

Tsinglin Micro Motors Limited

产 品 规 格 书

PRODUCT SPECIFICATION

Product Name (产品名称) : LINEAR VIBRATOR/线性振动器

Product Model (产品型号) : TSL-ELV321508

Version Number (版本号) : 20211208-01

Customer name (客户名称)	
Item of customer (客户项目)	
Customer part no. (客户料号)	
Customer approved (客户承认)	

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REVISED RECORD

修订记录

ISSUE 版本	REVISION CONTENT 修订内容	DRAWN 拟制	CHECK 审核	APPROVED 批 准	DATE 日期
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1. Operating scope 适用范围

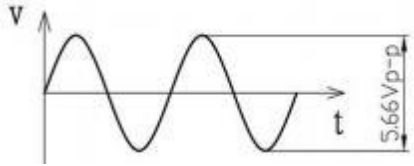
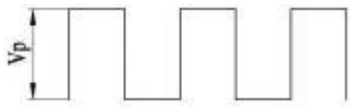
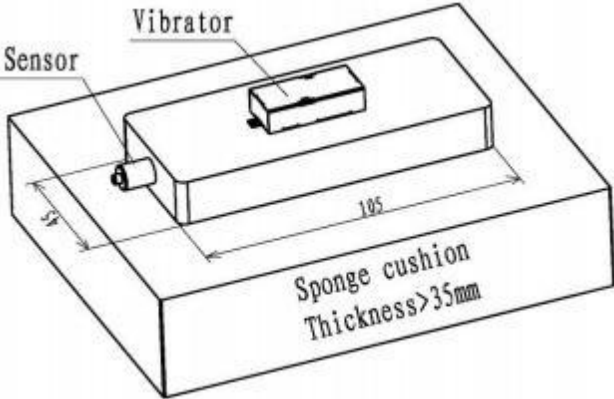
This specifications apply to x i n n i a n linear vibrator model TSL-ELV321508 .

本规格书适用于TSL-ELV321508 线性振动器。

2. Storage, Operating temperature / Humidity conditions (储存、使用温度/湿度条件)

No	Items (项目)	Conditions (条件)
2-5	Operating Environmental 使用环境	Temperature /温度: $-30^{\circ}\text{C} \sim 70^{\circ}\text{C}$ Humidity / 湿度: $5 \sim 95\%\text{RH}$
2-6	Storage Environmental 储存环境	Temperature /温度: $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$ Humidity / 湿度: $5 \sim 95\%\text{RH}$

3. Standard measurement conditions (标准测试条件)

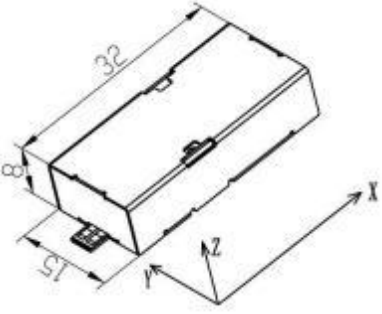
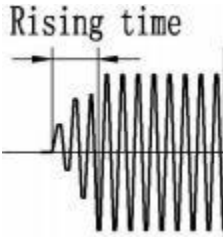
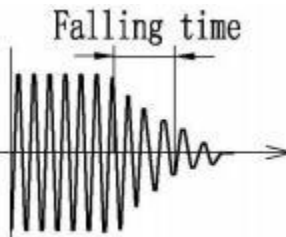
NO	ITEMS/项目	SPECIFICATION/规定		
3-1	Temperature/温度	$20 \pm 5^{\circ}\text{C}$		
3-2	Humidity/湿度	$(65 \pm 20\%)\text{RH}$		
3-3	Rated voltage 额定电压	AC Mode AC 模式	$2.0 \pm 0.05\text{Vrms}$ ($V_{p-p}=5.66\text{V}$)	
		PWM Mode PWM 模式	$4.0 \pm 0.05\text{Vp}$ Duty=50%	
3-4	Operating Frequency 工作频率	@F0 ($F0 \in 100 \pm 8\text{Hz}$)		
3-5	Measuring method 测量方法	Place Vibrator horizontally (Lock the Vibrator on a 100g dummy jig) 振动器水平放置 (固定在 100 克的测试夹具上) The direction of the sensor as same as the direction of Vibrator vibration (As item 4-2) 传感器检测方向和振动器振动方向保持一致。(参见项目 4-2) 		

4. Product performance (制品性能)

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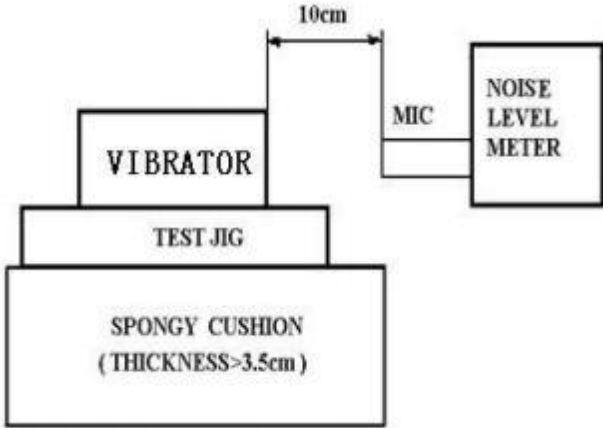
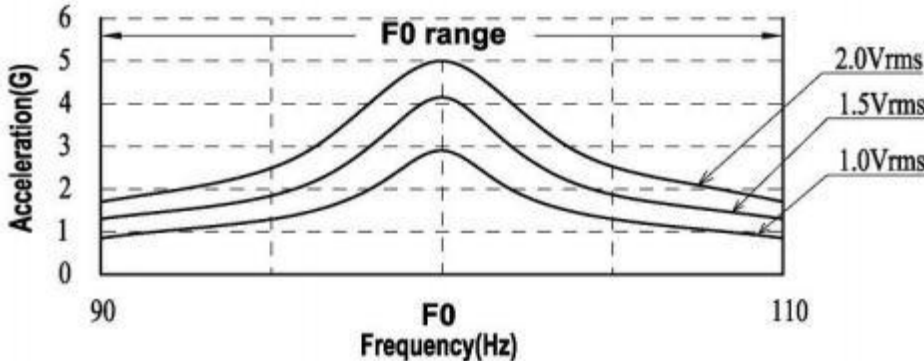
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NO	Items(项目)	Requirements (要求)	Conditions Or Remark (条件/备注)
4-1	Shape size 外形尺寸	L32*W15*H8.0(mm) not included Welding lead position 不包含引线焊接部位	Details refer to page 8 
4-2	Vibration direction 振动方向	X axis	
4-3	Weight/重量	13.6±1g	/
4-4	Resonant Frequency 谐振频率	100±8Hz	/
4-5	Acceleration 振动加速度	5±1.5G@F0	Sine wave 2.0Vrms
			PWM 4.0V (Vp) (Duty=50%)
4-7	Rise time 启动时间	≤50ms	Rise to 70% of the nominal acceleration 加速度上升到典型值的 70% 
4-8	Falling time 断开时间	≤120ms	Down to 30% of the nominal acceleration 加速度下降到典型值的 30% 
4-9	Rated current 额定电流	≤300mA _{rms}	@ Sine wave 2.0Vrms
4-10	Terminal resistance 端子电阻	6.5±1Ω	AT 20°C
4-11	Insulation resistance 绝缘电阻	10MΩ(Min)	100V DC, Between the vibrator terminal and case.测试电压 DC100V,端子和外壳间。
4-12	Operating Attitude 工作姿态	All direction (全方向)	

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4-13	Mechanical Noise 机械噪音	45dB-A (MAX)	At rated voltage and load; F0 , Background noise 30dB-A (MAX)/在额定电压, 额定负载下测试, 背景噪音不超过 35dB. 
4-14	Voltage- Acceleration Characteristics 输入电压—加速度特性曲线		

5. External performance (外观性能)

it should not remarkable wound and deleterious defect , No distortion、rust、stain, etc.
不应有明显的划伤、有害缺陷 , 无变形、锈蚀、污迹等。

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6. Reliability test 可靠性试验

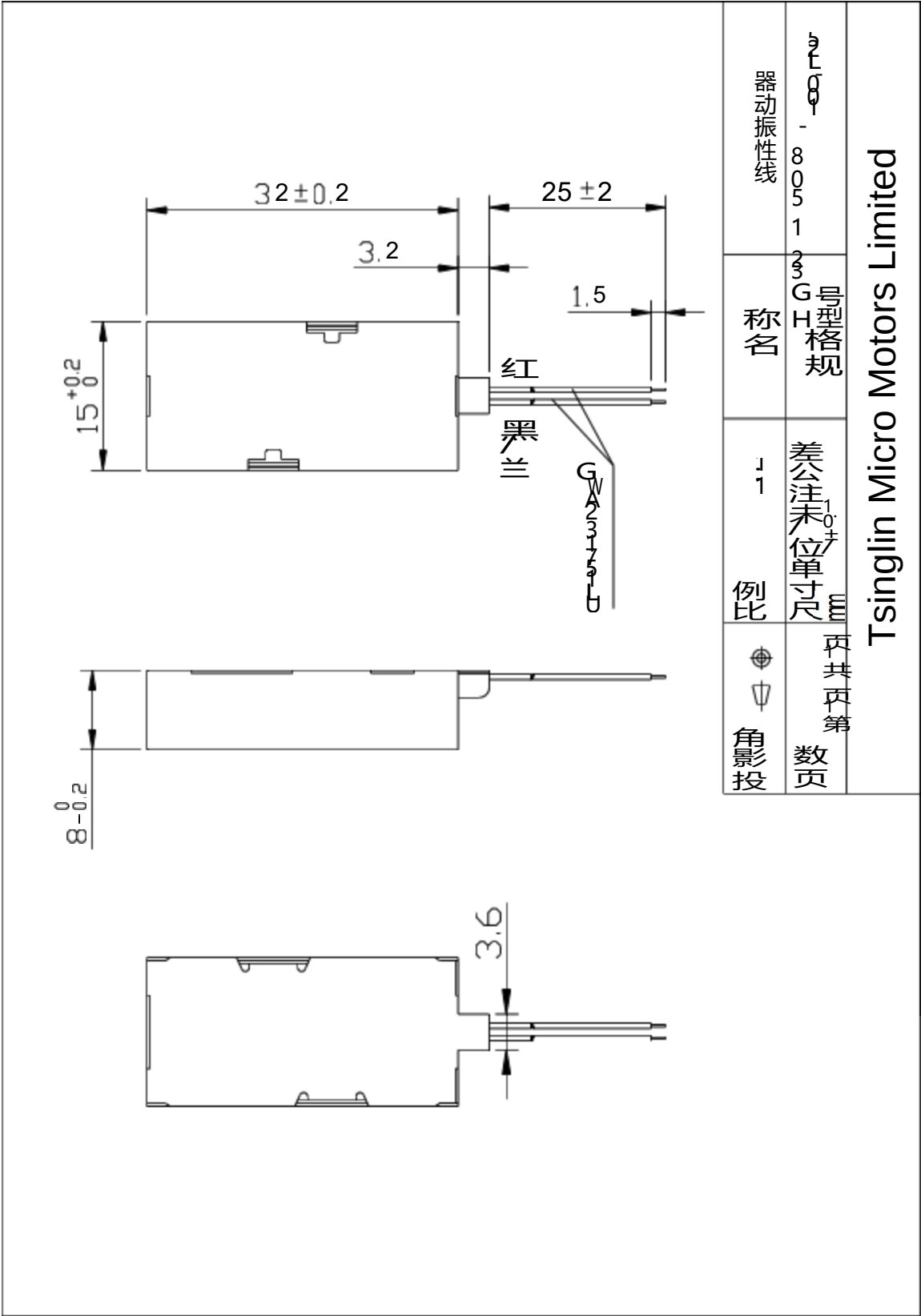
NO	Items(项目)	Standard test conditions(标准试验条件)	Judgment (判定)
6-1	Life test 寿命试验	Lock the vibrator on a test fixture (100g JIG) 振动器固定在 100g 的测试夹具上。 Temperature/温度: $25\pm 2^{\circ}\text{C}$ Humidity/湿度: $65\pm 20\%\text{RH}$ 2.0Vrms sine wave, $f=100\text{Hz}$ 2.0Vrms 正弦交流电, 频率 100Hz Test model/试验形式: 1S ON 1S OFF Total times: 500,000 times (50 万次/17.5 Days)	After the test, vibrator shall be satisfy with specified in item 6-8 试验结束后, 振动器应满足 6-8 中规定的要求。
6-2	Low temp Storage 低温存放试验	Temperature (温度): $-30\pm 2^{\circ}\text{C}$ Test time (试验时间): 168 hours	After the test, After 2 hours placed in ordinary temperature and humidity, vibrator shall be satisfy with specified in item 6-8 试验结束后, 在常温常湿中放置 2 小时后, 振动器应满足 6-8 中规定的要求
6-3	High temp storage 高温存放试验	Temperature (温度): $70\pm 2^{\circ}\text{C}$ Test time (试验时间): 168 hours	
6-4	Heat shock 温度冲击	$-40^{\circ}\text{C}/+85^{\circ}\text{C}$ 2hours/cycle, 15cycles. 低温 -40°C , 高温 $+85^{\circ}\text{C}$, 2 小时切换, 15 个循环	
6-5	Humidity storage 湿热存放试验	Temperature (温度): $65\pm 2^{\circ}\text{C}$ Humidity (湿度): 95%RH Test time (试验时间): 120hours	
6-6	Drop test 跌落试验	Dummy JIG 150g, drop to the granite floor. 治具 150g, 自由落下到花岗岩板上 Height/高度: 1.5m Direction/方向: 6 faces. Times/次数: Each face 3 times, totaling 18 times. 每面跌落 3 次, 共计 18 次	After the test, vibrator shall be satisfy with specified in item 6-8 试验结束后, 振动器应满足 6-8 中规定的要求。
6-7	Repetitive Drop Test 微跌试验	JIG/治具: 150g Height/高度: 7cm impact surface/冲击面: steel floor Times/次数: Front and back each 2500 drops	
6-8	AFTER TEST REQUIREMENTS/试验后特性判定		
	1、Acceleration within $\pm 30\%$ from initial./加速度变化在初始值的 $\pm 30\%$ 内;		
	2、Insulation resistance within $\pm 20\%$ from initial./绝缘电阻变化在初始值的 $\pm 20\%$ 内;		
	3、Terminal resistance within $\pm 20\%$ from initial./端子电阻变化在初始值的 $\pm 20\%$ 内;		
	4、No signs of corrosion/无明显腐蚀迹象		

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7. Outline drawing (外形图)



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8. Encoding rules 编码规则

To be determined according to customer's requirements
依据客户需求确定

9. Packaging requirements 包装要求

100 pcs per box, 10 boxes per bundle, 2 bundles per box, 2000 total.

每盒 100PCS, 每捆 10 盒,每箱 2 捆, 共 2000PCS

10. Caution for Use 使用注意事项

- 10-1. Please use vibrator in the specification of this specification. Otherwise the service life and performance of the vibrator will be affected. 请在本规格书规范内使用振动器, 否则会影响振动器的使用寿命和性能。
- 10-2. Make arrangement to limit the storage period to 6 months or less. 请在 6 个月内使用。
- 10-3. please do not push the load of 15N or more on the surface of the vibrator, when exceeding 20N, it causes the trouble.
振动器表面承载压力不得超过 20 牛顿, 否则可能会导致功能故障。
- 10-4. Vibrators should be firmly fixed in the direction of vibration (Recommended Installation Force 5-8N), Otherwise it will be prone to noise. 振动器应牢牢固定在振动方向上(推荐安装力 5-8N), 否则容易产生噪声。
- 10-5. Please lay the vibrators carefully in transportation to avoid any serious damage to the vibrator body or its electric function because of collision. 在运输过程中应小心轻放, 避免振动器碰撞受损
- 10-6. when soldering FPCB, The soldering iron temperature does not exceed 350 degrees and the soldering time per spot does not exceed 3 seconds. 焊接 FPCB 时, 电烙铁温度不超过 350°, 每个点焊接时间不超过 3 秒。
- 10-7. Vibrators can't be used in high temperature, High humidity and corrosive gas environment.
振动器不能在高温、高湿度和有腐蚀性气体环境中使用。
- 10-8. The vibrator has a strong magnet, So please be aware that it has a magnetic force on the surface of the bracket.
振动器有一个强的磁铁, 因此请注意, 它的支架表面有磁力。
- 10-9. Under the conditions of meeting this specification, our company can change the material、size and shape of parts to improve quality、performance or production efficiency. 在满足本规范的情况下, 我司可以改变零件材料、尺寸及形状来改善品质、性能或生产效率。
- 10-10. If there is any argument on vibrator performance and/or life, judgment is to be made base on this specification only.
如对振动器的性能和(或)寿命有任何争议, 仅基于此规格书作出判断。