

# Oven Controlled Crystal Oscillators

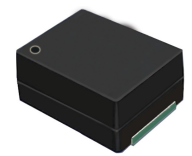
AOCJYR-24.576MHz-M6069LF



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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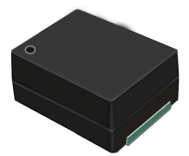
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## STANDARD SPECIFICATIONS CONTINUED:

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:

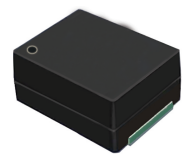
1. The characteristics of the component may be temporarily affected by the processes of assembly and soldering. The frequency specifications apply 48 hours after assembly. Nominal conditions apply unless otherwise stated.
2. Time needed for frequency to be within  $\pm 20$ ppb reference to frequency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

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## REFERENCE DESIGN INFORMATION

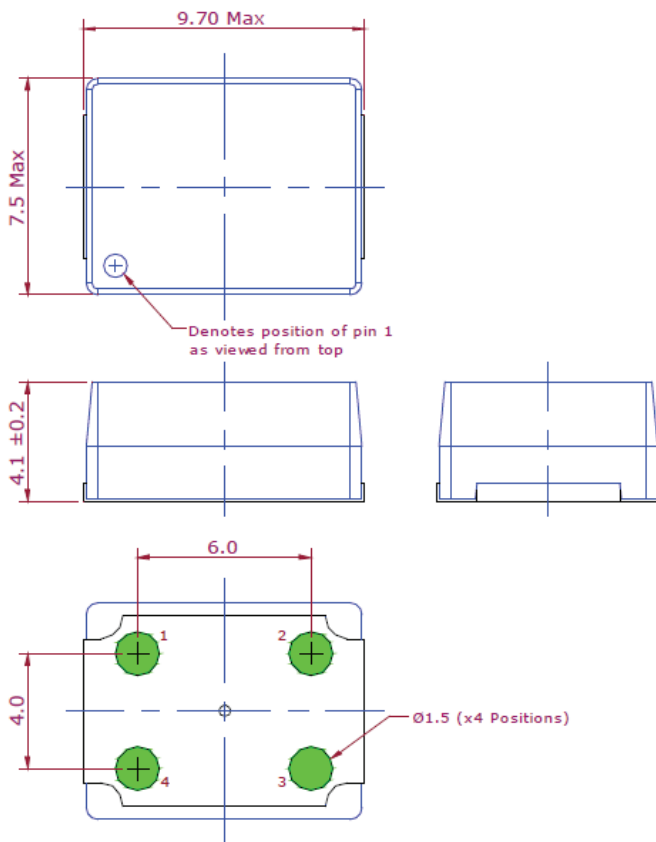
AOCJYR-24.576MHz-M6069LF is equivalent to Rakon P/N M6069LF.

## PART IDENTIFICATION:

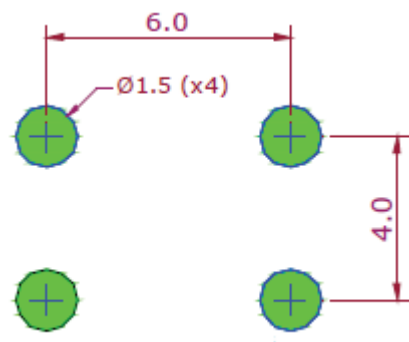
AOCJYR- 24.576MHz -M6069LF -

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 10µF 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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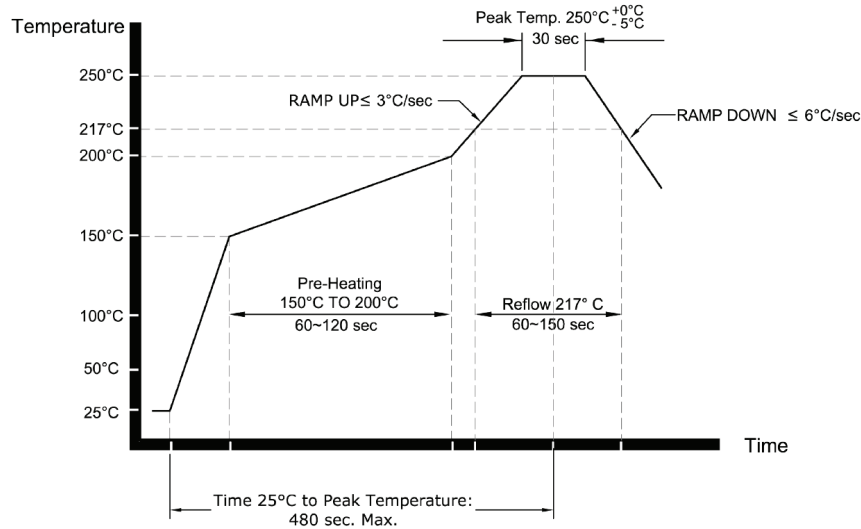


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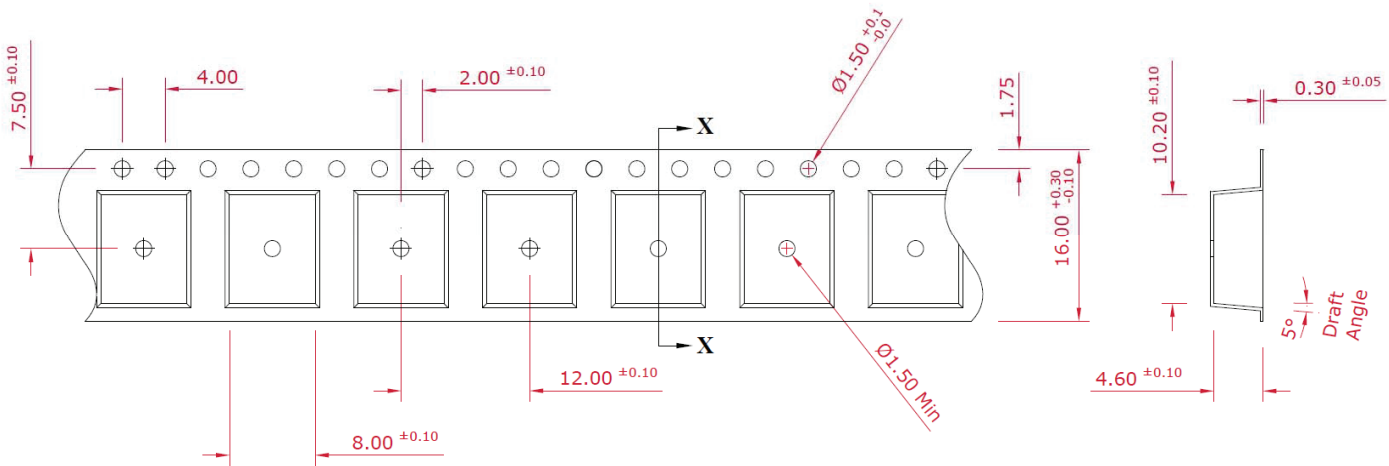
## REFLOW PROFILE:



## TAPE & REEL:

Packaging: 1000pcs/reel

Reel Size: Ø13"



Section 'X-X'

Dimension: mm

**ATTENTION:** Abracon Corporation's products are COTS – Commercial-Off-The-Shelf products; suitable for Commercial, Industrial and, where designated, Automotive Applications. Abracon's products are not specifically designed for Military, Aviation, Aerospace, Life-dependant Medical applications or any application requiring high reliability where component failure could result in loss of life and/or property. For applications requiring high reliability and/or presenting an extreme operating environment, written consent and authorization from Abracon Corporation is required. Please contact Abracon Corporation for more information.

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Revised: 08.20.14