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SHOULDER

HDS7 Saw Resonator SMD

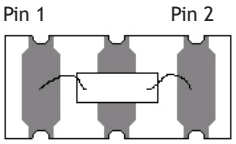
Low Series Resistance
Quartz Stability
Rugged, Hermetic, Low-profile SMD7.5x3.5 Case

Lead free

DESCRIPTION

The HDS7 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 HDS7 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.

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



Bottom View

Pin	Connection
1	Terminal 1
2	Terminal 2

Absolute Maximum Rating

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 (Table 1)

Characteristics		Units	Sym	Notes	Minimum	Typical	Maximum
Center Frequency (+25°C)	Absolute Frequency	MHz	f_c	2,3,4,5	433.845		433.995
	Tolerance from 433.920MHz	KHz	Δf_c				±75
Insertion Loss		dB	IL	2,5,6		1.5	2.0
Quality Factor	Unloaded Q		Q_U	5,6,7		12.800	
	50 Ohms loaded Q		Q_L			2.000	
Temperature Stability	Turnover Temperature	°C	To	5,7,8	24	39	54
	Turnover Frequency	KHz	fo			fc+2.7	
	Freq.Temp.Coefficient	ppm/°C²	FTC			0.037	
Frequency Aging	Absolute Value during the first year	ppm/yr	|f_A|	1		≤10	
DC Insulation Resistance betweeen Any Two Pins		MOhms		5	1.0		
RF Equivalent RLC Model	Motional Resistance	Ohms	R_M	5,7,9		18	26
	Motional Indutance	µH	L_M			86.0075	
	Motional Capacitance	pF	C_M			1.56417	
	Pin 1 to Pin 2 Static Capacitance	pF	C_O	5,6,9	1.7	2.0	2.3
Transducer Static Capacitance		pF	C_P	5,6,7,9		1.7	
Test Fixture Shunt Inductance		nH	L_{TEST}	2,7		78	
Lid Symbolization (in addition to lot and/or Date Code)		R433T2					

CAUTION: electrostatic Sensitive Device. Observe precautions for handling.

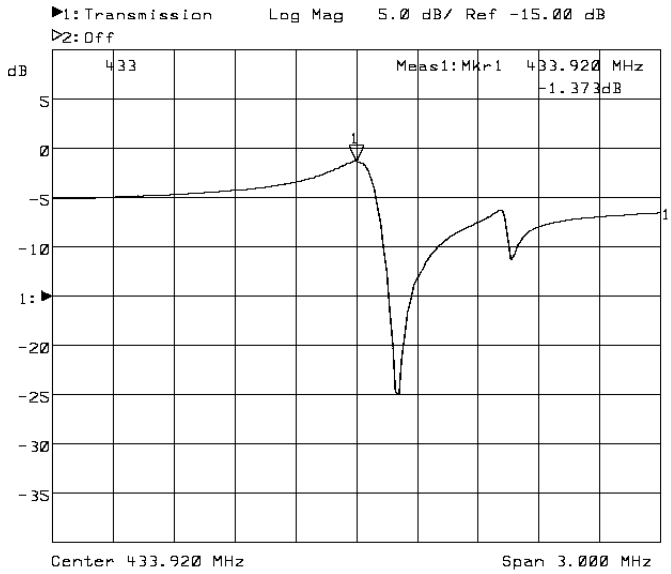
NOTES:

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, 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 Co at fc. Typically, $f_{OSCILLATOR}$ or $f_{TRANSMITTER}$ 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.
4. Typically, equipment designs utilizing this device require emissions testing and government approval, which is the responsibility of the equipment manufacturer.
5. Unless noted otherwise, case temperature Tc=25°C±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 parameter: fc, IL, 3dB bandwidth, fc versus Tc, and Co.
8. 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°C less than the specified resonator To.
9. This equivalent RLC model approximates resonators performance near the resonant frequency and is provided for reference only. The capacitance Co is the static (nonmotional) 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.

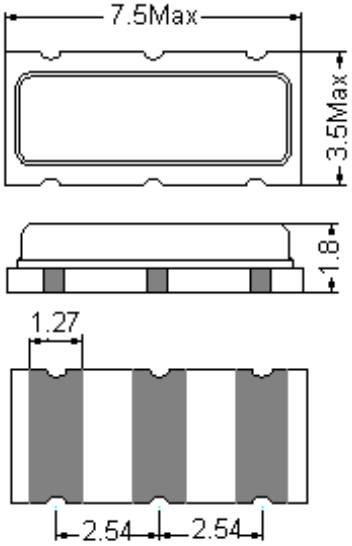
RELM - SHOULDER Brasil

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FREQUENCY RESPONSE



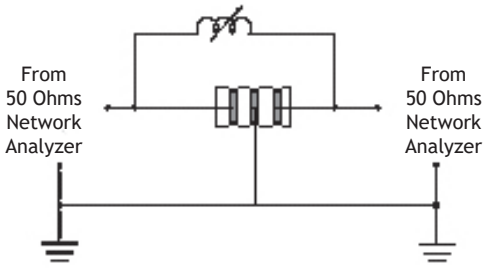
MECHANICAL DIMENSIONS (all in mm)



TYPICAL TEST CIRCUIT

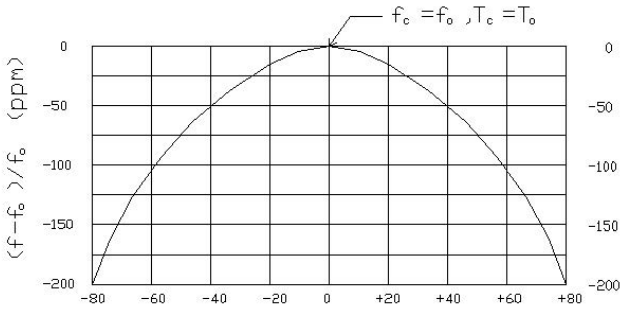
The test circuit inductor LTEST is turn to resonate with the static capacitance,Co at Fc.

Electrical Test:



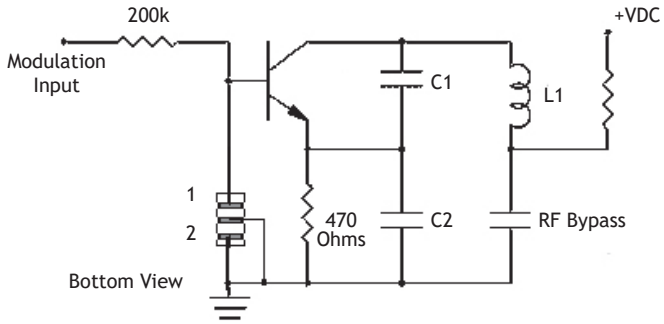
TEMPERATURE CHARACTERISTICS

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



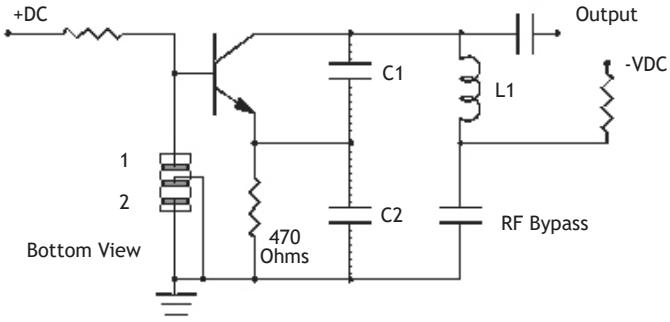
TYPICAL APPLICATION CIRCUIT

Typical Local Oscillator Application:



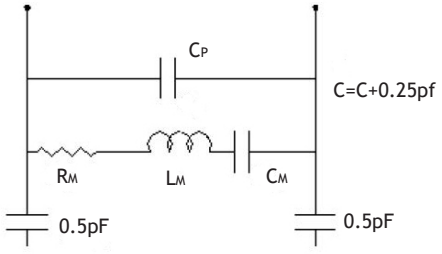
TYPICAL APPLICATION CIRCUIT

Typical Low-Power Transmitter Application:



EQUIVALENT LC MODEL

The following equivalent LC model is valid near resonance:



PART NUMBERING SYSTEM (Example)

HDS7-433.92-75-S-XX

- Package: HDS7
- Center Frequency in MHz: See table 1
- Frequency Tolerance in kHz: ± 75KHz
- Operating Temperature Range*: S=Standard
- Options (can be blank): S= Standard; X= Additional Specifications; T= Tape and Reel

* Operating Temperature Range: -40°C to +85°C (Standard)
* Specific Operating Temperature Range under request

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