

1. 适用范围 / SCOPE

此份规格书涵盖 MSHL2512-Series 金属板电流感测电阻组件相关规格。

This specification covers MSHL2512-Series, which are Metal Strip Current Sensing Resistor。

2. 产品型号/TYPE NUMBER

MSHL	2512	M	×W×	R×××	*	*
(1)	(2)	(3)	(4)	(5)	(6)	(6)

- (1) 产品系列号 / SERIES NUMBER : Ex.MSHL2512 = 短电极, 低感值/ Short electrode · Low Inductance value ; 两端子 / two terminal ; 有侧导 / side electrode / size “0.25×0.12”
- (2) 产品材质 / Material : M = 锰铜复合铜合金 / Complex alloy(MnCu,Cu)
- (3) 产品瓦特数 / Power Rating : Ex. 2W0=2.0Watt
- (4) 产品阻值 / Nominal Resistance Value : Ex. 1.5mΩ →1M50 ; 3mΩ →R003
- (5) 组件电阻偏差值 / Resistance Tolerance : Ex. F=±1% ; D=±0.5%
- (6) 產品碼/Product code:Ex. I →Non-standard electrode size; U →Special size

3. 产品尺寸 / PRODUCT DIMENSION

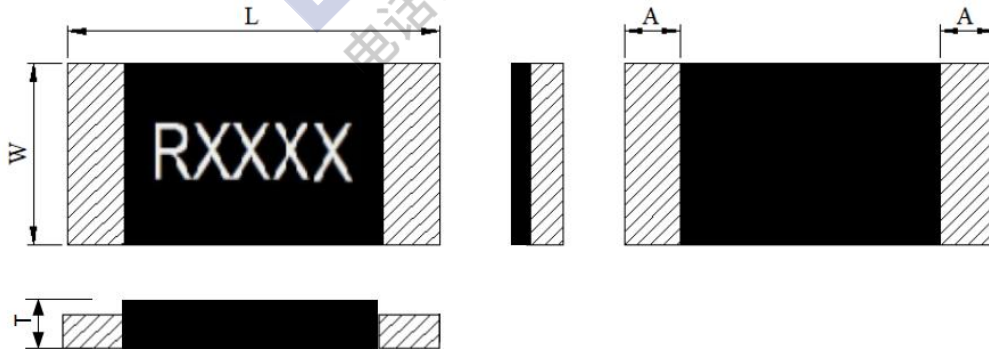


图 1 / Fig.1

Unit(mm)

Part Number	W	L	T	A
MSHL2512M2W0-Series 1M50*I/R001*I	3.20±0.30	6.40±0.30	0.90±0.20	1.90±0.25
MSHL2512M2W0-Series R002~R025	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25
MSHL2512M3W0-Series R001~R003	3.20±0.30	6.40±0.30	1.10±0.20	0.80±0.25
MSHL2512M3W0-Series R004*U~R009*U	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25
MSHL2512M3W0-Series R010	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25
MSHL2512M3W0-Series R011*U~R025*U	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25

4. 产品结构及使用材料说明(参考图 2) / STRUCTURE & MATERIAL (Ref to Fig.2)

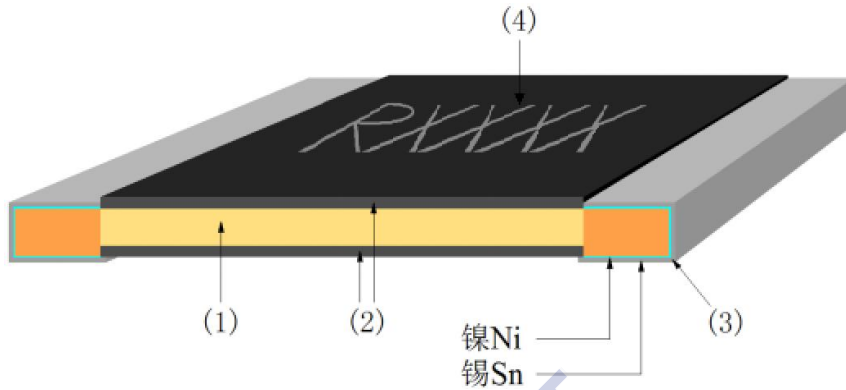


图 2 / Fig.2

4.1 电阻本体 / Resistive element(1) : M = 锰铜复合铜合金 / Complex alloy(MnCu,Cu) ;

4.2 保护防焊层 / Protective coating(2) : 防火级环氧树脂,符合 UL- 94-V0 要求(黑色) /  
 Flame-retardant epoxy, meets UL- 94-V0 requirements (black)

4.3 电镀层 / Plating layer(3) : 锡、镍 / Sn、Ni

4.4 文字标记 / Marking (4) : 镭射打标 / Laser marking

5. 电气特性 / ELECTRICAL CHARACTERISTICS

Part Number	Power Rating (Watt)	Material	Resistance Value (mΩ)	TCR (ppm/°C)	Inductance (nH)	Resistance Tolerance (%)
MSHL2512M2W0-Series R001*/1M50	2.0	M	1/1.5	±100	<5	±1%(F) ±0.5%(D)
MSHL2512M2W0-Series R002~R025	2.0	M	2~25	±50		±1%(F) ±0.5%(D)
MSHL2512M3W0-Series R001	3.0	M	1	±100		±1%(F) ±0.5%(D)
MSHL2512M3W0-Series R002~R003	3.0	M	2~3	±50		±1%(F) ±0.5%(D)
MSHL2512M3W0-Series	3.0	M	5~8	±50		±1%(F) ±0.5%(D)

R004*U~R009*U						
MSHL2512M3W0- Series R010	3.0	M	10	±50		±1%(F) ±0.5%(D)
MSHL2512M3W0- Series R011*U~R025*U	3.0	M	11~25	±50		±1%(F) ±0.5%(D)

6. 产品特性及信赖性测试规范 / PRODUCT CHARACTERISTICS AND RELIABILITY TEST STANDARD

测试方法 Parameter	条件 Conditions	允收标准 Requirements
瞬间过载测试 / Short Time Over Load	$P = 5.0P_r$ ; $T = 25 \pm 2^\circ\text{C}$ , $t = 5\text{sec}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.13
高温测试 / High Temp. Exposure	$T = +170 \pm 2^\circ\text{C}$ ; $t = 1000\text{h}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
低温测试 / Low Temp. Storage	$T = -55 \pm 2^\circ\text{C}$ ; $t = 1000\text{h}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
湿度负载寿命测试 / Moisture Load Life ( $60^\circ\text{C}$ 、 $95\%RH$ )	$P_{\text{test}} = P_{\text{rating}}$ ; $T = 60 \pm 2^\circ\text{C}$ ; $RH = 95\%$ ; $t = 90\text{min ON}$ , $30\text{min OFF}$ , $1000\text{h}$	$\pm(2.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
冷热冲击测试 / Thermal Shock	$[-55^\circ\text{C} 30\text{min.} \rightarrow \text{R.T. } 3\text{min.} \rightarrow +155^\circ\text{C} 30\text{min}$ $\rightarrow \text{R.T. } 3\text{min}]$ , 100 个连续循环 / 100Cycles	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.19
在 $70^\circ\text{C}$ 下负载寿命测试 / Load Life at $70^\circ\text{C}$	$P_{\text{test}} = P_{\text{rating}}$ ; $T = 70 \pm 2^\circ\text{C}$ ; $t = 90\text{min ON}$ , $30\text{min OFF}$ , $1000\text{h}$	$\pm(2.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
可焊性测试 / Solderability	浸入锡炉/Dip into solder at $T = 245 \pm 5^\circ\text{C}$ , $t = 3 \pm 0.5\text{sec}$	锡涵盖面积 /The covered area $> 95\%$ IEC60115-1 4.17
抗焊热性测试 / Resistance to Solder Heat	经三次热风式回焊炉 / Through Reflow, 3times $T = 260 \pm 5^\circ\text{C}$ , $t = 20 \pm 1\text{sec}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.18
机械冲击测试 / Mechanical Shock	加速度 $a = 100G$ , 振幅时间 $t = 6\text{ms}$ $a = 100G$ , $t = 6\text{ms}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.21

基板弯曲测试 / Substrate Bending	两支撑点间距 / Span between fulcrums : 90mm ; 振幅 / Bend Width : 2mm ; 测试板/Test board : 玻璃纤维板/ Glass-Epoxy Board ;厚度 / Thickness =1.6mm	$\pm(1.0\%+0.5m\Omega)$ IEC60115-1 4.33
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## 7. 环境特性 / ENVIRONMENTAL CHARACTERISTIC

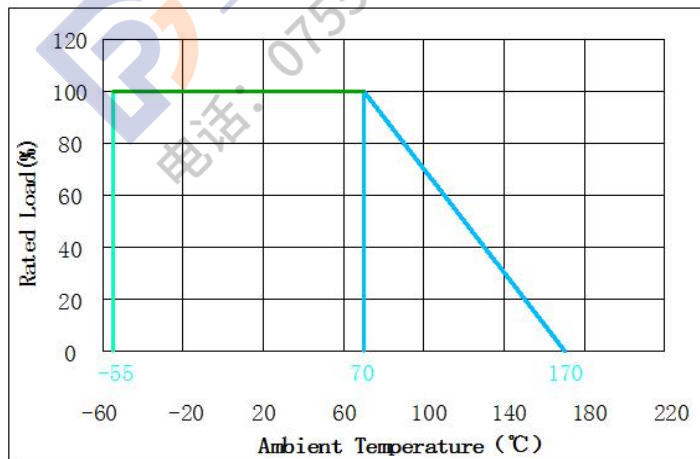
7.1 作温度范围: -55°C ~ 170°C / Operating Temperature:-55°C ~ 170°C

额定功率温度衰变曲线 / Typical Thermal Derating Curve

额定功率乃指于 70 °C 以内可连续满额功率使用的术语。

下图为当操作温度高于 70°C 时的可使用功率衰减曲线。

Power rating is based on continuous full load operation at rated ambient temperature of 70 °C. For resistors operated at ambient temp. in excess of 70 °C, the max. load shall be derated in accordance with the following curve.



## 7.2 存储条件 / STORAGE CONDITIONS

在温度+10°C ~ 40°C、相对湿度 $\leq 75\%$ 的密闭条件下可存放2年。

在温度+10°C ~ 60°C、相对湿度为95%的非露天下最多可存放30天。

Under airtight in temperature+10°C ~ 40°C、relative humidity  $\leq 75\%$  can store 2 years. Without dew in temperature+10°C ~ 60°C、relative humidity be 95% maximum value for 30days.

## 8. 焊锡垫尺寸及焊接条件 / SOLDER PAD SIZE AND WELDING CONDITIONS

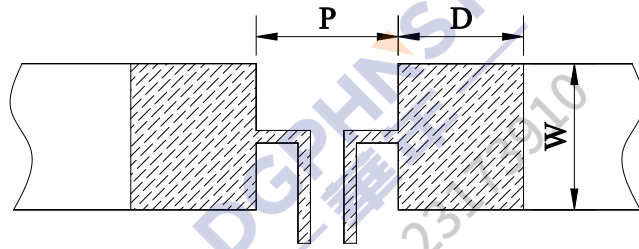
8.1建议如下图焊接方式焊接，并满足所要求的尺寸。/ Propose that the following picture installation way is installed, and satisfied the required size。

Part Number	P	W	D
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MSHL2512M2W0-Series 1M50/R001*1	1.50mm	3.57mm	2.95mm
MSHL2512M2W0-Series R002~R025	3.18mm	3.57mm	2.11mm
MSHL2512M3W0-Series R001~R003			
MSHL2512M3W0-Series R004*U~R009*U			
MSHL2512M3W0-Series R010			
MSHL2512M3W0-Series R011*U~R025*U			

loading : 适用于本司建议焊垫设计并用于限定稳定电流下。 /

suit for specific pad layout and specific steady current。 /



## 8.2 建议客户焊接参数 / Recommended Customer Soldering Parameters

### 8.2.1 波峰焊温度曲线 / Wave solder Temperature condition (图 3 / Fig.3)

预热段 / Preheating : 100°C~130°C, max.100 sec。 /

焊锡段 / Soldering: 250°C~265°C max. 10 sec。 /

允许最高温度 / Maximum temperature : 260±5°C, max. 10sec。 /

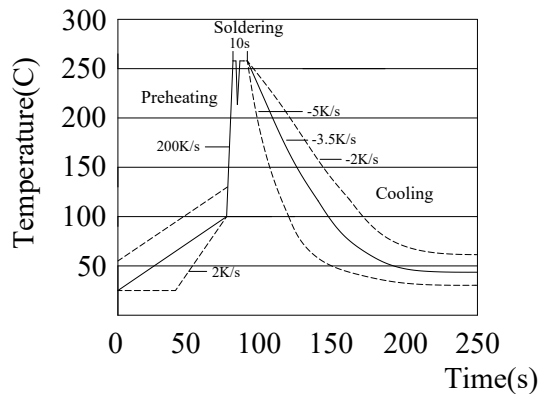


图 3 / Fig.3

### 8.2.2 回流焊温度曲线 / Solder reflow Temperature condition (图 4 / Fig.4)

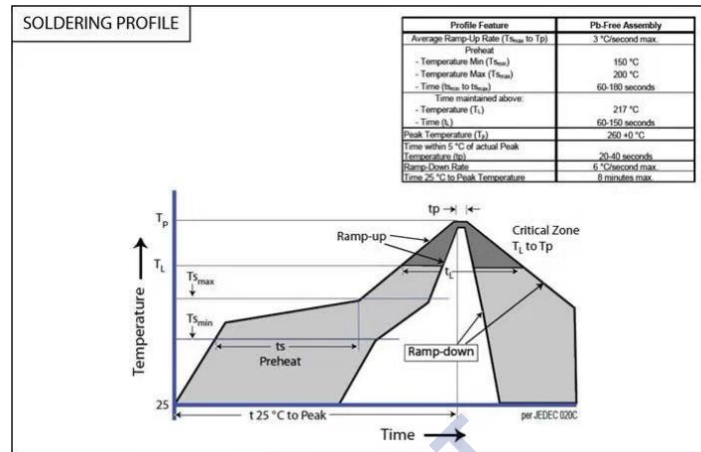


图 4 / Fig.4

8.2.3 允许烙铁焊接条件(热风设备) / Rework temperature ( hot air equipment ) : 350°C, 3~5seconds

8.2.4 焊接方法建议 / Recommended reflow methods

焊接热源方式可用红外线, 热蒸气, 热风. / IR, vapor phase oven, hot air oven  
如果焊锡温度超过允许最高温度, 则产品本身会有功能损坏的疑虑。 / If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements。

9. 批量生产后出货测试项目 / Lot ACCEPTANCE TEST REQUIREMENTS

每一批生产均须作入库检验, 每一批生产单量不可超过500Kpcs。 /

Qualification shall consist of passing a program of following tests. Parts shall be pulled from each lot and maximum lot quantity shall be within 500Kpcs。

9.1 外观 / Visual

方法 / Procedure : 利用放大镜进行检查 / Visual

标准 / Acceptance Criteria : 不能有脏污、不洁、文印错误、破损等 / No parts are outstandingly stained

9.2 尺寸 / Dimensions

方法 / Procedure : 使用合适且经校正的标尺 / As appropriate, calipers, micrometers, optical comparator, or approved gages

标准 / Acceptance Criteria : 尺寸均在規定標準範圍內 / No parts outside specific dimensions

### 9.3 单体组件电阻(Ro) / Resistance (Ro)

方法 / Procedure : 在 25°C 下利用四线量测技术量测之 / Resistance shall be measured with 25°C in the 4-wire resistance test

标准 / Acceptance Criteria : 电阻值均在規定標準範圍內 / The resistance of the test device shall be within the limits specified

### 9.4 电阻温度系数 / TCR

方法 / Procedure : 利用四线法量测出组件分别在 25°C 及125°C 下的电阻值, 并将其带入下面公式中即可得出 TCR值 / Getting the sampling device resistance values measured in 25°C and 125°C and put them in to the following equation to calculate the TCR

标准 / Acceptance Criteria : 温度系数值均在規定標準範圍內 / All parts must within the specific TCR = (Rb-Ra)/Ra × 1/(Tb-Ta) × 10<sup>6</sup>

### 9.5 绝缘电阻 / Insulation resistance (Ri)

方法 / Procedure :利用绝缘测试仪量测 / Resistance between protective layer and resistive shall be measured by high ohm meter

标准 / Acceptance Criteria : 防焊层与电阻本体绝缘电阻至少高于100MΩ / The resistance of the test device shall over 100MΩ

### 9.6 电感值/Inductance

电感特性 : 小于 5 纳亨 ( 电路频率涵盖 40kHz-200kHz & 100MHz-1000MHz ) / Inductance characteristics: <5nH(Circuit frequency is covers 40kHz-200kHz & 100MHz-1000MHz)

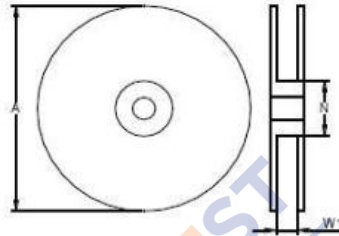
## 10. 包装讯息 / PACKAGING INFORMATION

### 10.1 包装数量、重量 / QUANTITY & WEIGHT

型号 / Type Number	数量 / Quantity (pcs)	重量 / Weight ( g )
MSHL2512M2W0-Series 1M50/R001*I	4,000	500±50
MSHL2512M2W0-Series R002~R025	4,000	450±50
MSHL2512M3W0-Series R001~R003	3,000	550±50
MSHL2512M3W0-Series R004*U~R009*U	4,000	450±50

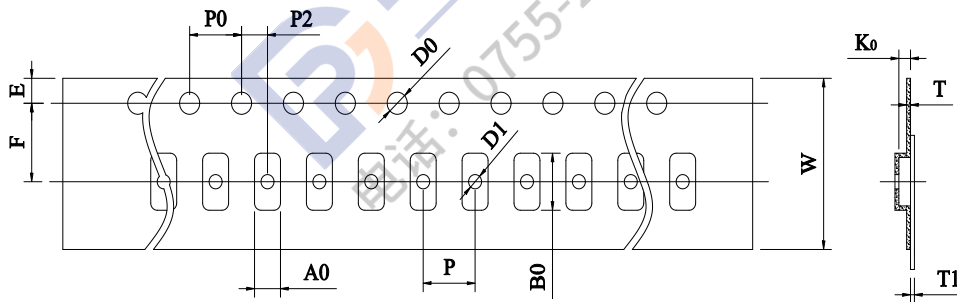
MSHL2512M3W0-Series R010		
MSHL2512M3W0-Series R011*U~R025*U		

10.2 卷轮规格 / Reel & Tape specifications



Unit: mm

型号 / Type Number	A±5 (mm)	N±2 (mm)	W1±1 (mm)
MSHL2512-Series	178	60	13



MSHL2512M2W0-Series 1M50/R001*I							
W	12.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	3.40 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10
E	1.75 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	1.00 ± 0.20
MSHL2512M2W0-Series R002~R025							
W	12.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	3.40 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10
E	1.75 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	1.00 ± 0.20
MSHL2512M3W0-Series R001~R003							
W	12.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	3.40 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10
E	1.75 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	1.30 ± 0.20
MSHL2512M3W0-Series R004*U~R009*U/R010/R011*U~R025*U							
W	12.00 ± 0.30	P0	4.00 ± 0.10	P	4.00 ± 0.10	P2	2.00 ± 0.10
A0	3.40 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10

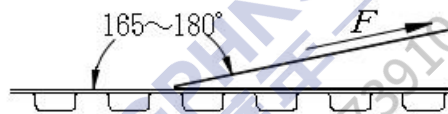


E	$1.75 \pm 0.10$	T	$0.20 \pm 0.10$	T1	Max. 0.1	K0	$1.00 \pm 0.20$
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### 10.3 密封胶膜剥离强度要求 / Peeling Strength of Seal Tape

F = 剥离强度 : 0.1 – 1.0N ( 10 - 100gf )

F = Peeling Strength: 0.1 – 1.0N (10 - 100gf)



### 11. 其他 / OTHERS

11.1 如果在使用中有超出本规格书的要求，必须经由双方协商确认。 / In the event that an impropriety is found beyond this specification ,it shall be fixed by mutual agreement between the parties .

11.2 如果本规格书有不适当的情况，必须通过双方协商并由本公司修改。 / In the event that an impropriety is found in this specification , Juneway Electronic Technology Co., Ltd. shall amend it by mutual agreement between the parties