LR315T2

SMD 7.3X3.3

315.00 MHz SAW Resonator

Low Series Resistance
Quartz Stability
Rugged, Hermetic, Low-profile SMD7.3X3.3 Case

The R315T2 is a true one-port, surface-acoustic-wave (SAW) resonator in a surface-mount epoxy board. It provides reliable, fundamental-mode, quartz frequency stabilization i.e. in transmitters or local oscillators operating at 315.000 MHz.

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	℃

Electrical Characteristics

Characteristics		Sym	Notes	Minimum	Typical	Maximum	Units
Center Frequency (+25℃)	Absolute Frequency	f_c	2,3,4,5	314.925		315.075	MHz
	Tolerance from 315.000MHz	Δf_c				±75	KHz
Insertion Loss		IL	2,5,6		1.5	2.0	dB
Quality Factor	Unloaded Q	Q_U	5,6,7		13.300		
	50Ω loaded Q	Q_L			2.000		
Temperature Stability	Turnover Temperature	T_O	5,7,8	10	25	40	℃
	Turnover Frequency	f_O			f_c		KHz
	Frequency Temperature Coefficient	FTC			0.037		ppm/℃^{2}
Frequency Aging	Absolute Value during the First Year	$\|f_A\|$	1		≦10		ppm/y τ
DC Insulation Resistance between Any Two Pins			5	1.0			MΩ
RF Equivalent RLC Model	Motional Resistance	R_M	5,7,9		19	29	Ω
	Motional Inductance	L_M			127.677		μH
	Motional Capacitance	C_M			1.99943		pF
	Pin 1 to Pin 2 Static Capacitance	C_O	5,6,9	3.0	3.3	3.6	pF
	Transducer Static Capacitance	C_P	5,6,7,9		3.3		pF
Test Fixture Shunt Inductance		L_{TEST}	2,7		100		nH
Lid Symbolization (in Addition to Lot and/or Date Code		LR315T2					

CAUTION: electrostatic Sensitive Device, Observe precautions for handling.

Notes:

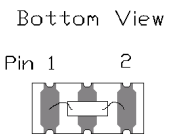
5. Frequency aging is the change in f_C with time and is specified at +65℃ or less. Aging may exceed the specification for prolonged temperatures above +65℃. Typically, aging is greatest the first year after manufacture, decreasing significantly in subsequent years.
6. The center frequency, f_C, is measured at the minimum insertion loss point, IL_{MIN} with the resonator in the 50Ω test system(VSWR≦1.2:1).The shunt inductance, L_{TEST}, is turned for parallel resonator with C_O at f_c. Typically, $f_{OSCILLATOR}$ or $f_{TRANSMITTER}$ is less than the resonator f_c.
7. One or more of following United States patents apply:4,454,488 and 4,616,197 and others pending.
8. Typically, equipment designs utilizing this device require emissions testing and government approval, which is the responsibility of the equipment manufacturer.
9. Unless noted otherwise, case temperature T_c=25℃±2℃.
10. The design, manufacturing process, and specifications of this device are subject to change without notice.

2. Derived mathematically from one or more of the following directly measured parameter: f_c, IL, 3dB bandwidth, f_c versus T_c, and C_o.
3. 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℃ less than the specified *resonator* T_o.
4. This equivalent RLC model approximates resonators performance near the resonant frequency and is provided for reference only. The capacitance C_o 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 C_o.

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

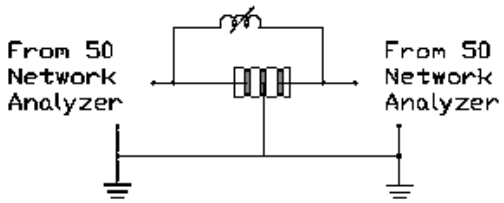


Typical Test Circuit

The test circuit inductor, L_{TEST}, is turn to resonate with the static capacitance, C_o at F_c.

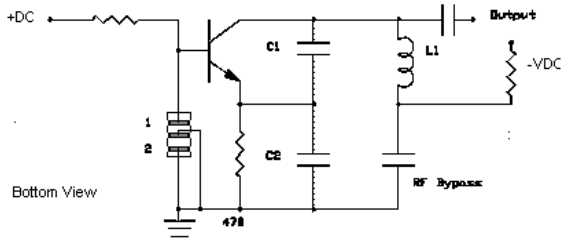
Electrical Test:

Power Test:

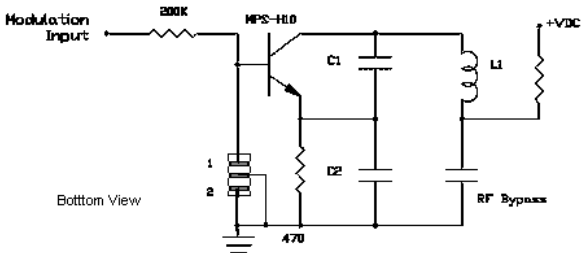


Typical Application Circuits

Typical Low-Power Transmitter Application:

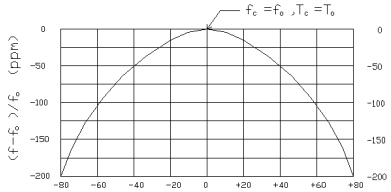


Typical Local Oscillator Application:



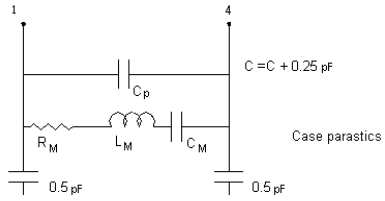
Temperature Characteristics

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

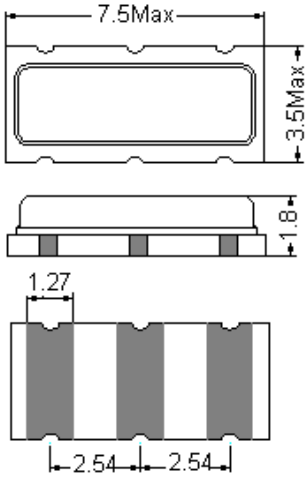


Equivalent LC Model

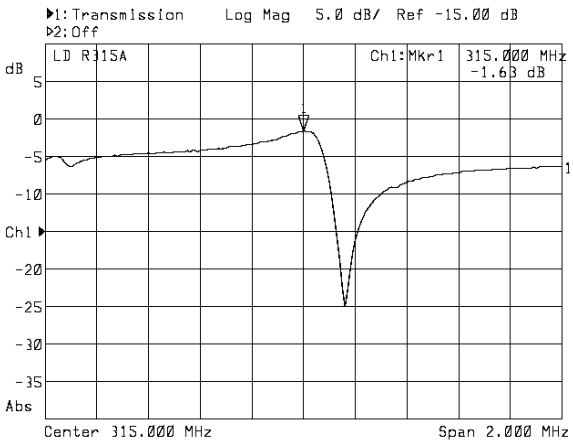
The following equivalent LC model is valid near resonance:



Case Design



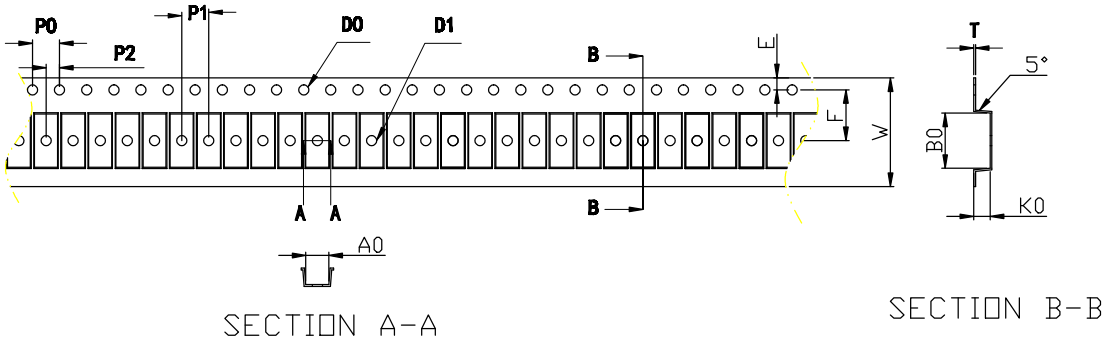
Frequency Response



Taping structure

Component load: per 7’ reel 2500pcs or per 13’ reel 8000pcs

ITEM	W	A_0	B_0	K_0	E	F	D_0	D_1	P_0	P_1	P_2	T	
DIM	16.0	3.40	7.85	2.00	1.75	7.50	Ø1.50	Ø1.50	4.00	4.00	2.00	**0. 30**	PCS/R
TOLE	+0.30 −0.30	+0.10 −0.00	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.10 −0.00	+0.25 −0.00	+0.10 −0.10	+0.10 −0.10	+0.10 −0.10	+0.05 −0.05	M/R



SECTION A-A

SECTION B-B