

compact

silent

powerful

efficient

light weight

reliable

PIEZO VIBRATORY FANS

..truly revolutionary

PTI **PELONIS**
TECHNOLOGIES, INC.

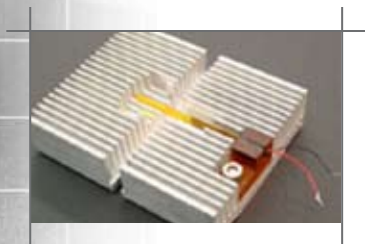
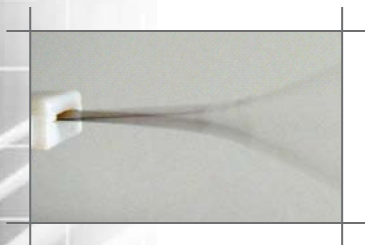
Innovation in Motion

PIEZO
VIBRATORY
FANS

RLP™

..truly revolutionary

RLP™ fans have no bearings or wearing parts and have a much longer life than traditional cooling fans



TECHNOLOGY OVERVIEW

Traditional muffin fans have been used for many years as an effective means of cooling different types of electronic equipment. However, they are not suitable for the increasingly shrinking devices that require compact cooling, low power, and quiet operation.

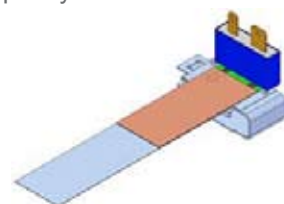
PIEZO COOLING FANS

In response to the cooling needs of small electronics, piezoelectric fans have become good alternatives to traditional fans because of their small size, low power, and quiet operation. However, the performance of the piezoelectric material used degrades with exposure to high mechanical and electrical stresses for extended periods. This drawback has limited “piezo fans” from being widely and economically used.

THE RLP™ BREAKTHROUGH

A new breakthrough in cooling technology combines compact and rugged design with quiet, low power operation and effective cooling - Ruggedized Laminated Piezo (RLP™).

RLP™ Piezo Vibratory Fans work on a simple principle. The RLP™ fan has a flexible blade, typically made of stainless steel, that is set into motion by a piezoceramic bending element. This bending element functions due to an ultra low power oscillating current of electricity. The electric field causes the piezoceramic to elongate, which bends the blade back and forth. The rapid flapping action produced is much like that of a hummingbird’s wing, and creates an enormous amount of cooling capacity.



ENHANCED PERFORMANCE

RLP™ fans are extremely rugged and can withstand greatly increased drive voltages and the stresses. This in turn enables the piezo to reliably perform much higher levels of work.

RELIABILITY

RLP™ fans exhibit superior performance, high reliability, and have been tested for over 100,000 hours B5 life using QALT (150,000 hrs to MTBF).

INDUSTRY BENEFITS

The need for RLP™ fans has become increasingly important as a major alternative cooling solution due to the ever-shrinking size of electronics. Traditional muffin and other rotary cooling fans are also too large for many applications and require more power that can be provided. RLP™ fans have no motors, bearings, or wearing parts and are very quiet. They require low power and take up a small space, and can therefore be easily incorporated into small electronic devices.

MARKETS SERVED

RLP™ fans can be used in a wide variety of applications and can be customized to meet industry specific requirements. A few markets include:

- *Computers • PDAs • Mobile Phones • Portable Electronics*
- *Video Games • Wireless Devices • Automotive Applications*

FAN PERFORMANCE SPECIFICATIONS

	3" Fan	2" Fan	1" Fan
Size	3"L x 0.5"W x 0.18"D	2"L x 0.5"W x 0.18"D	1"L x 0.375"W x 0.15"D
Tip Displacement	1" at 35°C	10mm (0.394")	0.375" at 35°C
Temperature Range	-40°C to +80°C up to +100°C for 1 hour	-40°C to +80°C	-40°C to +80°C up to +100°C for 1 hour
Power Consumption	20mW	TBD	<20mW
Reliability	5σ @ 50,000 hrs 3σ @ 100,000 hrs	10 yrs minimum 15 yrs desired	5σ @ 50,000 hrs 3σ @ 100,000 hrs
Humidity	5 to 100% RH, non-condensing	TBD	5 to 100% RH, non-condensing
Altitude	10,000 ft	TBD	10,000 ft
Operating Frequency	57-70 Hz	57-70 Hz Designed for 125 Hz	57-80 Hz
Input Power	60 Hz, 120VAC	12-15 VDC	60 Hz, 120VAC

RLP™ Piezo Vibratory Fans produce air movement with the industry's best reliability, even operating in the most extreme environments.

FEATURES

- Ruggedized Laminated Piezo (RLP™) Smart Material
- Stainless steel blade for more airflow and cooling capability
- Demonstrated greater than 4X natural convection cooling
- Energy Key (drive circuit) options:
 - 120VAC supply (plugs directly into line power)
 - 3.3VDC supply (tunable to range of frequencies)

OPTIONS

Size Range: **1" to 3"**
Frequency: **60 Hz to 120 Hz**
Drive Voltage: **3.3 VDC or 120 VAC**

ADVANTAGES

- Low power consumption
- No bearings or wearing parts
- Scale versatility
- Silent operation
- Light and easy to use
- No EMI
- Produces negligible heat
- Won't affect magnetic fields
- Won't interfere with electromagnetic transmission
- AC or DC power
- High reliability over a wide temperature range
- Air displacement device ideal for cooling and sensor-enhancement applications
- Can be optimized for various voltages, temperatures, size, applications, etc.

Call for Custom Configurations





R L P™

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FANS**

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COMPACT

RLP™ fans are compact in size enabling operation in many small electronic devices

SILENT

RLP™ fans vibrate air movement and are practically noiseless

POWERFUL

RLP™ fans provide very effective cooling relative to their small form factor

EFFICIENT

RLP™ fans require very little power to operate

LIGHT WEIGHT

RLP™ fans are made of a rugged light weight material

RELIABLE

RLP™ fans have a much longer operating life than conventional cooling fans because there are no bearings or wearing parts

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