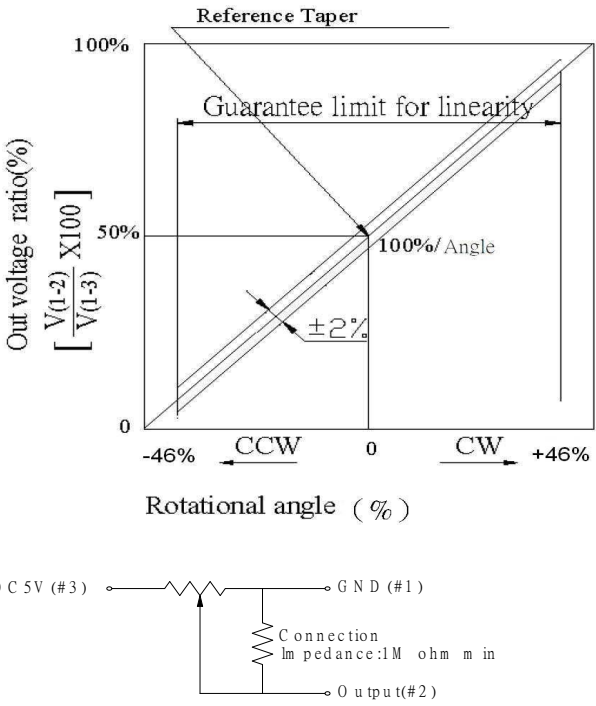


未指定尺寸±公差	
10??	±0.3
10~100	±0.5
100??	±0.8
角度	±5°

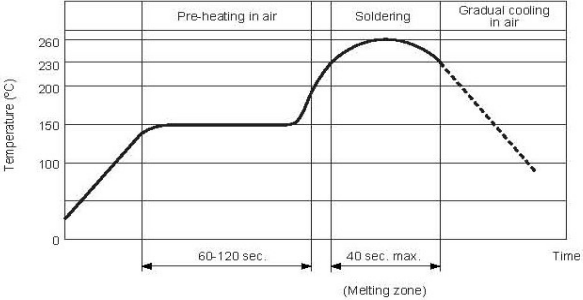
			惠州市弘旺电子有限公司 Huizhou Howang Electronics Co.,Ltd			
MTL	SPEC	DISPOSAL	UNIT		SCALE	TITLE
▲			MM		3/1	SE11 Series
▲			DRAWN	DESIGN	CHECK	APPROVAL
▲			CB	CB		
REVISION	DATE	DESIGN	2020.09.30			DWG NAME
						SE11-02
						DWG NO.

			<p>样品放置如表 1 的环境中 30-45 分钟后测量. 并根据如下公式测定: $TCR=(R2-R1)/(R1(t2-t1))\times 10^6(ppm/^{\circ}C)$ $t1$:参照温度 $t2$:测量温度 $R1$:参照温度下的阻值 $R2$:测量温度下的阻值</p>
1.4	Line error 线性误差	Variation line shall be within $\pm 2\%$. 线性变化为 $\pm 2\%$.	<p>Measured with the angle and the circuit as below (Figure 1) 测试的角度及电路如图 1</p>  <p>Figure-1</p>
1.5	Rated voltage 额定电压	Rated voltage shall comply with the right. 额定电压将遵循右侧.	<p>$E = \sqrt{PR}$ E:额定电压 Rated voltage(V) P:额定电力 Rated power(W) R:公称阻值 Normal total resistance(Ω) The rated voltage is calculated by above formula. When the rated voltage exceeds the maximum operating voltage, the maximum operating voltage should be the rated voltage. 额定电压按以上公式计算,当额定电压超过最大工作电压时,最大工作电压即为额定电压.</p>
1.6	Resistance Temperature characteristic 电阻温度特性	Variation rate of total resistance shall comply with the table left. 全阻变化要符合右表范围	<p>Total resistance after being exposed in a test chamber at $70\pm 2^{\circ}C$ for 5h shall be measured. 全阻值在暴露在测试室内 $70\pm 2^{\circ}C$ 5 小时后测量.</p>

			<table border="1"> <tr> <td>Taper</td> <td>1B</td> <td>A 15A</td> </tr> <tr> <td>Nominal total resistance</td> <td>(%)</td> <td>(%)</td> </tr> <tr> <td>10KΩ or less</td> <td>Within +5/-20</td> <td>Within +5/-20</td> </tr> <tr> <td>More than10KΩ</td> <td>Within +5/-25</td> <td>Within +5/-30</td> </tr> </table>	Taper	1B	A 15A	Nominal total resistance	(%)	(%)	10KΩ or less	Within +5/-20	Within +5/-20	More than10KΩ	Within +5/-25	Within +5/-30
Taper	1B	A 15A													
Nominal total resistance	(%)	(%)													
10KΩ or less	Within +5/-20	Within +5/-20													
More than10KΩ	Within +5/-25	Within +5/-30													
1.7	Rotational noise 旋转杂音	Less than 80mV of the rotational noise. 少于 80mV.	<p>A specimen shall be rotated at rate of 30 cycles per minute (one cycles is one clockwise turn, and then one counterclockwise turn.),and then rotational noise shall be measured according to JIS C 5261 (issued in 1993)para.5.8 Testing method C& rotational noise measuring curt as show in fig.2.</p> <p>旋转的速度为 30 周/分钟(一周是指顺时针方向转, 然后逆时针方向转),旋转杂音测量参照 JIS C5261(在 1993 发行)参数 5.8 试验方法,旋转杂音测试回路如图 2 所示.</p>												

二.MECHANICAL CHARACTERISTICS 机械特性

序号 NO	项 目 ITEM	性 能 PERFORMANCE	测 试 条 件 TEST CONDITIONS
2.1	Angle of effective rotation 有效回转角度	333° ±3°	
2.2	Rotational Torque 旋转力矩	0~30 gf.cm	Rotational torque shall be measured according to JIS C5261 (issued in1993)para.6.2. 旋转力矩测量方式参照 JIS C5261(1993 发行)参数 6.2
2.3	Push-Pull Strength of Shaft 推拔强度	There shall be neither shaft wobble nor breakage. Variation rate of total resistance shall be within ±5%. Para . 1.7 Rotational noise shall be satisfied. 轴心任何地方没有摇晃也无破损。总的抵抗变化率在 5%以内, 旋转杂音应该符合 1.7 部分.	A static force of 1kgf shall be applied to the side surface of the shaft in a perpendicular direction to tangent line of the shaft and then in the opposite direction for 10±1s each. 施加一个 1kgf 的静止的力与轴心切线垂直的方向一边侧面上,然后在相反方向施加,每次 10S ± 1S.
2.4	Terminal strength 端子强度	There shall be neither remarkable shaft wobble nor intermittence. The terminal bent, however, is allowed. 轴心无明显的晃动及间断感,端子可变形.	The tensile static load of 0.6kgf shall be applied to the terminal in the axial direction for 10±1s,and then the static load of 0.3kgf in a perpendicular direction for 10±1s. 施加静止的负载 0.6kgf 于端子的轴向的方向 10 ± 1 秒, 以及在端子的垂直方向上施加静止的负荷 0.3kgf 10 ± 1 秒。

2.5	Resistance to soldering heat 焊锡耐热性	Variation rate of total resistance shall be within $\pm 5\%$. There are no any loosened terminal which may cause intermittence. 全阻值变化在 $\pm 5\%$ 以内, 端子不能松动及引起断路。	<p>1. Peak: $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 5sec max. 峰点温度: $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 5 秒以内</p> <p>Temperature profile of reflow soldering 回流焊温度曲线图</p> <p>■ Reflow Soldering Standard Profile</p>  <p>2. The specimen shall be passed through the reflow furnace with the condition shown in the above profile for one time. 样品按以上温度曲线通过回流焊炉 1 回。</p> <p>3. The specimen shall be stored at standard atmospheric conditions for 1 hour after which the measurement shall be made. 焊锡后样品在常温常湿中放置 1 小时后再进行测定。</p>
2.6	Solder ability 可焊性	With no less than 90%, the surface immersed into solder shall be covered with new solder, expect for cutting surface. 浸入的表面的新焊料所覆盖不少于 90%, 切断表面除外	<p>Specimen shall be immersed into solution of rosin ethanol for 3~5 seconds, and specimen shall be put in the laminated board (1.6 mm thick), and then specimen shall be immersed into solder bath on to the bottom surface of board for 3 ± 0.5 seconds. As follows:</p> <p>1) In case of Pb free solder (Sn-3Ag-0.5Cu) Solder Temp.: $245 \pm 0/-3^{\circ}\text{C}$</p> <p>2) In case of Pb solder (Sn-37Pb) Solder Temp.: $235 \pm 0/-3^{\circ}\text{C}$</p> <p>将样品浸入调好松香酒精的溶液 3~5 秒, 并且将样品装入积层薄板(1.6 毫米厚), 然后将样品浸入焊液冲洗端面 3 ± 0.5 秒。如下:</p> <p>1) 如果为无铅焊料(Sn-3Ag-0.5Cu) 焊接温度为: $245 \pm 0/-3^{\circ}\text{C}$</p> <p>2) 如果有铅焊料(Sn-37Pb) 焊接温度: $235 \pm 0/-3^{\circ}\text{C}$</p>

三. ENDURANCE CHARACTERISTICS 耐久性能

序号 NO	项目 ITEM	性能 PERFORMANCE	测试条件 TEST CONDITIONS
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3.1	Cold 耐寒性	The total resistance change should be within $\pm 20\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 20\%$ 以内,线性变化为 $\pm 2\%$	Temperature: $-40 \pm 3^\circ\text{C}$ Time: 168 ± 4 hours surface moisture shall be removed, and then the controller shall be subjected to standard atmospheric conditions for $24+8/-0$ hours after which measurement shall be made 温度在 $-40 \pm 3^\circ\text{C}$ 放置 168 ± 4 小时,表面水份摄取后 $24+8/-0$ 小时正常状态下测试.															
3.2	Cold(Storage) 耐寒性 (储藏)	The total resistance change should be within $\pm 20\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 20\%$ 以内,线性变化为 $\pm 2\%$	Temperature: $-40 \pm 3^\circ\text{C}$ Time: 168 ± 4 hours surface moisture shall be removed, and then the controller shall be subjected to standard atmospheric conditions for $24+8/-0$ hours after which measurement shall be made 温度在 $-40 \pm 3^\circ\text{C}$ 放置 168 ± 4 小时,表面水份摄取后 $24+8/-0$ 小时正常状态下测试.															
3.3	Dry heat 耐热性	The total resistance change should be within $+5/-30\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $+5/-30\%$ 以内,线性变化为 $\pm 2\%$	Temperature: $120 \pm 3^\circ\text{C}$ Time: 250 ± 8 hours The controller shall be subjected to standard atmospheric conditions for $24+8/-0$ hours after which measurement shall be made. 温度在 $120 \pm 3^\circ\text{C}$ 放置 250 ± 8 小时. $24+8/-0$ 小时后正常状态下测试.															
3.4	Dry heat (Storage) 耐热性 (储藏)	The total resistance change should be within $\pm 20\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 20\%$ 以内,线性变化为 $\pm 2\%$	Temperature: $+120 \pm 3^\circ\text{C}$ Time: 250 ± 8 hours The controller shall be subjected to standard atmospheric conditions for $24+8/-0$ hours after which measurement shall be made. 温度在 $120 \pm 3^\circ\text{C}$ 放置 250 ± 8 小时. $24+8/-0$ 小时后正常状态下测试.															
3.5	Temperature cycle 温度循环	The total resistance change should be within $\pm 20\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 20\%$ 以内,线性变化为 $\pm 2\%$	<p>The potentiometer shall be subjected to 5 successive changes of temperature cycles, each as shown in table below. Then its surface moisture shall be removed. And then the potentiometer shall be subjected to standard atmospheric conditions: 1~2hours,after which measurements shall be made. 下表所示连续进行 5 次温度循环。擦除表面水分于常温常湿中放置 1~2 小时测定。</p> <table border="1" data-bbox="775 1576 1543 1863"> <thead> <tr> <th data-bbox="775 1576 903 1615">Step 阶段</th> <th data-bbox="903 1576 1214 1615">Temperature 温度</th> <th data-bbox="1214 1576 1543 1615">Duration 放置时间</th> </tr> </thead> <tbody> <tr> <td data-bbox="775 1615 903 1671">1</td> <td data-bbox="903 1615 1214 1671">$-40 \pm 3^\circ\text{C}$</td> <td data-bbox="1214 1615 1543 1671">30 minutes 分</td> </tr> <tr> <td data-bbox="775 1671 903 1749">2</td> <td data-bbox="903 1671 1214 1749">Standard atmospheric conditions 常温</td> <td data-bbox="1214 1671 1543 1749">5 minutes max. 分</td> </tr> <tr> <td data-bbox="775 1749 903 1805">3</td> <td data-bbox="903 1749 1214 1805">$120 \pm 3^\circ\text{C}$</td> <td data-bbox="1214 1749 1543 1805">30 minutes 分</td> </tr> <tr> <td data-bbox="775 1805 903 1863">4</td> <td data-bbox="903 1805 1214 1863">Standard atmospheric conditions 常温</td> <td data-bbox="1214 1805 1543 1863">5 minutes max. 分</td> </tr> </tbody> </table>	Step 阶段	Temperature 温度	Duration 放置时间	1	$-40 \pm 3^\circ\text{C}$	30 minutes 分	2	Standard atmospheric conditions 常温	5 minutes max. 分	3	$120 \pm 3^\circ\text{C}$	30 minutes 分	4	Standard atmospheric conditions 常温	5 minutes max. 分
Step 阶段	Temperature 温度	Duration 放置时间																
1	$-40 \pm 3^\circ\text{C}$	30 minutes 分																
2	Standard atmospheric conditions 常温	5 minutes max. 分																
3	$120 \pm 3^\circ\text{C}$	30 minutes 分																
4	Standard atmospheric conditions 常温	5 minutes max. 分																

3.6	To damp (Steady stage) 耐湿(稳定状态)	The total resistance change should be within $\pm 20\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 20\%$ 以内, 线性变化为 $\pm 2\%$	The specimen shall be subjected in a test chamber at $60 \pm 2^\circ\text{C}$, $90\sim 95\% \text{r.h}$ at no load for 250 ± 8 hours and then left in the standard conditions for 24 to 32 hours. 温度 $60 \pm 2^\circ\text{C}$, 湿度 $90\sim 95\%$ 之槽内, 无负载放置 250 ± 8 小时后, 在常温常湿放置 24~32 小时后测量.
3.7	Vibration 振动	The total resistance change should be within $\pm 10\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 10\%$ 以内, 线性变化为 $\pm 2\%$	The rotary position sensor should be rested under the condition of the amplitude of 1.5mm , the frequency range from 10 to 50Hz (should be traversed in approximately one minute) and 2 hour in each of 3 mutually perpendicular directions (total 6 hours) Then, the rotary position sensor should be kept in the dry box 1~2hrs 产品被放置在1.5mm 振幅度的状态下, 频率范围 从10到50赫兹(横波为1分钟)和3个相互垂直的方向(总6小时)中的每个方向为2小时 然后, 产品放在干燥箱1~2hrs后测试
3.8	Shock 冲击	The total resistance change should be within $\pm 10\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 10\%$ 以内, 线性变化为 $\pm 2\%$	The rotary position sensor should be rested under the condition of the peak acceleration 20G max . in half-sine wave and 5 shocks in each of 3 mutually perpendicular directions (total 15 shocks) Then, the rotary position sensor should be kept in the dry box 1~2hrs 产品被放置在震动波峰为20G状态下, 在3个相互垂直的方向(总15次震动)中,每个方向半正弦波震动里5次 然后, 产品放在干燥箱1~2hrs后测试
3.9	Humidity Load Life 负载寿命	The total resistance change should be within $\pm 20\%$. Variation line shall be within $\pm 2\%$. 全阻值变化要在 $\pm 20\%$ 以内, 线性变化为 $\pm 2\%$	The specimen shall be subjected in a test chamber at $40 \pm 2^\circ\text{C}$, $90\sim 95\% \text{r.h}$ with a raced DC voltage applied across terminals 1and 3 for 96 ± 4 hours at a cycle consisting of an "ON" time 1.5 hours and on "OFF" time 0.5 hours under the condition .That it shall be left in the standard conditions for 24 to32 hours. 样品在温度 $40 \pm 2^\circ\text{C}$, 湿度 $90\sim 95\%$ 之槽内, 1 和 3 脚加载直流定格电压 1.5 小时 ON、0.5 小时 OFF。如此循环连续负载测试 96 ± 4 小时, 放置在常温常湿室内 24~32 小时后测试。

3.10	Rotational Life 旋转寿命	<p>Variation rate of total resistance should be within $\pm 20\%$. Rotational noise shall be less than 80mV. After test variation line shall be within $\pm 3\%$.</p> <p>全阻值变化在 $\pm 20\%$ 以内, 旋转杂音少于 80mV. 经过寿命测试后线性在 $\pm 3\%$ 以内</p>	<p>The specimen shall be rotated for 1,000,000 cycles (Operating travel is at 90%~95% of effective rotation angle , effective electrical rotational angle, and then temperature is $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ without loading, the speed is 1cycles/second)</p> <p>样品规格为 1,000,000 次(运作行程在有效回转角度 90%~95%之间,温度为 $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ 且无负载,速度为 1 圈/秒)</p>
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四.General 一般事项

序号 NO	项 目 ITEM	
4.1	Application 适用范围 This Specification is applied to the F-11P types mainly used for consumer products.	
	Operating temperature range 使用温度范围	-40 $^{\circ}\text{C}$ ~120 $^{\circ}\text{C}$ (normal humidity, normal air pressure 常湿常压)
	Storage temperature range 保存温度范围	-40 $^{\circ}\text{C}$ ~120 $^{\circ}\text{C}$ (normal humidity, normal air pressure 常湿常压)
	Test Condition 试验状态	<p>Unless otherwise specified, the standard range of atmospheric conditions for making measurements 除另有规定外, 量测应在标准状态下进行:</p> <p>Normal temperature 常 温: (Temperature 温度 15$^{\circ}\text{C}$~35$^{\circ}\text{C}$)</p> <p>Normal humidity 常 温: (Relative humidity 相对湿度 25~75%)</p> <p>Normal Air pressure 常 温: (Air pressure 气压 86~106kPa)</p> <p>If there is any doubt arise from judgment , test shall be conducted at the following conditions: 遇有疑虑时, 则测试应在以下状态下进行:</p> <p>Ambient temperature 温 度: 20 $^{\circ}\text{C} \pm 2^{\circ}\text{C}$</p> <p>Relative humidity 相对湿度: 60~70%</p> <p>Air pressure 气 压: 86~106 K.Pa</p>
4.2	Appearance, Style and Dimensions 外观、形状、尺寸	
	Appearance 外观	<p>FSE1101 shall be no defects that affect the serviceability of the product. FSE1101 不可有影响产品服务性的瑕疵存在</p>

	Style and Dimensions 形状和尺寸	Refer to the assembly drawings . 参考成品图
	Type of actuating 动作形式	Rotation 旋转
	Contact arrangement 回路形式	Refer to the assembly drawings . 参考成品图

五 Notice on usage 使用注意事项

5.1	<p>Due to the material used such as poly-carbonate and/or ABS of non-crystalline polymer, the unit may be damaged when it will touch some kinds of organic solvents ,grease or inorganic chemicals.</p> <p>由于材质用是塑料类,故当产品接触到有机溶剂、润滑油或无机化学物会受到破坏..</p>
5.2	<p>Strafe under being packed 去除包装的损害</p> <p>After being received, the products packed shall be stored under 85% max. r.h. at 5 to 35°C shall not be stored in the place where dew and /or harmful gas are not to deserved. Please use the products within 3 months after the receipt.</p> <p>在收到之后, 包装的产品应储存在最大湿度 85%以下,温度在 5~35℃ ,在储存地方内不应在那里露或者有害气体的环境下.请收到产品 3 月内使用.</p>

六.Package Specification 包装规格

1. 成品包装方式 PACKING METHOD:

1.1. 将 V.R 成品置放于料带盘内,再将五个料带盘迭放在一起组成一组并用胶纸将其扎好。
Let the V.R be placed into plastic tape, five plastic tape be one group and use adhesive tape to tie it.

1.2. 将扎好之料带盘重迭放置于外箱内, 放好后用胶纸将外箱封口。

plastic tape be one row, be placed into use adhesive Tape to seal

2. 规格与数量 MEASUREMENT AND QUANTITY:

2.1. 包装带:总长度 16.6 米

plastic tape length 16.6m

2.2. 单个包装带包装数量: 1000pcs

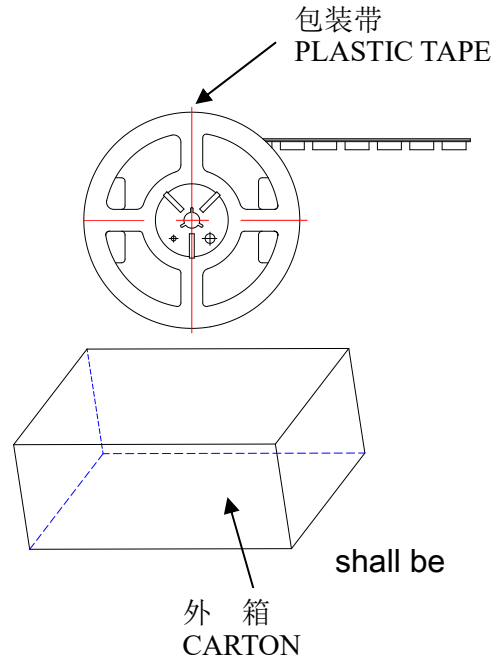
A plastic tape contain 1000pcs of V.R

2.3. 外箱规格 (长×宽×高): 360mm×360mm×180mm

Carton (length×width×high): 360mm×360mm×180mm.

2.4. 外箱包装 V.R 数量: 1000×5=5000pcs

A carton contain 1000×5=5000pcs of V.R.



3. Marking: A packaging label indicating following information

attached to the outside of the cartons .

标识：一个包装标签将附在外部纸板盒上注明。

I Customer(客户编号) II Prod name(部品名称) III Order No, (订单编号) IV Arranged No.(计划编号)
V Quantity (数量) VI Lot No. (批号) VII Part No. (部品编号) VIII Manufacturer Name. (制造厂商)

核准 Approved by	审查 Checked by	经办者 Designed by
CB		刘勇