



HoAR 贴片陶瓷系列规格书

| | |
|------|------------|
| 系列号 | HoAR |
| 修订日期 | 2019-04-16 |
| 版本号 | Ho-A0 |

规格书 Specification



制造商:深圳市毫欧电子有限公司

HoAR

适用: 本规格书适用于深圳市毫欧电子有限公司贴片陶瓷电阻 HoAR 系列产品选型。

包括: HoAR0210/ HoAR0402/ HoAR0603/ HoAR0805/ HoAR1206/ HoAR1210/ HoAR2010/ HoAR2512/

产品特点 Features:

先进的薄膜技术, 高精度低至±0.01%

低温漂 TCR 低至±1PPM /°C

电阻范围 1mR~3MR 微型尺寸 0201 可用 符合 ROHS 要求

产品名称 Product Name

贴片陶瓷电阻

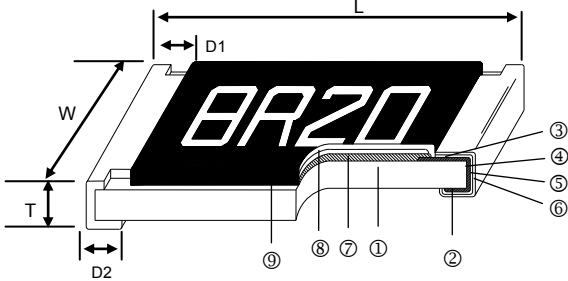
产品型号 Product number

| Ho | AR | 2512 | 1/2W | 10R | 1% | 50ppm |
|---------|---------|------|---------|------------|---------|----------------|
| 供应商 | 产品系列 | 封装 | 额定功率(W) | 阻值(mR) | 精度(%) | 温度系数 TCR (ppm) |
| Ho 毫欧电子 | AR 陶瓷贴片 | 0201 | 1/32 | 49.9R~33KR | 0.1%~1% | 25~50 |
| | | 0402 | 1/16 | 4.7R~511KR | 0.1%~1% | 5~50 |
| | | 0603 | 1/16 | 1R~511KR | 0.1%~1% | 10~50 |
| | | 0805 | 1/10 | 1R~200KR | 0.1%~1% | 5~50 |
| | | 1206 | 1/8 | 1R~499KR | 0.1%~1% | 5~50 |
| | | 1210 | 1/4 | 1R~499KR | 0.1%~1% | 5~50 |
| | | 2010 | 1/4 | 1R~499KR | 0.1%~1% | 5~50 |
| | | 2512 | 1/2 | 1R~499KR | 0.1%~1% | 5~50 |



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

| <ol style="list-style-type: none"> 1. Alumina Substrate 2. Bottom Electrode 3. Top Electrode 4. Edge Electrode 5. Barrier Layer 6. External Electrode 7. Resistor Layer 8. Primary Overcoat 9. Secondary Overcoat |  | | | | |
|--|--|-----------|-----------|-----------|-----------|
| 产品尺寸: | | | | | |
| 型号 | L(mm) | W(mm) | T(mm) | D1(mm) | D2(mm) |
| HoAR 0201 | 0.58±0.05 | 0.29±0.05 | 0.23±0.05 | 0.12±0.05 | 0.15±0.05 |
| HoAR0402 | 1±0.05 | 0.5±0.05 | 0.30±0.05 | 0.2±0.1 | 0.2±0.1 |
| HoAR0603 | 1.55±0.1 | 0.8±0.1 | 0.45±0.1 | 0.3±0.2 | 0.3±0.2 |
| HoAR0805 | 2±0.15 | 1.25±0.15 | 0.55±0.1 | 0.30±0.2 | 0.4±0.20 |
| HoAR 1206 | 3.05±0.15 | 1.55±0.15 | 0.55±0.1 | 0.42±0.2 | 0.35±0.25 |
| HoAR1210 | 3.1±0.15 | 2.4±0.15 | 0.55±0.1 | 0.4±0.2 | 0.55±0.25 |
| HoAR2010 | 4.9±0.15 | 2.4±0.15 | 0.55±0.1 | 0.6±0.3 | 0.5±0.25 |
| HoAR 2512 | 6.3±0.15 | 3.1±0.15 | 0.55±0.1 | 0.6±0.3 | 0.5±0.25 |

电气参数 Electrical parameter

| | |
|------------------------------------|--------------|
| 额定功率 Rated power | 1/32~1W |
| 阻值范围 Resistance range | 1R~511KR |
| 额定压降 Max. Operating Voltage | 15V~400V |
| 准确度等级 AccuracyClass | 0.1%、1% |
| 电阻温度系数 T.C.R (ppm / °C) | ±5~±50 |
| 工作温度范围 Operating Temperature Range | -55°C~+155°C |

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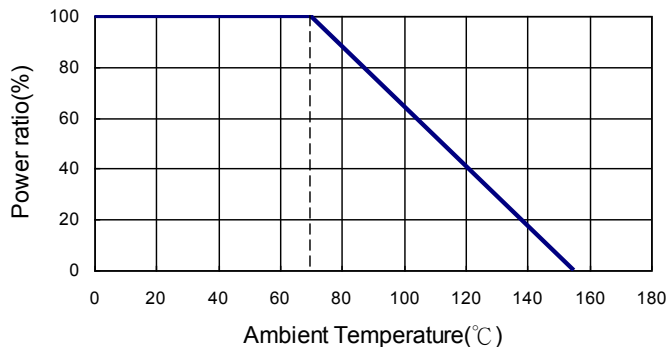


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■ 功率曲线 Power curve

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



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

I : Rated Current (A)

P: Rated Power (W)

R: Resistance Value (Ω)

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

■ 标准电气规范 (低阻值) Standard Electrical Specifications (Lower Resistance)

| Item Type | Power Rating at 70°C | Operating Temp. Range | Max. Operating Voltage | Max. Overload Voltage | Resistance Range | | | | | TCR (PPM/°C) |
|-------------|----------------------|-----------------------|------------------------|-----------------------|------------------|---------------|--------------|----------------|-----|--------------|
| | | | | | ±0.05% | ±0.1% | ±0.25% | ±0.5% | ±1% | |
| HoAR0201 | 1/32W | -55 ~ +155°C | 15V | 30V | — | | | | | ±25 |
| | | | | | | | | 49.9Ω - 4.99KΩ | | ±50 |
| HoAR(0402) | 1/16W | -55 ~ +155°C | 25V | 50V | 49.9Ω - 12KΩ | 10Ω - 511KΩ | 4.7Ω - 511KΩ | | | ±25,±50 |
| HoAR (0603) | 1/16W | -55 ~ +155°C | 50V | 100V | 4.7Ω - 332KΩ | 4.7Ω - 1MΩ | 1Ω - 1MΩ | | | ±25,±50 |
| HoAR(0805) | 1/10W | -55 ~ +155°C | 100V | 200V | 4.7Ω - 1MΩ | 4.7Ω - 2MΩ | 1Ω - 2MΩ | | | ±25,±50 |
| HoAR (1206) | 1/8W | -55 ~ +155°C | 150V | 300V | 4.7Ω - 1MΩ | 4.7Ω - 2.49MΩ | 1Ω - 2.49MΩ | | | ±25,±50 |
| HoAR(1210) | 1/4W | | | | | | | | | |
| HoAR(2010) | 1/4W | -55 ~ +155°C | 150V | 300V | 4.7Ω - 1MΩ | 4.7Ω - 3MΩ | 1Ω - 3MΩ | | | ±25,±50 |
| HoAR (2512) | 1/2W | | | | | | | | | |

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■ 特殊电气规格 Special Electrical Specifications

| Item Type | Power Rating at 70°C | Operating Temp. Range | Max. Operating Voltage | Max. Overload Voltage | Resistance Range | | | | | | TCR (PPM/°C) |
|-------------|----------------------|-----------------------|------------------------|-----------------------|------------------|--------------|---------------|--------|----------------|----------|--------------|
| | | | | | ±0.01% | ±0.05% | ±0.1% | ±0.25% | ±0.5% | ±1% | |
| HoAR(0402) | 1/16W | -55 ~ +155°C | 25V | 50V | 49.9Ω - 4.99KΩ | | - | | | | ±1, ±2, ±3 |
| | | | | | 49.9Ω - 20KΩ | | | | | | ±5 |
| | | | | | 49.9Ω - 20KΩ | | 49.9Ω - 100KΩ | | 49.9Ω - 69.8KΩ | | ±10 |
| HoAR (0603) | 1/16W | -55 ~ +155°C | 50V | 100V | 24.9Ω - 15KΩ | | - | | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 60KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 100KΩ | 4.7Ω - 332KΩ | 4.7Ω - 511KΩ | | | | ±10, ±15 |
| HoAR(0805) | 1/10W | -55 ~ +155°C | 100V | 200V | 24.9Ω - 30KΩ | | - | | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 150KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 200KΩ | 4.7Ω - 1MΩ | | | | ±10, ±15 | |
| HoAR (1206) | 1/8W | -55 ~ +155°C | 150V | 300V | 24.9Ω - 49.9KΩ | | - | | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 300KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 499KΩ | 4.7Ω - 1.5MΩ | | | | ±10, ±15 | |
| HoAR (1210) | 1/4W | -55 ~ +155°C | 150V | 300V | 24.9Ω - 49.9KΩ | | - | | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 300KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 499KΩ | 4.7Ω - 1MΩ | | | | ±10, ±15 | |
| HoAR (2010) | 1/4W | -55 ~ +155°C | 150V | 300V | 24.9Ω - 100KΩ | | - | | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 300KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 499KΩ | 4.7Ω - 1MΩ | | | | ±10, ±15 | |
| HoAR(2512) | 1/2W | -55 ~ +155°C | 150V | 300V | 24.9Ω - 100KΩ | | - | | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 300KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 499KΩ | 4.7Ω - 1MΩ | | | | ±10, ±15 | |

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■ 高功率等级电气规范 / High Power Rating Electrical Specification

| Item Type | Power Rating at 70°C | Operating Temp. Range | Max. Operating Voltage | Max. Overload Voltage | Resistance Range | | | | | | TCR (PPM/°C) |
|-------------|----------------------|-----------------------|------------------------|-----------------------|------------------|--------------------|--------------|----------------|----------|--------------------|--------------|
| | | | | | ±0.01% | ±0.05% | ±0.1% | ±0.25% | ±0.5% | ±1% | |
| HoAR (0402) | 1/10W | -55 ~ +155°C | 50V | 100V | 49.9Ω - 4.99KΩ | | | - | | | ±1, ±2, ±3 |
| | | | | | 49.9Ω - 4.99KΩ | | | | | | ±5 |
| | | | | | 49.9Ω - 12KΩ | | | 49.9Ω - 60KΩ | | | ±10 |
| | | | | | | | | 49.9Ω - 69.8KΩ | | | ±15 |
| - | 49.9Ω - 12KΩ | 10Ω - 255KΩ | 4.7Ω ~ 255KΩ | | | ±25, ±50 | | | | | |
| HoAR (0603) | 1/10W | -55 ~ +155°C | 75V | 150V | 24.9Ω - 15KΩ | | | - | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 15KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 100KΩ | 4.7Ω - 332KΩ | 4.7Ω - 332KΩ | | | ±10, ±15 | |
| | 4.7Ω - 1MΩ | | | ±25, ±50 | | | | | | | |
| 1/6W | -55 ~ +155°C | 100V | 150V | - | 10Ω - 332KΩ | | | | ±25, ±50 | | |
| HoAR(0805) | 1/8W | -55 ~ +155°C | 150V | 300V | 24.9Ω - 30KΩ | | | - | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 30KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 200KΩ | 4.7Ω - 511KΩ | 4.7Ω - 511KΩ | | | ±10 | |
| | 4.7Ω - 1MΩ | | | ±15 | | | | | | | |
| 1/4W | -55 ~ +155°C | 150V | 300V | - | 10Ω - 499KΩ | | | | ±25, ±50 | | |
| HoAR (1206) | 1/4W | -55 ~ +155°C | 200V | 400V | 24.9Ω - 49.9KΩ | | | - | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 49.9KΩ | | | | | | ±5 |
| | 24.9Ω - 499KΩ | 4.7Ω - 1MΩ | | | | ±10, ±15, ±25, ±50 | | | | | |
| 1/3W | -55 ~ +155°C | 200V | 400V | - | 10Ω ~ 1MΩ | | | | ±25, ±50 | | |
| HoAR(1210) | 1/3W | -55 ~ +155°C | 200V | 400V | 24.9Ω - 49.9KΩ | | | - | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 49.9KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 499KΩ | 4.7Ω - 1MΩ | | | | ±10, ±15, ±25, ±50 | |
| HoAR(2010) | 1/3W | -55 ~ +155°C | 200V | 400V | 24.9Ω - 49.9KΩ | | | - | | | ±1, ±2, ±3 |
| | | | | | 24.9Ω - 49.9KΩ | | | | | | ±5 |
| | | | | | 24.9Ω - 499KΩ | 4.7Ω - 1MΩ | | | | ±10, ±15, ±25, ±50 | |
| HoAR(2512) | 3/4W | -55 ~ +155°C | 200V | 400V | 24.9Ω - 2KΩ | 4.7Ω - 2KΩ | | 1Ω - 2KΩ | | ±10, ±15, ±25, ±50 | |
| | 1W | -55 ~ +155°C | 200V | 400V | - | 4.7Ω - 100Ω | 1Ω - 100Ω | | ±25, ±50 | | |

Operating Voltage = $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.
 Overload Voltage = $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is lower.

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

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|--|-----------------------|------|------------|
|  毫欧电阻 毫欧制造 | HoAR 贴片陶瓷系列规格书 | 系列号 | HoAR |
| | | 修订日期 | 2019-04-16 |
| | | 版本号 | Ho-A0 |

■ 环境特征 Environmental Characteristics

| Item | Requirement | | Test Method |
|--|-------------------------------|--------------|--|
| | Tol. ≤ 0.05% | Tol. > 0.05% | |
| Temperature Coefficient of Resistance (T.C.R.) | As Spec. | | MIL-STD-202 Method 304 +25/-55/+25/+125/+25°C |
| Short Time Overload | ΔR±0.05% | ΔR±0.2% | JIS-C-5201-1 4.13 RCWV*2.5 or Max. overload voltage whichever is lower for 5 seconds |
| | ΔR±0.2% for high power rating | | |
| Insulation Resistance | >9999 MΩ | | MIL-STD-202 Method 302 Apply 100V _{DC} for 1 minute |
| Endurance | ΔR±0.05% | ΔR±0.2% | MIL-STD-202 Method 108A 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| | >7kΩ ΔR±0.5% | | |
| | ΔR±0.5% for high power rating | | |
| Damp Heat with Load | ΔR±0.05% | ΔR±0.3% | MIL-STD-202 Method 103B 40±2°C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF" |
| | ΔR±0.5% for high power rating | | |
| Bending Strength | ΔR±0.05% | ΔR±0.1% | JIS-C-5201-1 4.33 Bending amplitude 3 mm for 10 seconds |
| Solderability | 95% min. coverage | | MIL-STD-202 Method 208H 245±5°C for 3 seconds |
| Resistance to Soldering Heat | ΔR±0.05% | ΔR±0.1% | MIL-STD-202 Method 210E 260±5°C for 10 seconds |
| Dielectric Withstand Voltage | By Type | | MIL-STD-202 Method 301 Max. overload voltage for 1 minute |
| Thermal Shock | ΔR±0.05% | ΔR±0.2% | MIL-STD-202 Method 107G -55°C ~150°C, 100 cycles |
| Low Temperature Operation | ΔR±0.05% | ΔR±0.2% | JIS-C-5201-1 4.36 1 hour, -65°C, followed by 45 minutes of RCWV |
| | ΔR±0.5% for high power rating | | |
| High Temperature Exposure | ΔR±0.5% | | MIL-STD-202 Method 108 at +155°C for 1000 hrs |

(Rated continuous working voltage)= $\sqrt{P \cdot R}$ or Max. Operating voltage whichever is lower ■

Storage Temperature: 15~28°C; Humidity < 80%RH

- (1) 最高温度260° C下进行回流焊接的时间: 10s
- (2) 最高温度点260° C下波峰焊接的时间: 10s
- (3) 最高温度410°C下烙铁的时间: 5s

回流焊曲线图



波峰焊曲线图



地址: 深圳市龙华新区观澜大布头南通邦高新产业园 A 栋 8 楼



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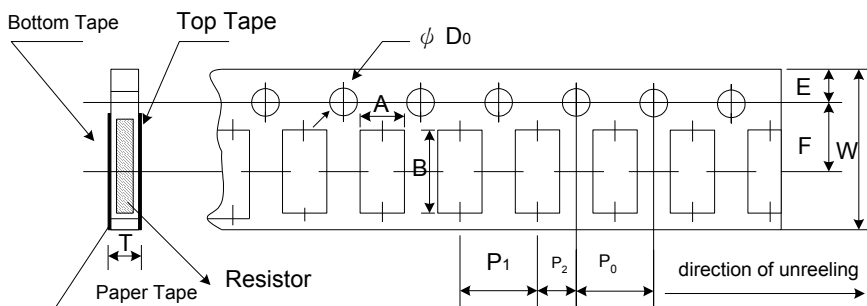
建议焊盘尺寸 Recommended Solder Pad Dimension

| 型号 | A(mm) | B(mm) | C(mm) |
|-----------|-------|-------|----------|
| HoAR 0201 | 0.25 | 0.3 | 0.4±0.2 |
| HoAR0402 | 0.5 | 0.5 | 0.6±0.2 |
| HoAR0603 | 0.8 | 1 | 0.9±0.2 |
| HoAR0805 | 1.0 | 1 | 1.35±0.2 |
| HoAR 1206 | 2.0 | 1.15 | 1.7±0.2 |
| HoAR1210 | 2.0 | 1.15 | 2.5±0.2 |
| HoAR2010 | 3.6 | 1.4 | 2.5±0.2 |
| HoAR 2512 | 4.9 | 1.6 | 3.1±0.2 |



卷轴规格 / 包装方式 Reel Specification / Packing Unit : mm

| Type | ØA | ØB | ØC | W | T | Paper Tape (EA) | Emboss Plastic Tape (EA) |
|----------|-----------|----------|----------|----------|----------|-----------------|--------------------------|
| HoAR0201 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0 | 11.5±1.0 | 10,000 | - |
| HoAR0402 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0 | 11.5±1.0 | 10,000 | - |
| HoAR0603 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0 | 11.5±1.0 | 5,000 | - |
| HoAR0805 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0 | 11.5±1.0 | 5,000 | - |
| HoAR1206 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0 | 11.5±1.0 | 5,000 | - |
| HoAR1210 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 9.5±1.0 | 11.5±1.0 | 5,000 | - |
| HoAR2010 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 13.5±1.0 | 15.5±1.0 | - | 4,000 |
| HoAR2512 | 178.0±1.0 | 60.0±1.0 | 13.5±0.7 | 13.5±1.0 | 15.5±1.0 | - | 4,000 |



Unit: mm

| Type | A | B | W | E | F | P ₀ | P ₁ | P ₂ | ΦD ₀ | T |
|----------|-----------|-----------|-----------|-----------|----------|----------------|----------------|----------------|-----------------|-----------|
| HoAR0201 | 0.40±0.05 | 0.70±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.55±0.03 | 0.42±0.02 |
| HoAR0402 | 0.70±0.05 | 1.16±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10 | 2.00±0.05 | 2.00±0.05 | 1.55±0.05 | 0.40±0.03 |
| HoAR0603 | 1.10±0.05 | 1.90±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.55±0.05 | 0.60±0.03 |
| HoAR0805 | 1.60±0.05 | 2.37±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.55±0.05 | 0.75±0.05 |
| HoAR1206 | 2.00±0.05 | 3.55±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.10 | 4.00±0.10 | 2.00±0.05 | 1.55±0.05 | 0.75±0.05 |
| HoAR1210 | 2.75±0.05 | 3.40±0.05 | 8.00±0.10 | 1.75±0.05 | 3.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.60±0.10 | 0.75±0.05 |

顶盖胶带的剥离力应在8gf至60gf之间

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

| | |
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Unit: mm

| Type | A | B | W | E | F | P ₀ | P ₁ | P ₂ | ∅D ₀ | T |
|----------|-----------|-----------|-----------|-----------|----------|----------------|----------------|----------------|-----------------|-----------|
| HoAR2010 | 2.85±0.10 | 5.45±0.10 | 12.0±0.10 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.50±0.10 | 1.00±0.20 |
| HoAR2512 | 3.40±0.10 | 6.65±0.10 | 12.0±0.10 | 1.75±0.10 | 5.5±0.05 | 4.00±0.05 | 4.00±0.10 | 2.00±0.05 | 1.50±0.10 | 1.00±0.20 |



顶盖胶带的剥离力
剥离速度约为300mm / min ± 5%
顶盖胶带的剥离力应在20gf至80gf之间

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