華德電子
WALTER ELECTRONIC

MSH 2512 系列電流感測電阻規格書
THE SPECIFICATION OF CURRENT SENSOR RESISTOR

1. 適用範圍 / SCOPE

此份規格書涵蓋 MSH2512 系列金屬板電流感測電阻元件相關規格.

This specification covers MSH2512 series devices, which are Metal Strap Current Sensing Resistor.

2. 產品型號/TYPE NUMBER

MSH2512	N	xWx	Rxxx	＊
(1)	(2)	(3)	(4)	(5)

（1） 產品系列號 / Series number : MSH2512 = 純金屬/ pure metal ; 短電極/ short electrode ; 兩端子&高功率 / two terminal & high power 尺寸 / size “0.25×0.12”

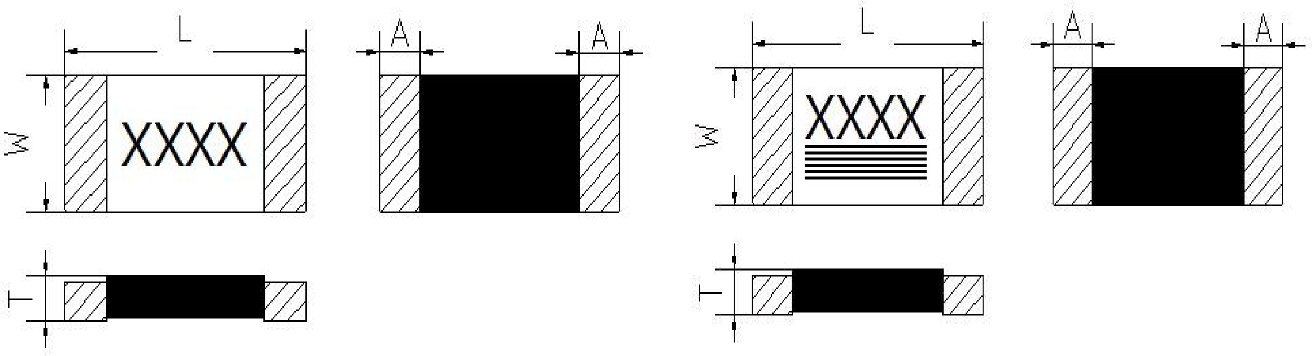
（2） 產品材質 / Material : N = 合金 / alloy

（3） 產品瓦特數 / Power Rating : 2W0=2.0 Watt ; 3W0=3.0 Watt

（4） 產品阻值 / Nominal Resistance Value : 1mΩ →R001 ; 5mΩ →R005 ; 10mΩ →R010

（5） 元件電阻偏差值 / Resistance Tolerance : F=±1% ; G =±2% ; H=±3% ; J=±5%

3. 產品尺寸 / PRODUCT DIMENSIONS



2W 3W

圖 1 / Fig.1

Part Number	W	L	T	A
MSH2512N2W0-series R001~R010	3.20±0.20	6.40±0.20	1.20±0.2	0.80±0.20
MSH2512N3W0-series R001~R010	3.20±0.20	6.40±0.20	1.20±0.2	0.80±0.20

4. 產品結構及使用材料說明 (參考圖 2) / STRUCTURE & MATERIAL (Ref to Fig.2)

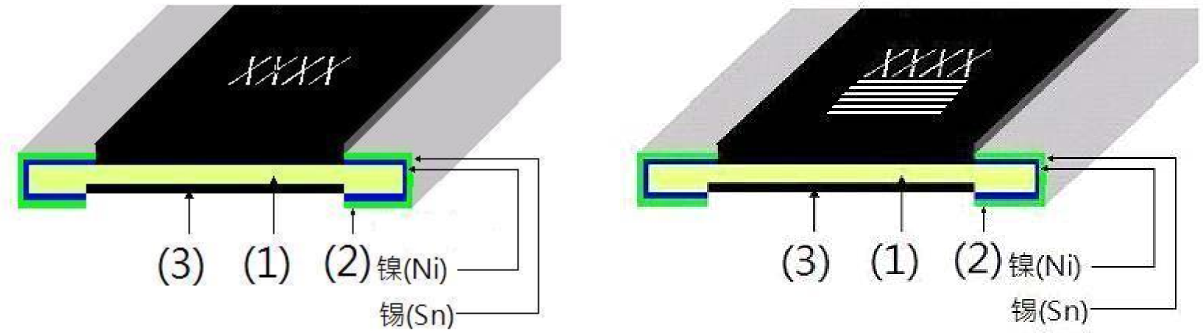


圖 2 / Fig.2

4.1 電阻本體 / Resistive element(1) : 合金 / metal – alloy

4.2 端電極 / Terminal electrode(3) : 鎳、錫/ Ni、Sn

4.3 保護防焊層 / Protective coating(2) : 防火級環氧樹脂,符合 UL- 94-V0 要求(黑色)/
Flame-retardant epoxy, meets UL- 94-V0 requirements (black)

5. 產品特性及信賴性測試規範 / PRODUCT CHARACTERISTICS AND RELIABILITY TEST STANDARD

測試方法 **Parameter**	條件 **Conditions**	允收標準 **Requirements**
瞬間過載測試 / Short Time Over Load	2W : R001 :P= 3Pr ; T=25±2ºC , t = 5sec. R002~ R010 :P= 5Pr ; T=25±2ºC , t = 5sec. 3W : P= 3Pr ; T=25±2ºC , t = 5sec.	±(1.0%+0.5mΩ) IEC60115-1 4.13
高溫測試 / High Temp. Exposure	T = +170±2ºC ; t = 1000h	±(1.0%+0.5mΩ) IEC60115-1 4.25
低溫測試 / Low Temp. Storage	T = -55±2ºC ; t = 1000h	±(1.0%+0.5mΩ) IEC60115-1 4.25
濕度負載壽命測試 / Moisture Load Life （60℃、95%RH）	Vtest = Vmax ; T=60±2ºC ; RH=95% ; t= 90min ON , 30min OFF , 1000h	±(2.0%+0.5mΩ) IEC60115-1 4.25
冷熱衝擊測試 / Thermal Shock	[-55ºC 30min. → R.T. 3min. → +150ºC 30min. → R.T. 3min], 100個連續循環 / 100Cycles	±(1.0%+0.5mΩ) IEC60115-1 4.19
在70ºC下負載壽命測試 / Load Life at 70ºC	Vtest = Vmax ; T=70±2ºC ;t= 90min ON , 30min OFF,1000h	±(2%+0.5mΩ) IEC60115-1 4.25
可焊性測試 / Solderability	浸入錫爐 / Dip into solder at T = 245±5ºC , t = 3±0.5sec.	錫涵蓋面積/The covered area >95% IEC60115-1 4.17
抗焊熱性測試 / Resistance to Solder Heat	經熱風式迴焊爐 / Through Reflow T= 265±5ºC , t =20±1sec.	±(1.0%+0.5mΩ) IEC60115-1 4.18
機械衝擊測試 / Mechanical Shock	加速度a =100G , 振幅時間t =11ms, 5個衝擊 a =100G , t =11ms, 5 times shock	±(1.0%+0.5mΩ) IEC60115-1 4.21
基板彎曲測試 / Substrate Bending	兩支撐點間距 / Span between fulcrums ：90mm ; 振幅 / Bend Width：2mm ; 測試板/Test board：玻璃纖維板/ Glass-Epoxy Board ;厚度 / Thickness =1.6mm	±(1.0%+0.5mΩ) IEC60115-1 4.33

6. 電氣特性 / ELECTRICAL CHARACTERISTICS

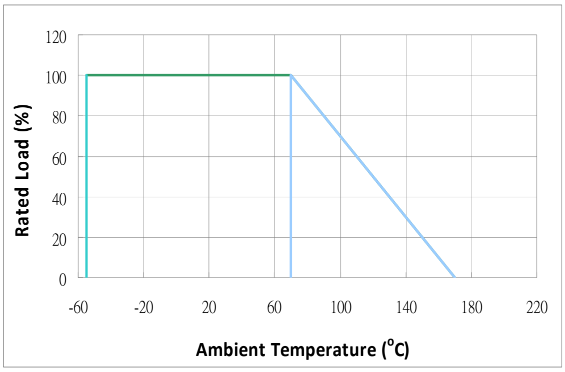
Part Number	**Resistance Value (mΩ)**	**Power Rating** (Watt)	**Resistance Tolerance (%)**	**TCR** (ppm)
MSH2512N2W0-series R001~R010	1~3	2	±1%(F)	±100
	4~10			±75

Part Number	**Resistance Value (mΩ)**	**Power Rating** (Watt)	**Resistance Tolerance (%)**	**TCR** (ppm)
MSH2512N3W0-series R001~R010	1~3	3	±1%(F)	±100
	4~10			±75

7. 環境特性 / ENVIRONMENTAL CHARACTERISTIC

7-1 操作溫度範圍: -55℃～170℃ / Operating Temperature:-55℃～170℃

額定功率溫度衰變曲線 / Typical Thermal Derating Curve
額定功率乃指於 70 ºC 以內可連續滿額功率使用的術語.
下圖為當操作溫度高於 70ºC 時的可使用功率衰減曲線.
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 存儲條件 / STORAGE CONDITIONS

在溫度+10℃～40℃、相對濕度≦75%的密閉條件下可存放2年。 /
Under airtight in temperature+10℃～40℃、relative humidity ≦75% can store 2 years.
在溫度+10℃～60℃、相對濕度為95%的非露天下最多可存放30 天。 /
Without dew in temperature+10℃～60℃、relative humidity be 95% maximum value for 30days.

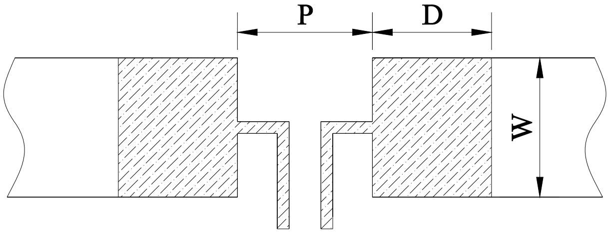
8. 焊錫墊尺寸及焊接條件 / SOLDER PAD SIZE AND WELDING CONDITIONS

8-1 建議如下圖焊接方式焊接，並滿足所要求的尺寸。/ Propose that the following picture installation way is installed, and satisfied the required size.

Part Number	P	W	D	t	Loading
MSH2512N2W0-series R001~R010	3.18mm	3.57mm	2.11mm	105μ	2.0W

Part Number	P	W	D	t	Loading
MSH2512N3W0-series R001~R010	3.18mm	3.57mm	2.11mm	105μ	3.0W

t : 元件焊墊金屬層厚度 (min.) / Thickness of pad metal (min.)
loading : 適用於本司建議焊墊設計並使用於限定穩定電流下 /
suit for specific pad layout and specific steady current



8-2 建議客戶焊接參數 / Recommended Customer Soldering Parameters

8-2-1 波峰焊溫度曲線 / Wave solder Temperature condition (圖 3 / Fig.3)

預熱段 / Preheating : 100℃~130℃, max.100 sec.
焊錫段 / Soldering: 250℃~265℃ max. 10 sec.
允許最高溫度 / Maximum temperature : 260±5℃, max. 10sec.

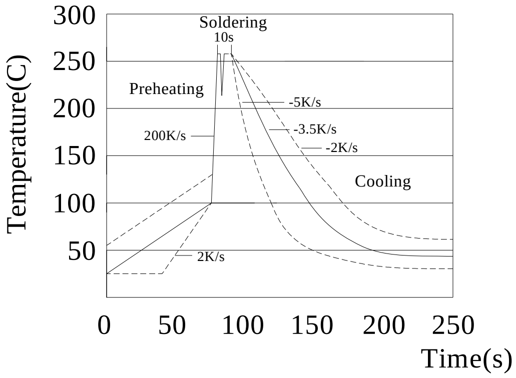


圖 3 / Fig.3

8-2-2 回流焊溫度曲線 / Solder reflow Temperature condition (圖 4 / Fig.4)

預熱段 / Preheating : 145 ± 15℃, max.120 sec.
焊錫段 / Soldering : min. 220℃, max. 60 sec.
允許最高溫度 / Maximum temperature : 260±5℃, max. 10sec.

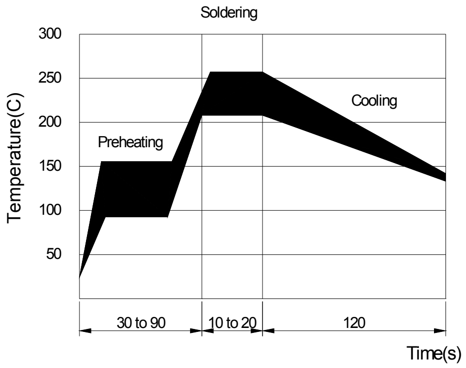


圖4 / Fig.4

8-2-3 允許烙鐵焊接條件(熱風設備) / Rework temperature（hot air equipment）：350℃, 3~5seconds

8-2-4 焊接方法建議 / Recommended reflow methods

焊接熱源方式可用紅外線, 熱蒸氣, 熱風. / IR, vapor phase oven, hot air oven
如果焊錫溫度超過允許最高溫度, 則產品本身會有功能損壞的疑慮. / If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

9. 批量生産後出貨測試項目 / Lot ACCEPTANCE TEST REQUIREMENTS

9-1 外觀 / Visual

方法 / Procedure : 利用放大鏡進行檢查 / Visual
標準 / Acceptance Criteria : 不能有髒污、不潔、文印錯誤、破損等 / No parts are outstandingly stained

9-2 尺寸 / Dimensions

方法 / Procedure : 使用合適且經校正的尺規 / As appropriate, calipers, micrometers, optical comparator, or approved gages
標準 / Acceptance Criteria : 尺寸均在規定標準範圍內 / No parts outside specific dimensions

9-3 單體元件電阻(Ro) / Resistance (Ro)

方法 / Procedure : 在 25℃ 下利用四線量測技術量測之 / Resistance shall be measured with 25 ℃ in the 4-wire resistance test
標準 / Acceptance Criteria : 電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 電阻溫度係數 / TCR

方法 / Procedure : 利用四線法量測出元件分別在 25℃ 及125℃ 下的電阻值, 並將其帶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
標準 / Acceptance Criteria : 溫度係數值均在規定標準範圍內 / All parts must within the specific
$TCR = (Rb-Ra)/Ra \times 1/(Tb-Ta) \times 10^{6}$

9-5 絕緣電阻 / Insulation resistance (Ri)

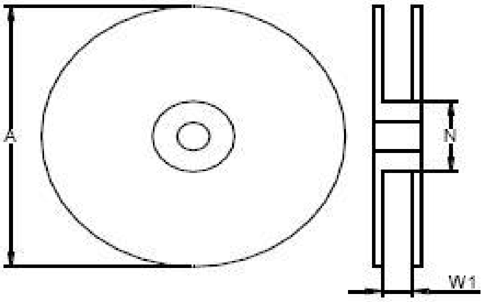
方法 / Procedure :利用絕緣測試儀量測 / Resistance between protective layer and resistive shall be measured by high ohm meter
標準 / Acceptance Criteria : 防焊層與電阻本體絕緣電阻至少高於100MΩ / The resistance of the test device shall over 100MΩ

10. 包裝訊息 / PACKAGING INFORMATION

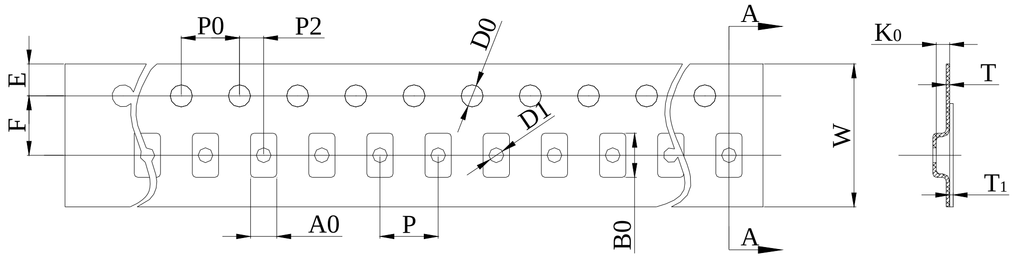
10-1 包裝數量、重量 / QUANTITY & WEIGHT

型號 / Type Number	數量 / Quantity (pcs)	重量 / Weight（g）
MSH2512N2W0-series	1,500	265±25
MSH2512N3W0-series	1,500	265±25

10-2 捲輪規格 / Reel & Tape specifications



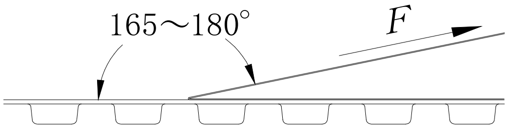
型號 / Type Number	A±5 (mm)	N±2 (mm)	W1±1 (mm)
MSH2512N2W0-series	178	60	13
MSH2512N3W0-series	178	60	13



MSH2512N2W0-series							
W	12.00 ± 0.30	P0	4.00 ± 0.10	P	8.00 ± 0.10	P2	2.00 ± 0.10
A0	3.90 ± 0.20	B0	6.75 ± 0.20	D0	1.55 ± 0.10	F	5.50 ± 0.10
E	1.75 ± 0.10	T	0.25 ± 0.10	T1	Max. 0.1	K0	1.50 -0.10/+0.2

10-3 密封膠膜剝離強度要求 / Peeling Strength of Seal Tape

F = 剝離強度 : 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規格書的要求，必須經由雙方協商確認. / In the event that an impropriety is found beyond this specification ,it shall be fixed by mutual agreement between the parties.

11-2 如果本規格書有不適當的情況，必須通過雙方協商並由本公司修改. / In the event that an impropriety is found in this specification , WALTER ELECTRONIC CO., LTD. shall amend it by mutual agreement between the parties.