1. 适用范围 / SCOPE

此份规格书涵盖 MSH2512-Series 金属板电流感测电阻组件相关规格。
This specification covers MSH2512-Series, which are Metal Strip Current Sensing Resistor。

2. 产品型号/TYPE NUMBER

MSH	2512	M/F	×W×	R×××	*	*
(1)		(2)	(3)	(4)	(5)	(6)

（1） 产品系列号 / SERIES NUMBER : Ex.MSH2512 = 短电极/ Short electrode ; 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) ; F = 铁铬铝复合铜合金 / Complex alloy(FeCrAl,Cu)
（3） 产品瓦特数 / Power Rating : Ex. 1W0=1.0Watt ; 3W0=3.0Watt
（4） 产品阻值 / Nominal Resistance Value : Ex. 1.5mΩ →1M50*I ; 3mΩ →R003
（5） 组件电阻偏差值 / Resistance Tolerance : Ex. D=±0.5% ;F=±1% ; G=±2%
（6） 產品碼/Product code:Ex. I →Non-standard electrode size; U →Special size.

3. 产品尺寸 / PRODUCT DIMENSIONS

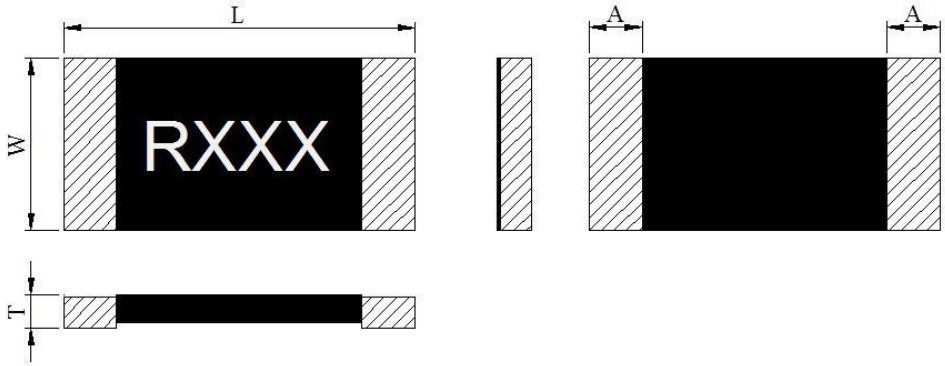


图 1 / Fig.1 Unit(mm)

Part Number	W	L	T	A
MSH2512M3W0-Series 0M50/0M75	3.20±0.30	6.40±0.30	1.05±0.20	1.90±0.25
MSH2512M3W0-Series R001~R003	3.20±0.30	6.40±0.30	1.10±0.20	0.80±0.25
MSH2512F3W0-Series R004				
MSH2512F3W0-Series R005*U~R056*U	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25

MSH2512M2W0-Series 0M50/0M75	3.20±0.30	6.40±0.30	1.05±0.20	1.90±0.25
MSH2512M2W0-Series 1M50*I/R001*I	3.20±0.30	6.40±0.30	0.90±0.20	1.90±0.25
MSH2512M2W0-Series R002~R004	3.20±0.30	6.40±0.30	0.90±0.20	0.80±0.25
MSH2512F2W0-Series R005~R056				

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

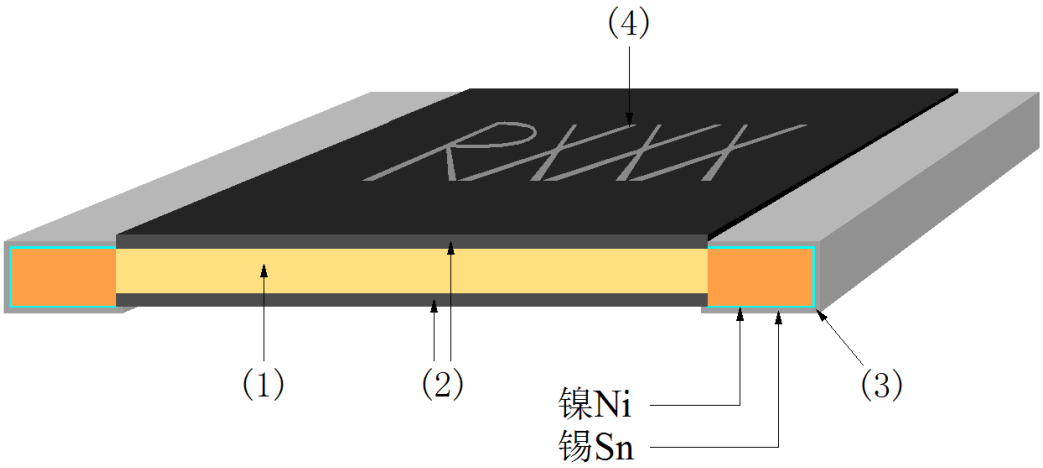


图 2 / Fig.2

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

F = 铁铬铝复合铜合金 / Complex alloy(FeCrAl,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/℃)	**Resistance Tolerance** (%)
MSH2512M3W0-Series 0M50/0M75	3.0	M	0.50/0.75	±150	±1%(F)

MSH2512M3W0-Series R001	3.0	M	1	±100	±1%(F)、±0.5%(D)
MSH2512M3W0-Series R002~R003	3.0	M	2~3	±50	±1%(F)、±0.5%(D)
MSH2512F3W0-Series R004	3.0	F	4	±50	±1%(F)、±0.5%(D)
MSH2512F3W0-Series R005*U~R056*U	3.0	F	5~50	±50	±1%(F)、±0.5%(D)
MSH2512M2W0-Series 0M50/0M75	2.0	M	0.50/0.75	±150	±1%(F)
MSH2512M2W0-Series 1M50*I/R001*I	2.0	M	1/1.5	±100	±1%(F)、±0.5%(D)
MSH2512M2W0-Series R002~R004	2.0	M	2~4	±50	±1%(F)、±0.5%(D)
MSH2512F2W0-Series R005~R056	2.0	F	5~50	±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= 5.0Pr ; T=25±2°C , t = 5sec	±(1.0%+0.5mΩ) IEC60115-1 4.13
高温测试 / High Temp. Exposure	T = +170±2°C ; t = 1000h	±(1.0%+0.5mΩ) IEC60115-1 4.25
低温测试 / Low Temp. Storage	T = -55±2°C ; t = 1000h	±(1.0%+0.5mΩ) IEC60115-1 4.25
湿度负载寿命测试 / Moisture Load Life (60℃、95%RH)	Vtest = Vmax ; T=60±2°C ; RH=95% ; t= 90min ON , 30min OFF , 1000h	±(2.0%+0.5mΩ) IEC60115-1 4.25

冷热冲击测试 / Thermal Shock	[-55°C 30min. → R.T. 3min. → +155°C 30min → R.T. 3min], 100个连续循环 / 100Cycles	±(1.0%+0.5mΩ) IEC60115-1 4.19
在 70ºC 下负载寿命测试 / Load Life at 70ºC	Vtest = Vmax ; T=70±2ºC ;t= 90min ON , 30min OFF,1000h	±(2.0%+0.5mΩ) IEC60115-1 4.25
可焊性测试 / Solderability	浸入锡炉 / Dip into solder at T = 245±5ºC , t = 3±0.5sec	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±5ºC , t =20±1sec	±(1.0%+0.5mΩ) IEC60115-1 4.18
机械冲击测试 / Mechanical Shock	加速度 a =100G , 振幅时间t =6ms a =100G , t =6ms	±(1.0%+0.5mΩ) 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	±(1.0%+0.5mΩ) IEC60115-1 4.33

7. 环境特性 / ENVIRONMENTAL CHARACTERISTIC

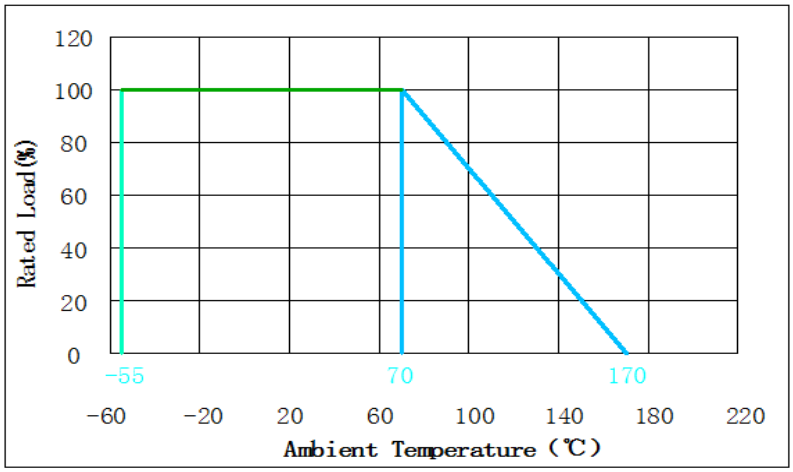
7.1 操作温度范围: -55℃～170℃ / Operating Temperature:-55℃～170℃

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

额定功率乃指于 70 ºC 以内可连续满额功率使用的术语。

下图为当操作温度高于 70ºC 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 ºC. For resistors operated at ambient temp. in excess of 70 ºC, the max. load shall be derated in accordance with the following curve.



7.2 存储条件 / STORAGE CONDITIONS

在温度+10℃～40℃、相对湿度≦75%的密闭条件下可存放2年。

在温度+10℃～60℃、相对湿度为95%的非露天下最多可存放30 天。 /

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

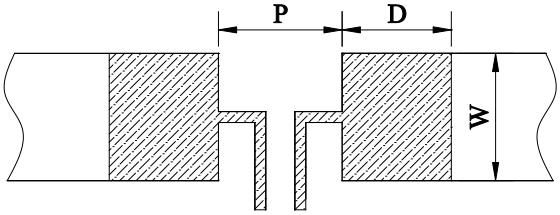
8. 焊锡垫尺寸及焊接条件 / SOLDER PAD SIZE AND WELDING CONDITIONS

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	Loading
MSH2512M3W0-Series 0M50/0M75	1.50mm	3.57mm	2.95mm	3.0w
MSH2512M3W0-Series R001～R003	3.18mm	3.57mm	2.11mm	3.0w
MSH2512F3W0-Series R004				
MSH2512F3W0-Series R005*U～R056*U				

MSH2512M2W0-Series 1M50*I/R001*I	1.50mm	3.57mm	2.95mm	2.0w
MSH2512M2W0-Series 0M50/0M75				
MSH2512M2W0-Series R002~R004	3.18mm	3.57mm	2.11mm	2.0w
MSH2512F2W0-Series R005~R056				

loading : 适用于本司建议焊垫设计并使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℃~130℃, max.100 sec。
焊锡段 / Soldering: 250℃~265℃ max. 10 sec。
允许最高温度 / Maximum temperature : 260±5℃, max. 10sec。

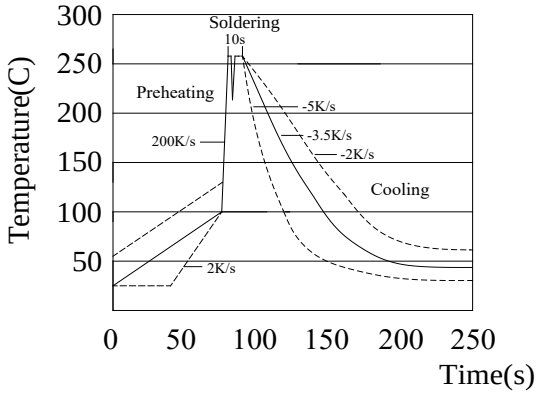


图 3 / Fig.3

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

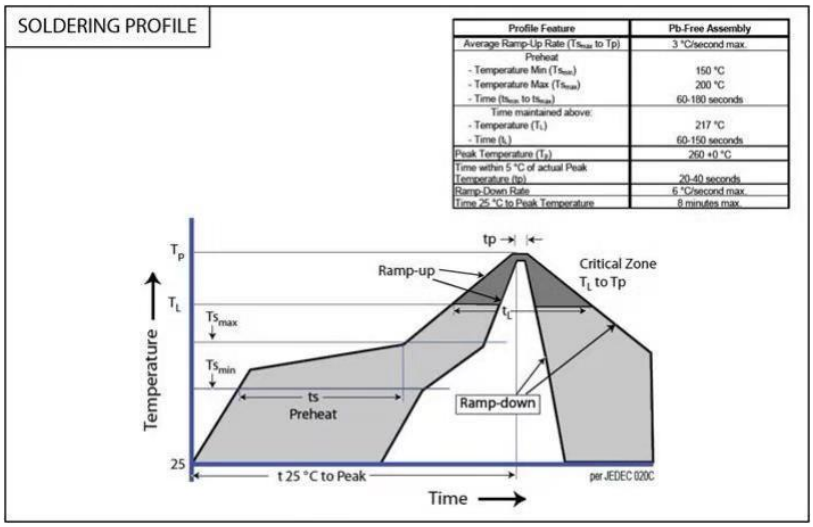


图 4 / Fig.4

8.2.3 允许烙铁焊接条件(热风设备) / Rework temperature（hot air equipment）： 350℃, 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 : 尺寸均在规定标准范围内 / No parts outside specific dimensions

9.3 单体组件电阻(Ro) / Resistance (Ro)

方法 / Procedure : 在 25℃ 下利用四线量测技术量测之 / Resistance shall be measured with 25℃ in the 4-wire resistance test
标准 / Acceptance Criteria : 电阻值均在规定标准范围内 / 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℃ 及125℃ 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℃ and 125℃ and put them in to the following equation to calculate the TCR
标准 / Acceptance Criteria : 温度系数值均在规定标准范围内 / All parts must within the specific
$TCR = (Rb-Ra)/Ra \times 1/(Tb-Ta) \times 10^{6}$

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

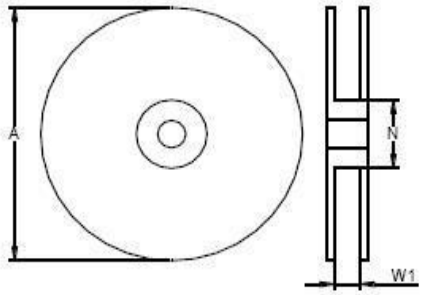
10. 包装讯息 / PACKAGING INFORMATION

10.1 包装数量、重量 / QUANTITY & WEIGHT

型号 / Type Number	数量 / Quantity (pcs)	重量 / Weight (g)
MSH2512M3W0-Series 0M50/0M75	3,000	550±50

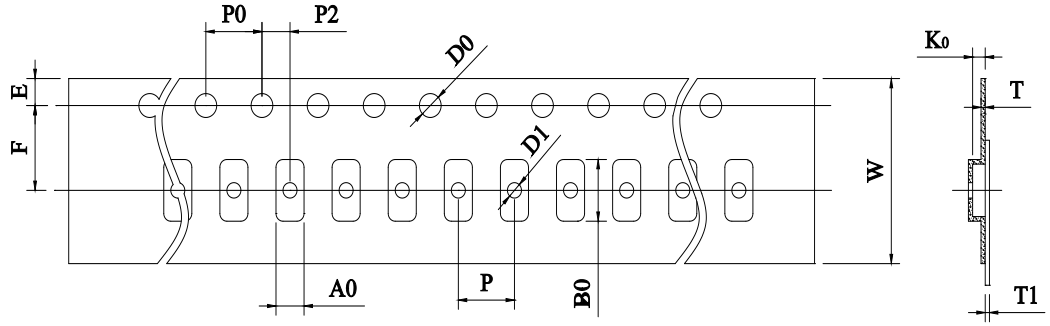
MSH2512M3W0-Series R001~R003 MSH2512F3W0-Series R004		
MSH2512F3W0-Series R005*U~R056*U	4,000	450±50
MSH2512M2W0-Series 0M50/0M75	3,000	550±50
MSH2512M2W0-Series 1M50*I/R001*I	4,000	500±50
MSH2512M2W0-Series R002~R004 MSH2512F2W0-Series R005~R056	4,000	450±50

10.2 卷轮规格 / Reel & Tape specifications



Unit(mm)

型号 / Type Number	A±5 (mm)	N±2 (mm)	W1±1 (mm)
MSH2512-Series	178	60	13



MSH2512M3W0-Series R001~R003/MSH2512F3W0-Series R004							
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

MSH2512-2W0 Series R001*I/1M50*I/R002~R004/ MSH2512F3W0-Series R005*U~R056*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 ± 0.10	T	0.20 ± 0.10	T1	Max. 0.1	K0	1.00 ± 0.20

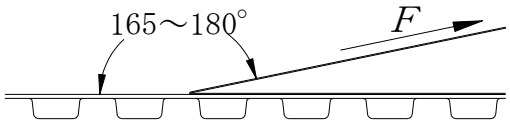
MSH2512M2W0-Series 0M50/0M75 / MSH2512M3W0-Series 0M50/0M75

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	$1.30^{+0.2}_{-0.1}$

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。