



# HoYH 陶瓷合金系列规格书

|      |            |
|------|------------|
| 系列号  | HoYH       |
| 修订日期 | 2020-04-22 |
| 版本号  | Ho-A0      |



## 规格书 Specification

制造商:深圳市毫欧电子有限公司

HoYH

适用: 本规格书适用于深圳市毫欧电子有限公司陶瓷合金HoYH系列产品选型。

包含: HoYH0603、HoYH0805、HoYH1206、HoYH2010、HoYH3921

### 产品特点 Features:

陶瓷合金芯片, 封体工艺, 焊接性能良好

高可靠性, 高过载能力, 产品精度高。

使用温度范围较宽无感型设计

电阻温度系数  $TCR \times 10^{-6}/^{\circ}C \leq 100ppm$

符合ROHS 要求和无卤要求

### 产品名称 Product Name

陶瓷合金电阻

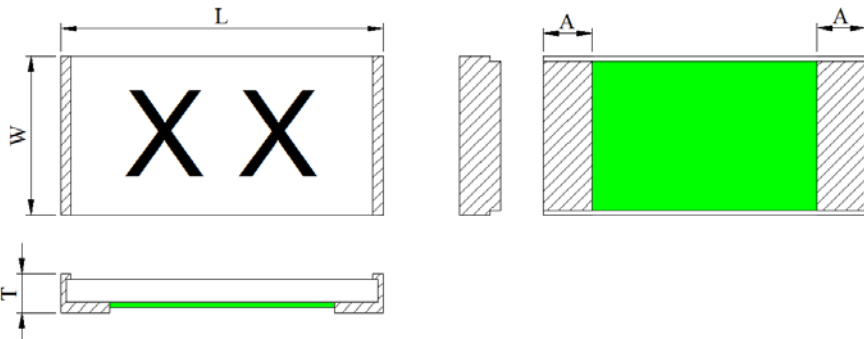
### 产品型号 Product number

| Ho      | YH      | 1206 | 1W      | 5mR    | 1%      |
|---------|---------|------|---------|--------|---------|
| 制造商     | 产品系列    | 封装   | 额定功率(W) | 阻值(mR) | 精度(%)   |
| Ho 毫欧电子 | YH 陶瓷合金 | 0603 | 1/2     | 2~9    | 1%      |
|         |         |      |         | 10~75  | 0.5%/1% |
|         |         | 0805 | 3/4     | 2~9    | 1%      |
|         |         |      |         | 10~200 | 0.5%/1% |
|         |         | 1206 | 1       | 2~9    | 1%      |
|         |         |      |         | 10~500 | 0.5%/1% |
|         |         | 2010 | 1.5     | 2~9    | 1%      |
|         |         |      |         | 10~400 | 0.5%/1% |
|         |         | 3921 | 3       | 2~9    | 1%      |
|         |         |      |         | 10~100 | 0.5%/1% |



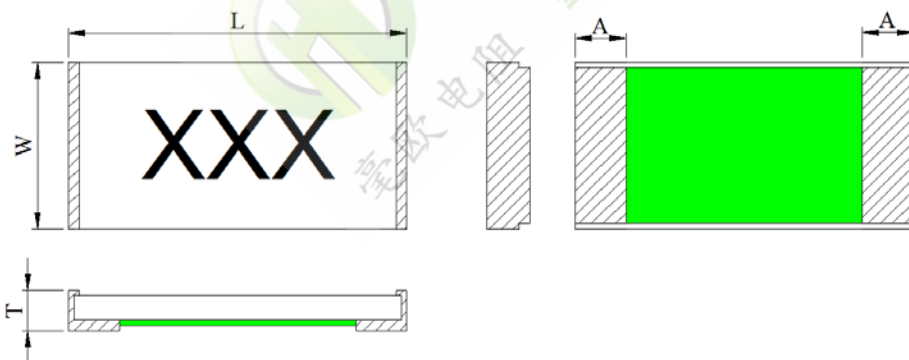
地址: 深圳市龙华新区观澜大布头路南通邦高新产业园 A 栋 8 楼

## ■ 产品尺寸 Product Size



单位(mm)

| Part Number               | W         | L         | T         | A         |
|---------------------------|-----------|-----------|-----------|-----------|
| HoYH0603-1/2W<br>2mR~5mR  | 0.90±0.20 | 1.70±0.20 | 0.65±0.20 | 0.50±0.20 |
| HoYH0603-1/2W<br>6mR~75mR | 0.90±0.20 | 1.70±0.20 | 0.65±0.20 | 0.40±0.20 |



单位(mm)

| Part Number                | W         | L         | T         | A         |
|----------------------------|-----------|-----------|-----------|-----------|
| HoYH0805-3/4W<br>2mR~3mR   | 1.35±0.20 | 2.10±0.20 | 0.65±0.20 | 0.65±0.20 |
| HoYH0805-3/4W<br>4mR~200mR | 1.35±0.20 | 2.10±0.20 | 0.65±0.20 | 0.50±0.20 |



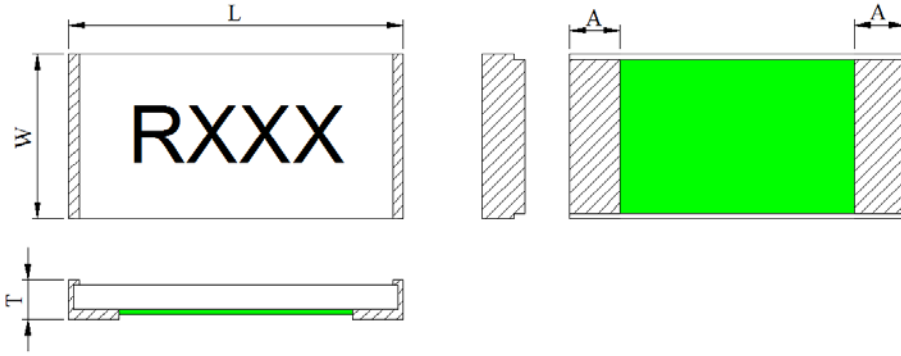
毫欧电阻 毫欧制造

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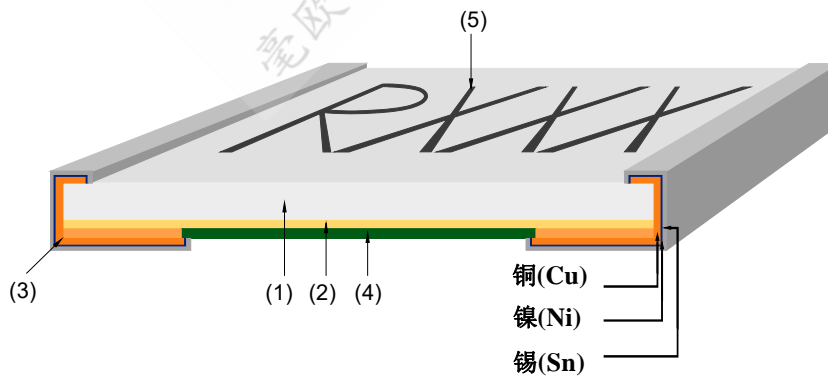
版本号 Ho-A0



单位(mm)

| Part Number                | W         | L          | T         | A         |
|----------------------------|-----------|------------|-----------|-----------|
| HoYH1206-1W<br>2mR~4mR     | 1.70±0.20 | 3.30±0.20  | 0.65±0.2  | 1.20±0.30 |
| HoYH1206-1W<br>5mR~500mR   | 1.70±0.20 | 3.30±0.20  | 0.65±0.2  | 0.68±0.30 |
| HoYH2010-1.5W<br>2mR~3mR   | 2.60±0.20 | 5.10±0.20  | 0.65±0.20 | 2.10±0.30 |
| HoYH2010-1.5W<br>4mR~400mR | 2.60±0.20 | 5.10±0.20  | 0.65±0.20 | 0.70±0.30 |
| HoYH3921-3W<br>2mR         | 5.10±0.30 | 11.10±0.30 | 0.65±0.20 | 4.90±0.30 |
| HoYH3921-3W<br>3mR         | 5.10±0.30 | 11.10±0.30 | 0.65±0.20 | 4.55±0.30 |
| HoYH3921-3W<br>4mR~100mR   | 5.10±0.30 | 11.10±0.30 | 0.65±0.20 | 2.36±0.30 |

## ■ 产品结构及使用材料说明 STRUCTURE & MATERIAL



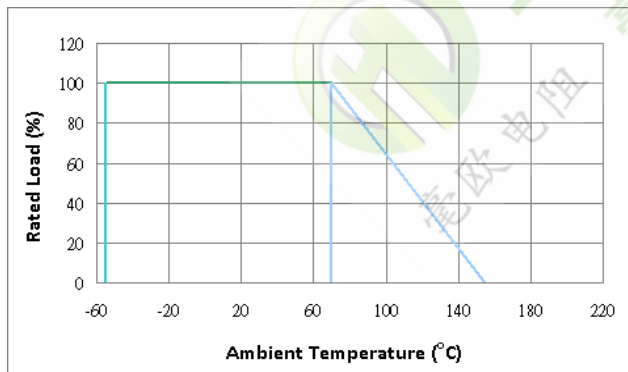
- 4.1 基板 Substrate(1) : 氧化铝陶瓷基板 Alumina Ceramic
- 4.2 粘著层 Adhesion layer(2) : 环氧树脂 Epoxy
- 4.3 电阻本体 Resistive element(3) : M = 锰铜合金 MnCu alloy
- 4.4 两端电极 Terminal electrode(4) : 锡、镍、铜 Sn、Ni、Cu
- 4.5 保护防焊层 Protective coating(5) : 防火级环氧树脂,符合 UL- 94-V0 要求(绿色) Flame-retardant epoxy, meets UL- 94-V0 requirements(green)
- 4.6 文印防焊层 Marking coating(6) : 防火级环氧树脂,符合 UL-94-V0 要求(黑色)

## ■ 电气参数 Electrical parameter

| Part Number | Resistance Value (mΩ) | Power Rating (Watt) | Resistance Tolerance (%) | TCR (ppm) |
|-------------|-----------------------|---------------------|--------------------------|-----------|
| HoYH0603    | 2~9                   | 1/2                 | ±1%                      | ±100      |
|             | 10~75                 | 1/2                 | ±0.5% / ±1%              | ±50       |
| HoYH0805    | 2~9                   | 3/4                 | ±1%                      | ±100      |
|             | 10~200                | 3/4                 | ±0.5% / ±1%              | ±50       |
| HoYH1206    | 3~9                   | 1.0                 | ±1%                      | ±100      |
|             | 10~500                | 1.0                 | ±0.5% / ±1%              | ±50       |
| HoYH2010    | 2~9                   | 1.5                 | ±1%                      | ±100      |
|             | 10~400                | 1.5                 | ±0.5% / ±1%              | ±50       |
| HoYH3921    | 2~9                   | 3.0                 | ±1%                      | ±100      |
|             | 10~100                | 3.0                 | ±0.5% / ±1%              | ±50       |

## ■ 功率曲线 Power curve

操作温度范围 -55 ~ +155 °C 电阻温度达到 70°C 时降功率示意图



## ■ 存储条件 STORAGE CONDITIONS

在温度+10°C~40°C、相对湿度≤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。

■ 额定电流计算公式 The rated current is calculated by the following Formu

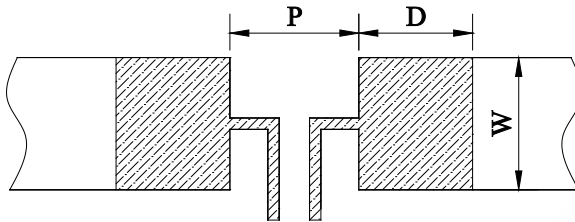
$$I = \sqrt{P/R}$$

I :Rated Current (A)

P:Rated Power (W)

R:Resistance Value ( $\Omega$ )

■ 建议焊盘尺寸 Recommended Solder Pad Dimension

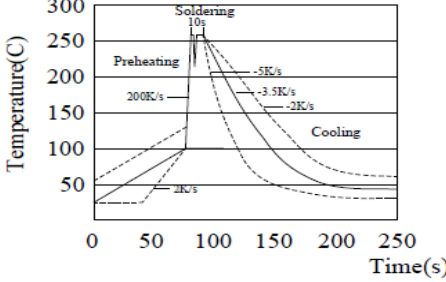
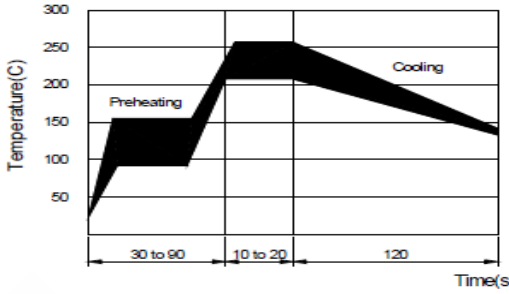


单位: mm

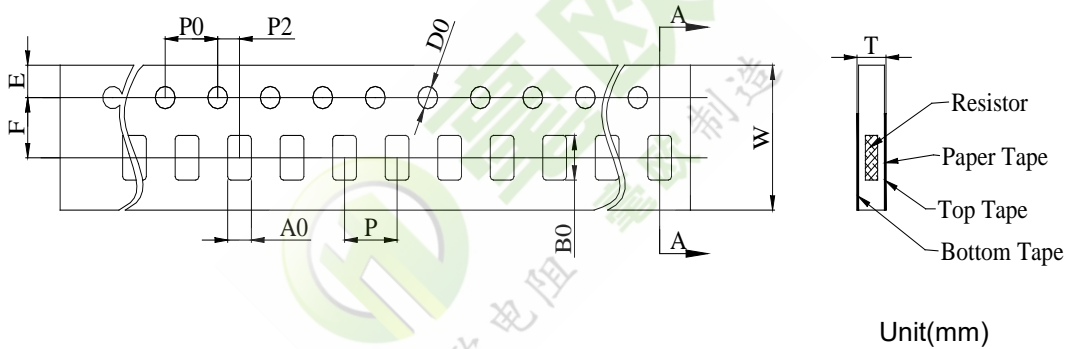
| Part Number                 | P    | W    | D    |
|-----------------------------|------|------|------|
| HoYH0603-1/2W<br>R002~R005  | 0.50 | 0.92 | 1.35 |
| HoYH06031/2W<br>R006~R075   | 0.60 | 0.92 | 1.30 |
| HoYH0805-3/4 W<br>R002~R006 | 0.80 | 1.44 | 1.40 |
| HoYH0805-3/4W<br>R007~R200  | 0.80 | 1.44 | 1.40 |
| HoYH1206-1W<br>R002~R004    | 0.60 | 1.84 | 2.10 |
| HoYH1206-1W<br>R005~R008    | 1.20 | 1.84 | 1.80 |
| HoYH1206-1W<br>R009~R500    | 1.20 | 1.84 | 1.80 |
| HoYH2010-1.5W<br>R002~R003  | 0.70 | 2.88 | 3.65 |
| HoYH2010-1.5W<br>R004~R009  | 2.70 | 2.88 | 2.65 |
| HoYH2010-1.5W<br>R010~R400  | 2.70 | 2.88 | 2.65 |
| HoYH3921-3W<br>R002         | 1.10 | 5.75 | 6.45 |
| HoYH3921-3W<br>R003         | 1.70 | 5.75 | 6.15 |
| HoYH3921-3W<br>R004~R100    | 5.00 | 5.75 | 4.50 |

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## ■ 建议焊接参数 / Recommended Customer Soldering Parameters

|   |  |
|---|--|
| 预热 / Preheating : 100°C~130°C, max.100 sec.<br>焊锡 / Soldering: 250°C~265°C max. 10 sec.<br>最高温度 / Maximum temperature : 260±5°C, max. 10sec.  | 预热/ Preheating : 145 ± 15°C, max.120 sec.<br>焊锡/ Soldering : min. 220°C, max. 60 sec.<br>最高温度 / Maximum temperature : 260±5°C, max. 10sec.   |
| <b>波峰焊曲线图</b><br> <p>The graph shows a temperature profile for wave soldering. The y-axis is Temperature (C) from 50 to 300. The x-axis is Time (s) from 0 to 250. The profile includes a preheating phase (0-100s) with a 200K/s ramp, a soldering phase (100-110s) at 260°C, and a cooling phase (110-250s) with a -5K/s ramp. A 10s dwell is shown at the peak temperature.</p> | <b>回流焊曲线图</b><br> <p>The graph shows a temperature profile for reflow soldering. The y-axis is Temperature (C) from 50 to 300. The x-axis is Time (s) from 0 to 120. The profile includes a preheating phase (0-30s) with a 30 to 90s dwell at 145°C, a soldering phase (30-40s) at 260°C with a 10 to 20s dwell, and a cooling phase (40-120s) with a 120s dwell.</p> |

## ■ 彩带尺寸 Ribbon size(Unit:mm)

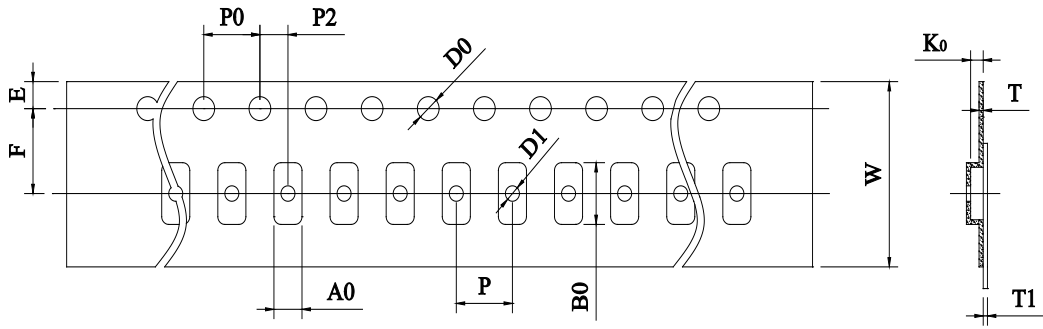


| HoYH0603-1/2W |             |    |             |    |             |    |             |
|---------------|-------------|----|-------------|----|-------------|----|-------------|
| W             | 8.00 ± 0.30 | P0 | 4.00 ± 0.10 | P  | 4.00 0.10   | P2 | 2.00 0.10   |
| A0            | 1.18 ± 0.20 | B0 | 1.98 ± 0.20 | D0 | 1.50 ± 0.10 | F  | 3.50 ± 0.10 |
| E             | 1.75 ± 0.10 | T  | 0.75 ± 0.20 | /  | /           | /  | /           |

| HoYH0805-3/4W |             |    |             |    |             |    |             |
|---------------|-------------|----|-------------|----|-------------|----|-------------|
| W             | 8.00 ± 0.30 | P0 | 4.00 ± 0.10 | P  | 4.00 0.10   | P2 | 2.00 0.10   |
| A0            | 1.68 ± 0.20 | B0 | 2.38 ± 0.20 | D0 | 1.50 ± 0.10 | F  | 3.50 ± 0.10 |
| E             | 1.75 ± 0.10 | T  | 0.87 ± 0.20 | /  | /           | /  | /           |

| HoYH1206-1W |             |    |             |    |             |    |             |
|-------------|-------------|----|-------------|----|-------------|----|-------------|
| W           | 8.00 ± 0.30 | P0 | 4.00 ± 0.10 | P  | 4.00 0.10   | P2 | 2.00 0.10   |
| A0          | 2.05 ± 0.20 | B0 | 3.65 ± 0.20 | D0 | 1.50 ± 0.10 | F  | 3.50 ± 0.10 |
| E           | 1.75 ± 0.10 | T  | 0.87 ± 0.10 | /  | /           | /  | /           |

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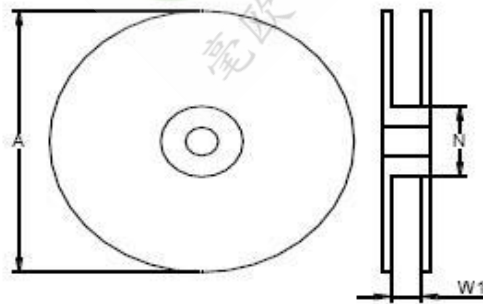


Unit(mm)


| HoYH2010-1.5W |             |    |             |    |             |    |             |
|---------------|-------------|----|-------------|----|-------------|----|-------------|
| W             | 12.00 0.30  | P0 | 4.00 ± 0.10 | P  | 4.00 0.10   | P2 | 2.00 0.10   |
| A0            | 2.85 ± 0.20 | B0 | 5.45 ± 0.20 | D0 | 1.50 ± 0.10 | F  | 5.50 ± 0.10 |
| E             | 1.75 ± 0.10 | T  | 0.25 ± 0.10 | T1 | Max. 0.1    | K0 | 0.80 0.20   |

| HoYH3921-3W |              |    |              |    |             |    |              |
|-------------|--------------|----|--------------|----|-------------|----|--------------|
| W           | 24.00 ± 0.30 | P0 | 4.00 ± 0.10  | P  | 8.00 ± 0.10 | P2 | 2.00 ± 0.10  |
| A0          | 5.50 ± 0.20  | B0 | 11.50 ± 0.20 | D0 | 1.50 ± 0.10 | F  | 11.50 ± 0.10 |
| E           | 1.75 ± 0.10  | T  | 0.30 ± 0.10  | T1 | Max. 0.1    | K0 | 0.90 ± 0.20  |

■ 卷轴规格 Reel Specification



| 型号 / Type Number | A±5 (mm) | N±2 (mm) | W1±1 (mm) |
|------------------|----------|----------|-----------|
| HoYH0603         | 178      | 60       | 9.0       |
| HoYH0805         | 178      | 60       | 9.0       |
| HoYH1206         | 178      | 60       | 9.0       |
| HoYH2010         | 178      | 60       | 13        |
| HoYH3921         | 178      | 60       | 24.5      |

|  |                       |      |            |
|--|-----------------------|------|------------|
| <br>毫欧电阻 毫欧制造 | <b>HoYH 陶瓷合金系列规格书</b> | 系列号  | HoYH       |
|  |                       | 修订日期 | 2020-04-22 |
|  |                       | 版本号  | Ho-A0      |

## ■ 性能测试 Performance Testing

| 测试方法<br>Parameter                          | 条件<br>Conditions  | 允收标准<br>Requirements                                 |
|--|---|--|
| 瞬间过载测试 / Short Time Over Load              | $P = 2.5P_r$ ; $T = 25 \pm 2^\circ\text{C}$ , $t = 5\text{sec.}$  | $\pm (1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.13 |
| 高温测试 / High Temp. Exposure                 | $T = +170 \pm 2^\circ\text{C}$ ; $t = 1000\text{h}$   | $\pm (1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.25 |
| 低温测试 / Low Temp. Storage                   | $T = -55 \pm 2^\circ\text{C}$ ; $t = 1000\text{h}$  | $\pm (1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.25 |
| 湿度负载寿命测试 / Moisture Load Life (60°C、95%RH) | $V_{\text{test}} = V_{\text{max}}$ ; $T = 60 \pm 2^\circ\text{C}$ ; $\text{RH} = 95\%$ ; $t = 90\text{min ON}$ , $30\text{min OFF}$ , $1000\text{h}$                                      | $\pm (2.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.25 |
| 冷热动击测试 / Thermal Shock                     | $[-55^\circ\text{C } 30\text{min.} \rightarrow \text{R.T. } 3\text{min.} \rightarrow +155^\circ\text{C } 30\text{min.} \rightarrow \text{R.T. } 3\text{min.}]$ ,<br>100 个连续循环 / 100Cycles | $\pm (1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.19 |
| 在 70°C 下负载寿命测试 / Load Life at 70°C         | $V_{\text{test}} = V_{\text{max}}$ ; $T = 70 \pm 2^\circ\text{C}$ ; $t = 90\text{min ON}$ , $30\text{min OFF}$ , $1000\text{h}$   | $\pm (2\% + 0.5\text{m}\Omega)$<br>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%<br>IEC60115-1 4.17     |
| 抗焊热性测试 / Resistance to Solder Heat         | 经热风式回焊炉 / Through Reflow $T = 275 \pm 5^\circ\text{C}$ , $t = 20 \pm 1\text{sec.}$  | $\pm (1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.18 |
| 机械热击测试 / Mechanical Shock                  | 加速度 $a = 100\text{G}$ , 振幅时间 $t = 11\text{ms}$ , 5 个热击 $a = 100\text{G}$ , $t = 11\text{ms}$ , 5 times shock  | $\pm (1.0\% + 0.5\text{m}\Omega)$<br>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 ;<br>测试板 / Test board: 玻璃纤维板 / Glass-Epoxy Board ; 厚度 / Thickness = 1.6mm  | $\pm (1.0\% + 0.5\text{m}\Omega)$<br>IEC60115-1 4.33 |

## ■ 包装方式 Packing

| 型号 / Type Number | 数量 / Quantity (pcs) | 重量 / Weight (g) |
|------------------|---------------------|-----------------|
| HoYH0603         | 5,000               | 130±30          |
| HoYH0805         | 5,000               | 150±30          |
| HoYH1206         | 5,000               | 160±40          |
| HoYH2010         | 4,000               | 210±40          |
| HoYH3921         | 2,000               | 510±60          |