

# Oven Controlled Crystal Oscillators

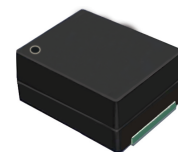
AOCJYR-24.576MHz-M6069LF



ESD Sensitive



RoHS / RoHS II Compliant



9.7 x 7.5 x 4.3 mm SMD

## Moisture Sensitivity Level (MSL) – 1

### OVERVIEW:

Abrakon's AOCJYR series of World's Smallest Profile, Surface Mount- Ovenized Quartz Crystal Oscillators are based on Proprietary Mercury™ ASIC technology, patented by Rakon. This Advanced Technology coupled with Rakon's proprietary manufacturing techniques enable  $\pm 10$  ppb stability over  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ , with typical short-term aging of better than  $\pm 2$  ppb per day.

Sophisticated Integrated Oven Control architecture ensures fast warm-up time, while minimizes initial power consumption to 350mW typical at  $25^{\circ}\text{C}$ . Further, the integration of critical functionality improves overall product reliability by reducing FIT rates 10x relative to traditional discrete OCXOs.

The AOCJYR series is offered in Industry leading 9.7 x 7.5 x 4.3 mm SMT package, while AOCJYR-DIL is available in 21.7 x 13.08 x 8.6 mm leaded hermetic package.

### FEATURES:

- Compact package size: 9.7 x 7.5 x 4.3mm
- Frequency stability over temperature as low as  $\pm 50$ ppb over  $-40$  to  $+85^{\circ}\text{C}$
- Low power consumption
- High reliability

### APPLICATIONS:

- Stratum 3
- Small Cells
- Switches and Routers
- Time & Frequency References
- SyncE and IEEE 1588

### STANDARD SPECIFICATIONS:

Parameters	Minimum	Typical	Maximum	Units	Notes
Nominal Frequency	24.576			MHz	
Supply Voltage (Vdd)	3.135	3.3	3.465	V	
Input Power (warm-up)		1000		mW	
Input Power (steady-state)			400	mW	@ $25^{\circ}\text{C}$ still air
Operable Temperature Range	-40		85	$^{\circ}\text{C}$	
Storage Temperature Range	-55		+125	$^{\circ}\text{C}$	
Initial Frequency Tolerance @ $25^{\circ}\text{C}$ At time of shipment			$\pm 0.5$	ppm	See Note 1
Reflow Shift			$\pm 1$	ppm	After 1hr recovery @ $25^{\circ}\text{C}$
Frequency Stability over Operating Temperature Range in Still Air			$\pm 50$	ppb	Ref. to $(F_{\text{MAX}}+F_{\text{MIN}})/2$ . See Note 1
Slope in Still Air			$\pm 2$	ppb/ $^{\circ}\text{C}$	Temperature ramp 1 $^{\circ}\text{C}/\text{minute}$ max.
Stability vs. Supply Voltage Change		$\pm 10$		ppb	$\pm 5\%$ variation in Vdd, ref. to freq. @ Vdd=3.3V
Load Coefficient		$\pm 10$		ppb	$\pm 5$ pF variation in load, ref. to freq. @ 15pF load
Frequency Aging (per day)			$\pm 2$	ppb	See Note 3
Frequency Aging (long-term stability)	First Year		$\pm 1$	ppm	
	10 Years		$\pm 3$	ppm	
Warm-up Time		<3		minute	See Note 2

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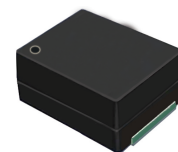
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## STANDARD SPECIFICATIONS CONTINUED:

Parameters	Minimum	Typical	Maximum	Units	Notes
Root Allan Variance		$7 \times 10^{-11}$			@25°C, $\tau=0.1s$
		$7 \times 10^{-11}$			@25°C, $\tau=1.0s$
		$7 \times 10^{-11}$			@25°C, $\tau=10s$
		$8 \times 10^{-11}$			@25°C, $\tau=100s$
		$8 \times 10^{-11}$			@25°C, $\tau=1000s$
Acceleration Sensitivity		<2		ppb/g	Gamma vector of all 3 axes from 30Hz to 1500Hz
Output Type	LVCMOS				
High-level Output Voltage ( $V_{OH}$ )	90%*Vdd			V	
Low-level Output Voltage ( $V_{OL}$ )			10%*Vdd	V	
Output Load	10	15	20	pF	
Rise and Fall Time ( $t_r, t_f$ )			4	ns	
Duty Cycle	45		55	%	Measured at 50% level
Control Voltage ( $V_c$ )	0.5		2.5	V	
Frequency Tuning Range (over Control Voltage range)	$\pm 5$		$\pm 15$	ppm	Ref. to Frequency @ $V_c=1.5V$
Frequency Tuning Linearity			1	%	Deviation from linear over control voltage range
Slope	Positive				
Port Input Impedance	80			k $\Omega$	
Modulation Bandwidth		3.5		kHz	
Phase Noise @ 24.576MHz Carrier					
@ 1 Hz offset		-55		dBc / Hz	
@ 10 Hz offset		-88		dBc / Hz	
@ 100 Hz offset		-110		dBc / Hz	
@ 1,000 Hz offset		-135		dBc / Hz	
@ 10,000 Hz offset		-148		dBc / Hz	
@ 100,000 Hz offset		-152		dBc / Hz	
@ 1,000,000 Hz offset		-153		dBc / Hz	

### Note:

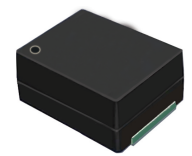
- The characteristics of the component may be temporarily affected by the processes of assembly and soldering. The frequency specifications apply 48 hours after assembly. Nominal conditions apply unless otherwise stated.
- Time needed for frequency to be within  $\pm 20$ ppb reference to frequency after 1hour, at 25°C. Parameter is assembly and operating history dependent
- After 30 days of continuous operation.

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## REFERENCE DESIGN INFORMATION

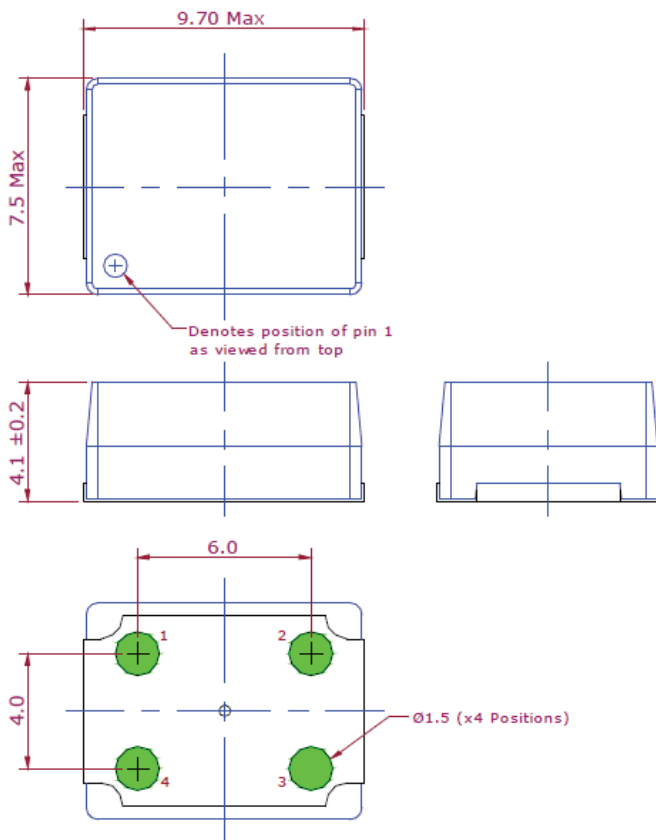
AOCJYR-24.576MHz-M6069LF is equivalent to Rakon P/N M6069LF.

## PART IDENTIFICATION:

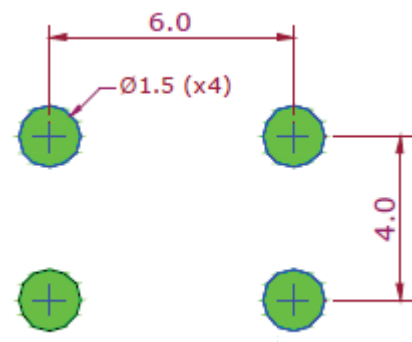
AOCJYR- 24.576MHz -M6069LF -

Packing
Blank: Bulk
T: Tape & Reel (1k/reel)

## OUTLINE DIMENSION:



## Recommended Land Pattern



Pin	Function
1	Control Voltage
2	Ground
3	RF-output
4	Supply Voltage

### Note:

1. For correct operation, decouple the supply voltage with a 10 $\mu$ F capacitor close to the oscillator.
2. The GND of the control voltage needs to be connected directly to pin 2 as ground lead impedance may cause performance degradation.

Dimension: mm

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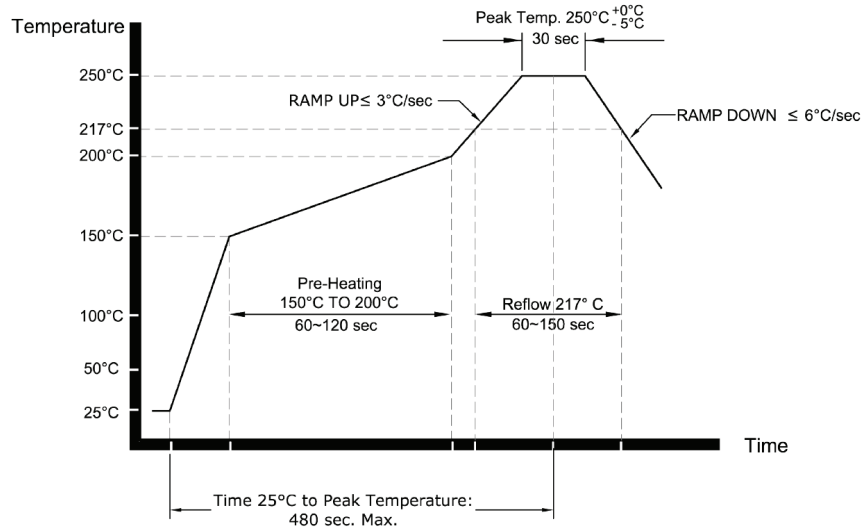


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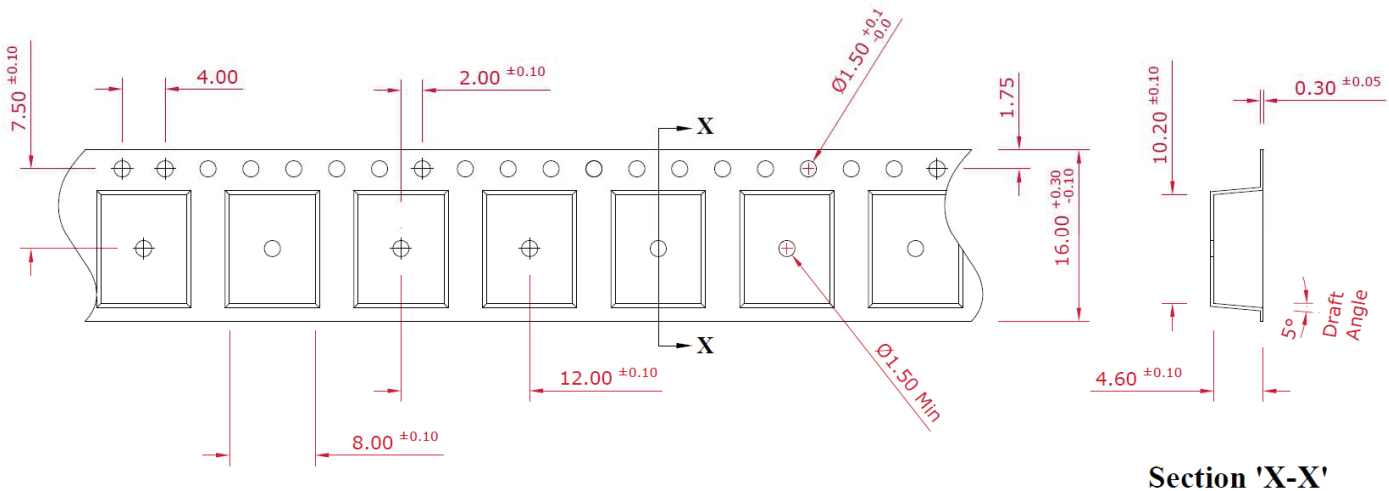
## REFLOW PROFILE:



## TAPE & REEL:

Packaging: 1000pcs/reel

Reel Size: Ø13"



Dimension: mm

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