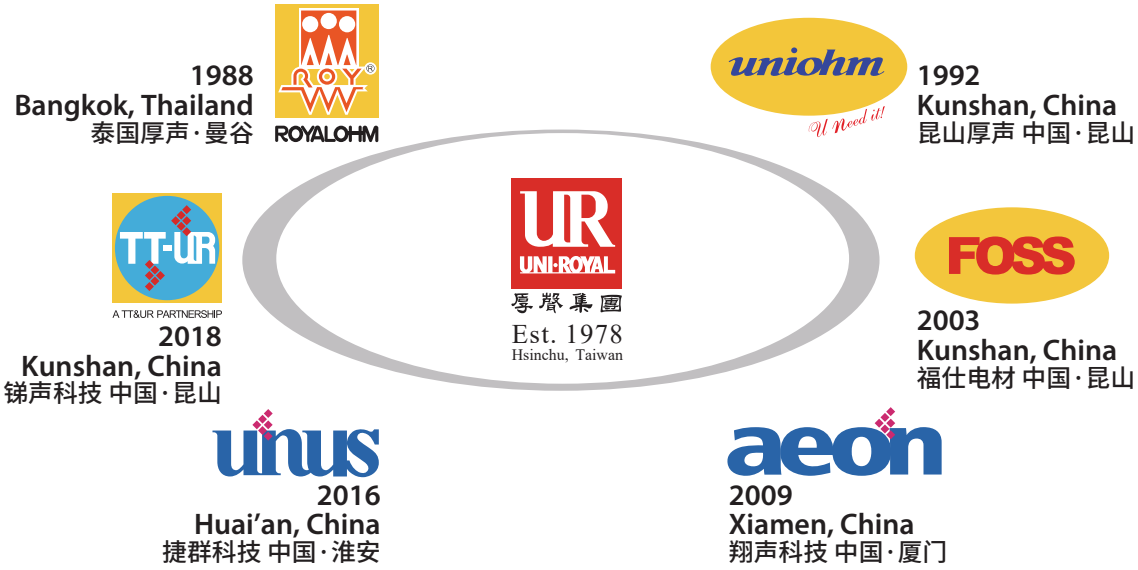
UR

UNI-ROYAL

厚聲集團

2019~2020

厚聲電阻



Our Mission:

Create value for customers, business associates and partners by providing reliable products and quality services.

我们的使命：

通过提供可信赖的产品和服务，为顾客、企业成员和合作伙伴创造价值。

Our Vision:

Become an excellent global supplier of passive components.

Be a respectable corporation to customers, business associates and partners.

我们的愿景：

以产品和服务成为电子制造业卓越的全球供货商。

做客户、企业成员、合作伙伴尊敬的企业。

厚声集团・昆山总部（Kunshan HQ)

UNI-ROYAL Group, founded in Hsinchu, Taiwan in 1978, has become a global leader in CHIP and DIP resistors industry. With more than 40 years of manufacturing experience, UNI-ROYAL has a profound industry insight and innovation leadership for the global electronics industry. UNI-ROYAL has a complete R&D team, manufacturing plants, global sales team and marketing service network located in Taiwan, Kunshan, Shenzhen, Xiamen, and Southeast Asia (Thailand). The group's four well-known brands: **ROYALOHM, UNIOHM, FOSS, AEON**, has become the world's favorite passive components suppliers and preferred partners.

UNI-ROYAL has successively been awarded many international standard system certifications such as QS9000, ISO14001, TL9000 and IATF16949. Products are widely used in microelectronics, mobile terminals, industrial equipment, automotive electronics, the Internet and other emerging civil and military high-tech industries. With the continuous development of the global economy, the iterative update of modern technology, especially the ever-changing application and innovation in the field of electronics, UNI-ROYAL has always provided cutting-edge technology, excellent products and leading solutions to supply a full range of products and services to well-known companies in the global industry.

厚声集团，始创于 1978 年台湾新竹，迄今已经成为全球晶片电阻和插件电阻的行业领导者。凭借逾四十年的制造经验，厚声对全球电子行业拥有深刻的行业洞察与创新领导能力。集团在台湾、昆山、深圳、厦门与东南亚（泰国）拥有完善的电阻研发团队、制造工厂及遍布全球的销售团队和营销服务网络。集团旗下四大著名品牌：**ROYALOHM**、**UNIOHM**、**FOSS**、**AEON**，已成为全球各行业备受青睐的被动元器件重要供货商和首选合作伙伴。

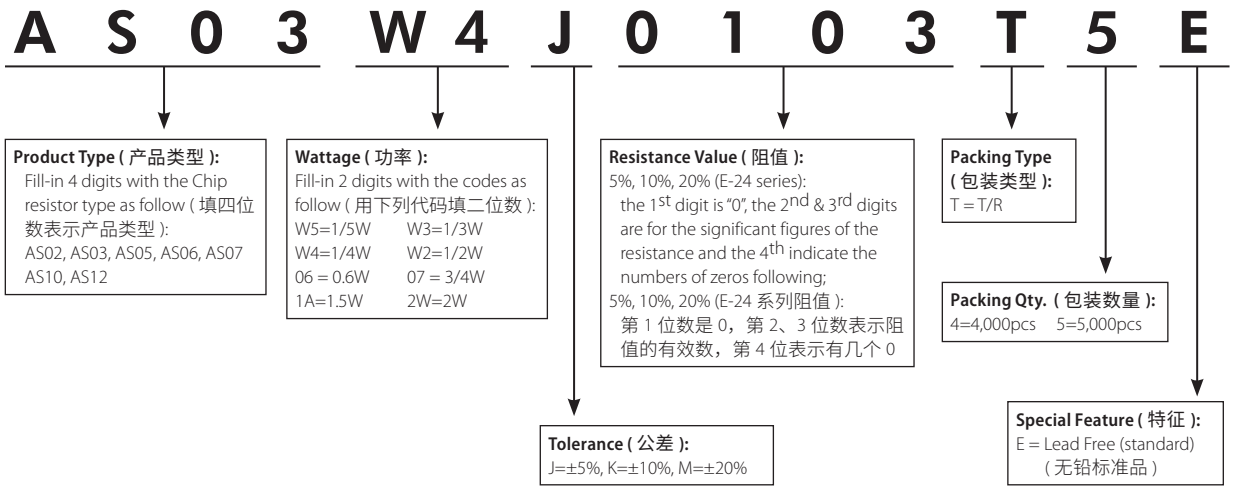
厚声先后获得 QS9000、ISO14001、TL9000、IATF16949 等多项国际标准体系认证。产品广泛应用于微电子、移动终端、工業設備、汽车电子、物联网等新兴民用与军工众多高科技领域。随着全球经济的不断发展、现代化技术的迭代更新，特别是电子领域日新月异的应用革新，厚声始终以前沿的技术、出色的产品和领先的解决方案，向全球行业知名企业提供全方位的产品和服务。

Performance Specifications (性能)

Temperature coefficient	温度系数	1Ω≤R≤10Ω: ±400ppm/℃ 10Ω<R≤10M: ±100ppm/℃
Short-time overload	短时间过负荷	±(1.0%+0.1Ω)
Terminal bending	端子弯曲	±(1.0%+0.05Ω)
Solderability	可焊性	Coverage must be over 95%.
Dielectric withstanding voltage	绝缘耐压	No evidence of flashover, mechanical damage, arcing or insulation breakdown 无击穿，飞弧及可见机械性损伤
Soldering heat	耐焊接热	±(1.0%+0.05Ω)
Rapid change of temperature	温度快速变化	±(1.0%+0.05Ω)
Load Life in humidity	湿度寿命	±(3.0%+0.1Ω)
Load life	负载寿命	±(3.0%+0.1Ω)
Humidity (Steady State)	恒定湿热	±(3.0%+0.1Ω)
Single pulse	单脉冲	±(1.0%+0.1Ω)

Ordering Procedure (Example: Anti-surge AS03 1/4W 5% 10KΩ T/R-5000)

订购方式 (例如: 抗浪涌 AS03 1/4W 5% 10KΩ T/R-5000)



Remark: Please refer to page 141 for ordering guide. 注：下单请详见 P141 页说明。

High-Precision Anti-Surge Thick Film Chip Resistors - PS

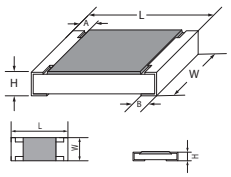
高精度抗浪涌厚膜晶片电阻器 - PS系列

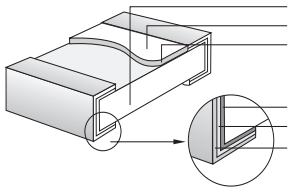
ROYALOHM
www.royalohm.com

Feature (特性)

- High-Precision, high-power, anti-pulse 高精度、高功率、抗脉冲
- Suitable for reflow & wave soldering 适合波峰焊与回流焊
- Application monitors, power supplies, camcorder, laptop computer
  适用于显示器、电源、手提电脑

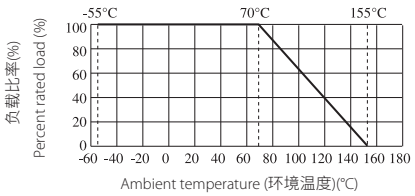
Figures (型状)



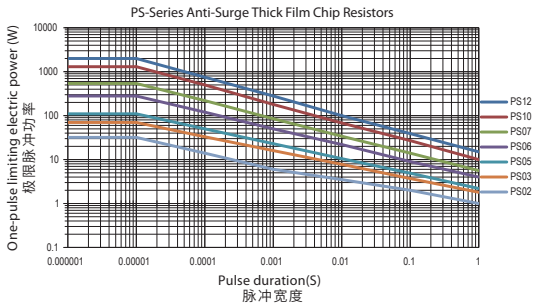


1. High purity Alumina substrate (高纯度氧化铝基板)
2. Protective coating (保护层)
3. Resistance element (阻抗元素)
4. Termination (Inner) Ni / Cr [端面(内)镍/铬层]
5. Termination (Between) Ni Barrier [端面(中)镍层]
6. Termination (Outer) Sn [端面(外)锡层(无铅)]

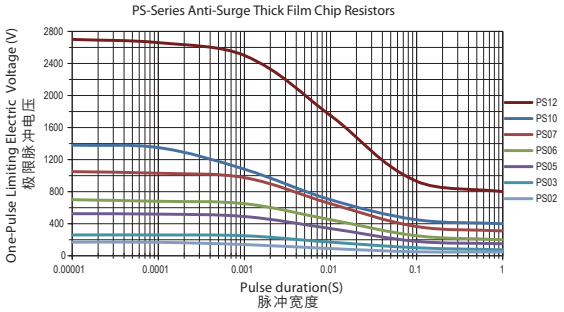
Derating Curve (降功率曲线)



Curve of Pulse Duration (脉冲曲线)



Pulse Voltage Limit (电压曲线)



Specification (性能)

Type 类型	Size 尺寸	Max working voltage 最大工作电压	Max Overload Voltage 最大过负荷电压	Dielectric Withstanding Voltage 绝缘耐压	Operating Temperature 工作温度范围
PS02	0402 (1005)	50V	100V	100V	-55~+155℃
PS03	0603 (1608)	50V	100V	300V	
PS05	0805 (2012)	150V	300V	500V	
PS06	1206 (3216)	200V	400V	500V	
PS07	1210 (3225)	200V	500V	500V	
PS10	2010 (5025)	400V	800V	500V	
PS12	2512 (6432)	500V	1000V	500V	

Type 类型	Power 功率 (70°C)	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	Resistance Range 阻值范围 1%(E96), 5%(E24)
PS02	1/8W	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10	1Ω~10M
PS03	1/4W	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	
PS05	1/3W	2.00±0.15	1.25 $^{+0.15}_{-0.10}$	0.55±0.10	0.40±0.20	0.40±0.20	
PS06	1/2W	3.10±0.15	1.55 $^{+0.15}_{-0.10}$	0.55±0.10	0.45±0.20	0.45±0.20	0.1Ω~10M
PS07	3/4W	3.10±0.10	2.60±0.20	0.55±0.10	0.55±0.25	0.50±0.20	
PS10	1.25W	5.00±0.10	2.50±0.20	0.55±0.10	0.60±0.25	0.50±0.20	1Ω~10M
PS12	2W	6.35±0.10	3.20±0.20	0.55±0.10	0.60±0.25	0.50±0.20	0.1Ω~10M

*Special offered 特别提供 : PS12 B:1.80±0.25mm

Performance Specification (性能)

Temperature coefficient	温度系数	PS02: 1Ω~10Ω: ±400PPM/°C 11Ω~100Ω: ±200PPM/°C >100Ω: ±100PPM/°C PS03, PS05, PS06, PS07, PS10, PS12: ±100ppm/°C
Short-time overload	短时间过负荷	±1%:±(1.0%+0.1Ω) ±5%:±(2.0%+0.1Ω)
Terminal bending	端子弯曲	±(1.0%+0.05Ω)
Solderability	可焊性	Coverage must be over 95%.
Soldering heat	耐焊接热	±(1.0% + 0.05Ω)
Load life in humidity	湿度寿命	±1%:±(1.0%+0.1Ω) ±5%:±(3.0%+0.1Ω)
Dielectric withstanding voltage	绝缘耐压	No evidence of flashover, mechanical damage, arcing or insulation breakdown 无击穿，飞弧及可见机械性损伤
Rapid change of temperature	温度快速变化	±1%:±(0.5%+0.1Ω) ±5%:±(3.0%+0.1Ω)
Load life	负载寿命	±1%:±(1.0%+0.1Ω) ±5%:±(3.0%+0.1Ω)
Single pulse	单脉冲	±(1.0%+0.1Ω)

Ordering Procedure (Example: PS05 1/3W 5% 120KΩ T/R-5000)

订购方式 (例如: PS05 1/3W 5% 120KΩ T/R-5000)

P S 0 5 W 3 J 0 1 2 4 T 5 E

Product Type (产品类型):
Fill-in 4 digits with the Chip resistor type as follow (填四位数表示产品类型) :
PS02, PS03, PS05, PS06, PS07, PS10, PS12

Wattage (功率):
Fill-in 2 digits with the codes as follow (用下列代码填二位数):
W2=1/2W
W3=1/3W
W4=1/4W
W5=1/5W
W8=1/8W
07=3/4W
1Q=1.25W
2W=2W

Tolerance (公差):
F = ±1%
J = ±5%

Resistance Value (阻值):
5% (E-24 series) :
the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following
5% 产品 (E-24 系列阻值):
第 1 位数是 0，第 2、3 位数表示阻值的有效数，第 4 位表示有几个 0);
≤1%(E-96 series):
the 1st to 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following
1% 产品 (E96 系列阻值):
第 1-3 位数表示阻值的有效数，第 4 位数表示有几个 0).

Packing Qty. (包装数量)
4=4,000pcs
5=5,000pcs
c=10,000pcs

Special Feature (特征):
E = Lead Free (standard)
(无铅标准品)

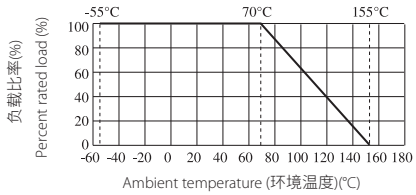
Packing Type (包装类型):
T = T/R (编带 / 卷带)

Remark: Please refer to page 141 for ordering guide. 注：下单请详见 P141 页说明 。

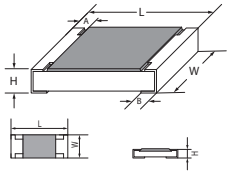
Feature (特性)

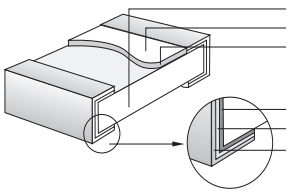
- Low T.C.R ±50PPM/℃ 低T.C.R ±50PPM/℃
- Suitable for reflow & wave soldering 适合波峰焊与回流焊
- Application Precision medical equipment, Auto industrial control system, Communication equipment, IPAD, Portable computer, LED lamps, Intelligent home appliances
  适用于精密医疗器械、自动工业控制系统、通讯设备、IPAD、手提电脑、LED灯具、智能家电产品等

Derating Curve (降功率曲线)



Figures (型状)





1. High purity Alumina substrate (高纯度氧化铝基板)
2. Protective coating (保护层)
3. Resistance element (阻抗元素)
4. Termination (Inner) Ni / Cr [端面(内)镍/铬层]
5. Termination (Between) Ni Barrier [端面(中)镍层]
6. Termination (Outer) Sn [端面(外)锡层(无铅)]

Specification (性能)

Type 类型	Size 尺寸	Max working voltage 最大工作电压	Max Overload Voltage 最大过负荷电压	Dielectric Withstanding Voltage 绝缘耐压	Operating Temperature 工作温度范围
LT02	0402 (1005)	50V	100V	100V	-55~+155℃
LT03	0603 (1608)	75V	150V	300V	
LT05	0805 (2012)	150V	300V	500V	
LT06	1206 (3216)	200V	400V	500V	

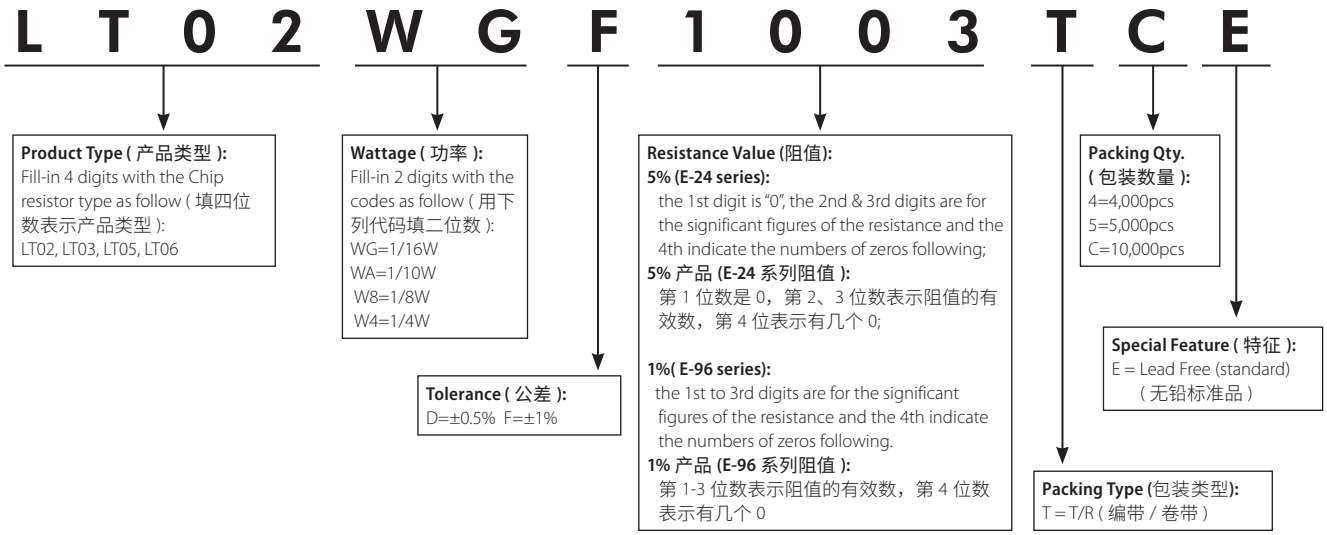
Type 类型	Power 功率 (70°C)	L (mm)	W (mm)	H (mm)	A(mm)	B (mm)	Resistance Range 阻值范围 0.25%, 0.5%, 1%
LT02	1/16W	1.00±0.10	0.50±0.05	0.35±0.05	0.20±0.10	0.25±0.10	100Ω~1MΩ
LT03	1/10W	1.60±0.10	0.80±0.10	0.45±0.10	0.30±0.20	0.30±0.20	1Ω~1MΩ
LT05	1/8W	2.00±0.15	$1.25^{+0.15}_{-0.10}$	0.55±0.10	0.40±0.20	0.40±0.20	
LT06	1/4W	3.10±0.15	$1.55^{+0.15}_{-0.10}$	0.55±0.10	0.45±0.20	0.45±0.20	

Performance Specifications (性能)

Temperature coefficient	温度系数	LT02: ±50ppm/℃ LT03: 1Ω≤R≤10Ω: ±100ppm/℃ 10Ω<R≤1MΩ: ±50ppm/℃ LT05: 1Ω≤R≤10Ω: ±100ppm/℃ 10Ω<R≤1MΩ: ±50ppm/℃ LT06: 1Ω≤R≤10Ω: ±100ppm/℃ 10Ω<R≤1MΩ: ±50ppm/℃
Short-time overload	短时间过负荷	±(1.0%+0.05Ω)
Terminal Bending	端子弯曲	±(1.0%+0.05Ω)
Solderability	可焊性	Coverage must be over 95%.
Soldering heat	耐焊接热	±(1.0%+0.05Ω)
Humidity (Steady State)	恒定温热	±(0.5%+0.05Ω)
Load life	负载寿命	±(1.0%+0.05Ω)

Ordering Procedure (Example: LT02 1/16W 1% 100KΩ T/R-10000)

订购方式 (例如: LT02 1/16W 1% 100KΩ T/R-10000)



Remark: Please refer to page 141 for ordering guide. 注：下单请详见 P141 页说明。

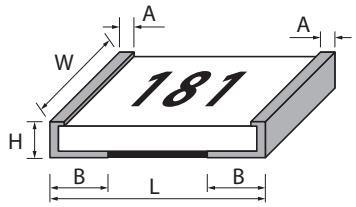
Flex LED Strip use Thick Film Chip Resistor - LE

软灯条专用芯片电阻器 - LE系列

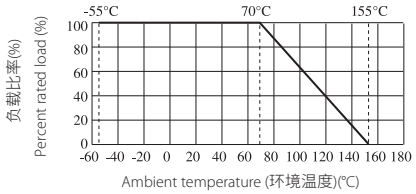
Feature (特性)

- Tolerance 精度为: ±0.5%~±5%
- Flex LED strip use thick film chip resistor 软灯条专用电阻
- Resistance range 阻值范围为: 10Ω~820Ω
- Operating temperature range 工作温度范围为: -55℃ ~+155℃
- Stable electrical capability ,high reliability 电性能稳定,可靠性高
- Suit for reflow 适合于回流焊焊接
- Low assembly cost, suit for automatic SMT equipment 装配成本低,并与自动装贴设备匹配
- Superior mechanical strength and high frequency characteristics 机械强度高、高频特性优越
- According with ROHS standard and Halogen-free 符合ROHS,无卤

Dimension (尺寸) mm



Derating Curve (降功率曲线)



Type 类型	Size 尺寸	Max Working Voltage 最大工作电压	Max Overload Voltage 最大过负荷电压	Temperature Coefficient 温度系数	Dielectric Withstanding Voltage 绝缘耐压	Operating Temperature Range 工作温度范围
LE05	0805	200V	400V	±200PPM/℃	500V	-55~+155℃
LE06	1206					

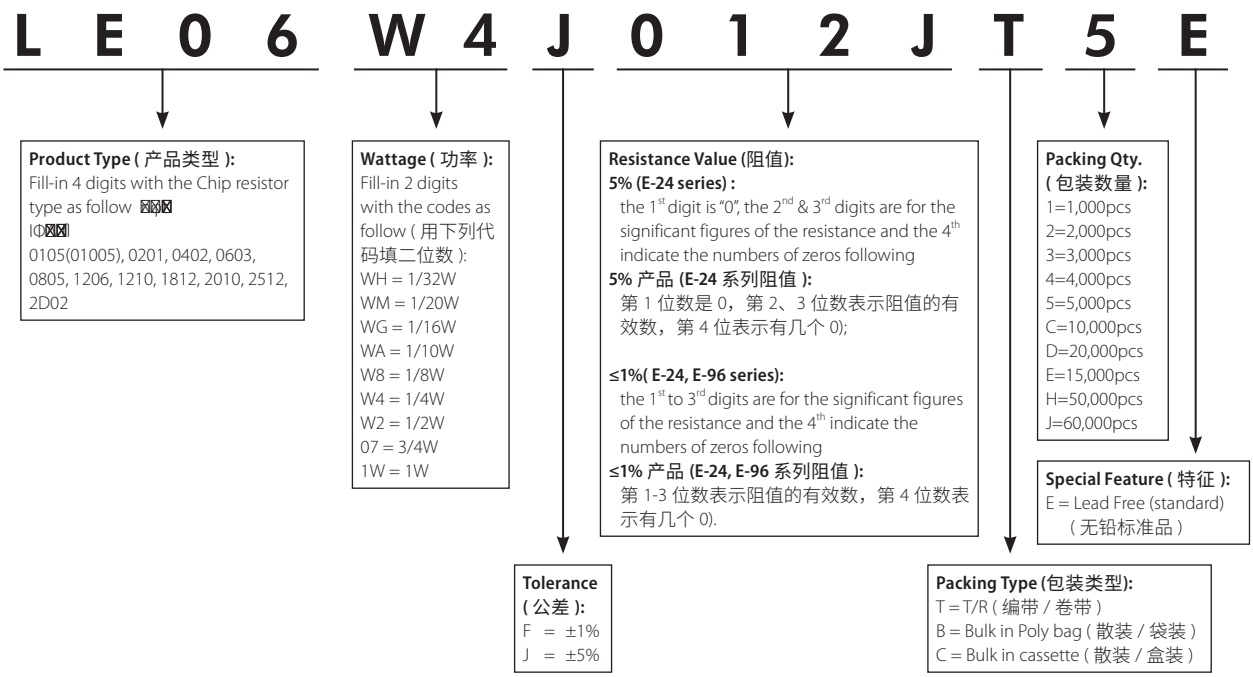
Type 类型	Size 尺寸	Power (功率) (70°C)	L (mm)	W (mm)	H (mm)	A (mm)	B (mm)	Resistance Range (阻值范围)
LE05	0805	1/8W	2.00±0.15	1.25 +0.15 -0.10	0.55±0.10	≤1.0	0.40±0.20	10Ω~820Ω
LE06	1206	1/4W	3.10±0.15	1.55 +0.15 -0.10	0.55±0.10	≤1.0	0.50±0.20	

Performance Specifications (性能)

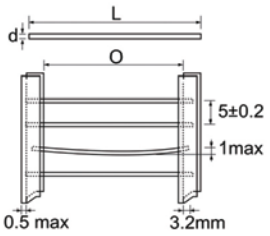
Temperature coefficient	温度系数	±200ppm/°C
Short time overload	短时间过负荷	±1%: ±(1%+0.1Ω) ±5%: ±(2%+0.1Ω)
Insulation resistance	绝缘电阻	≥ 1,000 MΩ
Dielectric withstanding voltage	绝缘耐压	No evidence of flashover, mechanical damage, arcing or insulation breakdown 无击穿，飞弧及可见机械性损伤
Terminal bending	端子弯曲	±(1.0% + 0.05Ω)
Soldering heat	耐焊接热	±(1.0% + 0.005Ω)
Solderability	可焊性	Coverage must be over 95%.
Rapid change of temperature	温度快速变化	±1%: ±(1%+0.1Ω) ±5%: ±(3%+0.1Ω)
Humidity (Steady State)	恒定湿热	±1%: ±(0.5%+0.1Ω) ±5%: ±(3%+0.1Ω)
Load life in humidity	湿度寿命	±1%: ±(1%+0.05Ω) ±5%: ±(3%+0.05Ω)
Load life	负载寿命	±1%: ±(1%+0.1Ω) ±5%: ±(3%+0.1Ω)

Ordering Procedure (Example: LE06 1/4W 5% 1.2 Ω T/R-5000)

订购方式 (例如: LE06 1/4W 5% 1.2 Ω T/R-5000)

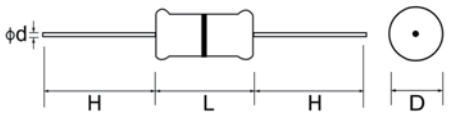


ZW Type (ZW 型)

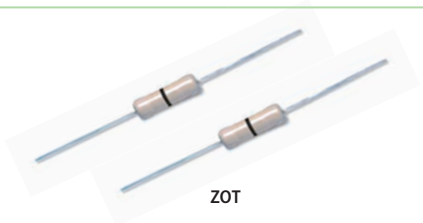


Part No 料号	Type 类型	L±3	d±0.05	O±1	
ZWA0	ZW-A	60/34	0.45	52	26
ZWB0	ZW-B	60/34	0.54	52	26
ZWB1	ZW-B1	60/34	0.60	52	26
ZWC0	ZW-C	60/34	0.70	52	26
ZWD0	ZW-D	60/34	0.75	52	26
ZWE0	ZW-E	60/34	1.00	52	26

ZO Type (ZO 型)



ZOC



ZOT

Part No 料号	Type	Power Rating 功率 70°C	Dimension (尺寸)(mm)				Resistance Range 阻值范围 (≤mΩ)
			D±0.3	L	d±0.05	H±3	
ZOT0W8/ZOCOW8	ZO-12	1/8W	1.9	3.3±0.3	0.45	28	ZOT：10 ZOC：50
ZOT0W4/ZOCOW4	ZO-25	1/4W	2.2	6.5±1.0	0.54	28	

Performance Specification(性能)

Lead material	引线材料	Tin-Plated copper（镀锡铜线）
Insulation resistance	绝缘阻值	Dry(干态)-10,000MΩ,Wet(湿态)-100MΩ
Dielectric withstanding voltage	绝缘耐压	Atmospheric（正常气压）-500V RMS; Reduced（减压）-325VRMS;
Rated current	额定电流	1/8W70°C 1.5A，1/4W 70°C 2.5A Derating to 0 Amps at 150°C 1/8W70°C 1.5A，1/4W 70°C 2.5A 150°C时，电流降低到 0A

Ordering Procedure (Example: ZOC 1/4W 0Ω T/R-5000)

订购方式 (例如: ZOC 1/4W 0Ω T/R-5000)

Z O C 0 W 4 0 0 0 0 0 0 T 5 0

Product Type (产品类型):
Zero Ohm Resistors(0Ω电阻)
ZOT0=0Ω(铁棒涂漆0Ω电阻)
ZOC0=0Ω(镀铜瓷棒0Ω电阻)
Jumper Wire(跳线）:
ZWA0=0.45mm ZWB0=0.54mm
ZWB1=0.60mm ZWC0=0.70mm
ZWD0=0.75mm ZWE0=1.0mm

Wattage (功率):
Zero Ohm Resistors(0Ω 电阻)
W8=1/8W
W4=1/4W
Jumper Wire(跳线):
00=NIL

Tolerance (公差):
0=NIL

Resistance Value (阻值):
Fill-in these 4digits with "0" specially 填 4 个 0 表示 0 阻值

Packing Type(包装类型):
A=Tape/Box (编带 / 盒装)
T=Tape/Reel (编带 / 卷装)
B=Bulk/Box (散装 / 盒装)
P=Tape/Box of PT-26 product
编带 /（PT-26 产品）盒装

Packing Qty. (包装数量):
5=5,000pcs
7=7,000pcs
8=8,000pcs
C=10,000pcs
0=Bulk/Box
（散装 / 盒装）

Additional Information(注):
0=NIL(标准品)

New/Old Part.no Contrast (新旧料号对照)

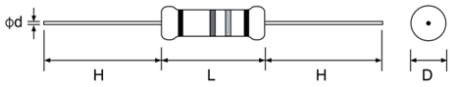
New Part.no 新料号	Old Part.no 旧料号
ZOC000000A*0**	CFR0**00000A*0
ZOT000000A*0**	ZO00**00000A*0

New Part.no 新料号	Old Part.no 旧料号
ZWB10000000A*0	ZWF00000000A*0
ZWE00000000A*0	ZWF00000000A*0

*M-type jumpers can be customized on request *M型跳線可特別提供

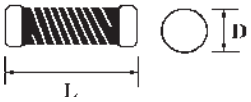
Copper Plated Steel Wire [铜包钢 (CP型)]

Tin Plated Copper Steel Lead Wire[镀锡铜包钢 (CT型)]



Part No 料号	Type 类型	Power Rating 功率 70°C	Dimension (尺寸)(mm)				MAX.Working Voltage 最大工作电压	MAX.Overlaod Voltage 最大过负荷电压	Dielectric Withstanding Voltage 绝缘耐压	Resistance Range 阻值范围
			D	L	d ±0.05	H±3				
CPXXW8/CTXXW8	CP/CT12	1/8W	1.9±0.3	3.3±0.3	0.54	28	200V	400V	400V	1Ω~10MΩ
CPXXW4/CTXXW4	CP/CT25	1/4W	2.2±0.5	6.5±1.0	0.54	28/38	250V	500V	500V	1Ω~10MΩ
CPXXS3/CTXXS3	CP/CT33-S	1/3W-S	2.2±0.5	6.5±1.0	0.54	28/38	300V	600V	500V	1Ω~10MΩ
CPXXW3/CTXXW3	CP/CT33	1/3W	3±0.5	9.0±1.0	0.54	28	300V	600V	700V	1Ω~10MΩ
CPXXS2/CTXXS2	CP/CT50-S	1/2W-S	3±0.5	9.0±1.0	0.54	28	350V	700V	700V	1Ω~10MΩ

Cutting Type (CO) [切割半成品型 (CO) 型]



Part No. 料号	Type 类型	Power Rating 功率 70°C	Dimension (尺寸)(mm)		Resistance Range 阻值范围
			D	L	
CO...W8	CO-12	1/8W	1.6 +0.10 -0.00	3.2 ±0.10	1Ω ~ 10MΩ
CO...W4	CO-25	1/4W	2.1 +0.09 -0.00	5.6 +0.10 -0.20	1Ω ~ 10MΩ
CO...W4...A	CO-25-A	1/4W	2.1 +0.09 -0.00	5.9 +0.10 -0.15	1Ω ~ 10MΩ
CO...W4...B	CO-25-B	1/4W	2.1 +0.09 -0.01	6.4 +0.10 -0.15	1Ω ~ 10MΩ

- Cutting type resistors are produced without lead-wire and without coating
  切割型半成品型电阻无导线，无涂装
- Cap plated option: 1. Tin-plated 2. Nickel-Plated
  铁帽：1 镀锡 2 镀镍

Ordering Procedure (Example: CTO 1/4W 5% 10Ω T/B-5000, CTO lead wire)

订购方式 (例如: CTO 1/4W 5% 10Ω T/B-5000, CTO导线)

C T O O W 4 J 0 1 0 0 A 5 0

Product Type (产品类型):
CPO=Copper plated steel lead wire
铜包钢线 (H=28mm)
CPL=Copper plated steel lead wire
铜包钢线 (H=38mm)
CTO=Tin Plated copper steel lead wire
镀锡铜包钢线 (H=28mm)
CTL=Tin Plated copper steel lead wire
镀锡铜包钢线(H=38mm)
COT= Cutting type (Tin-Plated Cap)
[切割型 (镀锡铁帽)]
CON= Cutting type (Nickel-Plated Cap)
[切割型 (镀镍铁帽)]

Special Feature (特征):
O=Standard(标准品)
F=Flame Retardant (阻燃型)
I=Non-Inductive (无感型)

Wattage (功率):
W8=1/8W
W4=1/4W
W3=1/3W
S3=1/3WS
S2=1/2WS

Tolerance (公差):
G = ±2%
J = ±5%
K = ±10%

Resistance Value (阻值):
2%, 5%, 10% (E-24 series):
the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following;
2%, 5%, 10% 产品 (E-24 系列阻值):
第 1 位是 0, 第 2、3 位表示阻值的有效数 , 第 4 位表示有几个 0.

≤1% (E-96 series):
the 1st to 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following.
≤1% 产品 (E-96 系列阻值):
第 1~3 位表示阻值的有效数 , 第 4 位表示有几个 0.

Packing Type(包装类型):
A=Tape/Box (编带 / 盒装)
T=Tape/Reel (编带 / 卷装)
B=Bulk/Box (散装 / 盒装)
P=Tape/Box of PT-26 product
编带 (PT-26 产品) / 盒装

Packing Qty. (包装数量):
1=1,000pcs,
2=2,000pcs
3=3,000pcs,
4=4,000pcs
5=5,000pcs,
A=500pcs
B=2,500pcs
0=Bulk/Box
(散装 / 盒装)

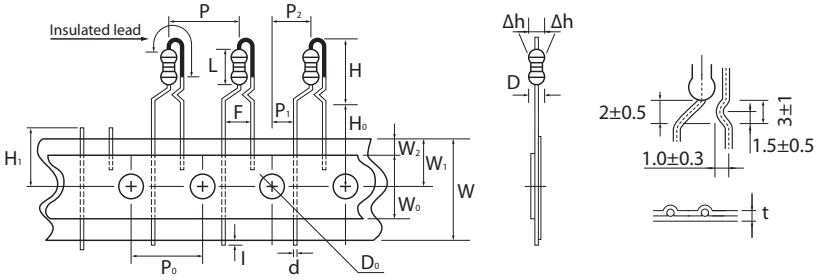
Additional Information(注):
0=CP/CT Type
A=Co-25-A,
B=CO-25-B

Feature (特性)

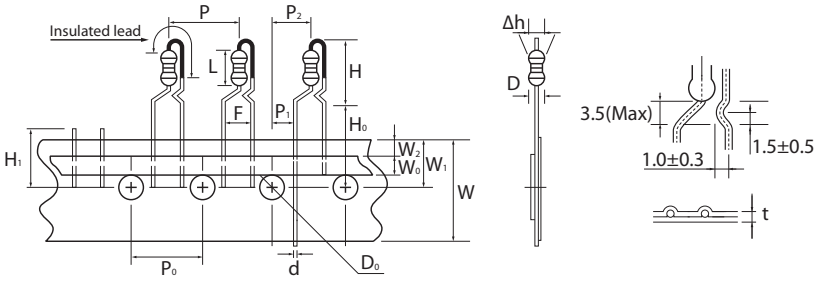
- This specification is applicable for CFR 1/4W,1/2W,1WS&CPR1/2W&MF1/4W,1/2WS,1/2W,1WS,2WS&MOR1/4W,1WS,2WS, KNP1/4W,1/2WS,1WS,2WS product only. KNP2WS product only; For other product (size), please consult factory for the available specification and drawing..

  下图规格适用于 CFR1/4W,1/2W,1WS&CPR1/2W&MF1/4W,1/2WS,1/2W,1WS,2WS&MOR1/4W,1WS,2WS,KNP1/4W,1/2WS,1WS,2WS. 其它产品的立 式加工，可洽询工厂以取得可生产的 规格图样。
- Standard product is insulated lead wire, insulated coating length 1/4W: 9.5±1mm; 1WS:13±1mm; 2WS:15±1mm
  标准品为绝缘引线，绝缘涂层长度为:
  1/4W: 9.5±1mm
  1WS: 13±1mm
  2WS: 15±1mm

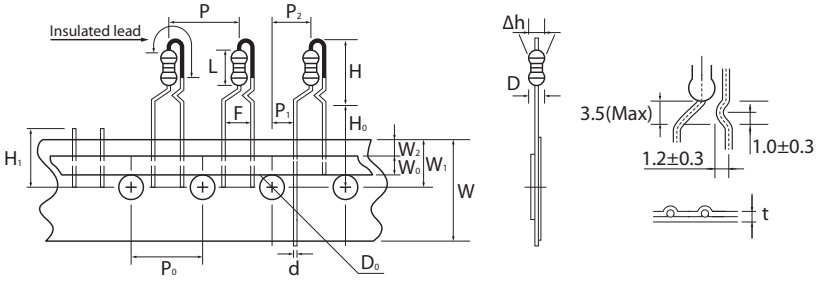
Panasert Type 1:



Panasert Type 1:



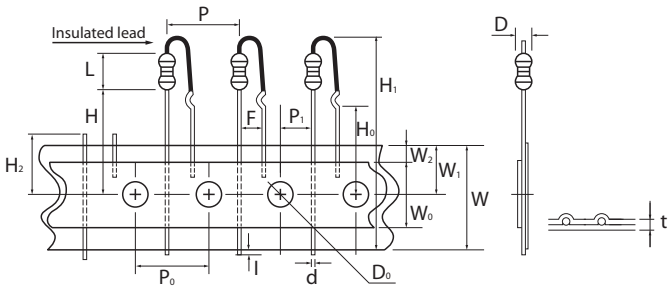
Panasert Type 2:



Items(项目)	Symbol	Dimension 尺寸 (mm)			
		1/4W	1/2WS	1WS	2WS
Body diameter 本体直径	D	2.5 (Max)	3±0.5	3.5±0.5	4±0.5
Body length 本体长度	L	6.8 (Max)	9±1	9±1	11.5±1
Body height 本体高度	H	12 (Max)	17 (Max)	19 (Max)	21 (Max)
Lead-wire diameter 导线直径	d	0.60±0.05	0.60±0.05	0.70±0.05	0.70±0.05
Pitch of component 零件间距	p	12.7±1	12.7±1	12.7±1	12.7±1
Feed hole pitch 孔距	P0	12.7±0.3	12.7±0.3	12.7±0.3	12.7±0.3
Hole center to lead 中心测量	P1	3.85±0.7	3.85±0.7	3.85±0.7	3.85±0.7
Hole center to body 孔心至本体	P2	6.35±1.3	6.35±1.3	6.35±1.3	6.35±1.3
Lead to lead distance 两脚导线中心测量	F	5±1	5±1	5±1	5±1
Component aligment 零件偏移	Δh	0±1	0±1	0±1	0±1
Tape width 纸带宽度	W	18±1	18+1/-1.5	18+1/-1.5	18+1/-1.5
Sticky tape width 热熔胶带宽	W0	12.5 (Min)	/	12.5 (Min)	12.5 (Min)
		6 (min)	6±0.2	6±0.2	6±0.2
Hole position 孔位	W1	9±0.5	9+0.75/-0.5	9+0.75/-0.5	9+0.75/-0.5
Uncovered paper tape width 纸带露出宽度	W2	1.5 (Max)	1.5 (Max)	1.5 (Max)	1.5 (Max)
Lead –wire clinch height 导线固定高度	H0	16.5 (Max)	16±0.5	16±0.5	16±0.5
Length of snipped lead 导线剪断高度	H1	11 (Max)	11 (Max)	11 (Max)	11 (Max)
Feed hole diameter 孔径	D0	4±0.3	4±0.3	4±0.3	4±0.3
Total tape thickness 胶带厚度	t	0.5±0.2	0.5±0.2	0.5±0.2	0.5±0.2
Lead wire protrusion 导线露出	i	1Max	-	-	-
Length of lead cut 切脚的长度	H1-w1	2±0.5	2±0.5	2±0.5	2±0.5

Avisert(1) Type【Avisert(1)型】

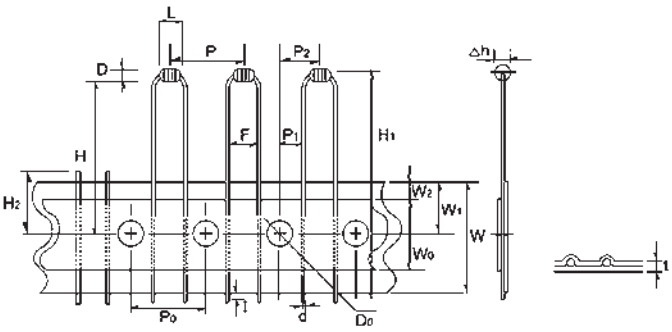
- This specification is applicable for CFR1/4W,CPR1/2W&MF1/4W,1/2WS,0.6WS,MOR1/4W,1/2WS,product only; For other product (size), please consult factory for the specification and drawing.
  适用于 CFR1/4W, CPR1/2W & MF1/4W, 1/2WS, 0.6WS, MOR1/4W, 1/2WS 固定电阻。其它产品的立式加工，可洽询工厂以取得可生产的规格图样。
- Standard product is insulated lead wire,insulated coating length 9.5±1mm
  标准品为绝缘引线，绝缘涂层长度为 : 9.5±1mm。



Items (项目)	Symbol	Dimension 尺寸 (mm) 1/4W
Body diameter 本体直径	D	2.5 (Max)
Body length 本体长度	L	6.8 (Max)
Lead-wire diameter 导线直径	d	0.60±0.05
Pitch of component 零件间距	p	12.7±1
Feed hole pitch 孔距	P0	12.7±0.3
Hole center to lead 中心测量	P1	3.85±0.7
Lead to lead distance 两脚导线中心测量	F	5±1
Tape width 纸带宽度	W	18±1
Sticky tape width 热熔胶带宽	W0	12.5 (Min)
		6 (min)
Hole position 孔位	W1	9.5±0.5
Uncovered paper tape width 纸带露出宽度	W2	3.0 (Max)
Height of component from tape center 零件至纸带中间的宽度	H	17.3±0.5
Lead –wire clinch height 导线固定高度	H0	16.5 (Max)
Component height 零件高度	H1	34.5 (Max)
Length of snipped lead 导线剪断高度	H2	11 (Max)
Feed hole diameter 孔径	D0	4±0.3
Total tape thickness 胶带厚度	t	0.5±0.2
Lead wire protrusion 导线露出	i	1 (Max)

Avisert(2) Type【Avisert(2)型】

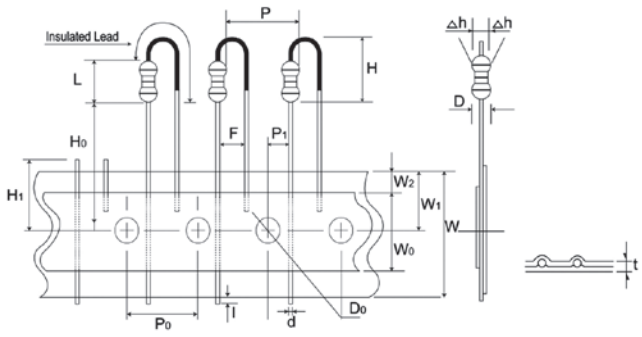
- This specification is applicable for CFR1/8W, 1/4WS&MF1/8W, 1/4WS product only; For other product avaiable forming products, please consult factory for the specification and drawing.
  适用于 CFR1/8W, 1/4WS&MF1/8W, 1/4WS 固定电阻。其它产品的立式加工，可洽询工厂以取得可生产的规格图样。



Items (项目)	Symbol	Dimension 尺寸 (mm) 1/8W
Body diameter 本体直径	D	1.85 (Max)
Body length 本体长度	L	3.5 (Max)
Lead-wire diameter 导线直径	d	0.45±0.05
Pitch of component 零件间距	p	12.7±1
Feed hole pitch 孔距	P0	12.7±0.3
Hole center to lead 中心测量	P1	3.85±0.7
Hold center to component center 孔心至零件中心距离	P2	6.35±1.3
Lead to lead distance 两脚导线中心测量	F	5±1
Tape width 纸带宽度	W	18±1
Sticky tape width 热熔胶带宽	W0	6 (Min)
Hole position 孔位	W1	9.0±0.5
Uncovered paper tape width 纸带露出宽度	W2	3.0 (Max)
Lead wire protrusion 打弯处到纸带中心位置	H	21.25 (Max)
Component height 零件高度	H1	32.25 (Max)
Length of snipped lead 导线剪断高度	H2	11 (Max)
Feed hole diameter 孔径	D0	4±0.3
Total tape thickness 胶带厚度	t	0.5±0.2
Lead wire protrusion 导线露出	i	1 (Max)

Avisert(3) Type【Avisert(3)型】

- This specification is applicable for CFR1/8W, CFR1/4WS, MF1/8W, MF1/4WS, MF1/4W, MF1/2WS, MF0.6WS, MOR1/4W, MOR1/2WS. For other product (size), please consult factory for the specification and drawing.
  下图规格适用于 CFR1/8W,CFR1/4WS,MF1/8W,MF1/4WS,MF1/4W,MF1/2WS,MF0.6WS,MOR1/4W,MOR1/2WS ; 其它产品的立式加工，可洽询工厂以取得可生产的规格图样 .
- Standard product is insulated lead wire,insulated coating length 9.5±1mm.
  标准品为绝缘引线，绝缘涂层长度为：9.5±1mm.



Items (项目)	Symbol	Dimension 尺寸 (mm)	
		1/8W	1/4W
Body diameter 本体直径	D	2.0 (Max)	2.5 (Max)
Body length 本体长度	L	4.2 (Max)	6.8 (Max)
Lead-wire diameter 导线直径	d	0.45±0.05	0.60±0.05
Pitch of component 零件间距	p	12.7±1	12.7±1
Feed hole pitch 孔距	P0	12.7±0.3	12.7±0.3
Hole center to lead 中心测量	P1	3.85±0.7	3.85±0.7
Lead to lead distance 两脚导线中心测量	F	2.5±1	5±1
Tape width 纸带宽度	W	18±1	18±1
Sticky tape width 热熔胶带宽	W0	6min	6min
Hole position 孔位	W1	9.0±0.5	9.0±0.5
Uncovered paper tape width 纸带露出宽度	W2	3.0 (Max)	3.0 (Max)
Body height 本体高度	H	7.0 (Max)	10.0 (Max)
Lead –wire clinch height 导线固定高度	H0	20.0 (Max)	16.0 (Max)
Component aligment 零件偏移	Δh	0±1	0±1
Length of snipped lead 导线剪断高度	H1	11 (Max)	11 (Max)
Feed hole diameter 孔径	D0	4±0.3	4±0.3
Total tape thickness 胶带厚度	t	0.5±0.2	0.5±0.2
Lead wire protrusion 导线露出	i	1 (Max)	1 (Max)

Ordering Procedure (Example: CFR1/4W 5% 100KΩ T/B-2000 PANASERT Type)

订购方式 (例如: CFR1/4W 5% 100KΩ T/B-2000 PANASERT Type)

C F R 0 W 4 J 0 1 0 4 A 2 P

Product Type (产品类型):
CFR = Carbon Film Fixed Resistors (碳膜固定电阻器)
MF = Metal Film Fixed Resistors (金属膜固定电阻器)
MOR= Metal Oxide Film Fixed Resistors (金属氧化膜固定电阻器)

Special Feature (特征):
O=Standard(标准品)
I=Non-Inductive (无感型)

Wattage (功率):
W8=1/8W
W4=1/4W
W2=1/2W
S4=1/4W-S
S2=1/2W-S
06=0.6W-S

Tolerance (公差):
G=2% J=±5%
K=±10%

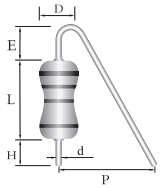
Resistance Value (阻值):
2%, 5%, 10% (E-24 series):
the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following;
2%, 5%, 10% 产品 (E-24 系列阻值):
第 1 位是 0, 第 2、3 位表示阻值的有效数 , 第 4 位表示有几个 0.
≤1% (E-96 series):
the 1st to 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following.
≤1% 产品 (E-96 系列阻值):
第 1~3 位表示阻值的有效数 , 第 4 位表示有几个 0.

Packing Type(包装类型):
A=Tape/Box (编带 / 盒装)
T=Tape/Reel (编带 / 卷装)

Packing Qty. (包装数量):
2=2,000pcs(T/B only)(限 T/B)
5=5,000pcs(T/R only)(限 T/R)
T/R is 2500PCS per reel &2reels per box (T/R 是每卷 2,500pcs, 每盒 2 卷)

Additional Information(注):
P=Panasert type 1
Q=Panasert type 2
1= Avisert type 1
2= Avisert type 2
3= Avisert type 3

F Forming Type (F 型)

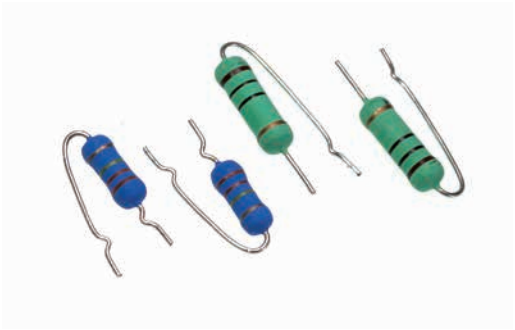


F Type (F 型)

F1 Type (F1 型)

F2 Type (F2 型)

F3 Type (F3 型)

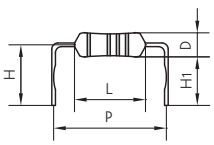


Dimension (尺寸) (mm)

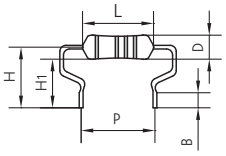
Power Rating 功率	L Max. L 最大	D Max. D 最大	d ± 0.05	P +1 -3	H ± I	E ± 0.5
I W (2W-S)	12	5.0	0.70	8	6	2.5
2 W (3W-S)	16	5.5	0.70	8	6	2.5

M Forming Type (M 型)

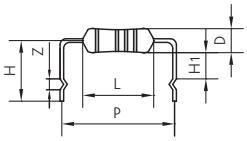
MB Type (MB 型)



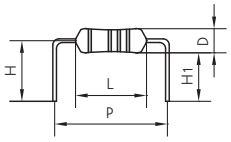
MC Type (MC 型)

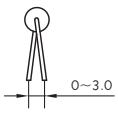


MK Type (MK 型)



M Type (M 型)

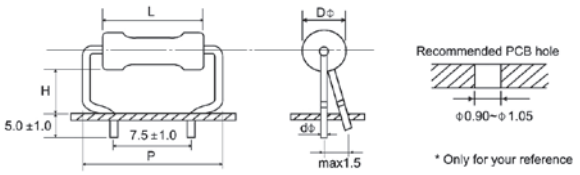




Power Rating 功率 70°C	L(Max)	D(Max)	d±0.05	H±2	P±1.5
1/2W & 1WS	10	4	0.70	14	13
1W & 2WS	12	5	0.70	14	15
2W & 3W-S	16	5.5	0.70	18	20
3W & 5WS	17.5	6.5	0.75	20	25
5W	26	8.5	0.75	20	31

T Forming Type (T 型)

Power Rating 功率 70°C	L(Max)	D(Max)	d±0.05	P(Max)	H +1 -0
1W-S	10	3.5	0.70	12.5	8
1W(2W-S)	12	5.0	0.70	15	8
2W(3W-S)	16	55	0.70	20	9



Ordering Procedure (Example: MOR1WS 5% 10Ω B/B M Type with flattened lead wire)

订购方式 (例如: MOR1WS 5% 10Ω B/B M 型导线打扁)

M O R 0 1 S J 0 1 0 0 B M F

Product Type (产品类型):
MOR=Metal Oxide Film Fixed Resistors (金属氧化膜固定电阻器)
CFR=Carbon Film Fixed Resistors (碳膜固定电阻器)

Special Feature (特征):
O=Standard(标准品)
I=Non-Inductive (无感型)

Wattage (功率):
W2=1/2W 1W=1W
2W=2W 3W=3W
5W=5W 1S=1W-S
2S=2W-S 3S=3W-S
5W=5W-S

Tolerance (公差):
G=2% J=±5% K=±10%

Resistance Value (阻值):
5% & 10% (E-24 series):
the 1st digit is "0", the 2nd & 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following;
5%,10% 产品 (E-24 系列阻值):
第 1 位是 0, 第 2、3 位表示阻值的有效数 , 第 4 位表示有几个 0.
2% (E-96 series):
the 1st to 3rd digits are for the significant figures of the resistance and the 4th indicate the numbers of zeros following.
2% 产品 (E-96 系列阻值):
第 1~3 位表示阻值的有效数 , 第 4 位表示有几个 0.

Packing Type(包装类型):
B=Bulk/Box (散装 / 盒装)

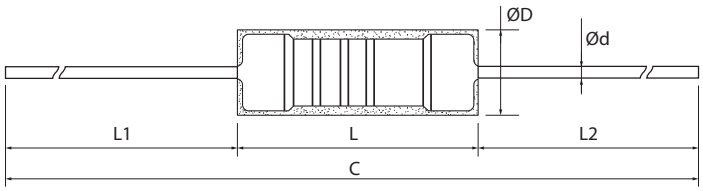
Additional Information(注):
F0=F Type (F 型) F1=F1 Type (F1 型)
F2=F2Type (F2 型) F3=F3 Type (F3 型)
T0=T Type (T 型)
MF=M Type with flattened lead wire M 型导线打扁
MC=M Type with bending lead wire M 型导线打弯曲
MK=M Type with kinked lead wire M 型导线打弯折
ML=M Type with normal lead wire M 型导线直线

Feature (特性)

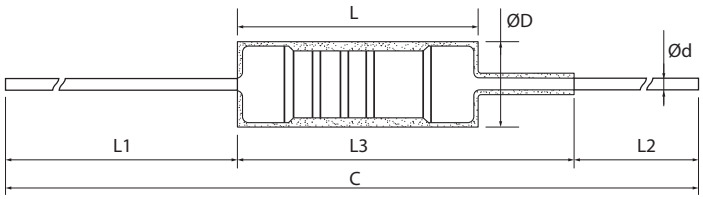
- Used for insulation protection and fusing protection of wire-wound (fusible) resistor.
  用于涂装产品的绝缘防护及绕线 (保险丝) 电阻的熔断防护。
- This specification is applicable for KNP、KNPU product only. For the other products (size), please consult factory for the available specification and drawing..
  适用于 KNP、KNPU 的产品，其他产品请洽谈工厂取得可生产的规格图样。

TZ Forming Type (TZ 轴向套管)

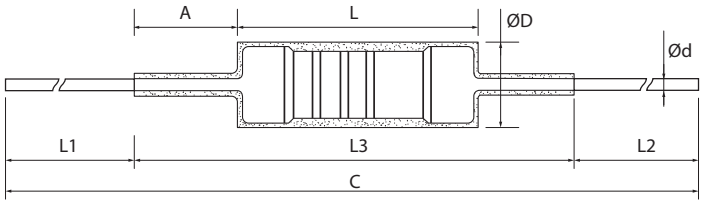
TZ-1 Wrapped resistor body only
TZ-1套管包电阻本体



TZ-2 Wrapped resistor body and lead one side only
TZ-2套管包电阻本体及一边导线



TZ-3 Wrapped resistor body and lead both two side
TZ-3套管包电阻本体及两边导线

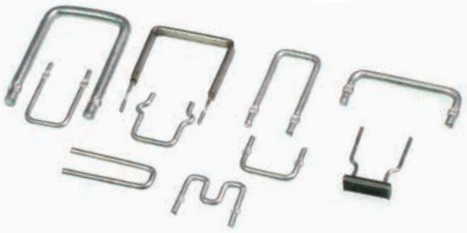


Dimension (尺寸) (mm)

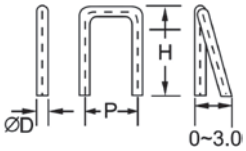
Type 类型	Forming type 加工形态	Dimension (尺寸)(mm) (L1、L2、L3 Adjustable range 可调范围)							
		D±1	L±1	L1	L2	L3	Ød±0.05	A (Max.)	C (Max.)
1/4W、1/2W、1WSS	TZ-1	2.5	6.5	38	25	/	0.54	/	Max.68mm
	TZ-2			38	2Min.	40Max.		/	
	TZ-3			2Min.	2Min.	40Max.		33	
1/2W、1WS、2WSS	TZ-1	3.5	9.5	38	25	/	0.54	/	Max.71mm
	TZ-2			38	2Min.	40Max.		/	
	TZ-3			2Min.	2Min.	40Max.		30	
1W、2WS、3WSS	TZ-1	4.5	11.5	38	25	/	0.70	/	Max.73mm
	TZ-2			38	2Min.	40Max.		/	
	TZ-3			2Min.	2Min.	40Max.		28	
2W、3WS、4WSS	TZ-1	5.5	15.5	38	25	/	0.70	/	Max.77mm
	TZ-2			38	2Min.	40Max.		/	
	TZ-3			2Min.	2Min.	40Max.		25	

Feature (特性)

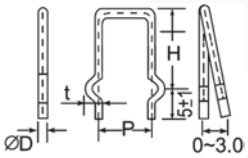
- Made by Cu/Ni or Mn/Cu Alloy resistance wire materials
  由铜 / 镍或锰 / 铜合金电阻线制成
- Excellent Solderability 优越的焊接性能
- Suitable for all kinds of Current sense application
  适用于各种类型的电流感应器应用
- Application: Power Supply 电源供应



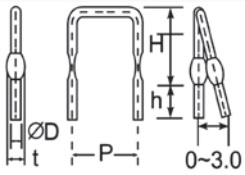
CSRA Type- CSRA 型



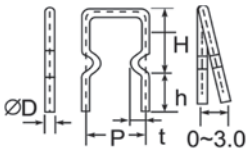
CSRB Type- CSRB 型



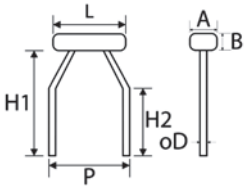
CSRC Type- CSRC 型



CSRD Type- CSRD 型



CSRE Type- CSRE 型



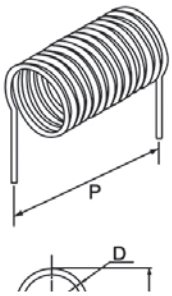
Specification(性能)

Type 类型	ΦD 线径	Rated Current 额定电流	Resistance Range 阻值范围	TCR	Remark 备注
CSRA CSRB CSRC CSRD	Φ0.8mm	4.5A	5mΩ~50mΩ	±100PPM/℃	*P&H could be design by customer's requirement P 值和 H 值可根据客户的要求进行设计 *Temperature coefficient of resistor could be design by customer's requirement 温度系数可根据客户的要求进行设计
	Φ0.9mm	5.0A	5mΩ~40mΩ		
	Φ1.0mm	5.5A	3mΩ~30mΩ		
	Φ1.1mm	6.0A	3mΩ~20mΩ		
	Φ1.2mm	7.0A	3mΩ~20mΩ		
	Φ1.3mm	7.5A	3mΩ~20mΩ		
	Φ1.4mm	8.0A	3mΩ~20mΩ		
	Φ1.5mm	9.0A	3mΩ~20mΩ		
	Φ1.6mm	9.5A	3mΩ~15mΩ		
	Φ1.8mm	11A	3mΩ~10mΩ		
	Φ2.0mm	12A	3mΩ~10mΩ		
	Φ2.3mm	14A	3mΩ~7mΩ		
CSRE	Φ1.0mm	50A	1mΩ		

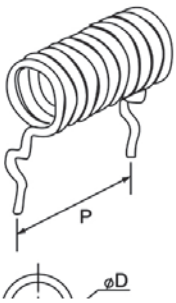
Feature (特性)

- Made by Cu/Ni or Mn/Cu Alloy resistance wire materials
  由铜 / 镍或锰 / 铜合金电阻线制成
- Excellent Solderability 优越的焊接性能
- Suitable for all kinds of Current sense application
  适用于各种类型的电流感应器应用
- Application: Power Supply 电源供应

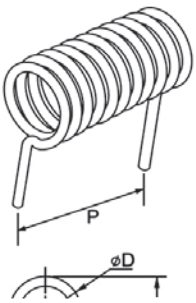
CSSA Type- CSSA 型



CSSB Type- CSSB 型



CSSC Type- CSSC 型



Type 类型	ΦD 线径	Rated Current 额定电流	Resistance Range 阻值范围	Remark 备注
CSSA CSSB CSSC	Φ0.8mm	4.5A	5mΩ~50mΩ	*P&H could be design by customer's requirement *P 值和 H 值可根据客户的要求进行设计
	Φ1.0mm	5.5A	3mΩ~30mΩ	
	Φ1.6mm	9.5A	3mΩ~15mΩ	
	Φ2.0mm	12A	3mΩ~10mΩ	

Ordering Procedure (Example: CSRC Φ1.5mm 10mΩ±5% B/B)

订购方式 (例如: CSRC Φ1.5mm 10mΩ±5% B/B)

C S R C 1 5 J 0 1 0 L B 0 0

Type (产品类型):
CSRA = CSRA type
CSRB = CSRB type
CSRC = CSRC type
CSRD = CSRD type
CSRE = CSRE type
CSSA = CSSA type
CSSB = CSSB type
CSSC = CSSC type

Wire Ø (线径 Ø):
08=Ø0.8 10=Ø1.0
12=Ø1.2 15=Ø1.5
16=Ø1.6 20=Ø2.0
23=Ø2.3

Tolerance (公差):
J=±5% K=±10%

Resistance Value (阻值):
2%, 5% (E-24 series): the 1st digit is "0"; the 2nd & 3rd digits are for the significant figures of the resistance and the 4th digit denotes number of zeros following.
2%, 5%产品 (E-24系列电阻): 第1位是0，第2,3位表示阻值的有效数，第4位表示有几个0.
≤1%(E-96 Series)
the 1st to 3rd digits are for the significant figures of the resistance and the 4th digit denotes number of zeros following:
≤1% 产品 (E-96系列阻值)
第1~3位表示阻值的有效数，第4位表示有几个0.

Packing Type (包装类型):
B=Bulk/Box (散装 / 盒装)

Packing Qty. (包装数量)
0=Bulk/Box
0= 散装 / 盒装

Additional Information (注):
0=NIL (标准品)

Remark: Please refer to page 141 for ordering guide. 注：下单请详见 P141 页说明。

Ceramic Rods For Resistors (电阻器用陶瓷基体)

	Ceramic Rod (瓷棒)	146	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.0×10, 3.5×10, 4.0×14, 5.0×16, 7.0×23

Capped & Sorted Ceramic Rod (组帽棒)

	White Capped Ceramic Rod (组帽瓷棒)	148	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.0×10, 3.5×10, 4.0×14, 5.0×16, 7.0×23
	Carbon Film Capped Ceramic Rod (碳膜组帽棒)	150	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.0×10, 3.5×10, 4.0×14, 5.0×16, 7.0×23
	Metal Film Capped Ceramic Rod (金属膜组帽棒)	152	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.0×10, 3.5×10, 4.0×14, 5.0×16, 7.0×23
	Metal Oxide Film Capped Ceramic Rod (金属氧化膜组帽棒)	154	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.0×10, 3.5×10, 4.0×14, 5.0×16, 7.0×23
	Capped Metal Glaze Film Rod (玻璃釉膜组帽棒)	156	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.0×10, 3.5×10, 4.0×14, 5.0×16
	Capped Chemical Deposited Film Rod (化学沉积膜组帽棒)	158	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.0×10, 3.5×10, 4.0×14, 5.0×16, 7.0×23
	Zero Ohm Rod (零歐姆棒)	160	1.3×2.7, 1.7×5.2

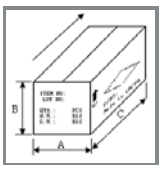
Tin-Plated Steel Cap (镀锡铁帽)

	Tin-Plated Steel Cap (镀锡铁帽)	162	Ø1.26, Ø1.64, Ø1.95, Ø2.45, Ø2.90, Ø3.41, Ø3.91, Ø4.90, Ø6.90

Ceramic Case (瓷壳)

	PRW series Case (PRW 系列瓷壳)	163	2W, 3W, 5W, 7W, 10W, 15W, 20W, 25W
	PRM series Case (PRM 系列瓷壳)	163	2W, 3W, 5W, 7W, 10W, 15W, 20W, 25W
	PRV series Case (PRV 系列瓷壳)	163	3W, 5W, 7W, 10W, 15W, 20W
	PRT series Case (PRT 系列瓷壳)	163	10W, 15W, 20W, 30W, 40W
	PFA series Case (PFA 系列瓷壳)	163	2W, 3W, 5W, 7W, 10W

Packing (包装)

	Ceramic Rod (瓷棒)	165
	Filmed & Capped Rod (组帽棒)	165
	Zero Ohm Rod (零欧姆棒)	166
	Tin-Plated Steel Cap (铁帽)	166

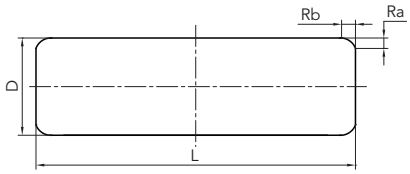
Material Characteristics Of Ceramics Rods
陶瓷棒特性表

Material 材质		Alumina 氧化铝瓷							
Product Code 产品代号		FS-25	FS-55	FS-70	FS-75	FS-80	FS-85	FS-92	FS-98
Chemical Analysis 主成份		AL_2O_3 25%	AL_2O_3 55%	AL_2O_3 70%	AL_2O_3 75%	AL_2O_3 80%	AL_2O_3 85%	AL_2O_3 92%	AL_2O_3 98%
Appearance 外观		Dense 致密质	Dense 致密质	Dense 致密质	Dense 致密质	Dense 致密质	Dense 致密质	Dense 致密质	Dense 致密质
Color 呈色		White 白色	White 白色	White 白色	White 白色	White 白色	White 白色	White 白色	White 白色
Features 特征		Good Heat Resistance, High Thermal Conductivity 耐热性优良，热传导性高							
Main Use 主要用途		Wire-wound Resistor 绕线电阻器用							
				Film Resistor 膜式电阻器用					
							Small-size & High power resistor 大功率小型化电阻器用		
Water Absorption 吸水率	%	≤ 0.02	≤ 0.02	≤0.01	≤0.01	≤0.01	≤0.01	< 0.02	< 0.02
Bulk Density 体积密度	g / cm^3	≥2.3	≥2.8	≥3.1	≥3.2	≥3.2	≥3.45	≥3.6	≥ 3.8
Thermal Expansion Coefficient 热膨胀系数	$\times10^{-6}$/°C (20-500°C)	> 4.0	> 5.5	> 6.1	> 6.7	> 7.0	> 7.3	> 7.0	> 7.7
Thermal Conductivity 热传导率	Cal/ cm.sec. °C	> 0.003	> 0.008	> 0.011	> 0.020	> 0.015	> 0.023	> 0.040	> 0.050
Dielectric Strength 绝缘强度	KV/mm	> 9	> 10	> 10	> 10	> 10	> 10	> 10	> 10
Dielectric Constant 绝缘常数	1MHZ	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
Loss Rate 损失率	1MHZ	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.0001	0.0001	0.0001
Anti-cross break strength 抗折力	Kg	> 9	> 10	> 12	> 12	> 16	> 16	> 16	> 16

Ceramic Rod
瓷棒

Feature (特性)

- Aluminum Content 70%, 80%, 85%. (70%, 80%, 85% 含铝量瓷棒)
- Electronic Ceramic parts in superior performance. (属于优良的电子陶瓷产品)
- Suitable for producing in different types of resistance film.
  (适合生产各种膜层的电阻)



Dimension (尺寸) (单位: mm)

NO	Size 规格	D 直径	L 长度	R	
				(Ra MIN 最小)	(Rb MAX 最大)
1	1.3×2.7	1.30±0.02	2.7±0.1	0.15	0.45
2	1.7×5.2	1.70±0.03	$5.2^{+0.1}_{-0.2}$	0.20	0.65
3	1.7×5.5	1.70±0.03	5.5±0.2	0.20	0.65
4	1.7×6.0	1.70±0.03	6.0±0.2	0.20	0.65
5	2.0×7.5	$2.00^{+0.04}_{-0.03}$	7.5±0.2	0.25	0.75
6	2.0×8.0	2.00±0.03	8.0±0.2	0.25	0.75
7	2.5×8.0	2.50±0.04	8.0±0.2	0.28	0.80
8	3.0×8.0	3.00±0.04	8.0±0.2	0.30	1.00
9	3.0×10	3.00±0.04	10.0±0.3	0.30	1.00
10	3.5×10	$3.50^{+0.04}_{-0.05}$	10.0±0.3	0.30	1.00
11	4.0×14	4.00±0.05	14.0±0.3	0.35	1.20
12	5.0×16	5.00±0.05	16.0±0.3	0.45	1.40
13	7.0×23	7.00±0.07	23.0±0.5	0.75	2.00

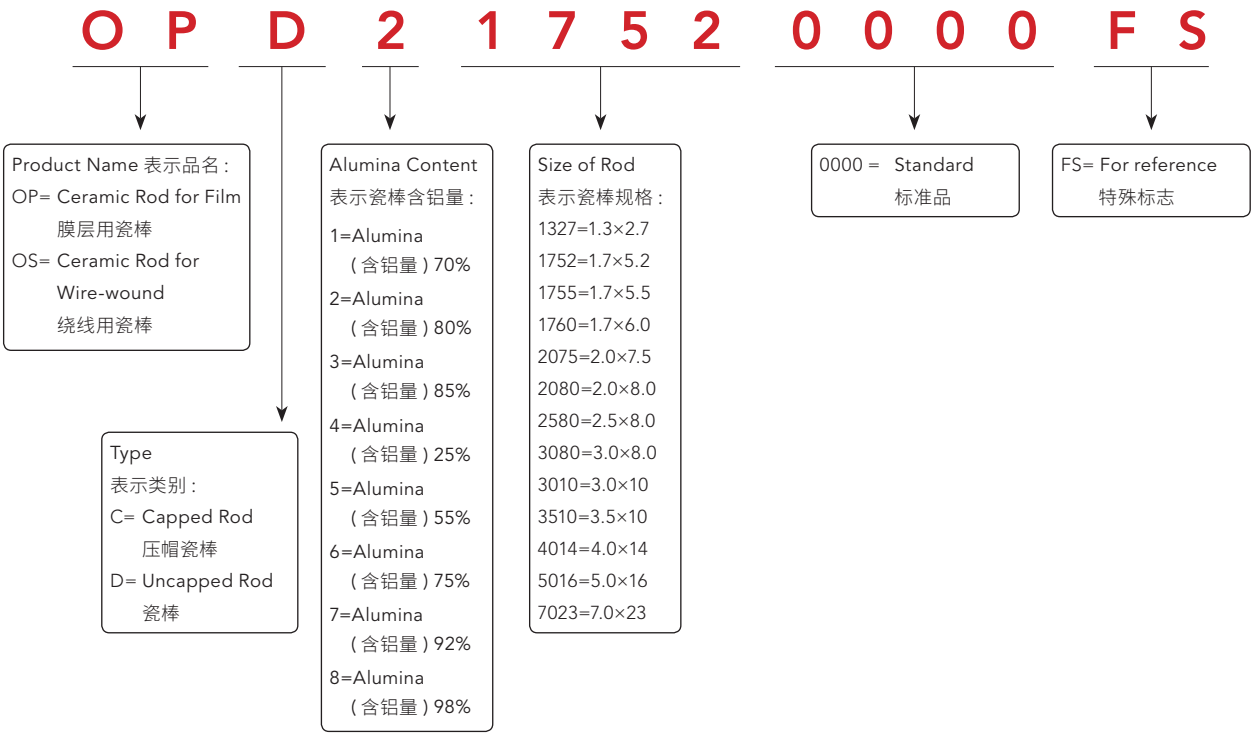
Remark: any special dimensions (4.0×12, 4.0×22, 4.0×39....) and Aluminum Content can be produced according to customer's request.
备注 : 特殊规格的尺寸 (4.0×12, 4.0×22, 4.0×39.....) 及公差和含铝量可以按客户的要求来生产。

Specification (产品规格)

Type （瓷 类）	Size （规 格）
FS-25 FS-55 FS-70	1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.5×10, 4.0×14, 5.0×16, 7.0×23
FS-75 FS-80	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.5×10, 4.0×14, 5.0×16, 7.0×23
FS-85 RS-92 FS-98	1.3×2.7, 1.7×5.2, 1.7×5.5, 1.7×6.0, 2.0×7.5, 2.0×8.0, 2.5×8.0, 3.0×8.0, 3.5×10, 4.0×14, 5.0×16, 7.0×23

Ordering Procedure (Example:OPD217520000FS)

订购方式 (例如: 膜层用 1.7×5.2 80% 瓷棒)

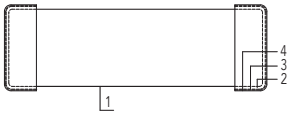


Remark: can produce other Alumina content product according to customer's request.
备注 : 可根据客户的要求订制其他含铝量的产品 .

Capped Ceramic Rod
组帽瓷棒

Feature (特性)

- Aluminum Content 70%, 80%, 85% (70%, 80%, 85% 含铝量白瓷棒)
- Electronic Ceramic parts in superior performance (属于优良的电子陶瓷产品)
- Suitable for producing in different types of Wire-wound resistors (适合生产绕线电阻)



1. Ceramic (瓷棒)
2. Cap (iron) (铁帽 . 铁)
3. Cap (copper) (铁帽 . 铜层)
4. Cap (tin) (铁帽 . 锡层)

Dimension (尺寸) (单位: mm)

NO	Size 规格	Capped Ceramic Rod 压帽瓷棒		MIN PULLING FORCE 最小拉力 (KG)
		D 直径	L 长度	
1	1.3×2.7	1.54~1.66	2.86~3.16	2
2	1.7×5.2	2.03~2.17	5.36~5.76	3
3	1.7×5.5	2.03~2.17	5.66~6.16	3
4	1.7×6.0	2.03~2.17	6.16~6.66	3
5	2.0×7.5	2.33~2.58	7.66~8.27	5
6	2.0×8.0	2.33~2.57	8.16~8.77	5
7	2.5×8.0	2.82~3.08	8.16~8.77	6
8	3.0×8.0	3.32~3.58	8.16~8.77	6
9	3.0×10	3.32~3.58	10.06~10.89	6
10	3.5×10	3.81~4.08	10.06~10.89	6
11	4.0×14	4.31~4.59	14.06~14.89	6
12	5.0×16	5.41~5.59	16.16~16.89	6
13	7.0×23	7.39~7.61	22.96~24.09	6

Ordering Procedure (Example: OSC14014000000)

订购方式 (例如 :4.0×14 规格 70% 组帽瓷棒)

O S C 1 4 0 1 4 0 0 0 0 0 0

Product Name
表示品名 :
OS= Ceramic Rod for Wire-wound
绕线用瓷棒

Type 表示类别 :
C= Capped Ceramic Rod 组帽

Alumina Content
表示瓷棒含铝量 :
1=Alumina (含铝量) 70%
2=Alumina (含铝量) 80%
3=Alumina (含铝量) 85%
4=Alumina (含铝量) 25%
5=Alumina (含铝量) 55%
6=Alumina (含铝量) 75%
7=Alumina (含铝量) 92%
8=Alumina (含铝量) 98%

Size of Rod 表示瓷棒规格 :

1327=1.3×2.7	1752=1.7×5.2
1755=1.7×5.5	1760=1.7×6.0
2075=2.0×7.5	2080=2.0×8.0
2580=2.5×8.0	3080=3.0×8.0
3010=3.0×10	3510=3.5×10
4014=4.0×14	5016=5.0×16
7023=7.0×23	

0=Standard 标准品

Remark: can produce other Alumina content product according to customer's request.
备注 : 可根据客户的要求订制其他含铝量的产品 .

Technical parameter of Capped Rods in various film

各类膜层组帽棒技术参数

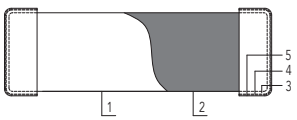
Type 膜层类型	Characteristic 膜层特点	Resistance range 电阻值范围 (Ω)	T.C.R. 电阻温度系数 (ppm/°C)	Limit of short time over load 短时间过载变化率
Film ceramic rods of carbon film resistor 碳膜	Conductive film made of high-heat temperature decompose carbon material 高温热分解碳质导电膜层 Ceramic rod with high-conduction material 高导热材料基体 Low cost 低成本	1Ω ~2.5Ω 2.6Ω ~800Ω 801Ω ~5KΩ 5.1KΩ ~ 120KΩ	±300 ±450 0 ~ -700 0 ~ -1500	≦ (1%+0.05Ω)
Film ceramic rods of metal film resistor 金属膜	Vacuum sputtering film ceramic rod adopted 采用真空溅射完成膜层 Ceramic rod with high-conduction material 高导热材料基体 Low current noise & T.C.R. 低电流噪声、低电阻温度系数 Wide resistance range:1Ω ~20KΩ 电阻值范围可达 :1Ω ~20KΩ	0.5Ω ~20KΩ	±15 ±25 ±50	≦ (0.5%+0.05Ω)
Film ceramic rods of metal oxide film resistor 金属氧化膜	Conductive film made of metal oxide fired at high temperature 金属氧化物高温烧成膜层 Good overload capacity 具有高温负荷能力 Ceramic rod with high-conduction material 高导热材料基体	2Ω ~500Ω	±350	Normal size 正常尺寸 ≦ (1%+0.05Ω) Small size 小尺寸≦ (2%+0.05Ω)
Film ceramic rods of Chemical Deposited Film resistors 化学沉积膜	Conductive film made of chemical plated metal 化学镀金属导电膜层 Ceramic rod with high-conduction material 高导热材料基体 Low cost 低成本	0.02Ω ~1.3Ω	±200	Normal size 正常尺寸 ≦ (1%+0.05Ω) Small size 小尺寸≦ (2%+0.05Ω)
Film ceramic rods of Metal Glaze film resistors 玻璃釉膜	Conductive film made of high temperature 高温烧成贵金属氧化物导电膜层 With high overload capacity 具有高过负荷能力 Wide resistance range:15Ω ~2.5MΩ 阻值范围 :15Ω ~2.5MΩ Small T.C.R.: ±100~200ppm/°C 温度系数小 :±100~200ppm/°C	15Ω ~1.3MΩ	±100 ±200	≦ (1%+0.05Ω)
OΩ resistors 零欧电阻	Conductive film made of chemical plated copper 化学镀铜导电膜层 Ceramic rod with high-conduction material 高导热材料基体 Low cost 低成本	≦ 50mΩ	/	/

Carbon Film Capped Ceramic Rod

碳膜组帽棒

Feature (特性)

- Filming in CVD technology (采用 CVD 技术成膜)
- Low cost, good performance at High Frequency (低成本 , 高频特性好)
- Wide IRV range, can be sorted accurately (初值范围宽 , 并可以精准分类)



1. Ceramic (瓷棒)
2. Film (膜层)
3. Cap (iron) （铁帽 . 铁)
4. Cap (copper) （铁帽 . 铜层)
5. Cap (tin) （铁帽 . 锡层)

Dimension (尺寸) (单位: mm)

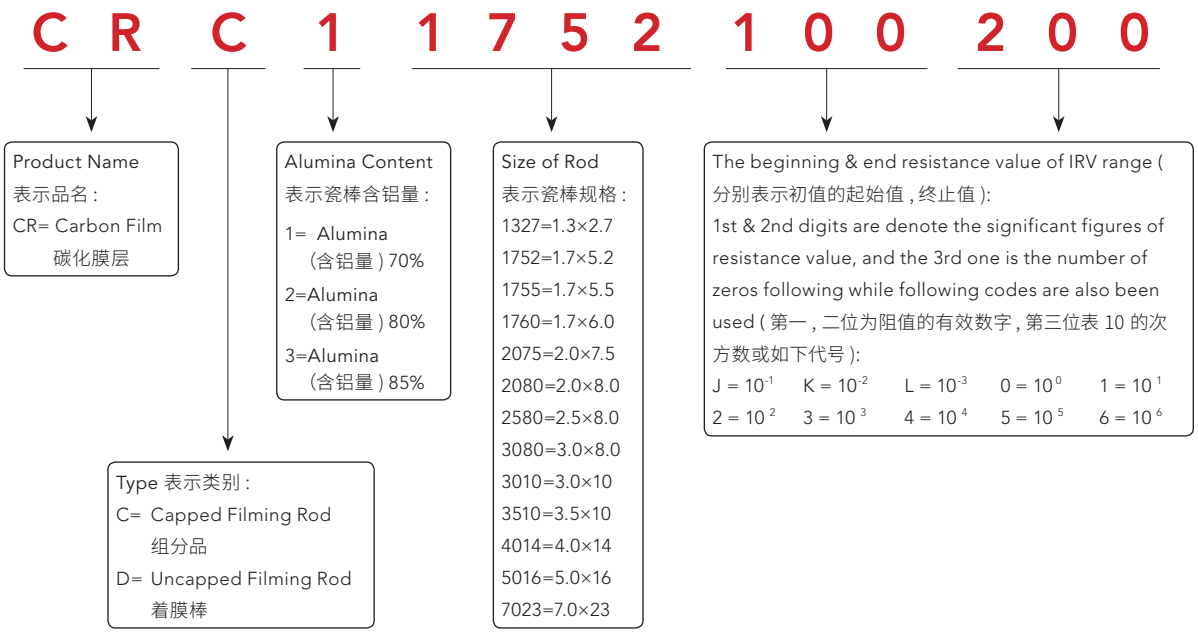
NO	Size 规格	Uncapped Filming Rod 着膜棒		Capped Filming Rod 组分品		MIN PULLING FORCE 最小拉力 (KG)
		D 直径	L 长度	D 直径	L 长度	
1	1.3×2.7	1.30±0.02	2.7±0.1	1.54~1.66	2.86~3.16	2
2	1.7×5.2	1.70±0.03	$5.2^{+0.1}_{-0.2}$	2.03~2.17	5.36~5.76	3
3	1.7×5.5	1.70±0.03	5.5±0.2	2.03~2.17	5.66~6.16	3
4	1.7×6.0	1.70±0.03	6.0±0.2	2.03~2.17	6.16~6.66	3
5	2.0×7.5	$2.00^{+0.04}_{-0.03}$	7.5±0.2	2.33~2.58	7.66~8.27	5
6	2.0×8.0	2.00±0.03	8.0±0.2	2.33~2.57	8.16~8.77	5
7	2.5×8.0	2.50±0.04	8.0±0.2	2.82~3.08	8.16~8.77	6
8	3.0×8.0	3.00±0.04	8.0±0.2	3.32~3.58	8.16~8.77	6
9	3.0×10	3.00±0.04	10.0±0.3	3.32~3.58	10.06~10.89	6
10	3.5×10	$3.50^{+0.04}_{-0.05}$	10.0±0.3	3.81~4.08	10.06~10.89	6
11	4.0×14	4.00±0.05	14.0±0.3	4.31~4.59	14.06~14.89	6
12	5.0×16	5.00±0.05	16.0±0.3	5.41~5.59	16.16~16.89	6
13	7.0×23	7.00±0.07	23.0±0.5	7.39~7.61	22.96~24.09	6

IRV (Initial Resistance Value) Range (初值范围)

1Ω-2Ω	8Ω-13Ω	60Ω-100Ω	500Ω-800Ω	4KΩ-7KΩ	30KΩ-60KΩ
1.5Ω-2.5Ω	10Ω-20Ω	80Ω-130Ω	600Ω-900Ω	5KΩ-10KΩ	40KΩ-80KΩ
2Ω-3.5Ω	15Ω-25Ω	100Ω-200Ω	800Ω-1.3KΩ	6KΩ-12KΩ	50KΩ-100KΩ
3Ω-5Ω	20Ω-30Ω	150Ω-250Ω	1KΩ-2KΩ	8KΩ-16KΩ	60KΩ-120KΩ
4Ω-7Ω	30Ω-50Ω	200Ω-400Ω	1.5KΩ-2.5KΩ	10KΩ-20KΩ	
5Ω-8Ω	40Ω-60Ω	300Ω-500Ω	2KΩ-4KΩ	15KΩ-30KΩ	
6Ω-10Ω	50Ω-80Ω	400Ω-600Ω	3KΩ-5KΩ	20KΩ-40KΩ	

Ordering Procedure (Example: CRC11752100200)

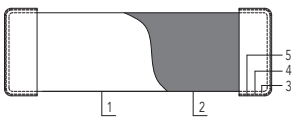
订购方式 (例如: CR 70% 1.7×5.2 10-20E)



Metal Film Capped Ceramic Rod
金属膜组帽棒

Feature (特性)

- Filming in PCD technology. (采用 PCD 成膜技术).
- Excellent Temperature coefficient, very low current noise. (温度系数范围低 , 电流噪声小).
- Wide IRV range, suitable to produce high precision product. (初值范围宽 , 适用于生产高精度产品)



1. Ceramic (瓷棒)
2. Film (膜层)
3. Cap (iron) （铁帽 . 铁)
4. Cap (copper) （铁帽 . 铜层)
5. Cap (tin) （铁帽 . 锡层)

Dimension (尺寸) (单位: mm)

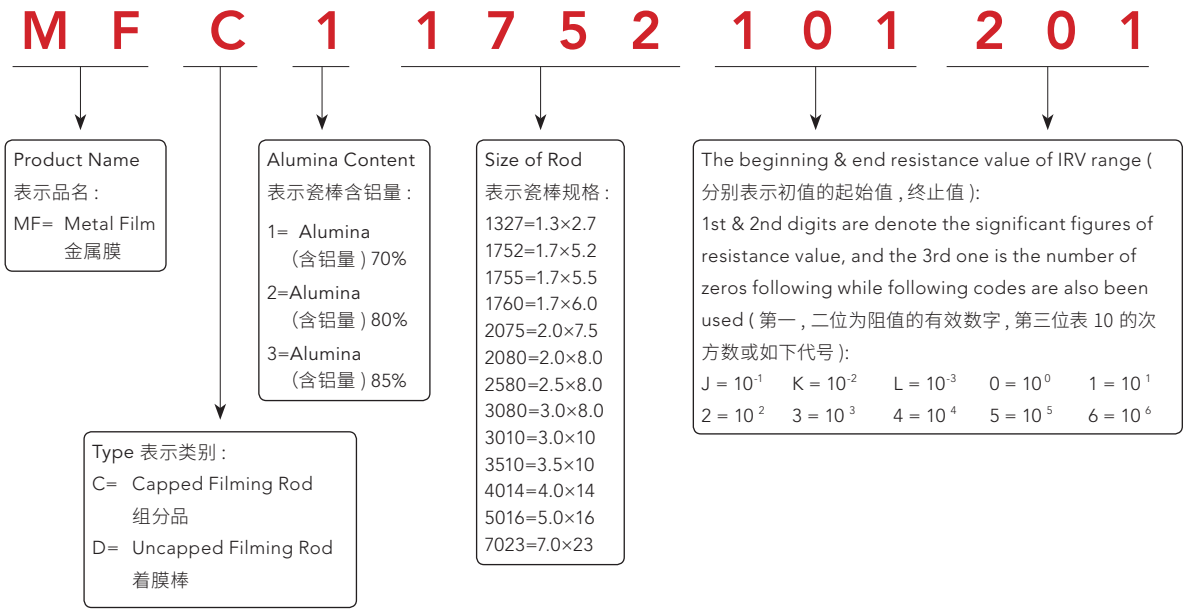
NO	Size 规格	Uncapped Filming Rod 着膜棒		Capped Filming Rod 组分品		MIN PULLING FORCE 最小拉力 (KG)
		D 直径	L 长度	D 直径	L 长度	
1	1.3x2.7	1.30±0.02	2.7±0.1	1.54~1.66	2.86~3.16	2
2	1.7x5.2	1.70±0.03	$5.2^{+0.1}_{-0.2}$	2.03~2.17	5.36~5.76	3
3	1.7x5.5	1.70±0.03	5.5±0.2	2.03~2.17	5.66~6.16	3
4	1.7x6.0	1.70±0.03	6.0±0.2	2.03~2.17	6.16~6.66	3
5	2.0x7.5	$2.00^{+0.04}_{-0.03}$	7.5±0.2	2.33~2.58	7.66~8.27	5
6	2.0x8.0	2.00±0.03	8.0±0.2	2.33~2.57	8.16~8.77	5
7	2.5x8.0	2.50±0.04	8.0±0.2	2.82~3.08	8.16~8.77	6
8	3.0x8.0	3.00±0.04	8.0±0.2	3.32~3.58	8.16~8.77	6
9	3.0x10	3.00±0.04	10.0±0.3	3.32~3.58	10.06~10.89	6
10	3.5x10	$3.50^{+0.04}_{-0.05}$	10.0±0.3	3.81~4.08	10.06~10.89	6
11	4.0x14	4.00±0.05	14.0±0.3	4.31~4.59	14.06~14.89	6
12	5.0x16	5.00±0.05	16.0±0.3	5.41~5.59	16.16~16.89	6
13	7.0x23	7.00±0.07	23.0±0.5	7.39~7.61	22.96~24.09	6

IRV (Initial Resistance Value) Range (初值范围)

0.5Ω-0.8Ω	4Ω-7Ω	20Ω-30Ω	100Ω-200Ω	600Ω-900Ω	4KΩ-7KΩ
0.8Ω-1.3Ω	5Ω-8Ω	30Ω-50Ω	150Ω-250Ω	800Ω-1.3KΩ	5KΩ-10KΩ
1Ω-2Ω	6Ω-10Ω	40Ω-60Ω	200Ω-400Ω	1KΩ-2KΩ	6KΩ-12KΩ
1.5Ω-2.5Ω	8Ω-13Ω	50Ω-80Ω	300Ω-500Ω	1.5KΩ-2.5KΩ	8KΩ-16KΩ
2Ω-3.5Ω	10Ω-20Ω	60Ω-100Ω	400Ω-600Ω	2KΩ-4KΩ	10KΩ-20KΩ
3Ω-5Ω	15Ω-25Ω	80Ω-130Ω	500Ω-800Ω	3KΩ-5KΩ	

Ordering Procedure (Example: MFC11752101201)

订购方式 (例如: MF 70% 1.7×5.2 100-200Ω)

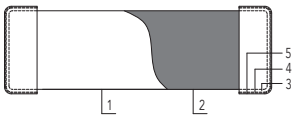


Metal Oxide Film Capped Ceramic Rod

金属氧化膜组帽棒

Feature (特性)

- Conductive Film Layer produced under High Temperature (高温烧成导电膜层)
- Good Performance under High Temperature environment (高温负荷能力强)
- First Choice for Power type resistor materials (功率型产品优选原料)



1. Ceramic (瓷棒)
2. Film (膜层)
3. Cap (iron) （铁帽 . 铁)
4. Cap (copper) （铁帽 . 铜层)
5. Cap (tin) （铁帽 . 锡层)

Dimension (尺寸) (单位: mm)

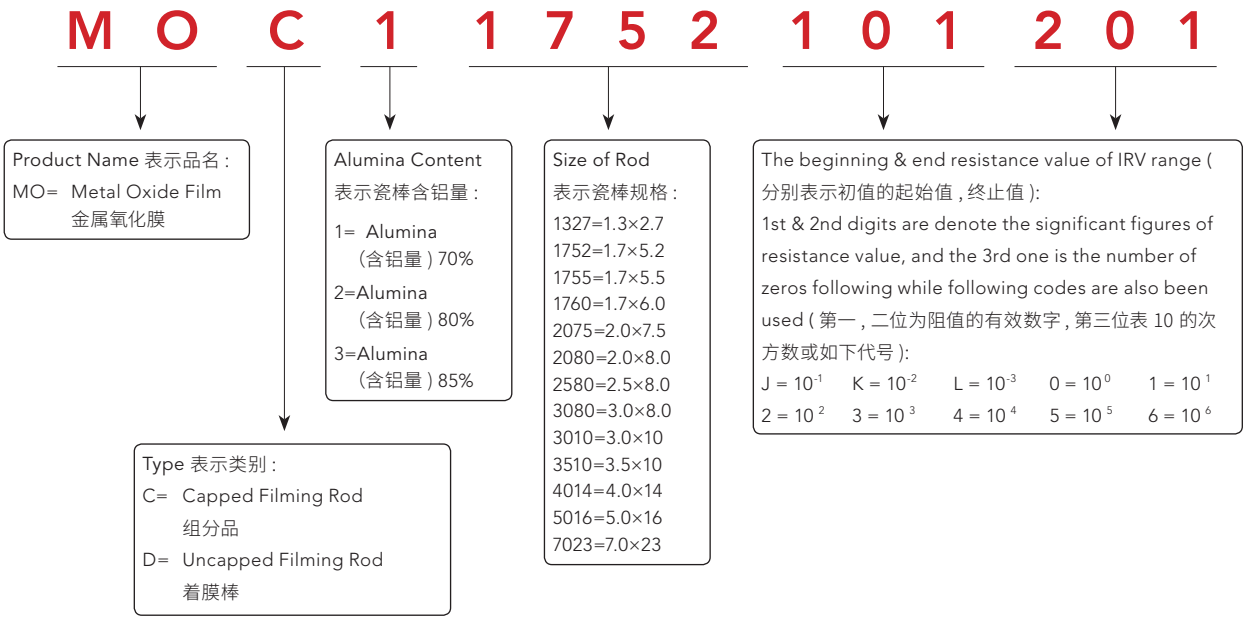
NO	Size 规格	Uncapped Filming Rod 着膜棒		Capped Filming Rod 组分品		MIN PULLING FORCE 最小拉力 (KG)
		D 直径	L 长度	D 直径	L 长度	
1	1.3×2.7	1.30±0.02	2.7±0.1	1.54~1.66	2.86~3.16	2
2	1.7×5.2	1.70±0.03	$5.2^{+0.1}_{-0.2}$	2.03~2.17	5.36~5.76	3
3	1.7×5.5	1.70±0.03	5.5±0.2	2.03~2.17	5.66~6.16	3
4	1.7×6.0	1.70±0.03	6.0±0.2	2.03~2.17	6.16~6.66	3
5	2.0×7.5	$2.00^{+0.04}_{-0.03}$	7.5±0.2	2.33~2.58	7.66~8.27	5
6	2.0×8.0	2.00±0.03	8.0±0.2	2.33~2.57	8.16~8.77	5
7	2.5×8.0	2.50±0.04	8.0±0.2	2.82~3.08	8.16~8.77	6
8	3.0×8.0	3.00±0.04	8.0±0.2	3.32~3.58	8.16~8.77	6
9	3.0×10	3.00±0.04	10.0±0.3	3.32~3.58	10.06~10.89	6
10	3.5×10	$3.50^{+0.04}_{-0.05}$	10.0±0.3	3.81~4.08	10.06~10.89	6
11	4.0×14	4.00±0.05	14.0±0.3	4.31~4.59	14.06~14.89	6
12	5.0×16	5.00±0.05	16.0±0.3	5.41~5.59	16.16~16.89	6
13	7.0×23	7.00±0.07	23.0±0.5	7.39~7.61	22.96~24.09	6

IRV (Initial Resistance Value) Range (初值范围)

2Ω-3.5Ω	8Ω-13Ω	40Ω-60Ω	150Ω-250Ω
3Ω-5Ω	10Ω-20Ω	50Ω-80Ω	200Ω-400Ω
4Ω-7Ω	15Ω-25Ω	60Ω-100Ω	300Ω-500Ω
5Ω-8Ω	20Ω-30Ω	80Ω-130Ω	
6Ω-10Ω	30Ω-50Ω	100Ω-200Ω	

Ordering Procedure (Example: MOC11752101201)

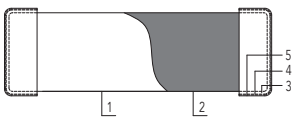
订购方式 (例如: MO 70% 1.7×5.2 100-200Ω)



Metal Glaze Capped Ceramic Rod
玻璃釉膜组帽棒

Feature (特性)

- Good performance against Humidity environment (耐湿特性好)
- Wide IRV range, can be sorted accurately
  (初值范围宽 , 并可以精准分类)
- Best choice for Anti-surge product （抗浪涌型产品的优选原料)



1. Ceramic (瓷棒)
2. Film (膜层)
3. Cap (iron) （铁帽 . 铁)
4. Cap (copper) （铁帽 . 铜层)
5. Cap (tin) （铁帽 . 锡层)

Dimension (尺寸) (单位: mm)

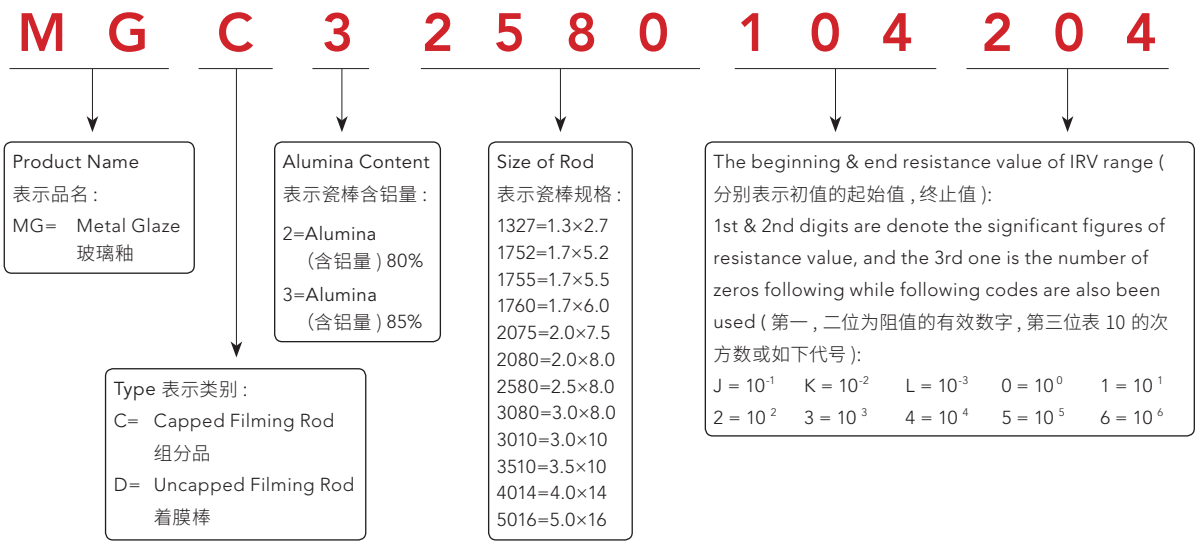
NO	Size 规格	Uncapped Filming Rod 着膜棒		Capped Filming Rod 组分品		MIN PULLING FORCE 最小拉力 (KG)
		D 直径	L 长度	D 直径	L 长度	
1	1.3×2.7	1.30±0.02	2.7±0.1	1.54~1.67	2.86~3.16	2
2	1.7×5.2	1.70±0.03	$5.2^{+0.1}_{-0.2}$	2.03~2.18	5.36~5.76	3
3	1.7×5.5	1.70±0.03	5.5±0.2	2.03~2.18	5.66~6.16	3
4	1.7×6.0	1.70±0.03	6.0±0.2	2.03~2.18	6.16~6.66	3
5	2.0×7.5	$2.00^{+0.04}_{-0.03}$	7.5±0.2	2.33~2.73	7.66~8.27	5
6	2.0×8.0	2.00±0.03	8.0±0.2	2.33~2.60	8.16~8.77	5
7	2.5×8.0	2.50±0.04	8.0±0.2	2.82~3.11	8.16~8.77	6
8	3.0×8.0	3.00±0.04	8.0±0.2	3.32~3.60	8.16~8.77	6
9	3.0×10	3.00±0.04	10.0±0.3	3.32~3.60	10.06~10.89	6
10	3.5×10	$3.50^{+0.04}_{-0.05}$	10.0±0.3	3.81~4.10	10.06~10.89	6
11	4.0×14	4.00±0.05	14.0±0.3	4.31~4.67	14.06~14.89	6
12	5.0×16	5.00±0.05	16.0±0.3	5.41~5.62	16.16~16.89	6

IRV (Initial Resistance Value) Range (初值范围)

15Ω-25Ω	200Ω-400Ω	3KΩ-5KΩ	40KΩ-80KΩ	500KΩ-800KΩ
20Ω-30Ω	300Ω-500Ω	4KΩ-7KΩ	50KΩ-100KΩ	600KΩ-900KΩ
30ΩE-50Ω	400Ω-600Ω	5KΩ-10KΩ	60KΩ-120KΩ	800KΩ-1.3MΩ
40Ω-60Ω	500Ω-800Ω	6KΩ-12KΩ	80KΩ-160KΩ	
50Ω-80Ω	600Ω-900Ω	8KΩ-16KΩ	100KΩ-200KΩ	
60Ω-100Ω	800Ω-1.3KΩ	10KΩ-20KΩ	150KΩ-300KΩ	
80Ω-130Ω	1KΩ-2KΩ	15KΩ-30KΩ	200KΩ-400KΩ	
100Ω-200Ω	1.5KΩ-2.5KΩ	20KΩ-40KΩ	300KΩ-500KΩ	
150Ω-250Ω	2KΩ-4KΩ	30KΩ-60KΩ	400KΩ-700KΩ	

Ordering Procedure (Example: MGC32580104204)

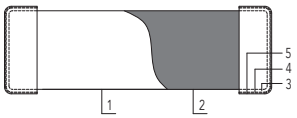
订购方式 (例如: MG 85% 2.5×8.0 100-200KΩ)



Chemical Nickel - Plating Film Capped Ceramic Rod
化学沉积膜组帽棒

Feature (特性)

- Conductive layer (Ni) deposited by Chemical method (化学镀镍形成导电膜层)
- Extremely Low Resistance value (超低阻值)
- Specially used for Low Resistance range product (其他膜层低阻部分的替代品)



1. Ceramic (瓷棒)
2. Film (膜层)
3. Cap (iron) （铁帽 . 铁)
4. Cap (copper) （铁帽 . 铜层)
5. Cap (tin) （铁帽 . 锡层)

Dimension (尺寸) (单位: mm)

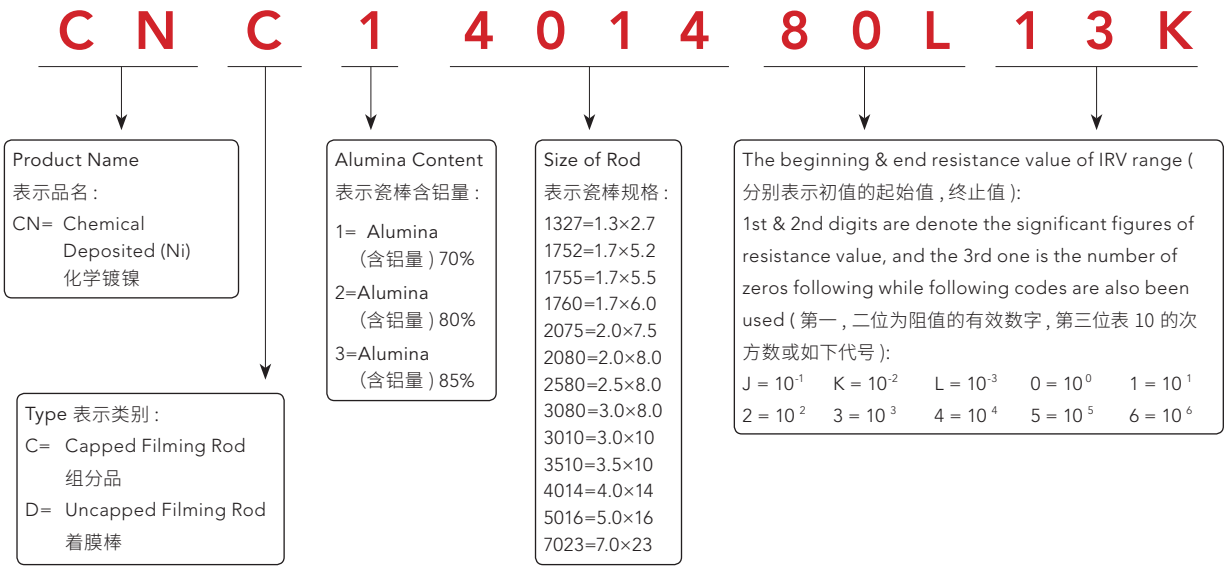
NO	Size 规格	Uncapped Filming Rod 着膜棒		Capped Filming Rod 组分品		MIN PULLING FORCE 最小拉力 (KG)
		D 直径	L 长度	D 直径	L 长度	
1	1.3×2.7	1.28~1.33	2.7±0.1	1.54~1.67	2.86~3.16	2
2	1.7×5.2	1.67~1.74	$5.2^{+0.1}_{-0.2}$	2.03~2.18	5.36~5.76	3
3	1.7×5.5	1.67~1.74	5.5±0.2	2.03~2.18	5.66~6.16	3
4	1.7×6.0	1.67~1.74	6.0±0.2	2.03~2.18	6.16~6.66	3
5	2.0×7.5	1.97~2.19	7.5±0.2	2.33~2.73	7.66~8.27	5
6	2.0×8.0	1.97~2.06	8.0±0.2	2.33~2.60	8.16~8.77	5
7	2.5×8.0	2.46~2.57	8.0±0.2	2.82~3.11	8.16~8.77	6
8	3.0×8.0	2.96~3.06	8.0±0.2	3.32~3.60	8.16~8.77	6
9	3.0×10	2.96~3.06	10.0±0.3	3.32~3.60	10.06~10.89	6
10	3.5×10	3.45~3.56	10.0±0.3	3.81~4.10	10.06~10.89	6
11	4.0×14	3.95~4.13	14.0±0.3	4.31~4.67	14.06~14.89	6
12	5.0×16	4.95~5.08	16.0±0.3	5.41~5.62	16.16~16.89	6
13	7.0×23	6.93~7.10	23.0±0.5	7.39~7.64	22.96~24.09	6

IRV (Initial Resistance Value) Range (初值范围)

0.02Ω-0.03Ω	0.10Ω-0.20Ω	0.80Ω-1.3Ω
0.03Ω-0.05Ω	0.20Ω-0.30Ω	1.0Ω-2.0Ω
0.05Ω-0.07Ω	0.30Ω-0.50Ω	
0.07Ω-0.10Ω	0.50Ω-0.80Ω	

Ordering Procedure (Example: CNC1401480L13K)

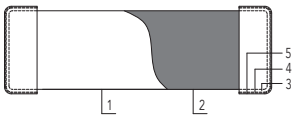
订购方式 (例如: CN 70% 4.0×14 0.08-0.13Ω)



0Ω Resistor
0Ω 电阻

Feature (特性)

- Conductive layer formed by Copper Plating (or Tin plating) process (电镀铜层或锡层作为导电膜层)
- Resistance value can be lowest to mini ohm range (阻值可低至 mΩ)
- Ceramic rod core or Alloy rod core (陶瓷棒或合金棒作为基体材料)

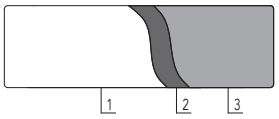


1. Ceramic (瓷棒)
2. Film (膜层)
3. Cap (iron) (铁帽 . 铁)
4. Cap (copper) (铁帽 . 铜层)
5. Cap (tin) (铁帽 . 锡层)

Copper Film Ceramic Rod 镀铜瓷棒 (单位: mm)

NO	Size 规格	Copper Film Ceramic Rod 镀铜瓷棒		Copper Film Capped Ceramic Rod 镀铜组帽棒	
		D 直径	L 长度	D 直径	L 长度
1	1.3x2.7	1.30±0.02	2.7±0.1	1.60~1.70	2.89~3.14
2	1.7x5.2	1.70±0.03	$5.2^{+0.1}_{-0.2}$	2.09~2.21	5.39~5.74

Tinned Iron Rod (镀锡铁棒)



1.Fe 铁棒 2.Cu 铜层 3.Sn 锡层

Tinned Iron Rod (镀锡铁棒) (单位: mm)

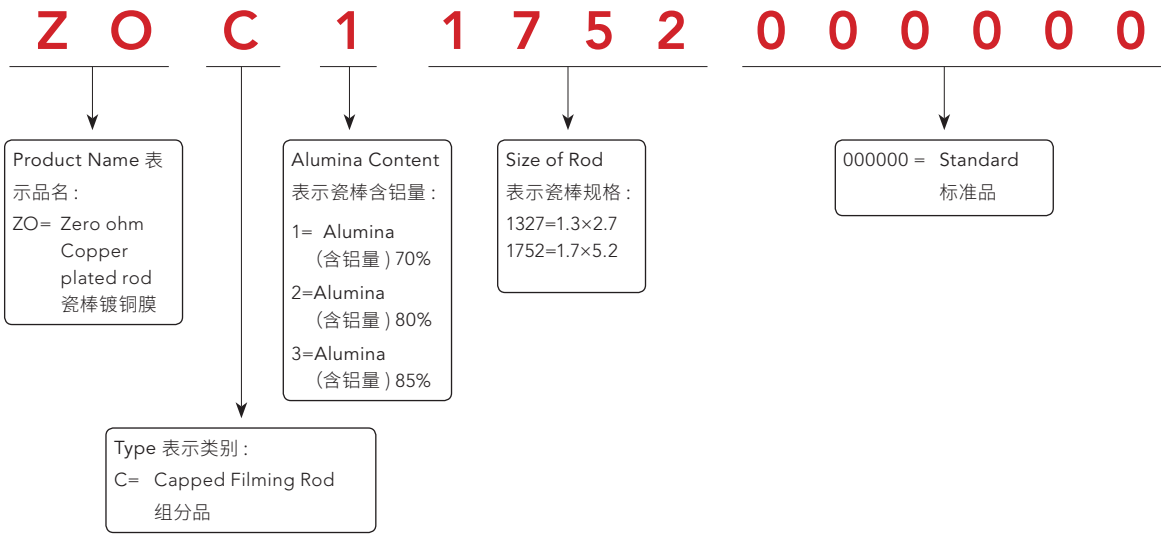
NO	Size 规格	Tinned Iron Rod 镀锡铁棒	
		D 直径	L 长度
1	1.3x2.7	1.50 ± 0.05	3.00 ± 0.05
2	1.7x5.2	2.00 ± 0.05	5.60 ± 0.05

IRV (Initial Resistance Value) Range (初值范围)

Standard resistance value <=50mE, other value or special structure can be specially provided
标准品阻值 ≤50mΩ, 其他阻值或特殊结构的要求可以特别提供

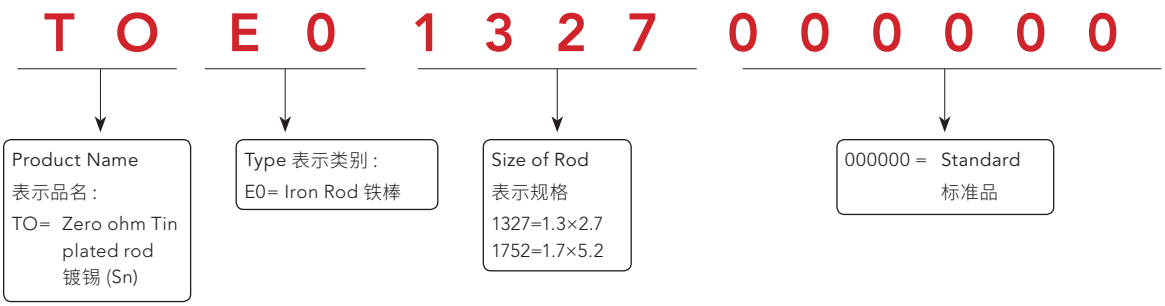
Ordering Procedure (Example: ZOC11752000000)

订购方式 (例如: ZO 70% 1.7×5.2 0Ω)



OrderingProcedure (Example: TOE01327000000)

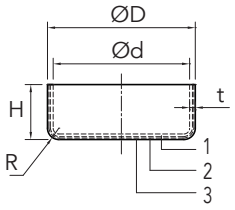
订购方式 (例如 :0Ω 1.3×2.7 镀锡铁棒)



Tin-Plated Steel Cap
铁帽

Feature (特性)

- Suitable for many different kinds of Electronic parts (适用各类电子产品)
- Full series in different size (规格齐全)
- Surface treatments in Tin & Copper Plating (表面经过镀铜镀锡处理)



1.Fe 铁
2.Cu 铜层
3.Sn 锡层

Dimension (尺寸) (单位: mm)

NO	Size 规格	ØD 直径	Ød 内径	H 高度	R(Max. 最大)	t±0.02
1	1.26 × 0.95	1.62±0.02	1.265±0.02	0.95±0.02	0.15	0.15
2	1.64 × 1.42	2.10±0.02	1.64±0.02	1.42±0.04	0.20	0.20
3	1.95 × 1.74	2.51±0.02	1.93±0.02	1.74±0.03	0.25	0.25
4	1.95 × 1.85	2.51±0.02	1.93±0.02	1.85±0.03	0.25	0.25
5	2.45 × 1.95	3.00±0.02	2.44±0.02	1.95±0.05	0.25	0.25
6	2.90 × 2.00	3.50±0.03	2.92±0.02	2.00±0.05	0.25	0.25
7	2.90 × 2.10	3.50±0.03	2.92±0.02	2.10±0.05	0.25	0.25
8	3.41 × 2.35	4.00±0.03	3.41±0.02	2.35±0.05	0.25	0.25
9	3.91 × 2.35	4.50±0.03	3.91±0.03	2.35±0.05	0.25	0.25
10	4.90 × 2.85	5.48±0.02	4.88±0.03	2.85±0.05	0.25	0.25
11	6.90 × 3.45	7.50±0.02	6.90±0.03	3.45±0.05	0.25	0.25

Ordering Procedure (Example: TOCA12600000FS)
订购方式 (例如: 镀锡铁帽 Ø1.26)

T O C A 1 2 6 0 0 0 0 0 F S

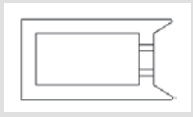
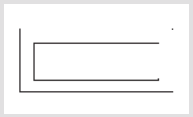
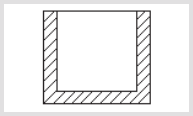
- **T O** — Product Name 表示品名 : TO= 镀锡 (Sn)
- **C** — Type 表示类别 : C= Cap 铁帽
- **A** — Thickness 表示厚度 A=0.15mm 厚 B=0.20mm 厚 C=0.25mm 厚
- **1 2 6 0** — Size 表示铁帽尺寸 :
  1260= Ø1.26 / 1640 = Ø1.64
  1950 = Ø1.95 / 2450= Ø 2.45
  2900 = Ø2.90 / 3910 = Ø3.91
  4900 = Ø4.90 / 6900= Ø6.90
- **0 0 0 0** — 0000 for Steel Cap product. Can indicate the specified height in case for non-standard cap 无需描述添 0 补足 ---0000 指定高度 , 例 : 1900--- H1.90mm
- **F S** — FS= For reference 特殊标志

Remark: Special size can be provided according to customer's request
备注 : 特殊尺寸可以按客户的要求订制

Feature (特性)

- Superior Talc Material (优质滑石瓷原料)
- Full series in different size (规格齐全)
- Hot-briquetting & Dry-pressing two different process (热压和干压两种成形方式)

Type & Dimension (类型及尺寸) (单位: mm)

Type (类型)		功率	2W	3W	5W	7W	10W	15W	20W	25W	30W	40W
	PRW	L 长	18	22	22	35	49	49	60	64	-	-
		W 宽	7	8	10	10	10	12.5	14.5	14.5	-	-
		H 高	7	8	9	9	9	11.5	13.5	13.5	-	-
	PRM	L 长	20	25	25	38	50	-	45	-	-	-
		W 宽	11.5	12.5	12.5	12.5	12.5	-	20	-	-	-
		H 高	7.5	8.5	9	9	9	-	13.5	-	-	-
	PRV	L 长	-	22	27/25	35	48	48	63	-	-	-
		W 宽	-	10	10	10	10	12.5	12.5	-	-	-
		H 高	-	9	9	9	9	11.5	13.5	-	-	-
	PRT	L 长	-	-	-	-	48	48	63	-	75	90
		W 宽	-	-	-	-	10	12.5	12.5	-	19	19
		H 高	-	-	-	-	9	11.5	13.5	-	19	19
	PFA	L 长	13 / 26	13 / 26	14 / 26	26	26	-	-	-	-	-
		W 宽	5	5	5	5	-	-	-	-	-	-
		H 高	8.5 / 9	13.5 / 13	18	20	18	-	-	-	-	-

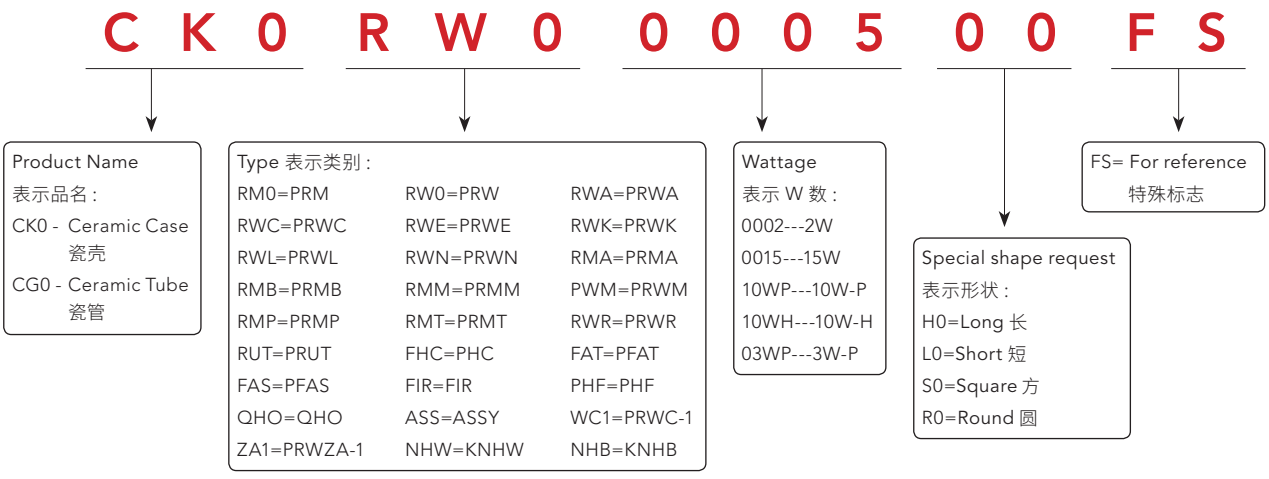
Remark: Special type and dimension can be orded by customer's request.
备注 : 特殊尺寸可以按客户的要求订制

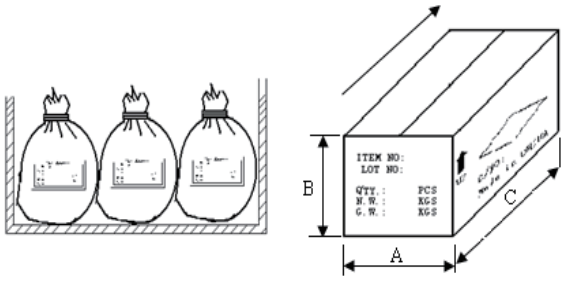
Performance Specifications (性能)

Item	项目	Unit 单位	Specification 标准
Bulk Density	体积密度	g/cm^3	≥ 2.8
Flexural Strength	抗折强度	MPa	139
Coefficient of Linear Thermal Expansion	线膨胀系数 (20~100°C)	$\times10^{-6}$/°C	7.3
Permittivity	介电常数 (1MHz 20°C)	F/M	6.2
Dielectric Loss Tangent	介质损耗角正切值	$\times10^{-4}$	13
Volume Resistivity	体积电阻率 (100°C)	Ω.cm	≥ 10^{12}
Dielectric Strength	击穿强度	K v /mm	≥ 20

Ordering Procedure (Example: CK0PRW0000500FS)

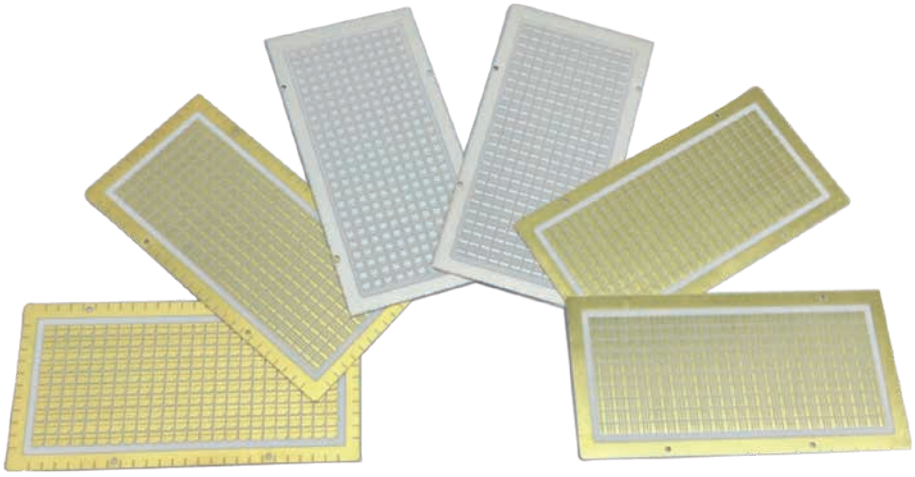
订购方式 (例如 :PRW5W 瓷壳)





Packing (标准包装方式)						
Tpye (类 型)		Size (尺寸) (mm)			Quantity (数量) (KPCS)	
Aluminum Content (瓷棒)						
		A	B	C	袋	盒
1	1.3 × 2.7	25	20	45	600	1800
2	1.7 × 5.2	25	20	45	200	600
3	1.7 × 5.5	25	20	45	200	600
4	1.7 × 6.0	25	20	45	200	600
5	2.0 × 7.5	25	20	45	100	300
6	2.0 × 8.0	25	20	45	100	300
7	2.5 × 8.0	25	20	45	60	180
8	3.0 × 8.0	25	20	45	40	120
9	3.0 × 10	25	20	45	40	120
10	3.5 × 10	25	20	45	25	75
11	4.0 × 14	25	20	45	12.5	37.5
12	5.0 × 16	25	20	45	7.5	22.5
13	7.0 × 23	25	20	45	2.5	7.5
Capped Ceramic Rod (组帽棒)						
1	1.3 × 2.7	25	20	45	600	1800
2	1.7 × 5.2	25	20	45	200	600
3	1.7 × 5.5	25	20	45	200	600
4	1.7 × 6.0	25	20	45	200	600
5	2.0 × 7.5	25	20	45	100	300
6	2.0 × 8.0	25	20	45	100	300
7	2.5 × 8.0	25	20	45	60	180
8	3.0 × 8.0	25	20	45	40	120
9	3.0 × 10	25	20	45	40	120
10	3.5 × 10	25	20	45	25	75
11	4.0 × 14	25	20	45	12.5	37.5
12	5.0 × 16	25	20	45	7.5	22.5
13	7.0 × 23	25	20	45	2.5	7.5

Packing (标准包装方式)						
Tpye (类 型)	Size (尺寸) (mm)				Quantity (数量) (KPCS)	
Zero Ohm product (0Ω 产品)						
Copper plated 0 ohm in Ceramic core 镀铜瓷棒	1.3 × 2.7	25	20	45	600	1800
Tin plated 0 ohm in Ceramic core 镀铜瓷棒	1.7 × 5.2	25	20	45	200	600
Copper plated 0 ohm in Steel core 铁棒鍍銅鍍錫	1.3 × 2.7	25	20	45	300	900
Tin plated 0 ohm in Steel core 铁棒鍍銅鍍錫	1.7 × 5.2	25	20	45	100	300
Tin-Plated Steel Cap (铁帽)						
1	1.26 × 0.95	25	20	45	1800	5400
2	1.64 × 1.42	25	20	45	900	2700
3	1.95 × 1.85	25	20	45	600	1800
4	2.45 × 1.95	25	20	45	250	750
5	2.90 × 2.10	25	20	45	200	600
6	3.41 × 2.35	25	20	45	150	450
7	3.91 × 2.35	25	20	45	120	360
8	4.90 × 2.85	25	20	45	80	240
9	6.90 × 3.45	25	20	45	40	120

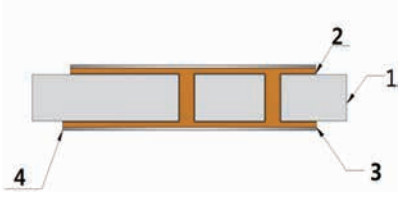


Technology Description (技术说明)

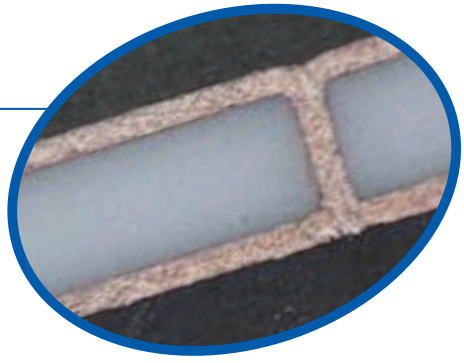
厚声采用半导体薄膜创新观念，开发直接电镀铜 (Direct Plating Copper, DPC) 陶瓷基板制程，完美的结合陶瓷散热及金属之特性。此制程利用溅镀及曝光显影方式在陶瓷基板上刻划出各种各样的电路图形，在经由电镀方式不仅可使金属与陶瓷两种不同属性之物质相互紧密结合，线路亦不易脱落 (结合力佳)。透过微显技术线路位置可更准确，线距更缩小之优点。主要应用于高亮度高功率 LED、微波无线通信、太阳能组件及半导体设备等领域。

Uni-Royal using the semiconductor thin-film innovative idea to develop the Direct Plating Copper (DPC) manufacturing process, in order to perform the excellent properties of metal and ceramic. This process developed by sputtering and exposure procedure to produce a wide variety of circuit pattern, by plating integrated the metal and ceramic properties, which the metallized metal will not be easy to peel off (good adhesion). Through this technology, the line position can be more accurately, and more narrow margin of line. Application mainly used in high brightness and high power LED, microwave radio Communication (Wireless) and semiconductor equipment, solar cell and other fields.

Thin Film Structures 薄膜结构



① Substrate 基板
② Sputter layer 溅镀层
③ Conductive layer 导电层
④ Surface Coating 表面金属层



Thin Film Technology Feature (薄膜技术特征)

- ✓ 采用薄膜工艺制程获得精准的线路
- ✓ 优化的使用散热陶瓷材料特性
- ✓ 高热可靠性，能承受 300℃ 1min 热板测试
- ✓ 良好的热结合力，可达拉力 1Kg 以上
- ✓ 优异的导通性能，阻抗 ≤0.1E
- ✓ 可按客户要求进行设计
- ✓ 高散热系数材料远优于 PCB 和 LTCC
- ✓ 高热稳定性远优于铝基板
- ✓ 符合 ROHS 要求

- ✓ Thin-film process to obtain accurate of line
- ✓ Optimize the best used of thermal properties of ceramic
- ✓ High reliability , withstand 300 ℃ within 1
- ✓ Good thermal adhesion, tensile reach > 1kg up
- ✓ Excellent conduction performance, impedance under controlled within 0.1E
- ✓ According to customer requirements, OEM available
- ✓ Highly dissipation coefficient than PCB and LTCC
- ✓ Highly heat stability superior than aluminum substrate
- ✓ ROHS compliant for global application

Process Capability 制程能力

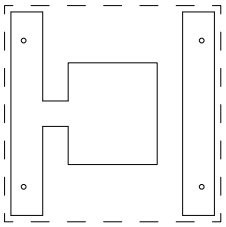
Item 项目	Reference Range 参考范围
Material 材质	AL_2O_3、ALN
Dimension & Thickness 尺寸厚度	Sheet size 4.5"114.3x114.3mm 0.38mm, 0.5mm, 1.0mm
Set-PIN 上机孔	Φ1、1.3、1.5、1.8、2mm Depending on the client machine 取决于客户机台
VIA diameter 导通孔径	75~150μm Depending on the customer requirement 依客户需求
Line spacing 线路间距	The smallest diameter of up to 60μm 最小线径可达 60μm
Plate margins 板边距	Sheet design set aside a minimum of 3mm 基板设计预留最小 3mm
Copper Thickness 镀层厚度	Cu 30~75μm
Surface Coating 表面处理	Electronless Gold/Silver 化学镀 (金 / 银)、Eletrolytic Gold/Silver 电镀 (金 / 银)、OSP Antioxidant treatment 抗氧化处理

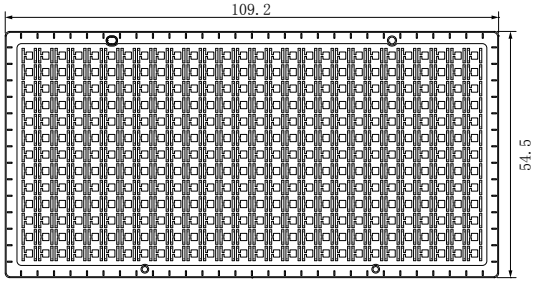
Reliability Test (可靠性测试)

NO	Item 项目	Parameter 测试参数	Specification 测试规范
1	Adhesion test 附着力试验	1. Temp: RT 温度: RT 2. Tool: 3M 600# 工具: 3M 600# 3. Time adhesive 30 seconds 持续粘合 30 秒 4. Angle:180° 角度 : 180°	• The extensor must be no separate 镀层没有被分离
2	Thermal Test 热板试验	1. Temp:300°C 温度 : 300°C 2. Times:1min 时间 :1 分钟	• No yellowing、blisters 未黄变、起泡现象
3	耐热持久性试验 Thermal durability test	1. Temp:150°C 温度 : 150°C 2. Times:3 hours 时间 :3 小时	• test before-and-after 试验前后 • 尺寸形变量 ≤1% • Size shape variables are 1% or less • 导通阻抗恒低于 5mE • Conduction resistance constant below 5 mE

Reference Pattern (Thin-Film) 参考设计图形 (薄膜)

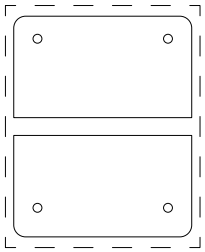
TYPE 1

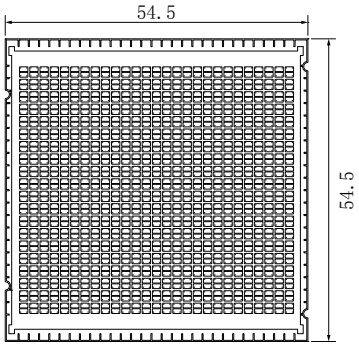




28×13=364 PCS

TYPE 2





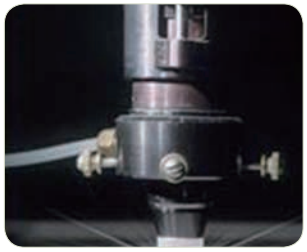
27×20=540 PCS

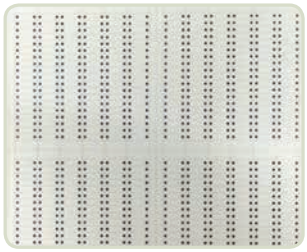
* Product drawing for reference only 产品图片仅供参考
* Custom Design Circuit could be available on a case to case basis. (可按客户特殊要求定制)

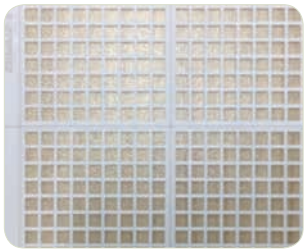
Ceramic Processing Parts (陶瓷加工件)

- ✓ 优异的加工精准度
- ✓ 高绝缘性能及机械性能强度
- ✓ 客制化服务，可按客户要求进行加工
- ✓ 精密研磨，表面粗化处理等
- ✓ 适用于 LED 照明、汽车组件等产品加工

- ✓ Superior processing of accuracy
- ✓ High performance of insulation and mechanical properties
- ✓ Customized design services, OEM available
- ✓ Precision grinding, coarsening treatment of surface
- ✓ It's suitable for LED lighting, automotive components and other products processing







Storage conditions (储存条件)

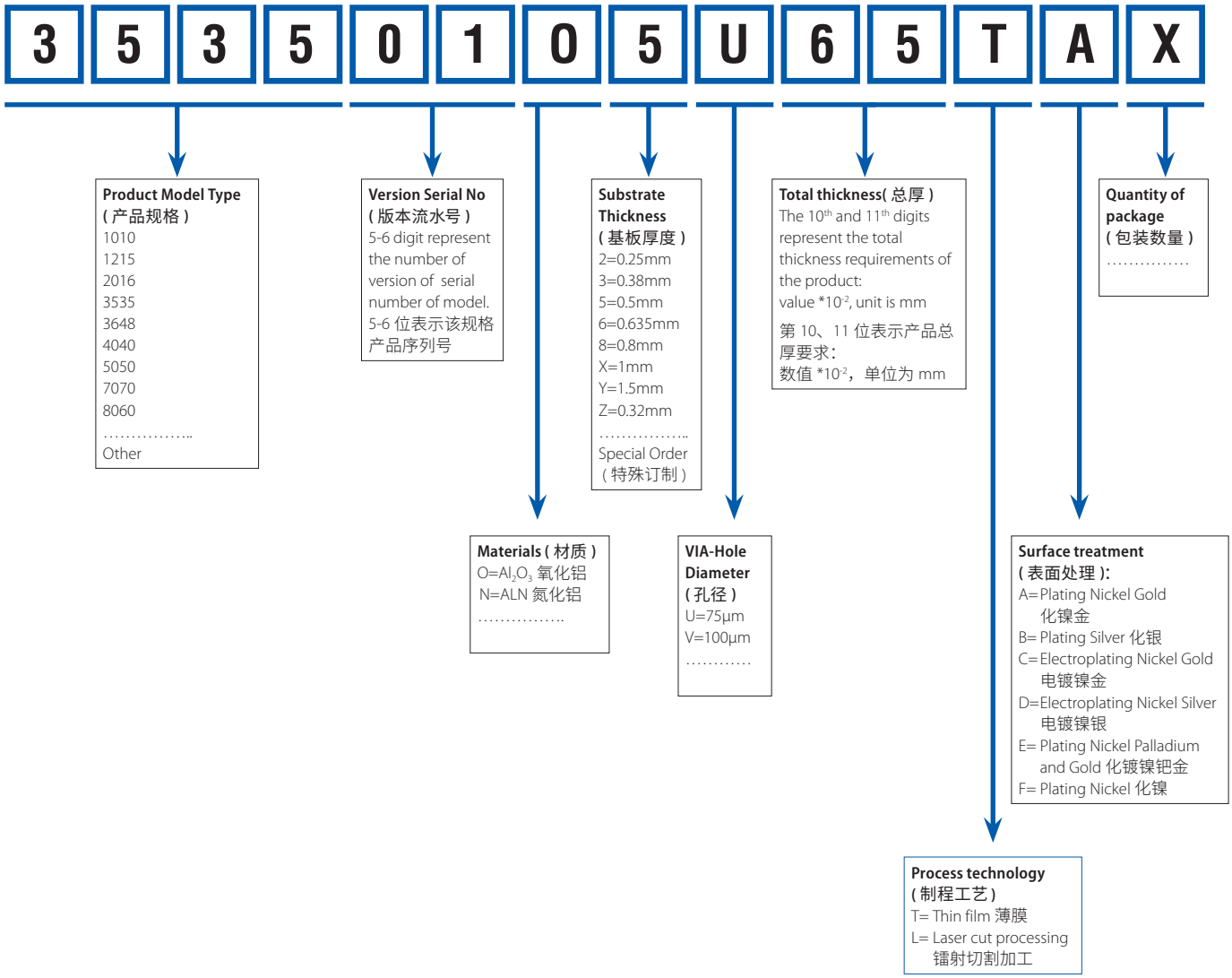
- ✓ Store under 25±5℃,50±10% RH when sealed (密封保存)
- ✓ The expiration date is less than 3 months when unsealed (不开封产品保质期在 3 个月以内)
- ✓ Store under 25±5℃,50±10%RH when unsealed (开封产品的储存条件)
- ✓ Please store unsealed package in airtight containers and try to used within 3 days (已开封产品请于 3 日内使用完，并在一个密闭容器内开封)

Ordering Procedure

订购方式

Example: Open version of 3535 model type , Alumina sheet size 4.5" (114.3x114.3x0.5mm), via hole 75μm, total thickness 0.65mm, Gold (Au) thickness ≥0.03μm

例如：公版 1 3535 规格 氧化铝基板尺寸 4.5 寸 (114.3x114.3x0.5mm), 孔径要求 75μm 总厚要求 0.65mm 金 ≥0.03μm



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Resistors 电阻成品	Material 电子材料	Heat Dissipation Substrate 散热基板

ROYALOHM　uniohm U Need it!　FOSS　aeon

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