



維盟科技有限公司  
Evowave Technology Co., Ltd.

規格書 / Specification

Description:	Linear Vibration Motor
Part No.:	LK0815WXX
Date:	2017/11/13

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**Keywords: Linear Vibrator, 14Ohms, 8X25x3.8mm, PAD Contact, GP Compliant**

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Date	Issue	Detail changes
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## 1. Scope

This document contains required environmental, electrical, vibratory, mechanical, package and reliability test requirements.

## 2. Environmental Requirement

The vibration including all components and solder joints must be free from lead (Pb) and other banned or restricted substances according to customer's requirements.

## 3. Description And Application

This is a FPC contact vibrator which is applied with an AC signal (sine wave or square wave) around the resonant frequency. This device is recommended to be used for haptic feedback device, ex. Mobile phone.

## 4. Standard Operation Condition.

- |                                 |  |
|---------------------------------|--|
| 4.1 Rated voltage               | 2Vrms (sine wave)  |
| 4.2 Min start voltage           | 0.1Vrms  |
| 4.3 Operating temperature range | -20°C to +70°C ordinary humidity (No condensation of moisture) |
| 4.4 Storage temperature range   | -40°C to +85°C ordinary humidity (No condensation of moisture) |

## 5. Characteristics

- |                            |  |
|----------------------------|--|
| 5.1 Coil resistance        | 14±15%Ω  |
| 5.2 Rated current          | Max 170mA @ rated voltage  |
| 5.3 Power consumption      | Max 280mW@ rated voltage   |
| 5.4 Insulation resistance  | Min 10MΩ @ 100VDC Between terminal and housing.                  |
| 5.5 Direction of vibration | X-axis<br>Definition of the direction seen in Mechanical Drawing |

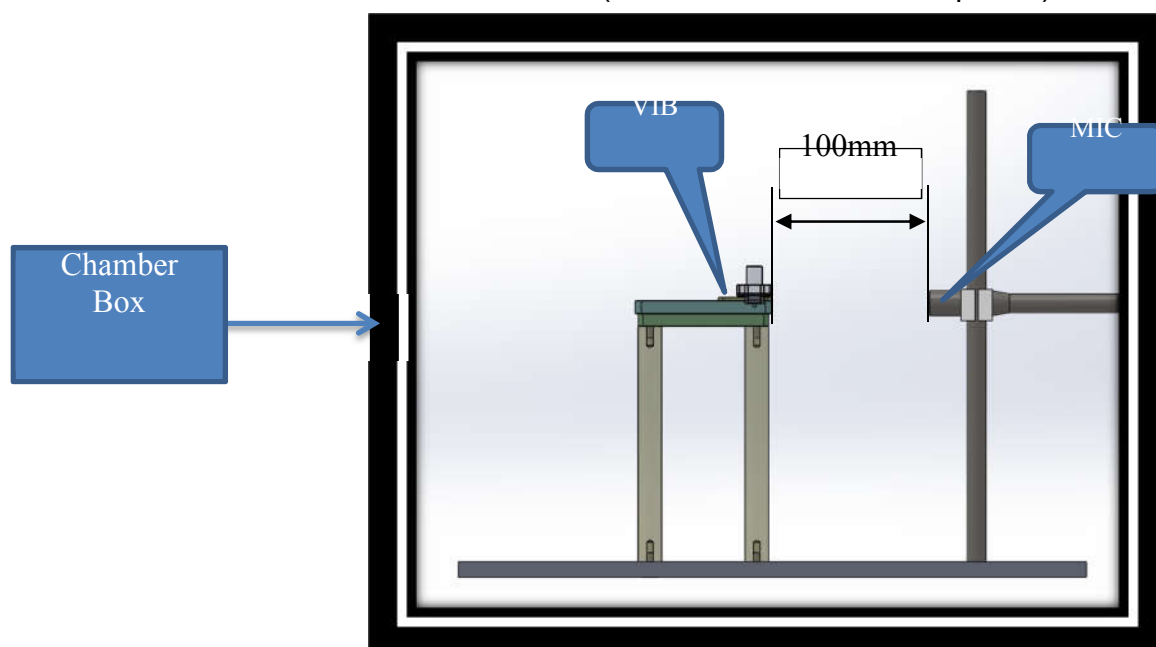
## 6. Performance

- |                  |   |
|------------------|---|
| 6.1 Acceleration | Min 1.0Grms(1.4Gp) at F0 @100g fixture in the middle<br>@ rated voltage(Refer to standard test condition) |
|------------------|---|

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- |                        |  |
|------------------------|--|
| 6.2 Resonant frequency | 150±10 Hz<br>(Refer to standard test condition)  |
| 6.3 Rise time          | 90ms Max (from 0 to 90% nominal acceleration)<br>(Refer to standard test condition)              |
| 6.4 Fall time          | 95ms Max (free fall from 100% to 10% nominal acceleration)<br>(Refer to standard test condition) |
| 6.5 Noise              | ≤50 dBA @ 10 cm @ 100g test jig @ F0 @ 2Vrms,<br>DRV2604 (10cm distance from microphone)         |



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## 7. Standard Test Condition

### 7.1 Climatic condition

The measurement at  $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$  &  $65\%\text{RH} \pm 20\%\text{RH}$  is standard. If the judgment is not questionable, recognize measurement at  $5^{\circ}\text{C}$  to  $35^{\circ}\text{C}$  & relative humidity 45%RH to 85%RH.

7.2 Input Frequency                      sine wave/F0  
(input F0 from frequency response curve)

7.3 Input voltage                          Rated voltage

### 7.4 Suspending method

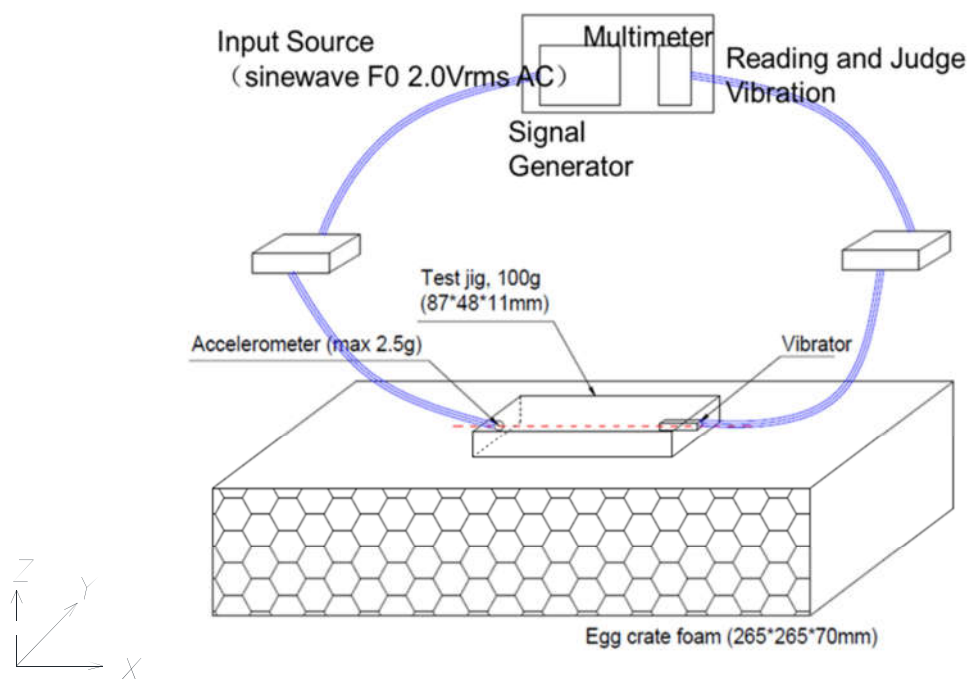


Fig 2. test method

1. Placed a 100g dummy jig at the center of the soft foam, 87\*48mm plane must be located on foam.

2. Attached the vibrator and accelerometer to the x axis face of the block, both vibrate and measure direction should be mounted to x axis.

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### 7.5 Drawing of dummy jig

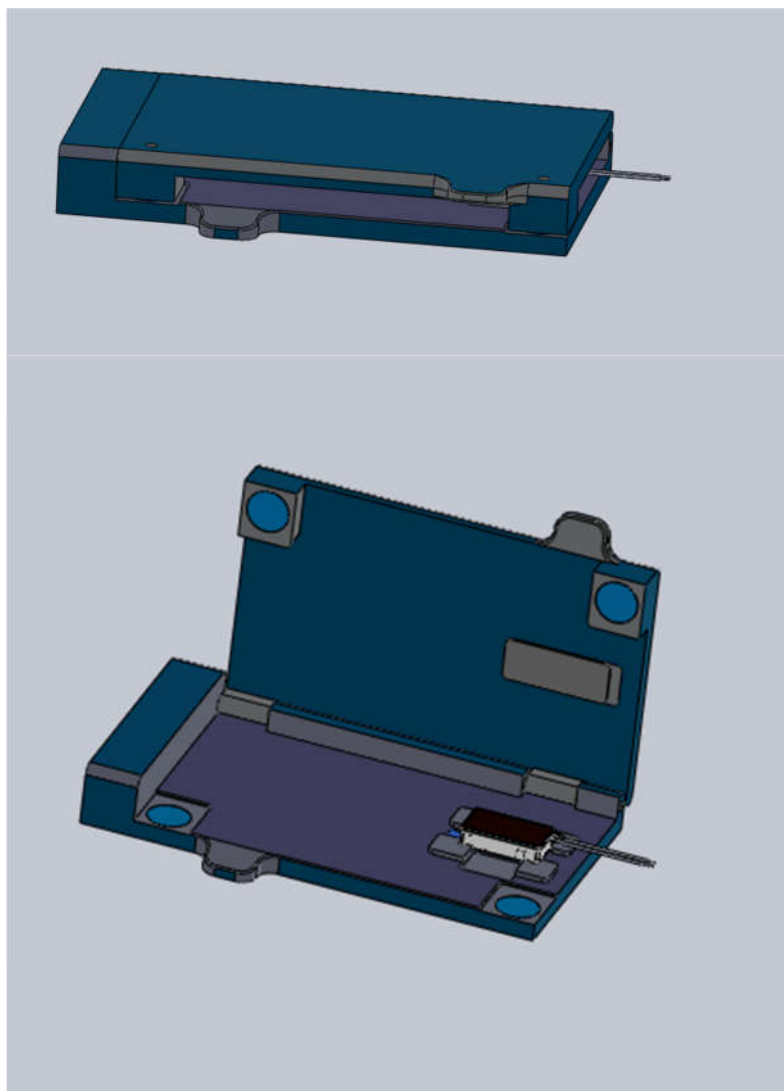


Fig 3. test jig

#### Caution:

Be sure the attach both accelerometer and vibrator tightly to get precise test result.  
Or may get wrong acceleration data or noise.

### 7.6 Measure method

7.6.1 Reading the vibration for 2.0 seconds.

7.6.2 For more precision measurement, average of 3 times measure data is required.

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## 8. Recommended Stimulus

Auto resonance driver is strongly recommended. Vibration can be adjusted by changing voltage.

## 9. Reliability Tests

Immediately after reliability test, the samples shall be stored under climatic conditions such as normally exist in ordinary rooms or laboratories. Unless otherwise noted, the recovery period shall be 4 hours at least before performance testing.

After reliability test, all samples must be meet the requirements as follow:

- 1 Resonant frequency: within  $\pm 5\%$  of original
- 2 Noise: Max 55dBA
- 3 Acceleration: Min 0.85Grms (1.2Gp )

### 9.1 Free Fall Test: 10 samples

The samples should be mounted in a 180g fixture, drop to the granite floor, 1.5 meters 18 times, 6 face x 3 times;

### 9.2 Tumble Test: 10 samples

180g grams block, drop from 1.0 meter onto steel base, total 100 cycles (200 times);

### 9.3 Life Test:

Samples should be operated on standard condition(180g jig on foam), each test takes 10 samples.

#### 9.3.1 Life Test - Room temperature

ON(2s)/OFF(1s) for 200 hours@ $23 \pm 3^{\circ}\text{C}$ /20-60%RH@Drv2604@Rated voltage

#### 9.3.2 Life Test - High temperature and High Humidity

ON(1s)/OFF(1s) for 24 hours@ $60^{\circ}\text{C}$ /95%RH@Drv2604@Rated voltage

#### 9.3.3 Life Test - Low temperature:

ON(1s)/OFF(1s) for 24 hours@ $-20^{\circ}\text{C}$ @Drv2604@Rated voltage

#### 9.3.4 Life Test - Off resonance (@ $23 \pm 3^{\circ}\text{C}$ /20-60% RH @sine wave)

9.3.4.1 ON(20ms)/OFF(50ms), 5M cycles @135Hz, 4Vrms

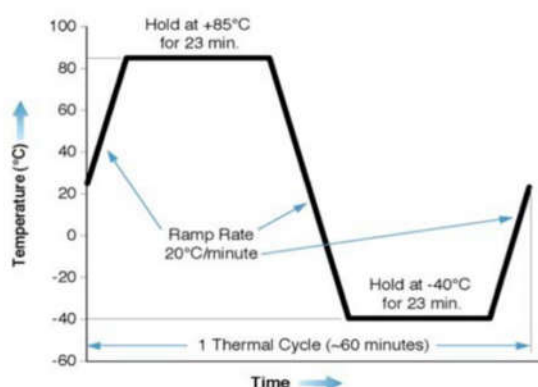
9.3.4.2 ON(20ms)/OFF(50ms), 5M cycles @120Hz, 4Vrms

9.3.4.3 ON(20ms)/OFF(50ms), 5M cycles @165Hz, 4Vrms

9.3.4.4 ON(20ms)/OFF(50ms), 5M cycles @180Hz, 4Vrms

### 9.4 Temperature shock: 10 samples

$-40^{\circ}\text{C}/+85^{\circ}\text{C}$  in each of 30min, total 10 cycles. 7 min transition time



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9.5 High temperature storage: 10 samples

+85°C, 168 hours

9.6 Low temperature storage: 10 samples

-40°C, 168 hours

9.7 Salt Mist Test: 10 samples

+35°C, 5%NaCl, 24 hours

## 10. Caution for use

10.1 Do not press vibrator with force more than 12N. It may lead to transformation of appearance or performance.

10.2 Do not use vibrator in follow environment. It may cause decline of performance or damage to vibrator.

10.2.1 Do not keep vibrator at high humidity or high temperature for extended too long times.

10.2.2 Do not use vibrator near magnetic device or magnetizer.

10.2.3 Do not use vibrator near erosion gas.

10.2.4 Do not drop vibrator into liquid.

10.3 There is strong magnetic on the surface of vibrator. Do not set components sensitive to magnetic within 3 mm in Z-direction of vibrator surface.

10.4 To use vibrator reliable, vibrator should be fixed to house firmly in vibrate direction. Or it may be cause bad noise.

10.5 Soft material (such as Poron foam etc.) is not adequate to fix vibrator in vibration direction. it can only be used as a auxiliary to reinforce reliability. Or it may be cause lower vibration.



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# 11. Mechanical Drawing:

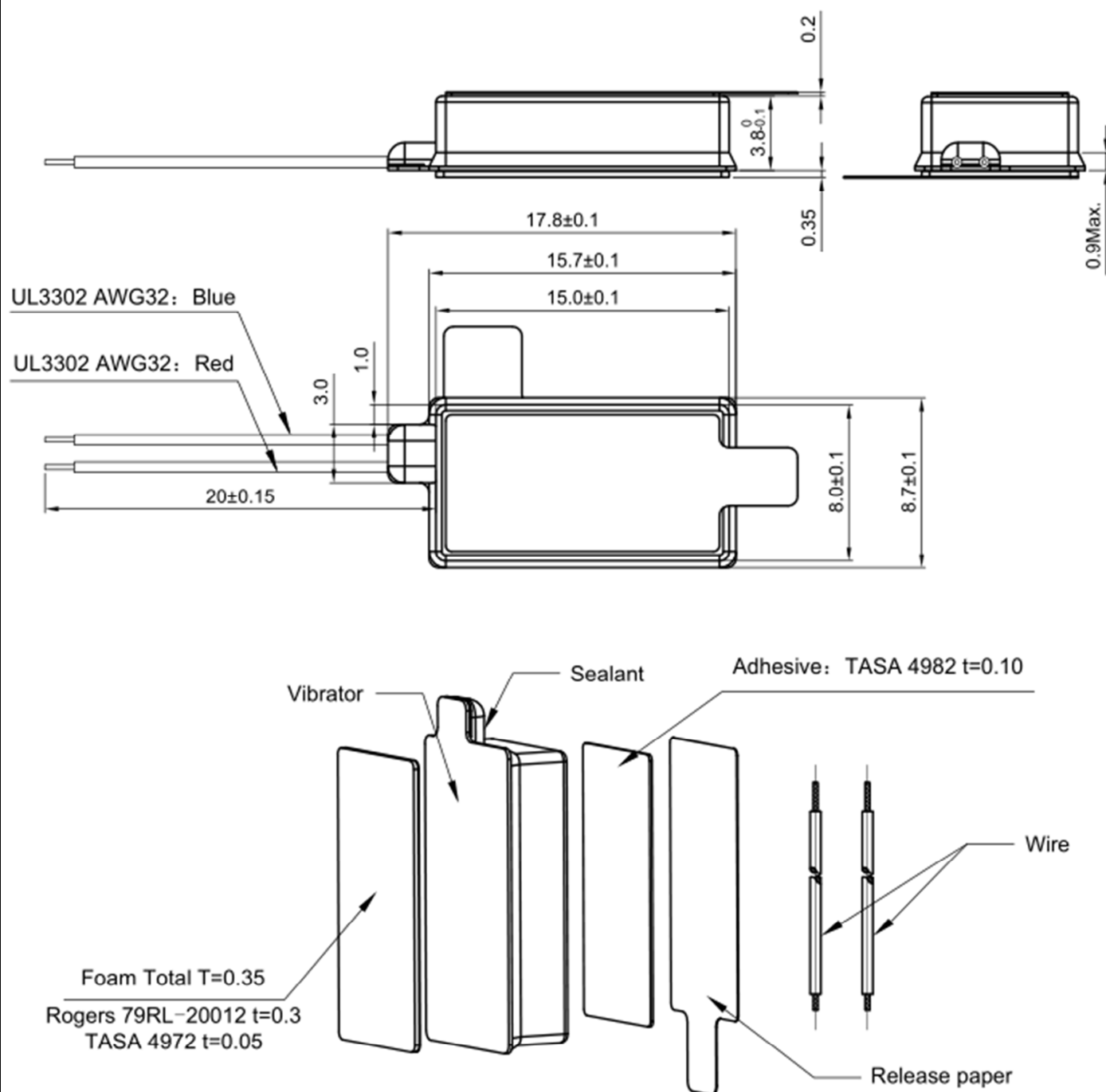
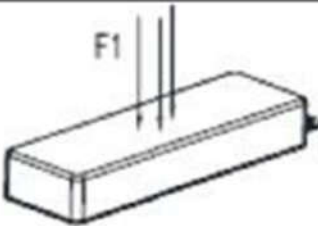
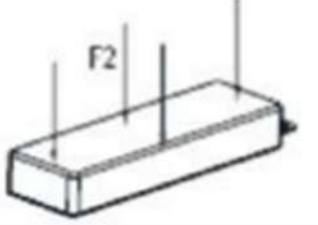
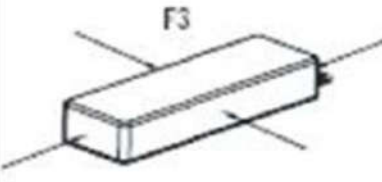
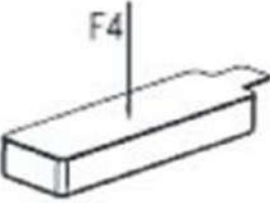
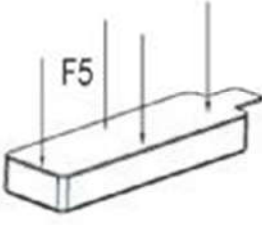



Fig 4. mechanical layout

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## 12. Permitted force to vibrator

NO.	Meannung of the force	Magnitude(N)
1		Max. 12
2		Max. 12
3		Max. 5
4		Max. 12
5		Max. 12
6		Max. 15