Product Specification

Number: L-KLS6-MOF-XW-XXR-XX

Name: Metal Oxide Film Fixed Resistors

Customer: _____

Date: 2025-06-23

Customer Signature:

WWW.KLSELE.COM

NINGBO KLS ELECTRONIC CO; LTD

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Compi	Check	Review	Approva
Jenny	Jack.C		

1. 一般事项 General

适用范围 Scope

本承认书适用于宁波开乐亿启电子有限公司之[金属氧化膜固定电阻器]。

This specification is available for Fixed Metal Oxide Film Resistors manufactured by NINGBO KLS ELECTRONIC CO.LTD

品质 Quality

本电阻器的制造系经高品质管理程式，并具有高信赖性的品质保证。

The resistor is manufactured by highly quality-controlled process and guaranteed high reliability.

标准试验状态 Standard measuring conditions

温度 20±2℃、湿度 65±5%。

但在温度 5～35℃、湿度 45～85%之情况下，仍可给予判定。

Temperature 20±2℃, Humidity 65±5%.

Being no doubt about the judgment, measurements can be made within the following Temperature

5～35℃, Humidity 45～85%.

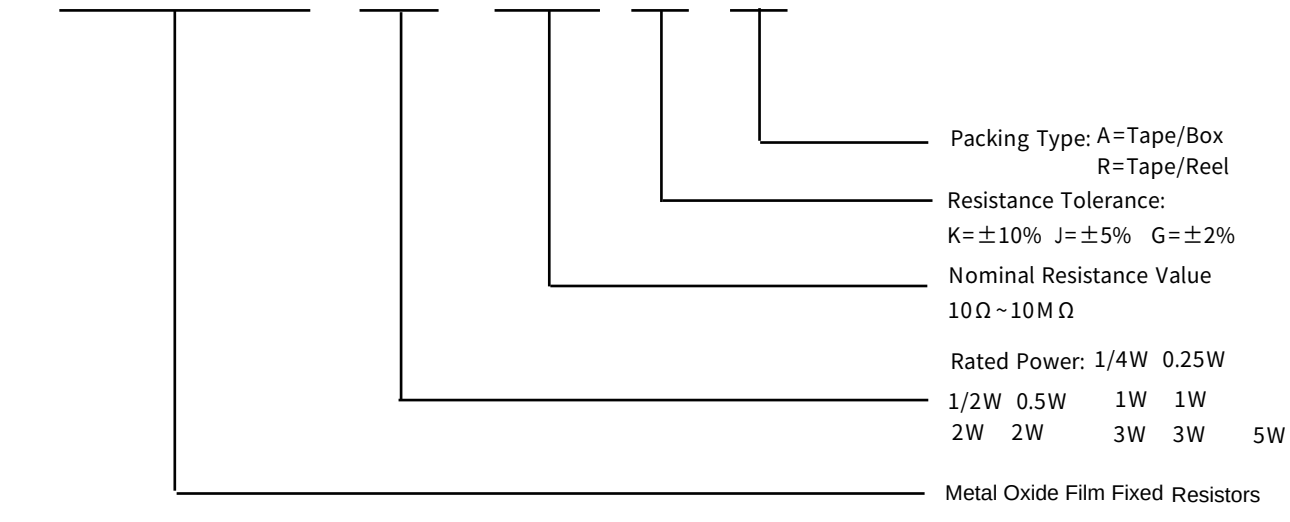
形名（例） Type designation (example)

依使用种类、额定电力、形状、公称电阻值、电阻值容许差而区别，其构造如下：

The type designation shall be in the following form and as specified.

Order Information

L-KLS6-MOF- XW - XXR - X X



额定电力 Rated power

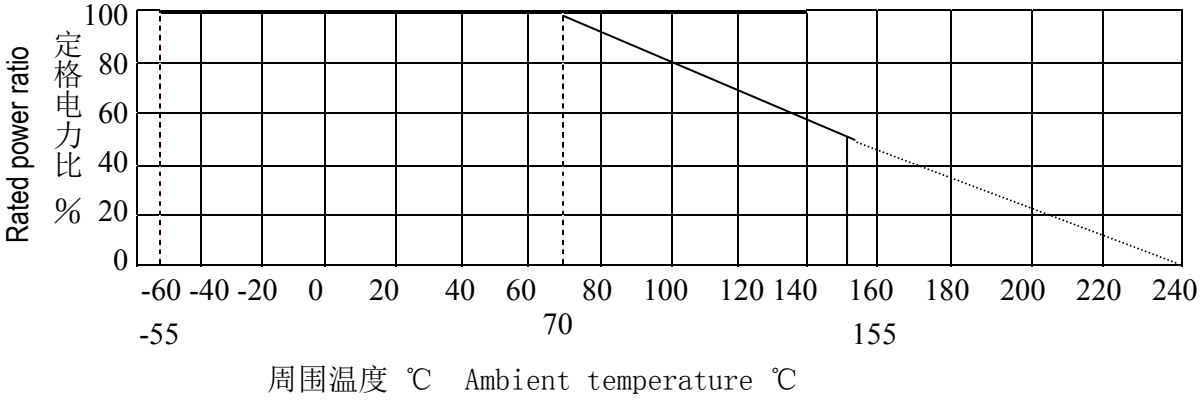
额定电力是适应在周围温度 70℃可以连续负载的最大电力，如表-1；但周围温度如超过 70℃时之额定电力则依图一的电力轻减曲线实施。

Rated power is maximum power which can be continuously loaded at specified ambient temperature 70℃, however when the ambient temperature exceeds 70℃, rated power should be determined from the derating curve of Fig.1.

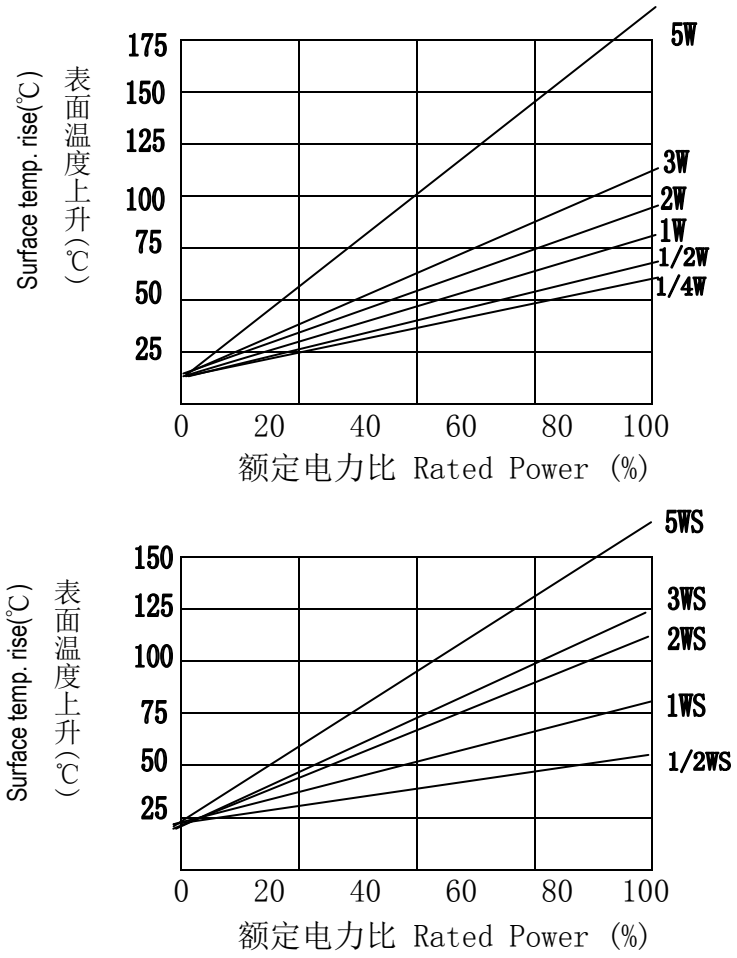
表-1 Table-1

种类 Type		额定电力 Rated power	最高使用电压 Maximum working voltage	最高过负荷电压 Maximum overload voltage	最高断续电压 Maximum pulse voltage	耐电压 Dielectric withstanding voltage	电阻值范围 Resistance range	使用温度范围 Operating temperature range
Normal size	MOF-1/4W	0.25W	200V	350V	500V	200V	10Ω～22KΩ	-55℃～155℃
	MOF-1/2W	0.5W	250V	400V	500V	250V	10Ω～75KΩ	
	MOF-1W	1W	350V	600V	750V	350V	10Ω～100KΩ	
	MOF-2W	2W	350V	600V	750V	350V	10Ω～120KΩ	
	MOF-3W	3W	350V	600V	750V	350V	10Ω～120KΩ	
	MOF-5W	5W	500V	1000V	1500V	700V	10Ω～120KΩ	
Small size	MOF-1/2WS	0.5W	250V	400V	500V	250V	10Ω～22KΩ	
	MOF-1WS	1W	350V	600V	750V	350V	10Ω～68KΩ	
	MOF-2WS	2W	350V	600V	750V	350V	10Ω～68KΩ	
	MOF-3WS	3W	350V	600V	750V	350V	10Ω～100KΩ	

图一 电力轻减曲线 Figure 1 Power derating curve



图二　表面温度上升 Figure 2　Surface temperature rise



额定电压 Rated voltage

额定电压是指对应于额定电力的直流或交流（商用频率之有效值）的电压，由下式求得。
The rated voltage shall be the D.C. or A.C. (R.M.S. at power frequency) voltage which corresponds the rated power and the value of which is calculated from the formula below.

$$E = \sqrt{P \cdot R}$$

Where E：额定电压 Rated voltage (V)
P：额定电力 Rated power (W)
R：公称电阻值 Nominal resistance (Ω)

公称电阻值 Nominal resistance values

公称电阻值是按表-2 之数乘以 10^n(n 为整数)之数值，其單位为欧姆(Ω)。
公称电阻值之范围则按表-1 所示。
The nominal resistance values shall be the numerical values given in Table-2 multiplied by 10^n (n is an integer) in the unit of ohm(Ω).
The minimum resistance and maximum resistance shall be as given in Table-1.

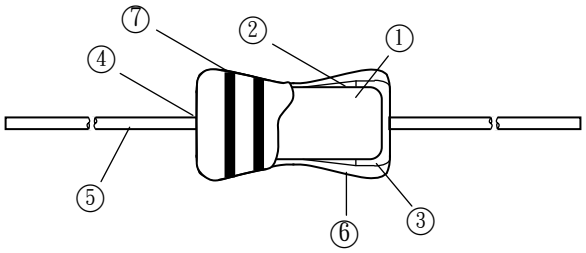
表-2 电阻值有效数字的标准 Table-2 Standard nominal resistance values

系列名 Name of series	标准公称电阻值（为有效数字，单位省略） Standard nominal resistance values (significant figures with the unit omitted)
E－6	1.0, 1.5, 2.2, 3.3, 4.7, 6.8
E－12	1.0, 1.2, 1.5, 1.8, 2.2, 2.7, 3.3, 3.9, 4.7, 5.6, 6.8, 8.2
E－24	1.0, 1.1, 1.2, 1.3, 1.5, 1.6, 1.8, 2.0, 2.2, 2.4, 2.7, 3.0 3.3, 3.6, 3.9, 4.3, 4.7, 5.1, 5.6, 6.2, 6.8, 7.5, 8.2, 9.1
E－48	1.00, 1.05, 1.10, 1.15, 1.21, 1.27, 1.33, 1.40, 1.47, 1.54, 1.62, 1.69 1.78, 1.87, 1.96, 2.05, 2.15, 2.26, 2.37, 2.49, 2.61, 2.74, 2.87, 3.01 3.16, 3.32, 3.48, 3.65, 3.83, 4.02, 4.22, 4.42, 4.64, 4.87, 5.11, 5.36 5.62, 5.90, 6.19, 6.49, 6.81, 7.15, 7.50, 7.87, 8.25, 8.66, 9.09, 9.53

构造图 Structure diagram

MOF 系列之氧化金属皮膜固定电阻器是按下表的材料而构成：

The construction of resistor (MOF series) shall be as follows:



号码 No.	构造名称 Item	内 容 Material
1	基体磁器 Ceramic core	使用高含铝量的瓷器棒。 High alumina ceramic is used.
2	电阻体 Resistance element	电阻体的成份是使用氧化金属皮膜。 The resistor element shall consist of metal oxide film.
3	端子 Terminal	铁帽。 Tinned iron cap.
4	连接 Connection	导线对铁帽须以电气熔接。 The lead wire, which is plated with solder, shall be mounted to the caps by welding process.
5	导线 Lead wire	焊锡或镀锡铁引线。不含铅 Soldered or tinned iron lead. Lead free
6	上涂涂装 Finishing painting	使用矽树脂涂料。 Silicone resin is used.
7	表示 Indication	色码。 Color code.

铁帽端子 Terminal caps

铁帽端子须确实地连接（电气的及机械的)于电阻体上。

The caps shall be securely connected with the resistor element electrically and mechanically.

涂装 Painting

本体必须依照试样书之规定以绝缘涂料绝缘之。

Coating in accordance with specification insulates the body.

外装色泽 Resistor body color

表-3 Table-3

种类 Type	颜色 Color	种类 Type	颜色 Color
MOF	灰色 Grey	MOFS	灰色 Grey

表示 Indication

参照本仕样书的「3. 表示」。

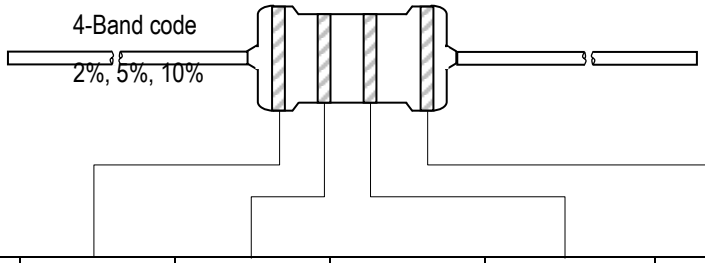
The indication shall be satisfied with 「3. Indication」.

2. 特性 Characteristics 表-4 Table-4

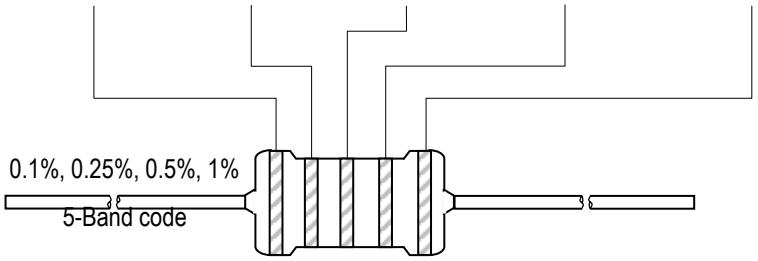
项目 Item	规格值 Performance	试验方法 (依据 JIS C 5202) Test methods (Conform to JIS C 5202)
温度系数 Temperature coefficient	±350ppw℃以内 within±350ppw	5.2 项参照 Comply with 5.2 $\frac{R_1 - R_0}{R_0(T_1 - T_0)} \times 10^6$ (PPM/℃) R_0 :室温(T_0)所测量之电阻值。 R_1 :室温+100℃(T_1)后所测量之电阻值。 R_0 : Resistance value at room temp. (T_0). R_1 : Resistance value at room temp. plus 100℃ (T_1).—
短时间过负荷 Short time overload	±(1%+0.05Ω)以内 不得有机械的损伤 within±(1%+0.05Ω) NO evidence of mechanical damage.	5.5 项参照 Comply with 5.5 额定电压 X 2.5 倍, 5 秒。 不可超过最高过负荷电压(见表-1) Rated voltage X 2.5 times, 5s But not to exceed maximum overload voltage. (See table-1)
绝缘抵抗 Insulation resistance	10^4MΩ以上。 10^4MΩor more	5.6 项参照 Comply with 5.6 置于 V 型槽方法。 施加个别规定之直流电压 60 秒。 V-block method Resistor shall be tested at DC potential respectively for 60 seconds.
耐电压 Dielectric withstanding voltage	无电弧放电、烧损及绝缘破坏等异状。 No evidence of flashover mechanical damage, arcing or insulation breakdown.	5.7 项参照 Comply with 5.7 常压,置于 V 型槽方法。 施加个别规定之交流电压60秒。(见表-1) Constant pressure, V-block method Resistor shall be tested at AC potential respectively for 60 seconds.(See table-1)
断续过负荷 Pulse overload	MOF：±(2%+0.1Ω)以内。 MOFS：±(5%+0.1Ω)以内。 MOF：within ±(2%+0.1Ω) MOFS：within ±(5%+0.1Ω)	5.8 项参照 Comply with 5.8 额定电压 X 4 倍, 10000 回 (1 秒 ON, 25 秒 OFF)。 不可超过最高断续电压(见表-1) Rated voltage X 4 times, 10000 cyc.(1s ON, 25s OFF) But not to exceed maximum pulse voltage.(See table-1)
端子强度 Terminal strength	端子不得断裂及松弛。 No evidence of mechanical damage.	6.1 项参照 Comply with 6.1 引张强度：25N(2.5Kgf),保持 10 秒。 Tensile strength: 25N(2.5kgf), for 10 seconds. 扭转强度：360° 交互回转 5 回。 Torsional strength: Rotated through 360°, 5 rotations.

项目 Item	规格值 Performance	试验方法（依据 JIS C 5202） Test methods (Conform to JIS C 5202)
焊锡耐热性 Resistance to soldering heat	±(1%+0.05Ω)以内。 不得有机械的损伤。 within ±(1%+0.05Ω) No evidence of mechanical damage.	6.4 项参照 Comply with 6.4 350±10℃, 3+0.5/-0 秒，试验后放置 3 小时。 350±10℃, 3+0.5/-0s After test leave for 3h.
焊锡附著性 Solderability	导线至少 95%以上新锡覆盖。 Covered with new solder by 95% at least.	6.5 项参照 Comply with 6.5 焊锡温度：235±5℃。 浸锡时间：5±0.5 秒。 Test temperature of solder: 235±5℃ Dipping time in solder: 5±0.5s
耐溶剂性 Resistance to solvent	涂装及色码不得脱落。 No deterioration of protective coating and markings.	6.9 项参照 Comply with 6.9 放入异丙醇溶剂之超音波机内，保持 3 分钟点。 Specimens shall be immersed in a bath of isopropyl alcohol completely for 3 minutes with ultrasonic.
温度循环 Temperature cycle	±(1%+0.05Ω)以内。 不得有机械的损伤。 within ±(1%+0.05Ω) No evidence of mechanical damage.	7.4 项参照 Comply with 7.4 低温侧：-55℃/30 分，室温：10～15 分钟 高温侧：+85℃/30 分，室温：10～15 分钟 5 回 Low side：-55℃/30min, Room temp.：10 to 15min High side：85℃/30min, Room temp.：10 to 15min 5 cycles
耐湿负荷寿命 Load life in humidity	±(5%+0.1Ω)以内。 within ±(5%+0.1Ω)	7.9 项参照 Comply with 7.9 40±2℃，湿度 90～95%, 1000 小时 定格电压(90 分钟 ON, 30 分钟 OFF) 40±2℃, 90 to 95%RH, 1000h Rated voltage (90 min ON, 30 min OFF)
负荷寿命 Load life	±(5%+0.1Ω)以内。 within ±(5%+0.1Ω)	7.10 项参照 Comply with 7.10 70±3℃, 1000 小时 定格电压(90 分钟 ON, 30 分钟 OFF) 70±3℃, 1000h Rated voltage (90 min ON, 30 min OFF)
耐炎性 Flame retardant	火炎的持续时间：10 秒以下。 Burning duration: within 10 s	7.12 项参照 Comply with 7.12 15 秒， 5 回 15 s, 5 times

3. 表示 Indication
色码 Color Code



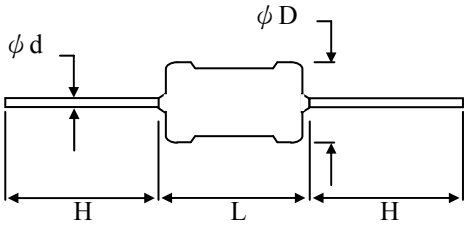
颜色 Color	第 1 数字 1st figure	第 2 数字 2nd figure	第 3 数字 3RD figure	倍 率 Multiplier	误差率 Tolerance
黑 Black	0	0	0	10^0	
棕 Brown	1	1	1	10^1	±1% (F)
红 Red	2	2	2	10^2	±2% (G)
橙 Orange	3	3	3	10^3	
黄 Yellow	4	4	4	10^4	
绿 Green	5	5	5	10^5	
蓝 Blue	6	6	6	10^6	
紫 Violet	7	7	7	10^7	
灰 Gray	8	8	8		
白 White	9	9	9		
金 Gold				10^{-1}	±5% (J)
银 Silver				10^{-2}	±10% (K)
无 Plain					±20% (M)



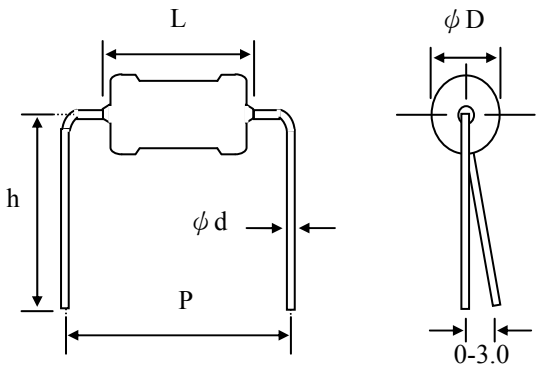
4. 外形寸法 External dimensions

散装P形与卧式M形系列 P type & M-Form series (Horizontal Forming)

P Type



M Type



单位：mm
Unit：mm

种 类 Type		尺 寸 Dimensions					
普通型 Normal Size	小型化 Small Size	L	ϕD	ϕd	H	P	h
1/2W	1WS	9.0±1.0	3.2±0.5	0.38±0.05	18±3.0	12.5±1.0	10.0±1.0
1W		11.0±1.0	3.5±0.5	0.42±0.05	24±3.0	15.0±1.0	14.0±1.0
	2WS	11.0±1.0	4.0±0.5	0.50±0.05	24±3.0	15.0±1.0	14.0±1.0
2W	3WS	15.0±1.0	5.0±0.5	0.5±0.05	22±3.0	20.0±1.0	20.0±1.0
3W	5WS	17.0±1.0	6.0±1.0	0.6±0.05	26±3.0	25.0±1.0	25.0±1.0
5W		24.0±1.0	8.0±1.0	0.65±0.05	28±3.0		