RFMi

RO3073A-10

315.050 MHz SAW Resonator

- *Ideal for 315.050 MHz Transmitters*
- *Very Low Series Resistance*
- *Quartz Stability*
- *Complies with Directive 2002/95/EC (RoHS)*
- *Tape & Reel Standard per ANSI/EIA481*
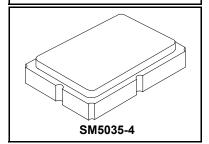- *Moisture Sensitivity Level: 1*
- *AEC-Q200 Qualified*

The RO3073A-10 is a true one-port, surface-acoustic-wave (SAW) resonator in a surface-mount, ceramic case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency transmitters operating at 315.050 MHz. This SAW is designed for remote-control and wireless security transmitters.

SM5035-4

Absolute Maximum Ratings

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

Characteristic		Sym	Notes	Minimum	Typical	Maximum	Units
Center Frequency (+25 °C)	Absolute Frequency	f_C		314.975		315.125	MHz
	Tolerance from 315.050 MHz	Δf_C				±75	kHz
Insertion Loss		IL			1.5	2.2	dB
Quality Factor	Unloaded Q	Q_U			8000		
	50 Ω Loaded Q	Q_L			1300		
Temperature Stability	Turnover Temperature	T_O		10	25	40	°C
	Turnover Frequency	f_O			f_C		
	Frequency Temperature Coefficient	FTC			0.032		ppm/°C^2
Frequency Aging	Absolute Value during the First Year	$|f_A|$			≤10		ppm/yr
DC Insulation Resistance between Any Two Terminals				1.0			MΩ
RF Equivalent RLC Model	Motional Resistance	R_M			19.4		Ω
	Motional Inductance	L_M			78.4		µH
	Motional Capacitance	C_M			3.3		fF
	Shunt Static Capacitance	C_O			4.1		pF
Test Fixture Shunt Inductance		L_{TEST}			64.2		nH
Lid Symbolization (YY = Year, WW = Week, S = Shift)				782, YYWWS			
Standard Reel Quantities 7/13 inch Reel Sizes				500/3000 pieces/reel			

CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

NOTES:

1. The design, manufacturing process, and specifications of this device are subject to change.
2. US or International patents may apply.
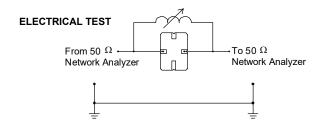3. RoHS compliant from the first date of manufacture.

Electrical Connections

The SAW resonator is bidirectional and may be installed with either orientation. The two terminals are interchangeable and unnumbered. The callout NC indicates no internal connection. The NC pads assist with mechanical positioning and stability. External grounding of the NC pads is recommended to help reduce parasitic capacitance in the circuit.
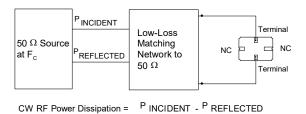

Typical Test Circuit

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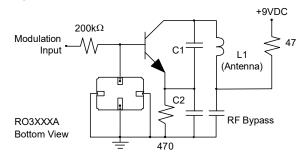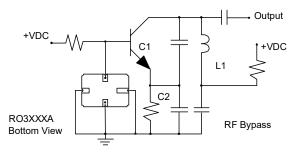

ELECTRICAL TEST

From 50 Ω Network Analyzer — To 50 Ω Network Analyzer

POWER TEST

50 Ω Source at F_C — $P_{INCIDENT}$ — Low-Loss Matching Network to 50 Ω — Terminal / NC / NC / Terminal — $P_{REFLECTED}$

CW RF Power Dissipation = $P_{INCIDENT}$ - $P_{REFLECTED}$

Typical Application Circuits

Typical Low-Power Transmitter Application

Modulation Input — 200kΩ — C1 — L1 (Antenna) — +9VDC — 47 — C2 — RF Bypass — 470 — RO3XXXA Bottom View

Typical Local Oscillator Applications

+VDC — C1 — Output — L1 — +VDC — C2 — RF Bypass — RO3XXXA Bottom View

Equivalent LC Model

0.05 pF*

C_p

$C_O = C_p + 0.05$ pF

*Case Parasitics

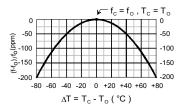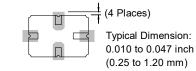Rm   Lm   Cm

Temperature Characteristics
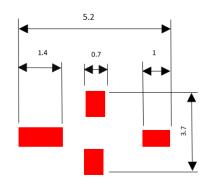
The curve shown on the right accounts for resonator contribution only and does not include LC component temperature contributions.

$f_c = f_o$, $T_c = T_o$

$(f-f_o)/f_o$ (ppm)

$\Delta T = T_c - T_o$ (°C)

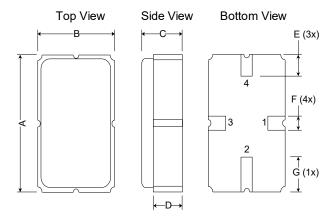## Typical Circuit Board Land Pattern

The circuit board land pattern shown below is one possible design. The optimum land pattern is dependent on the circuit board assembly process which varies by manufacturer. The distance between adjacent land edges should be at a maximum to minimize parasitic capacitance. Trace lengths from terminal lands to other components should be short and wide to minimize parasitic series inductances.

(4 Places)

Typical Dimension: 0.010 to 0.047 inch (0.25 to 1.20 mm)

5.2
1.4
0.7
1
3.7

PCB Footprint

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Case Design

Top View   Side View   Bottom View

Dimensions	Millimeters			Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.87	5.00	5.13	0.191	0.196	0.201
B	3.37	3.50	3.63	0.132	0.137	0.142
C	1.45	1.53	1.60	0.057	0.060	0.062
D	1.35	1.43	1.50	0.040	0.057	0.059
E	0.67	0.80	0.93	0.026	0.031	0.036
F	0.37	0.50	0.63	0.014	0.019	0.024
G	1.07	1.20	1.33	0.042	0.047	0.052

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Recommended Reflow Profile

1. Preheating shall be fixed at 150~180° for 60~90 seconds.
2. Ascending time to preheating temperature 150° shall be 30 seconds min.
3. Heating shall be fixed at 220°C for 50~80 seconds and at 260°C peak (10 seconds.)
4. Time: 5 times maximum

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