 毫欧电阻 毫欧制造	HoGX封体合金系列规格书	系列号	HoGX
		修订日期	2019-11-25
		版本号	Ho-A0

# 规格书 Specification

制造商:深圳市毫欧电子有限公司

HoGX

适用: 本规格书适用于深圳市毫欧电子有限公司HoGX封体合金系列产品选型。

包含: HoGX1206/ HoGX2512/HoGX5931 等封装。

## 产品特点 Features:

高功率、低温漂、低阻值、高精度 (1%)

低电感设计, 小于1.0nH

卓越的可靠性和合适的成本。

适用于无铅焊接。

高精度修边工具。

符合RoHS标准, 无卤素。



## 产品名称 Product Name

封体合金电阻

## 产品型号 Product number

Ho	GX	2512	2W	10mR	1%	50ppm
制造商	产品系列	封装	额定功率(W)	阻值(mR)	精度(%)	温度系数 TCR (ppm)
毫欧电子	GX	1206	0.5W~1W	3 mR ~30mR	1%/2%/5%	50/70
		2512	1W ~3W	1mR ~220mR	1%/2%/5%	50/70/100
		5931	5W	3 /5/10	1%/2%/5%	70/100

具体参数请查看下页详情



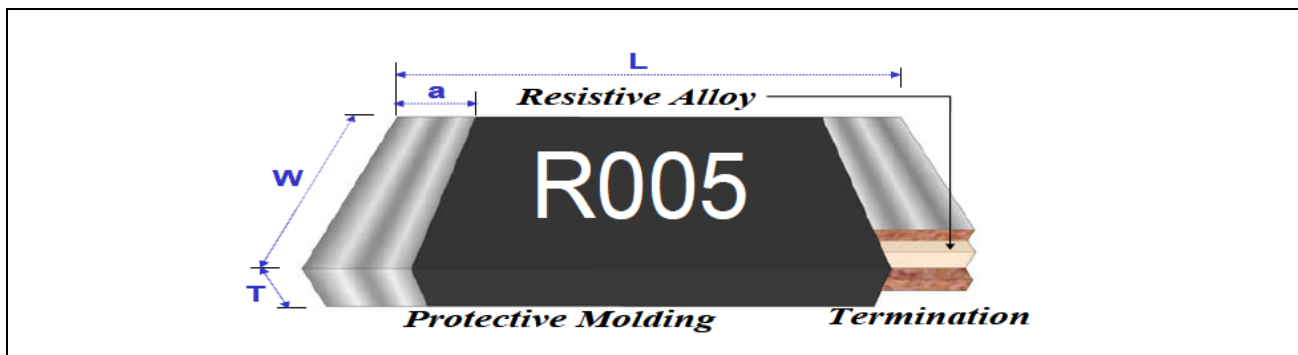
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### ■ 产品尺寸及结构 Dimension and Construction



产品结构

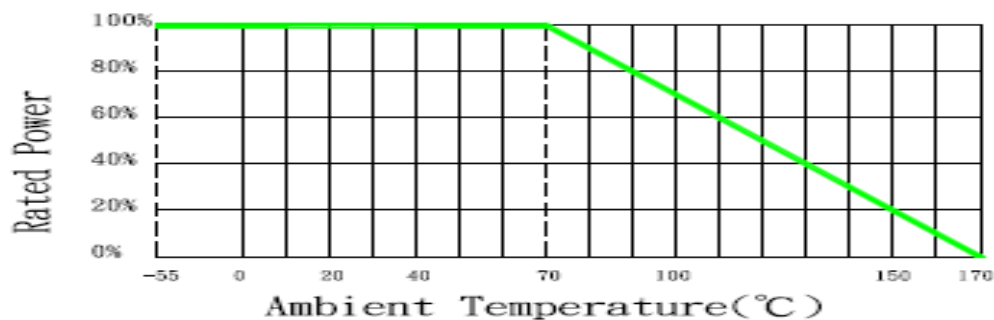
项目	保护性模塑	电阻元件	内部终端	外部终端
材料	树脂	合金金属	铜	焊料

单位：mm

Type	Resistance	L	W	T	a
HoGX1206	5~30mR	3.10±0.20	1.65±0.20	0.60±0.20	0.60±0.20
HoGX2512	3~220mR	6.20±0.20	3.25±0.20	0.60±0.20	0.80±0.20
HoGX2512	3W series	6.20±0.20	3.25±0.20	0.65±0.20	0.80±0.20
HoGX2512	1~2mR	6.40±0.20	3.25±0.20	0.70±0.20	2.00±0.20
HoGX5931	2~10mR	15.0±0.20	7.80±0.20	0.70±0.20	3.50±0.20

### ■ 功率降额曲线 Power Derating Curve

工作温度范围：-55至+170摄氏度



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### ■ 电气参数规格 Electrical parameter Specification (0.5~2W)

Rating Type	Tolerance (%)	Rating 70°C (W)	Max. Working Current (Voltage)*	Max. Overload Current (Voltage)*	Alloy Type	Temperature coefficient of Resistance (ppm/°C)**	Resistance (mΩ) ***
HoGX1206	±1%(F) ±2%(G) ±5%(J)	0.5	12.9A (111mV)	28.9A (250mV)	Low EMF	±70	3,4,5,6,9,10, 15,20,25
			10.0A (111mV)	22.4A (250mV)	Standard	±50	5,10,15,15.5 18,20,25,30
		1	18.3A (158mV)	40.8A (354mV)	Low EMF	±70	3,4,5,6,9,10 15,20,25
			14.1A (173mV)	31.6A (387mV)	Standard	±50	5,10,15,15.5 18,20,25,30
HoGX2512	±1%(F) ±2%(G) ±5%(J)	1	31.6A (158mV)	70.7A (354mV)	Low EMF	±70	1,2,2.5,3,4,5 10,15,20,25
			18.3A (469mV)	40.8A (1049mV)	Standard	±50	3,4,5,6,7,8,9,10 12,15,20,22,25,30 33,35,40,50,60,70 75,80,100,200,220
		2	44.7A (224mV)	100A (500mV)	Low EMF	±70	1,2,2.5,3,4,5 10,15,20,25
			25.8A (663mV)	57.7A (1483mV)	Standard	±50	3,4,5,6,7,8,9,10 12,15,20,22,25,30 33,35,40,50,60,70 75,80,100,200,220

Note:

- (i)  $= \sqrt{P * R}$  or Max. Working Voltage whichever is lower.
- (ii) : Working Voltage(V) · P : Rated Power (W) · R : Resistance Value(Ω)
- (iii) Solder-pad and trace size should be >300 mm<sup>2</sup> and board surface temperature should not exceed 105°C when applying rated power
- (iv) \* : Related number are depend on specific items only.    \*\* : TCR Hot (+25~+155°C).  
\*\*\* : Special requests and details please contact factory.

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### ■ 电气参数规格Electrical parameterSpecification(3~5W)

Rating Type	Rating 70°C (W)	Max. Working Current (Voltage)*	Max. Overload Current (Voltage)*	Resistance Tolerance (%)	Temperature coefficient of Resistance (ppm/°C)**	Resistance (mΩ) ***
HoLR2512 低电磁波	3	31.6A (245mV)	70.7A (548mV)	±1%(F) ±2%(G) ±5%(J)	±70	3,4,5,6,7,8,9,
					±50	
HoLR2512 标准	3	24.5A (812mV)	54.8A (1817mV)	±1%(F) ±2%(G) ±5%(J)	±70	5,6,8
					±50	12,14,15,16,18,20 25,30,33,35,40,50 60,75,80,100 200,220
HoLR5931 标准	5	40.8A (224mV)	91.3A (500mV)	±1%(F) ±2%(G) ±5%(J)	±100	
					±70	5

Note:

(v)  $E = \sqrt{P \cdot R}$  or Max. Working Voltage whichever is lower.

(vi) E : Working Voltage(V) , P : Rated Power (W) , R : Resistance Value(Ω)

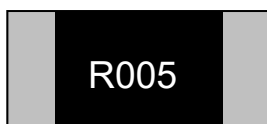
(vii) Solder-pad and trace size should be >300 mm<sup>2</sup> and board surface temperature should not exceed 105°C when applying rated power

(viii) \* : Related number are depend on specific items only. \*\* : TCR Hot (+25~+155°C). \*\*\* : Special requests and details please contact factory.

### ■ 标记Marking

HoGX1206/HoGX2512/HoGX5931

TOP: Marking. (4 Digits marking to identify the resistance value.)



R005=5mΩ



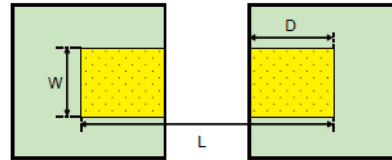
R001=1 mΩ

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■ 建议焊盘尺寸 Recommended Solder Pad Dimension

Type	W	D	L
HoGX1206	1.80	1.30	4.70
HoGX2512	3.70	1.60	7.60
HoGX2512 R001/R002	4.00	3.00	7.30
HoGX5931	8.75	6.00	17.60

Unit:mm




■ 可靠性性能 Reliability Performance

标准品常规检验项目

Test Item	Specification	Test Method (AEC-Q200. IEC 60115)
*DC Resistance	F : $\pm 1\%$ 、G : $\pm 2\%$ 、J : $\pm 5\%$	<b>AEC-Q200 TABLE 7.1</b> <b>IEC 60115-1 / JIS C 5201-1 , Clause 4.5</b> Measure the resistance Value.
High Temperature Exposure (Storage)	J、G : $\Delta R \leq \pm(3\%+0.5m\Omega)$ F : $\Delta R \leq \pm(1\%+0.5m\Omega)$	<b>AEC-Q200 TABLE 7.3</b> 1000 hrs. @ T=125°C. Unpowered. Measurement at 24 $\pm 2$ hours after test conclusion.
*Temperature Cycling	J、G : $\Delta R \leq \pm(1\%+1m\Omega)$ F : $\Delta R \leq \pm(0.5\%+1m\Omega)$ No mechanical damage.	<b>AEC-Q200 TABLE 7.4</b> 1000 Cycles (-55°C to +125°C). Measurement at 24 $\pm 2$ hours after test conclusion.
Moisture Resistance	J、G : $\Delta R \leq \pm(1\%+0.5m\Omega)$ F : $\Delta R \leq \pm(0.5\%+0.5m\Omega)$	<b>AEC-Q200 TABLE 7.6</b> Test 65°C/80~100%RH/10Cycles. Measurement at 24 $\pm 2$ hours after test conclusion. (t=24hrs/cycle).
Biased Humidity	J、G : $\Delta R \leq \pm(3\%+0.5m\Omega)$ F : $\Delta R \leq \pm(1\%+0.5m\Omega)$	<b>AEC-Q200 TABLE 7.7</b> 1000 hours 85°C/85%RH. 10% of operating power. Measurement at 24 $\pm 2$ hours after test conclusion.
Operational Life	J、G : $\Delta R \leq \pm(3\%+0.5m\Omega)$ F : $\Delta R \leq \pm(1\%+0.5m\Omega)$	<b>AEC-Q200 TABLE 7.8</b> Test 1000hr @ TA=125°C at specified rated power. Measurement at 24 $\pm 2$ hours after test conclusion.


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■ 可靠性性能 **Reliability Performance**

<b>External Visual</b>	No visual damage and refer PDC marking code.	<b>AEC-Q200 TABLE 7.9</b> Inspect device construction, marking and workmanship.
<b>Physical Dimension</b>	Within the spec.	<b>AEC-Q200 TABLE 7.10</b> Verify physical dimensions to the applicable device detail specification.
<b>Mechanical Shock</b>	Within product specification tolerance and no visible damage.	<b>AEC-Q200 TABLE 7.13</b> Test Peak value:100g's,Wave:Hail-sine, Duration:6ms,Velocity:12.3ft/sec.
<b>Vibration</b>	No mechanical damage.	<b>AEC-Q200 TABLE 7.14</b> 5 g's for 20 min., 12 cycles each of 3 orientations. Test from 10-2000 Hz.
<b>*Resistance to Solder Heat</b>	J、G : $\Delta R \leq \pm(1\% + 0.5m\Omega)$ F : $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage.	<b>AEC-Q200 TABLE 7.15</b> Solder dipping @ 270°C $\pm 5^\circ\text{C}$ for 10sec. $\pm 1$ sec.
<b>Thermal Shock</b>	J、G : $\Delta R \leq \pm(1\% + 0.5m\Omega)$ F : $\Delta R \leq \pm(0.5\% + 0.5m\Omega)$ No mechanical damage.	<b>AEC-Q200 TABLE 7.16</b> -55 to 155°C/ dwell time 15min/ Max transfer time 20sec/ 300cycles.
<b>ESD</b>	$\Delta R \leq \pm(1\% + 0.5m\Omega)$ No mechanical damage.	<b>AEC-Q200-002 Test</b> contact min. 1KV.
<b>*Solder Ability</b>	Over 95% of termination must be covered with solder.	<b>AEC-Q200 TABLE 7.18</b> a)Baking 155°C 4H, dipping 235°C 5s b)Steam 1H, dipping 215°C 5s c)Steam 1H, dipping 260°C 7s
<b>Flammability</b>	Refer UL-94.	<b>AEC-Q200 TABLE 7.20</b> UL-94 V-0 or V-1 are acceptable
<b>*Board Flex</b>	J、G : $\Delta R \leq \pm(1\% + 1m\Omega)$ F : $\Delta R \leq \pm(0.5\% + 1m\Omega)$ No mechanical damage.	<b>AEC-Q200 TABLE 7.21</b> Bending 2mm 5931.2512.1206
<b>Terminal Strength</b>	No mechanical damage	<b>AEC-Q200 TABLE 7.22</b> Force 1 Kg for 60 seconds.
<b>*Short Time Overload</b>	J、G : $\Delta R \leq \pm(2\% + 0.5m\Omega)$ F : $\Delta R \leq \pm(1\% + 0.5m\Omega)$	<b>IEC 60115-1, Clause 4.13</b> 5 × Rated power for 5 seconds

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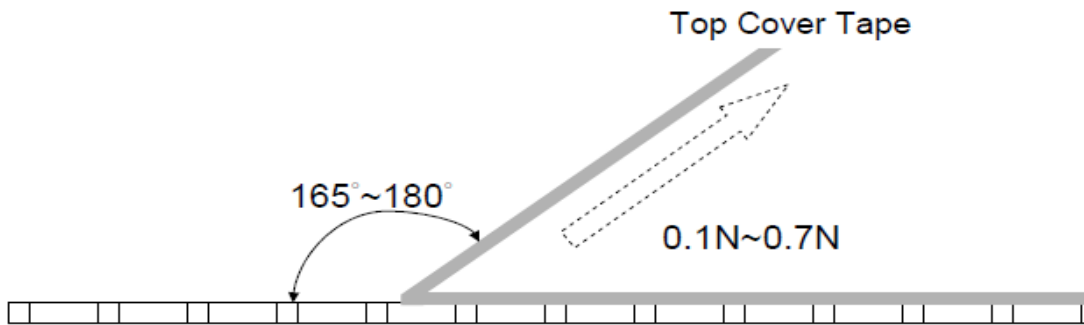
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■ 可靠性能 **Reliability Performance**

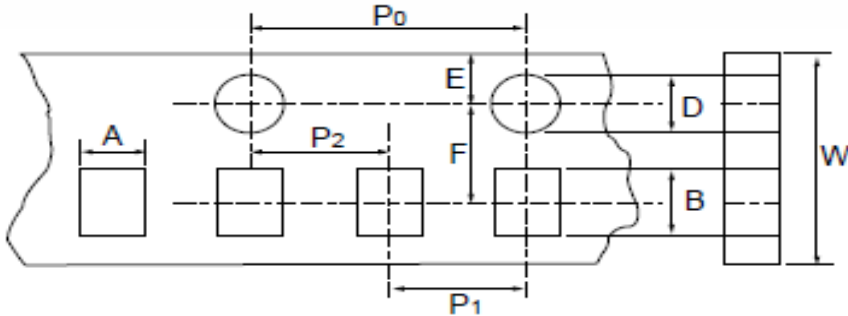
<b>*Load Life Humidity</b>	J、G : $\Delta R \leq \pm(3\%+0.5m\Omega)$ F : $\Delta R \leq \pm(1\%+0.5m\Omega)$	<b>IEC 60115-1, Clause 4.24</b> 40±2°C with relative humidity 90% ~ 95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF. Cycle repeated 1000 hours.
<b>*Temperature Coefficient of Resistance (TCR)</b>	Within the spec.	<b>IEC 60115-1, Clause 4.8</b> Test temperature : 25°C ~ +155°C TCR(ppm/°C) = $(R_2-R_1)/R_1 \times 1 / (T_2-T_1) \times 10^6$ ( +25~ -55°C please contact factory. )
<b>*Load Life</b>	J、G : $\Delta R \leq \pm(3\%+0.5m\Omega)$ F : $\Delta R \leq \pm(1\%+0.5m\Omega)$	<b>IEC 60115-1, Clause 4.25</b> Rated voltage for 1.5 hours for followed by a pause 0.5 hour at 70±2°C . Cycle repeated 1000 hours.
<b>*Insulation Resistance</b>	Between termination and coating must over 1000MΩ	<b>IEC 60115-1, Clause 4.6</b> Test voltage : 100±15V

■ 顶盖胶带剥离强度 **Peel Strength of Top Cover Tape**

剥离速度约为300 mm/min  
顶盖胶带的剥离力应在0.1~0.7N之间



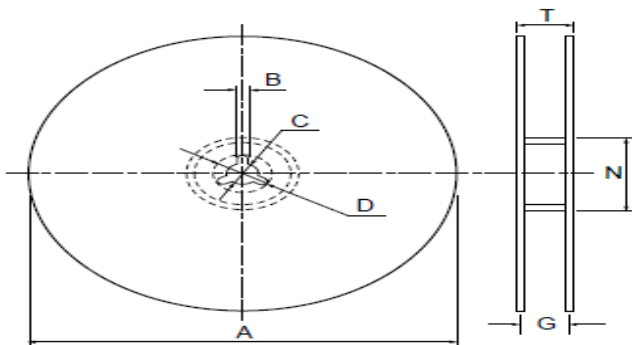
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**■ 彩带尺寸 Ribbon size(Unit:mm)**


• Accumulated dimensional tolerance  $40\pm 0.2\text{mm}$

Size	A	B	W	F	E	P1	P2	P0	D
1206	$2.00\pm 0.20$	$3.60\pm 0.20$	$8.00\pm 0.30$	$3.50\pm 0.05$	$1.75\pm 0.10$	$4.00\pm 0.10$	$2.00\pm 0.05$	$4.00\pm 0.10$	$1.50\pm 0.10$
2512	$3.50\pm 0.20$	$6.75\pm 0.20$	$12.0\pm 0.30$	$5.50\pm 0.05$	$1.75\pm 0.10$	$4.00\pm 0.10$	$2.00\pm 0.05$	$4.00\pm 0.10$	$1.50\pm 0.10$
5931	$8.20\pm 0.10$	$15.4\pm 0.10$	$24.0\pm 0.30$	$11.5\pm 0.10$	$1.75\pm 0.10$	$12\pm 0.10$	$2.00\pm 0.10$	$4.00\pm 0.10$	$1.50\pm 0.10$

unit : mm

**■ 卷轴规格 Reel Specification**


Size	Packaging Q'ty	A	N	C	D	B	G	T
1206	4kpcs/Reel	$178.0\pm 2.0$	$60.0\pm 0.5$	$13.0\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$10.0\pm 1.5$	14.9max.
2512	4kpcs/Reel	$178.0\pm 2.0$	$0.0\pm 0.5$	$13.0\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$13.8\pm 1.5$	16.7max.
	8kpcs/Reel	$254.0\pm 2.0$	$100.0\pm 0.5$	$13.5\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$13.8\pm 1.5$	20.0max.
	16kpcs/Reel	$330.0\pm 2.0$	$00.0\pm 1.0$	$13.5\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$13.8\pm 1.5$	20.0max.
5931	3kpcs/Reel	$330.0\pm 2.0$	$99.5\pm 1.0$	$13.0\pm 0.5$	20(Min.)	$2.0\pm 0.5$	$24.0\pm 1.0$	28.6max.

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