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| Approved by: |
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**RoHS**

Surface-Acoustic-Wave Resonator

SPECIFICATION

LR433T2

# SMD 7.5X3.5

### *Low Series Resistance* Quartz Stability

**433.92 MHz SAW**

**Resonator**

***Rugged, Hermetic, Low-profile SMD7.5X3.5 Case***

The R433T2 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 433.92 MHz. The R433T2 is designed specifically for remote-controls and wireless security transmitters. Operating in the Europe underETS11-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 | ℃ |

**Electrical Characteristics**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Characteristics** | **Sym** | **Notes** | **Minimum** | **Typical** | **Maximum** | **Units** |
| Center Frequency (+25℃) Absolute FrequencyTolerance from 433.920MHz | fc | 2,3,4,5 | 433.845 |  | 433.995 | MHz |
| Δfc |  |  | ±75 | KHz |
| Insertion Loss | IL | 2,5,6 |  | 1.5 | 2.0 | dB |
| Quality Factor Unloaded Q50Ωloaded Q | QU | 5,6,7 |  | 12.800 |  |  |
| QL |  | 2.000 |  |  |
| Temperature Stability Turnover TemperatureTurnover FrequencyFrequency Temperature Coefficient | TO | 5,7,8 | 24 | 39 | 54 | ℃ |
| fO |  | fc+2.7 |  | KHz |
| FTC |  | 0.037 |  | ppm/℃2 |
| Frequency Aging Absolute Value during the First Year | IfAI | 1 |  | ≦10 |  | ppm/yτ |
| DC Insulation Resistance between Any Two Pins |  | 5 | 1.0 |  |  | MΩ |
| RF Equivalent RLC Model Motional ResistanceMotional Inductance Motional CapacitancePin 1 to Pin 2 Static Capacitance | RM | 5,7,9 |  | 18 | 26 | Ω |
| LM |  | 86.0075 |  | μH |
| CM |  | 1.56417 |  | pF |
| CO | 5,6,9 | 1.7 | 2.0 | 2.3 | pF |
| Transducer Static Capacitance | CP | 5,6,7,9 |  | 1.7 |  | pF |
| Test Fixture Shunt Inductance | LTEST | 2,7 |  | 78 |  | nH |
| Lid Symbolization (in Addition to Lot and/or Date Code | LR433T2 |

**CAUTION: electrostatic Sensitive Device, Observe precautions for handling. Notes:**

1. Frequency aging is the change in fC 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.
2. The center frequency, fC, is measured at the minimum insertion loss point, ILMIN with the resonator in the 50Ω test system(VSWR≦1.2:1).The shunt inductance, LTEST, is turned for parallel resonator with CO at fc. Typically, fOSCILLATOR or fTRANSMITTER is less than the resonator fc.
3. One or more of following United States patents apply:4,454,488 and

4,616,197 and others pending.

1. Typically, equipment designs utilizing this device require emissions testing and government approval, which is the responsibility of the equipment manufacturer.
2. Unless noted otherwise, case temperature Tc=25℃±2℃.
3. The design, manufacturing process, and specifications of this device are subject to change without notice.
4. Derived mathematically from one or more of the following directly measured parameter: fc, IL, 3dB bandwidth, fc versus Tc, and Co.
5. Turnover temperature, To , is the temperature of maximum (or turnover) frequency, fo. The nominal frequency at any case temperature, Tc. may be calculated from:

f=fo [1-FTC(To-Tc)2]. Typically, *oscillator* To is 20℃ less than the specified *resonator* To.

1. This equivalent RLC model approximates resonators

performance near the resonant frequency and is provided for reference only. The capacitance Co 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 Co.

**Electrical Connections**

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

## Typical Test Circuit

|  |  |
| --- | --- |
| **Pin** | **Connection** |
| 1 | Terminal 1 |
| 2 | Terminal 2 |

The test circuit inductor, LTEST, is turn to resonate with the static capacitance, Co at Fc.

**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 per13’ reel 8000pcs







   