

1. 適用範圍 / SCOPE

此份規格書涵蓋 HTE2512C3W0-series 金屬陶瓷電流感測電阻元件相關規格.

This specification covers HTE2512C3W0-series devices, which are Metal Strip Current Sensing Resistor.

2. 產品型號/TYPE NUMBER

HTE2512	C	3W0	R001~ R100	*
(1)	(2)	(3)	(4)	(5)

- (1) 產品系列號 / SERIES NUMBER : HTE2512 = 長電極/ Long electrode(high power) ; 兩端子 / two terminal ; 有側導 / with side electrode ; 尺寸 / size “0.25×0.12”
- (2) 產品材質 / Material : C = 銅合金 / Cu alloy
- (3) 產品瓦特數 / Power Rating : Ex. 3W0=3.0 Watt
- (4) 產品阻值 / Nominal Resistance Value : Ex. 1mΩ →R001 ;5mΩ →R005 ; 10mΩ →R10
- (5) 元件電阻偏差值 / Resistance Tolerance : Ex. D=0.5% ; F=±1%

3. 產品尺寸 / PRODUCT DIMENSIONS

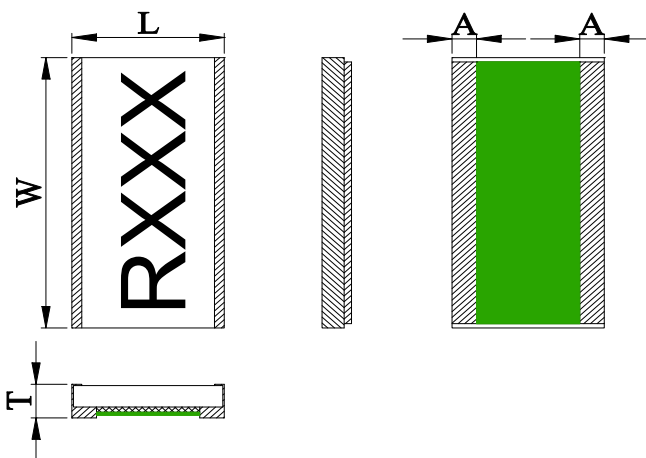


圖 1 / Fig.1

Part Number	w	L	T	A
HTE2512C3W0-series R001	6.40±0.30	3.20±0.30	0.65±0.20	1.25±0.30
HTE2512C3W0-series R002~R100	6.40±0.30	3.20±0.30	0.65±0.20	0.60±0.30

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

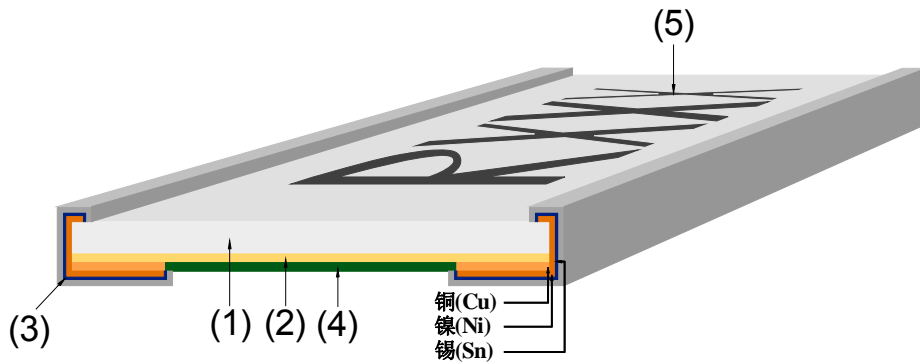


圖 2 / Fig.2

- 4.1 基板 / Substrate(1) : 氧化鋁陶瓷基板 / Alumina Ceramic
- 4.2 電阻本體 / Resistive element(2) : 銅合金 / Cu - alloy
- 4.3 端電極 / Terminal electrode(3) : 錫、鎳、銅 / Sn、Ni、Cu
- 4.4 保護防焊層 / Protective coating(4) : 防火級環氧樹脂,符合 UL- 94-V0 要求(綠色) /
Flame-retardant epoxy, meets UL- 94-V0 requirements(green)
- 4.5 文印防焊層 / Marking coating(5) : 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. 電氣特性 / ELECTRICAL CHARACTERISTICS

Resistance Value (mΩ)	Power Rating (Watt)	Resistance Tolerance (%)	TCR (ppm)
1~9	3.0	±1%(F)	±100
10~100	3.0	±0.5%(D) / ±1%(F)	±50

規格外阻值可依客戶需求提供 / We can provide other resistance value per request

6. 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	$P = 2.5P_r$; $T = 25 \pm 2^\circ\text{C}$, $t = 5\text{sec.}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.13
高溫測試 / 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
低溫測試 / 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
濕度負載壽命測試 / Moisture Load Life (60°C 、 $95\%RH$)	$V_{\text{test}} = V_{\text{max}}$; $T = 60 \pm 2^\circ\text{C}$; $RH = 95\%$; $t = 90\text{min ON}$, 30min OFF , 1000h	$\pm(2.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
冷熱衝擊測試 / Thermal Shock	$[-55^\circ\text{C } 30\text{min.} \rightarrow \text{R.T. } 3\text{min.} \rightarrow +150^\circ\text{C } 30\text{min.}$ $\rightarrow \text{R.T. } 3\text{min.}]$, 100 個連續循環 / 100Cycles	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.19
在 70°C 下負載壽命測試 / Load Life at 70°C	$V_{\text{test}} = V_{\text{max}}$; $T = 70 \pm 2^\circ\text{C}$; $t = 90\text{min ON}$, 30min OFF , 1000h	$\pm(2\% + 0.5\text{m}\Omega)$ IEC60115-1 4.25
可焊性測試 / Solderability	浸入錫爐 / Dip into solder at $T = 245 \pm 5^\circ\text{C}$, $t = 3 \pm 0.5\text{sec.}$	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 $T = 275 \pm 5^\circ\text{C}$, $t = 20 \pm 1\text{sec.}$	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.18
機械衝擊測試 / Mechanical Shock	加速度 $a = 100G$, 振幅時間 $t = 11\text{ms}$, 5 個衝擊 $a = 100G$, $t = 11\text{ms}$, 5 times shock	$\pm(1.0\% + 0.5\text{m}\Omega)$ 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	$\pm(1.0\% + 0.5\text{m}\Omega)$ IEC60115-1 4.33

7. 環境特性 / ENVIRONMENTAL CHARACTERISTIC

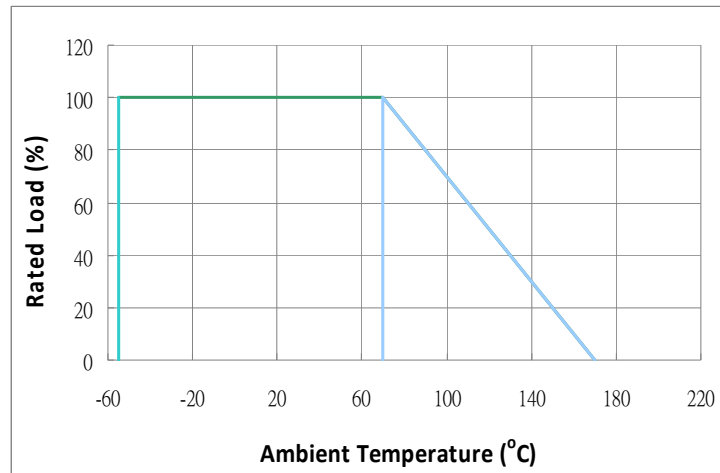
7-1 操作溫度範圍: $-55^\circ\text{C} \sim 170^\circ\text{C}$ / Operating Temperature: $-55^\circ\text{C} \sim 170^\circ\text{C}$

額定功率溫度衰變曲線 / Typical Thermal Derating Curve

額定功率乃指於 70°C 以內可連續滿額功率使用的術語。

下圖為當操作溫度高於 70°C 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°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 存儲條件 / STORAGE CONDITIONS

在溫度+10°C~40°C、相對濕度 $\leq 75\%$ 的密閉條件下可存放2年。 /

Under airtight in temperature+10°C~40°C、relative humidity $\leq 75\%$ can store 2 years.

在溫度+10°C~60°C、相對濕度為95%的非露天下最多可存放30天。 /

Without dew in temperature+10°C~60°C、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

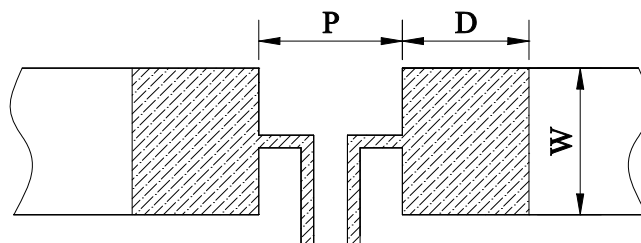
8-1 建議如下圖焊接方式焊接，並滿足所要求的尺寸。 / Propose that the following picture installation way is installed, and satisfied the required size.

Part Number	P	W	D	t	Loading
HTE2512C3W0-series R001	0.60mm	7.25mm	2.75mm	105 μ	3.0w
HTE2512C3W0-series R002~R100	1.40mm	7.25mm	2.35mm	105 μ	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°C~130°C, max.100 sec.

焊錫段 / Soldering: 250°C~265°C max. 10 sec.

允許最高溫度 / Maximum temperature : 260±5°C, max. 10sec.

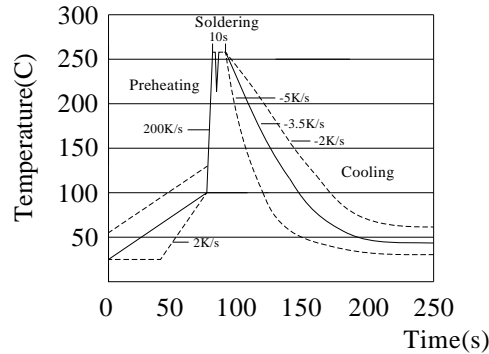


圖 3 / Fig.3

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

預熱段 / Preheating : 145 ± 15°C, max.120 sec.

焊錫段 / Soldering : min. 220°C, max. 60 sec.

允許最高溫度 / Maximum temperature : 260±5°C, max. 10sec.

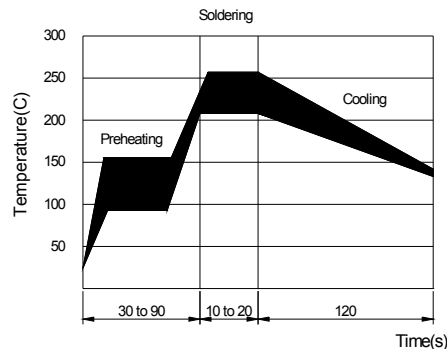


圖4 / Fig.4

8-2-3 允許烙鐵焊接條件(熱風設備) / Rework temperature (hot air equipment) : 350°C, 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. 批量生產後出貨測試項目 / Lot ACCEPTANCE TEST REQUIREMENTS

每一批生產均須作入庫檢驗, 每一批生產單量不可超過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°C 下利用四線量測技術量測之 / Resistance shall be measured with 25 °C 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°C 及125°C 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°C and 125°C 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 $TCR = (R_b - R_a) / R_a \times 1 / (T_b - T_a) \times 10^6$

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

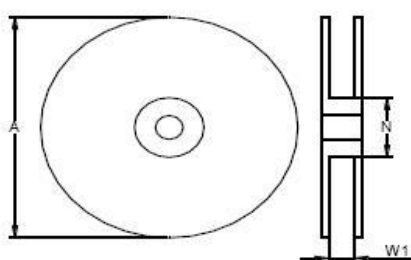
標準 / Acceptance Criteria : 防焊層與電阻本體絕緣電阻至少高於100MΩ / The resistance of the test device shall over 100MΩ

10. 包裝訊息 / PACKAGING INFORMATION

10-1 包裝數量、重量 / QUANTITY & WEIGHT

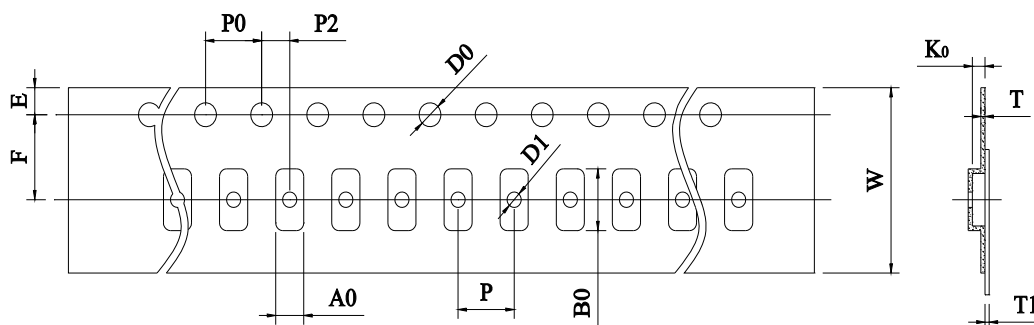
型號 / Type Number	數量 / Quantity (pcs)	重量 / Weight (g)
HTE2512C3W0-series	4,000	275±20

10-2 捲輪規格 / Reel & Tape specifications



Unit(mm)

$A \pm 5$	$N \pm 2$	$W1 \pm 1$
178	60	13



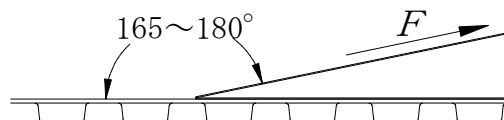
Unit(mm)

W	12.00 ± 0.30	D0	1.50 ± 0.10
P0	4.00 ± 0.10	F	5.50 ± 0.10
P	4.00 ± 0.10	E	1.75 ± 0.10
P2	2.00 ± 0.10	T	0.25 ± 0.10
A0	3.40 ± 0.20	T1	Max. 0.1
B0	6.75 ± 0.20	K0	0.90 ± 0.20

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 , ELLON ELECTRONIC CO., LTD. shall amend it by mutual agreement between the parties.