湖南龙建达电子科技有限公司

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SPECIFICATION FOR APPROVAL

CUSTOMER　客户 _____

DESCRIPTION　种类 绕线保险丝（FKNP）电阻器

YOUR MODEL NO　料号 _____

APPRVED BY　承认 _____

DATE　日期 2019 年 5 月 11 日

龙建达电子及盖章		
核准	复审	作成
陈 菓	吴 建 刚	符 丰

贵公司及盖章		
核准	复审	作成

1. 一般事项　General

1.1 适用 Scope

本承认书适用于 湖南龙建达电子科技股份有限公司 制造之[绕线保险丝电阻器]，符合环境关联物质要求之 RoHS 测试。

This specification is available for Wirewound Fusible Resistor manufactured by Hunan Longkingdom Electronics Technolongy Co.,Ltd.， it accords with RoHS test of Environment related substance requirement。

1.2 形名(例) Type designation (example)

依使用种类、额定电力、公称电阻值、容许误差及型状而区别,其构造如下。

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

FKNP | 1WS | 10Ω | J | T52

种 类 Type

额定电力 Rated power	
标准 Normal	小型 Small
1/4W	1WS
1/2W	1WS
1W	2WS
2W	3WS

公称电阻值 Nominal resistance value
E-24 Series

电阻值容许误差 Resistance tolerance	
J	±5%
G	±2%

形状 Form
T52 Tape Type52
P 型 P Type
MB 型 MB Type

1.3 额定电力 Rated power

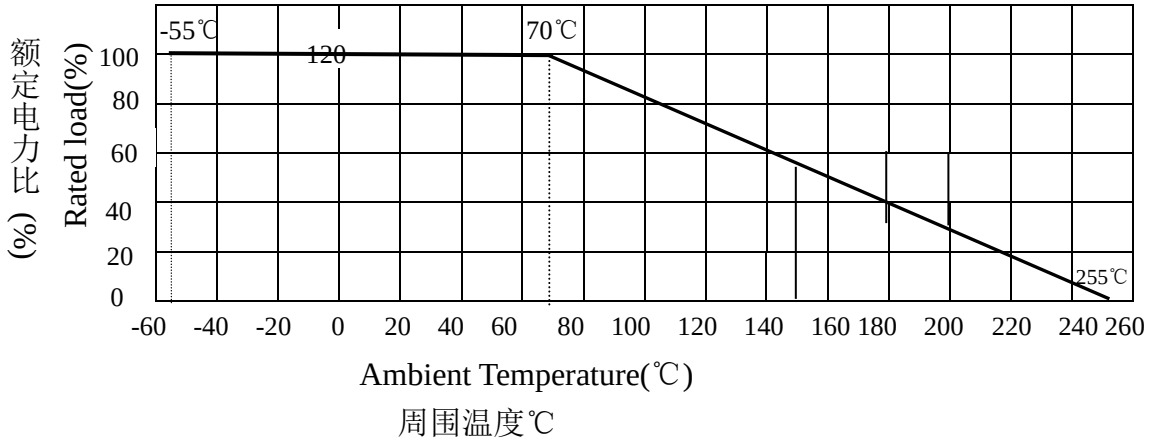
额定电力系应在周围温度 70℃可以连续负载的最大电力, 如表-1;但周围温度如超过 70℃时之额定电力则依图一的电力递减曲线实施。

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

表-1　Table-1

种 类 Type		定格电力 Rated power	耐电压 Dielectric withstanding voltage	FKNP 阻值范围(Ω) FKNP Resistance Range(Ω)
Normal size	FKNP1/4W	0.25W	250V	0.5Ω~68Ω
	FKNP1/2W	0.5W	250V	0.5Ω~100Ω
	FKNP1W,	1W	300V	
	FKNP2W,	2W	350V	
Small size	FKNP1/2WS,	1/2W	200V	0.5Ω~68Ω
	FKNP1WS,	1W	250V	0.5Ω~100Ω
	FKNP2WS,	2W	300V	
	FKNP3WS.	3W	350V	

图一　　电力递减曲线　Figure 1　Power derating curve



1.4 额定电压　Rated voltage

额定电压系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.

$E=\overline{\sqrt{(P\times R)}}$　　Where　　E: 定格电压　Rated voltage(V)
P: 定格电力　Rated power(W)
R: 公称电阻值　Nominal resistance(Ω)

2. 构造　Construction

2.1　外形尺寸　External dimensions

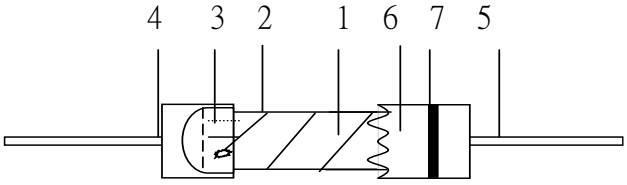
参照本承认书的 [5.　外形尺寸]。

The dimensions shall be satisfied with　[5. External dimensions].

2.2　构造图　Structure diagram

FKNP/NFKNP 系列之绕线电阻器系按下表的材料而构成:

The construction of resistor (FKNP/NFKNP 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**白瓷棒蕊**。 High alumina ceramic is used.
2	电阻线 Resistor wire	电阻体的成份系使用电阻线。 The resistor element shall consist of Resistance wire(Exemple .
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	焊锡或镀锡的导线。 Soldered or tinned annealed wire.
6	上涂涂装 Finishing painting	使用硅树酯涂料。符合 UL-94V-0 不燃性规定。 Silicon resin is used. Accord with UL-94V-0 Nonflammable specification.
7	表示 Indication	色码。 Color code.

2.3 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.

2.4 外装色泽 Resistor body color

表-2 Table-2

普通型 Normal size		小型化 Small size	
种类 Type	颜色 Color	种类 Type	颜色 Color
FKNP1/4W, FKNP1/2W, FKNP1W FKNP2W	灰色 Gray	FKNP1/2WS, FKNP1WS, FKNP2WS, FKNP3WS.	灰色 Gray

2.5 表示 Indication

参照本承认书的 [4. 表示]。

The indication shall be satisfied with [4. Indication].

3. 特性 Characteristics 表-3 Table-3

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	±350PPM/℃ (±500PPM/℃＜1Ω)	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	±(2%+0.05Ω)以内。 不得有机械的损伤。 Within ±(2%+0.05Ω). No evidence of mechanical damage.	5.5 项参照 Comply with 5.5 额定电压×2.5 倍,5 秒。 不可超过最高过负荷电压(见表-1) Rated voltage×2.5 times,5sBut not to exceed maximum overload voltage. (See table-1)
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 放入酒精溶剂之超音波机内，保持 3 分钟。 Specimens shall be immersed in a bath of soproalcohol completely for 3 minutes with ultrasonic.

项　目 Item	规格值 Performance	试验方法(依据 JIS C 5202) Test methods(Conform to JIS C 5202)
绝缘电阻 Insulation Resistance	10^4MΩ 以上。 10^4MΩ or more.	5.6 项参照　Comply with 5.6 置于 V 型槽方法。V-block method 施加直流电压 500V 60 秒。 Resistor shall be tested at DC 500V 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	±(2%+0.05Ω)以内。 Within ±(2%+0.05Ω)	5.8 项参照　Comply with 5.8 额定电压×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 Tensile strength： 线径 mm Diameter / 引张力 Tensile force N(kgf) / 时　间 Time Φ0.38mm~0.50mm / 5(0.51) / 10±1 second Φ0.50mm~0.70 mm / 10(1.02) / 10±1 second 扭转强度：自电阻体起约 6mm~6.5mm 处之端子线,以约 0.75mm 曲率半径弯曲 90 度,其次由弯曲处向端子线先端 1.2±0.4mm 处挟定端子引出轴,作回转轴,以约 5 秒时间沿直面回转 360°再逆转 360°,如此施行回逆转 2 次,不可发生折断及松动现象。 Torsion strength：To bend the lead wire at the point of about 6mm~6.5mm from resistor body. about 0.75mm curvature e radii to 90°then catch the wire at 1.2±0.4mm apart from the bend point end and turn it (clockwise) by 360 degrees perpendicular to the resistor axis at speed of same 5 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn for 2 times without causing any break and looseness.

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 6.4 260±10℃, 10±1 秒, 试验后放置半小时。 260±10℃, 10±1s After test leave for 0.5h.
焊锡附着性 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：260±5℃。 浸锡时间：2±0.5 秒。 Test temperature of solder:260±5℃ Dipping time in solder:2±0.5 s
温度循环 Temperature cycle	±(2%+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：+80℃/30 分，室温：10～15 分钟 5 回 Low side：-55℃/30min, Room temp.：10 to 15min High side：80℃/30min, Room temp.：10 to 15min 5 cycles
耐湿负荷寿命 Load life in humidity	±(5%+0.05Ω)以内。 Within ±(5%+0.05Ω)	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%+0.05Ω)以内。 Within ±(5%+0.05Ω)	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)

4．熔断特性试验方法：

使用直流稳流电源，按规定的过负荷和标称阻值计算出施加在被试电阻器上的试验电压和电流值；试验时，先在试验电阻器阻值相同的大功率电阻器，根据试验电流调节电压，使试验电流达到规定值；断开电源，换上被测电阻器，接通电源；若电流不在规定值时，应在 2 秒钟内调至规定值，此后不再调整电流，观察电流表，计算熔断时间。

R 值及倍数 / 时间 time	×25
熔 断 时 间 Fusing time	60 秒以下 Under 60 sec

*熔断电压=$\sqrt{(额定功率 \times 阻抗值 \times 倍数)}$

*Fusing Voltage =$\sqrt{Power\ rating \times Resistance\ value \times Times}$

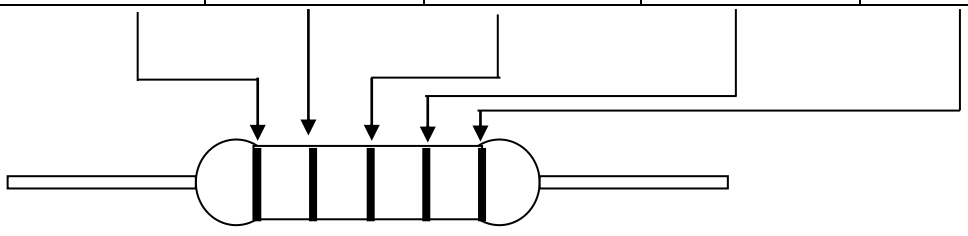
*通相应倍数熔断电压后，电阻值变化率超过 100 倍即符合要求。

*Wattage over 100 times can bepassed.

5. 表示　Indication

色码表示 Color Coding

颜色 Color	第一条 1st significant	第二条 2nd significant	倍数 Multiplier	误差 Tolerance	第五条 5 th significant
Silver 银			10^{-2}	±10%(K)	‘白色’表示绕线保险丝电阻，FKNP type in ‘Black’,
Golden 金			10^{-1}	±5%(J)	
Black 黑	0	0	10^{0}		
Brown 棕	1	1	10^{1}	±1%(F)	
Red 红	2	2	10^{2}	±2%(G)	
Orange 橙	3	3	10^{3}		
Yellow 黄	4	4	10^{4}		
Green 绿	5	5	10^{5}	±0.5%(D)	
Blue 蓝	6	6	10^{6}	±0.25%(C)	
Purple 紫	7	7	10^{7}	±0.1%(B)	
Gray 灰	8	8			
White 白	9	9			



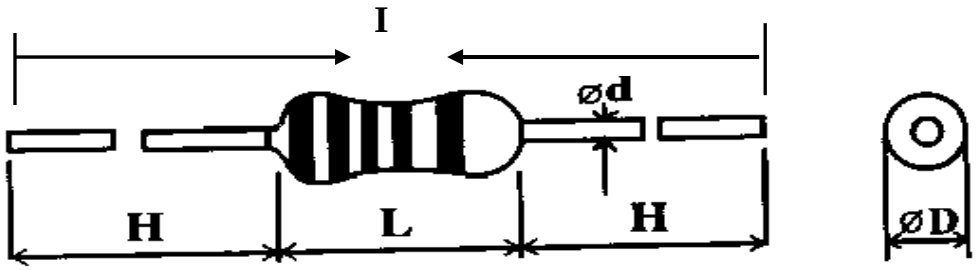
绕线保险丝电阻器：涂五色环.

Wirewound Fusible Resistor： 5-Band code.

6 外形寸法　External dimensions

6.1 散装 P 型　P type

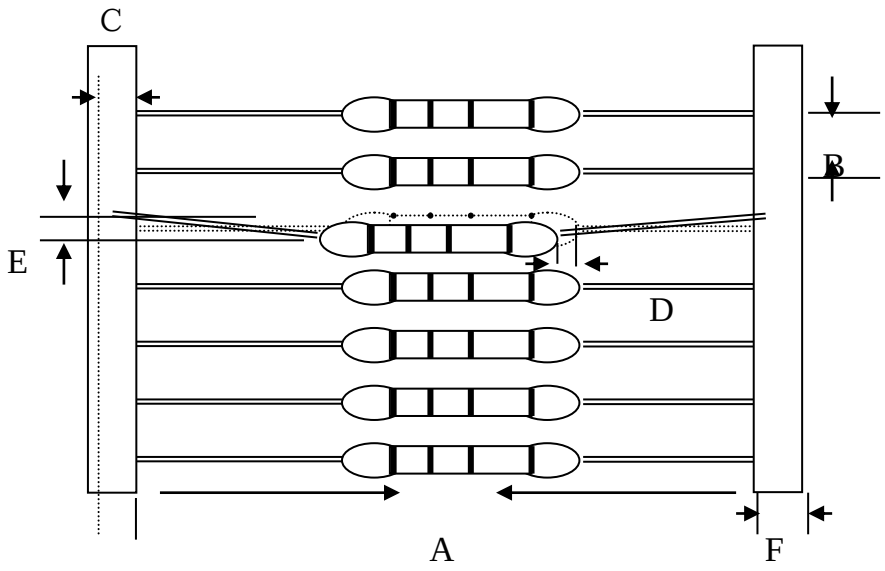
P Type



单位：mm
Unit：mm

种 类　Type		尺　寸　Dimensions				
普通型 Normal Size	小型化 Small Size	I	L	ψD	H	ψd±0.05
FKNP1/4W	FKNP 1/2WS	58	6.0±0.5	2.3±0.5	26±2.0	0.45
FKNP1/2W	FKNP 1WS	58	9.0±0.5	3.2±0.5	25±2.0	0.50
FKNP 1W	FKNP 2WS	60	115±1.0	4.2±0.5	24±2.0	0.60
		72	11.5±1.0	4.2±0.5	30±2.0	0.60
FKNP 2W	FKNP 3WS	60	15.0±1.0	5.0±0.5	22±2.0	0.70
		72	15.0±1.0	5.0±0.5	29±2.0	0.70
		81	15.0±1.0	5.0±0.5	33±2.0	0.70

6.2 带装尺寸 Tape Type DimenSionS

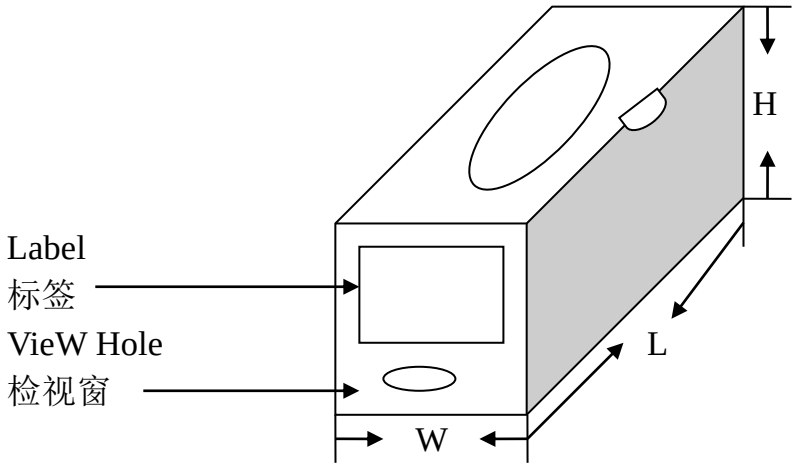


型号	T-52	T-63	T-73
A	52±1	63±1.5	73±2
B	≤ 1W:5±0.5	1W:5±0.5	10±0.5
	2W:10±0.5	2W:10±0.5	
C	5±1	5±1	5±1
D	Max0.8	Max1.0	Max1.0
E	Max1.2	Max1.2	Max1.2
F	6±1	6±1	6±1

Unit:mm

7.包装

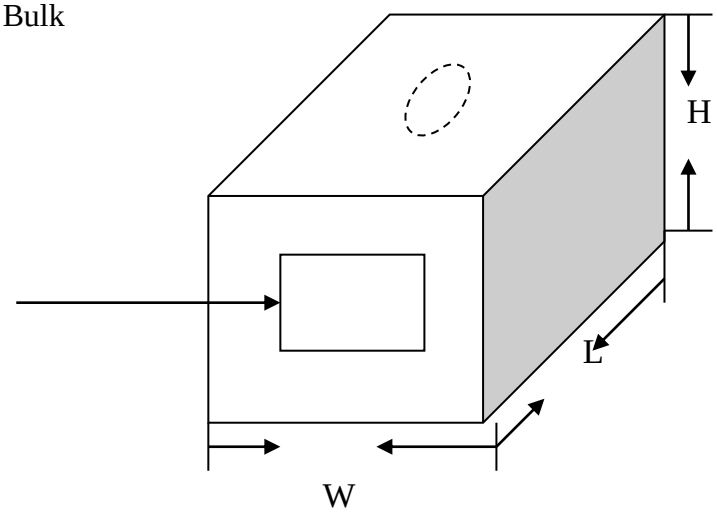
7-1 带式包装　Taping　Type



规格	瓦特数	L(mm)	W(mm)	H(mm)	数量 PCS/盒
T-52	1/4W,1/2WS	260	80	110	5000PCS
	1/2W,1WS	260	80	100	2000PCS
	1W,2WS	260	80	85	1500PCS
T-63	1W,2WS	260	85	85	1000PCS
	2W,3WS	260	85	115	1000PCS
T-73	2W,3WS	260	95	115	1000PCS

尺寸误差:±10mm

7-2 散装 Bulk



瓦特数		形状	L(mm)	W(mm)	H(mm)	Poly Bog	Box
1/4W	1/2WS	P	240	130	70	500	10000PCS
		成型	240	140	110	1000	10000PCS
1/2W	1WS	P	240	140	80	500	5000PCS
		成型	240	140	110	500	5000PCS
1W	2WS	P	240	140	95	500	4000PCS
		成型	240	140	110	500	4000PCS
2W	3WS	P	230	140	60	200	2000PCS
		成型	240	140	110	250	2000PCS

尺寸误差:±10mm

9.注意事项

1. 湿气会使电极之焊锡劣化,保持场所在温度 25℃以下,湿度 70%以下,有效期限为一年.
   IN THE HIGH HUMIDLTY SITUATION, IT WILL MAKE THE SOLDERABILITY WORST.PLEASE PRESERVE THE RESISTORS IN 25℃,70RH　BELOW
2. 尽量不要打开最小包装.
   PLEASE DO NOT OPEN THE MINI PACKAGE WHEN YOU PRERVE IT.

3. 周围温度高时按照负荷减轻曲线图减少使用规定电力.
   WHEN IN THE HIGH TEMPERATURE SITUATION, PLEASE ACCORD TO THE　PICTURE OF "POWER,DERATING CURVE"REDUCE THEUSE OF POWER RATING .

4. 尽量不要将多个电阻并列或直列连接,而以大电压或大电流使用.
   YOU SHOULD AVOID THE CONNECTOR OF RESTANCE REPLACED BY LARGE VOLTAGE AND POWER.

5. 由于特殊涂料之故,对外部冲击力较弱,故注意各种处置.
   DUE TO ITS SPECIAL MATERIAL OF PAINT,YOU MUST BE CAREFUL TO ITS WEAK APPEARANCE.

6. 洗净后,外膜多少会弱化,自然放置后可覆元其强度,所以洗净后 20 分钟内不要任电阻涂膜上有任何品之接触.
   AFTER CLEANING THE BODY,IT WILL MAKE THE FILM WEAKER.BUT IF YOU LET IT NATURE DRY WITHOUT TOUCHING OR PAINTING ANYTHING,THE RESISTORS WILL RECOVER ITS STRENGTH BY 20MINUTES .

7.电阻为导热性零件,所以电阻间不应相互堆积或接近其它导热零件组合成,而妨碍其散热性.
THE RESISTORS ARE REQUESTED NOT TO PLACE BY THE OTHER HEATING CCESSOR WHICH WILL OBSRUCT THEIR HEAT DISSIPATION .