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**TO:** \_\_\_\_\_

超声波美容换能器  
(Ultrasonic Beauty Transducer)

**HNM-4SS-3528-D50B**

产品规格书

Specification



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## 性能参数(SPECIFICATION)

### 1. 范围 Scope

本产品适用于医疗、美容、减肥等设备。

This product is suitable for medical, beauty, loss weight equipment and so on

### 2. 规格 Model

HNM-4SS-3528-D50B

### 3. 性能参数(Specification)

#### 3.1 尺寸 Dimensions

详见产品外形图 As per the drawing No:

HN131010-03D 3/3 (HNM-4SS-3528-D50B)

#### 3.2 胶合前电性能参数 Electrical specification before gluing

##### 3.2.1 谐振频率 Resonant Frequency (fs)

$f_s = 28.5 \pm 0.8 \text{ kHz}$

##### 3.2.2 谐振阻抗 Resonant Resistance (Zr)

$Z_r \leq 25 \Omega$

##### 3.2.3 静态电容 Capacitance (Cp)

$C_p = 4400 \text{ pF} \pm 10\%$

##### 3.2.4 机械品质因素 Mechanical Factor (Qm)

$Q_m \geq 500$

##### 3.2.5 谐振频宽 Bandwidth ( $\Delta f = f_p - f_r$ )

$\Delta f \geq 0.8 \text{ KHz}$

##### 3.2.6 绝缘阻抗 Insulation Resistance (Rv)

$R_v \geq 100 \text{ M}\Omega$  (2000V DC)

标题 Title	设计 Design	审核 Check	批准 Approval
超声换能器 Ultrasonic transducer			

### 3.3 胶合后电性能参数 Parameters after glue bonding with stainless steel cap

(仅指与不锈钢帽的胶合) (Only for glue bonding with stainless steel cap)

#### 3.3.1 谐振频率 Resonant Frequency (fs)

$$f_s = 24.0 \pm 1.5 \text{kHz}$$

#### 3.3.2 谐振阻抗 Resonant Resistance (Zr)

$$Z_r \leq 120 \Omega (Z_r = \max 120 \Omega)$$

#### 3.3.3 静态电容 Capacitance (Cp)

$$C_p = 4400 \text{pF} \pm 10\%$$

#### 3.3.4 机械品质因素 Mechanical Factor (Qm)

$$Q_m \geq 180$$

#### 3.3.5 谐振频宽 Bandwidth ( $\Delta f = f_p - f_r$ )

$$\Delta f \geq 0.5 \text{kHz}$$

## 4. 测试过程控制 Test Procedure

### 4.1 测试条件 Test Atmosphere

温度 Temperature:  $23 \pm 3^\circ\text{C}$

湿度 Humidity: 40 ~ 70%RH.

### 4.2 测试设备 Apparatus

#### 4.2.1 Cp、fr、Zr、Qm 和 $\Delta f$ 参数测试 The Parameters Test

TH2818 元件自动分析仪或压电阻抗分析仪

(The TH2818 Impedance Analyzer or the piezoelectric Impedance Analyzer)

#### 4.2.2 Rv 参数测试 Test Rv

KYORITSU 3121 高压测试仪

(High voltage Insulation tester .Model 3121 KYORITSU)

## 5. 输入功率 Input Power

最大输入功率 Maximum Power: 50W

最大输入电压 Maximum Voltage  $V_{P-P}$ : 1000V

## 6. 工作环境 Working Condition

环境温度 Temperature:  $-5^{\circ}\text{C}\sim+40^{\circ}\text{C}$

环境湿度 Humidity:  $\leq 85\%RH$ .

## 7. 工作温度 Temperature

7.1 最大工作温度:  $T_{\max}\leq 80^{\circ}\text{C}$  (Maximum Operating Temperature)

7.2 建议工作温度:  $T\leq 60^{\circ}\text{C}$  (Recommended Operating Temperature)

7.3 发射端脱水时不可以工作 Can't work without water on transmit head

## 8. 组成材料 : Materials

7.1 前辐射块 Front matching: 铝合金 (Aluminum Alloy)

7.2 后匹配块 Back matching : 合金钢 (Steel Alloy)

7.3 压电晶体 Piezo-ceramic: PZT-4 ( PZT-4)

7.4 电极片(Electrode): 磷青铜 (Copper Alloy)

7.5 振动帽 (Vibration Cap): 不锈钢 ( Stainless steel)

## 9. 产品有效工作时间 Working time :

换能器是一个高频振动的易损件，主要损耗体现在陶瓷元件的电性能衰竭（退极化）和开裂，铝材内部空化、螺杆锁紧力松动及环氧胶的老化开裂等方面。

不锈钢帽表面在使用一段时间后，出现黑斑点或凹坑为超声波振动的空化腐蚀，为正常现象。经实验确认，在满足上述驱动工作要求，本规格产品总有效工作时间不低于 3500 小时。

Ultrasonic transducer is a wearing part of higher frequency vibration, the main loss is the electrical properties of ceramic components failure (depolarization) and cracking, aluminum internal cavitations, fracture, screw loosening and locking force of the aging of epoxy adhesive cracking and so on.

It is normal phenomenon to appear black spots or pots on stainless steel cap after using some times , those all cavitations corrosion of ultrasonic vibration. The experiment confirmed that the total effective working time is not less than 3500 hours.

10. 外形示意图 (Drawings and Dimension)



