

DATASHEET

Product Name **Wire -Wound Fusible Resistors**

Part Name **KNPU Series**

File No. **DIP-SP-013**

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1. Scope

- 1.1 This datasheet is the characteristics of wire wound fusible resistors manufactured by UNI-ROYAL
- 1.2 Suitable for all kinds of protection circuit
- 1.3 Non-flammable coating, could withstand high Temperature
- 1.4 Common resistor with additional safety function, no flame or smoke, no explosion or coating crack when fusing
- 1.5 UL items available (file NO: E306074)
- 1.6 Compliant with RoHS directive.
- 1.7 Halogen free requirement.

2. Part No. System

The standard Part No. includes 14 digits with the following explanation:

- 2.1 Wire wound fusible Resistors type, the 1st to 3rd digits are to indicate the product type and 4th digit is the special feature.
Example: KNP= Wire wound fusible Resistors type.

- 2.2 5th~6th digits:

This is to indicate the wattage or power rating. To determine the size and the numbers,

The following codes are used; and please refer to the following chart for detail. This is to indicate the wattage or power rating. To distinguish the size and the number, the following codes are used; and please refer to the following chart for details:

1W~7W ($\geq 1W$)

Wattage	1	2	3	5	7
Normal Size	1W	2W	3W	5W	7W

- 2.3 The 7th digit is to denote the Resistance Tolerance. The following letter code is to be used for indicating the standard Resistance Tolerance.

F=±1% G=±2% J=±5% K=±10%

- 2.4 The 8th to 11th digits is to denote the Resistance Value.

- 2.4.1 For the standard resistance values of 5% series, the 8th digit is "0", the 9th & 10th digits are to denote the significant figures of the resistance and the 11th digit is the number of zeros following;

- 2.4.2 The following numbers and the letter codes are to be used to indicate the number of zeros in the 11th digit:

0=10⁰ 1=10¹ 2=10² 3=10³ 4=10⁴ 5=10⁵ 6=10⁶ J=10⁻¹ K=10⁻² L=10⁻³ M=10⁻⁴

- 2.4.3 The 12th, 13th & 14th digits.

The 12th digit is to denote the Packaging Type with the following codes:

A=Tape/Box (Ammo pack) B=Bulk/Box T=Tape/Reel P=Tape/Box of PT-26 products

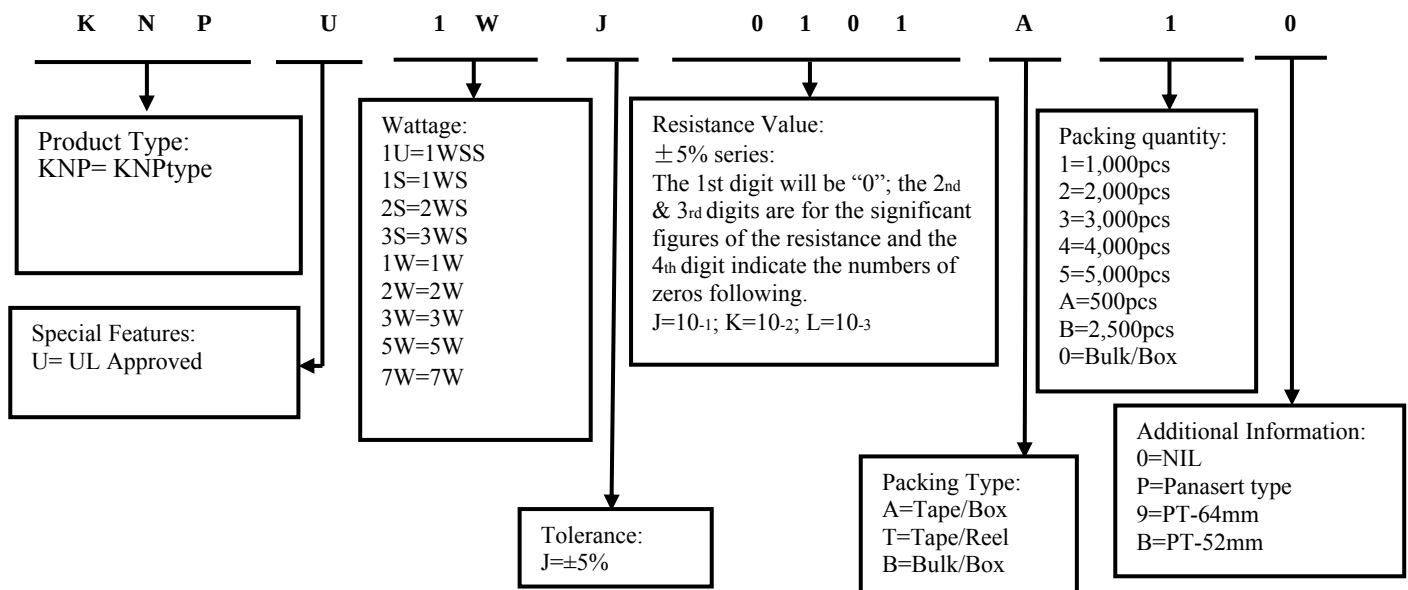
- 2.4.4 The 13th digit is normally to indicate the Packing Quantity of Tape/Box & Tape/Reel packaging types. The following letter code is to be used for some packing quantities:

1=1000pcs 2=2000pcs 5=5000pcs

- 2.4.5 For some items, the 14th digit alone can use to denote special features of additional information with the following codes:

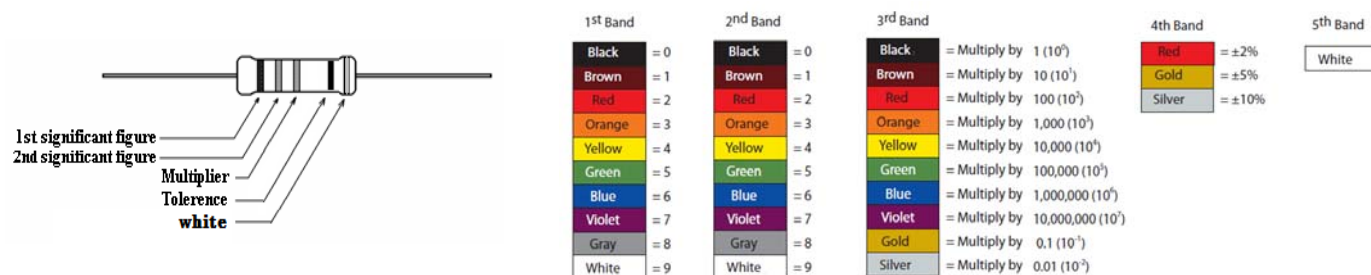
P=Panasert type 0=NIL 1=Avisert type 1 2=Avisert type 2 3=Avisert type 3 A=Cutting type CO 1/4W-A type B= Cutting type

3. Ordering Procedure



4. Marking

Resistors shall be marked with color coding and welding point exposed. Colors shall be in accordance with JIS C 0802
For KNPU $\pm 5\%$



4.1 Label:

Label shall be marked with following items:

- (1) Type and style
- (2) Nominal resistance
- (3) Resistance tolerance
- (4) Quantity
- (5) Lot number
- (6) PPM

Example:

Wire -Wound Fusible Resistors	
WATT : 1W	VAL: 30Ω
Q'TY:	TOL: 5%
LOT: 7021528	PPM:

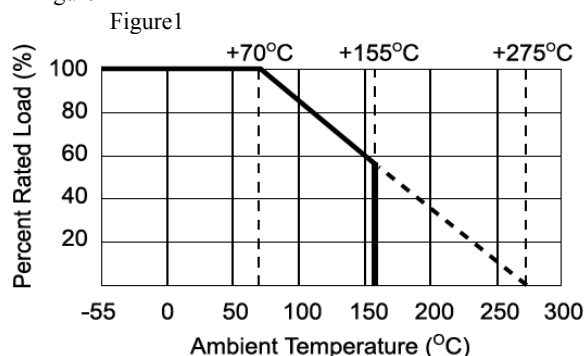
5. Ratings & Dimension



Type	Dimension(mm)					Tolerance	Resistance Range
	D	L ± 1	H ± 3	d ± 0.05	PT		
KNPU 1WSS	2.5+1/-0.3	7.5	28	0.54	52	$\pm 5\%$	10Ω
KNPU 1WS	3.5+1/-0.5	9.5	28	0.75	52	$\pm 5\%$	0.47Ω~240Ω
KNPU 1W	4.5+1/-0.3	11.5	28	0.70	52	$\pm 5\%$	0.47Ω~240Ω
KNPU 2WS	4.5+1/-0.3	11.5	28	0.70	52	$\pm 5\%$	0.47Ω~240Ω
KNPU 2W	5.5+1/-0.5	15.5	28	0.70	64	$\pm 5\%$	0.47Ω~240Ω
KNPU 3WS	5.5+1/-0.5	15.5	28	0.70	64	$\pm 5\%$	0.47Ω~240Ω
KNPU 3W	6.5+1/-0.5	17.5	28	0.75	64	$\pm 5\%$	0.47Ω~240Ω
KNPU 5W	7.0+1/-0.3	19.5	38	0.75	B/B	$\pm 5\%$	0.47Ω~240Ω
KNPU 7W	8.5+1/-0.5	24.5	38	0.75	B/B	$\pm 5\%$	0.47Ω~47Ω

6. Derating Curve

Resistors shall have a power rating based on continuous load operation at an ambient temperature from -55°C to 70°C. For temperature in excess of 70°C, the load shall be derate as shown in figure 1



6.1 Voltage rating:

Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:

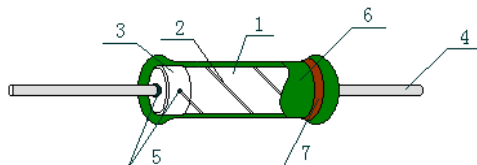
$$RCWV = \sqrt{P \times R}$$

Where: RCWV = Rated DC or RMS AC continuous working voltage at commercial-line frequency and waveform (VOLT.)

P = power rating (WATT.) R = nominal resistance (OHM)

The overload voltage is 2.5 times RCWV or Max. Overload voltage whichever is less.

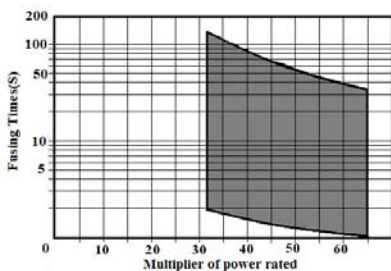
7. Structure



NO.	Name	Raw materials
1	Basic body	Rod Type Ceramics
2	Resistor	Resistance Wire Alloy
3	End cap	Steel (Tin Plated iron Surface)
4	Lead wire	Annealed copper wire coated with tin
5	Joint	By welding
6	Coating	Insulated & Non-Flame paint (Color : Deep Green)
7	Color code	Non-Flame Epoxy Resin

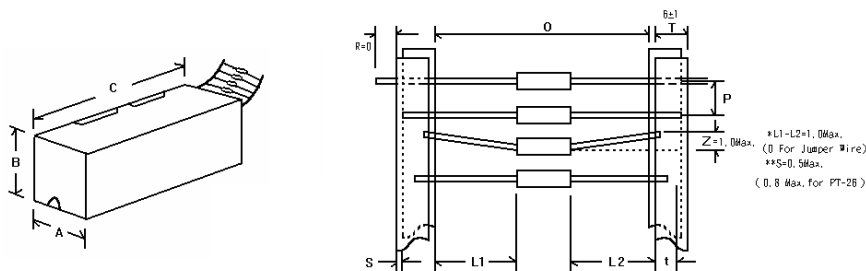
8. Performance Specification

Characteristic	Limits	Test Method (JIS-C-5201& JIS-C-5202&UL1412& IEC60115-1)
Temperature Coefficient	$\geq 20\Omega$: $\pm 300\text{PPM}/^\circ\text{C}$ $< 20\Omega$: $\pm 400\text{PPM}/^\circ\text{C}$	JIS-C-5201 4.8 4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM}/^\circ\text{C)}$ R ₁ : Resistance Value at room temperature (t ₁) ; R ₂ : Resistance at test temperature (t ₂) t ₁ : +25°C or specified room temperature t ₂ : Test temperature (-55°C or 125°C)
Short-Time Overload	Resistance change rate is: $\pm(2\% + 0.05\Omega)\text{Max.}$ With no evidence of mechanical damage.	JIS-C-5201 4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV or Max.Overload Voltage whichever less for 5 seconds.

Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down	JIS-C-5201 4.7 Resistors shall be clamped in the trough of a 90°metallic V- block ,applied voltage AC1000V, for 60-70 seconds.				
Terminal strength	No evidence of mechanical damage	JIS-C-5201 4.16 Direct load: Resistance to a 2.5 kg direct load for 10 seconds in the direction of the longitudinal axis of the terminal leads. Twist test: Terminal leads shall be bent through 90°at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations.				
Solderability	95% Coverage Min.	JIS-C-5201 4.17 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Temperature of solder:245°C±3°C Dwell time in solder: 2~3seconds.				
Resistance to soldering heat	Resistance change rate is: (1%+0.05 Ω) Max. With no evidence of mechanical damage	JIS-C-5201 4.18 Permanent resistance change when leads immersed to a point 2.0-2.5mm from the body in 260°C±5°C solder for 10±1 seconds.				
Load life	Resistance change rate is :±(5%+0.05Ω) Max.. With no evidence of mechanical damage.	JIS-C-5201 4.25.1 Permanent Resistance change after 1000 hours operating at RCWV or Max.Working Voltage whichever less with duty cycle of 1.5 hours “ON” , 0.5 hour “OFF” at 70±2° C ambient.				
Load life in humidity	Resistance change rate is:±(5%+0.05Ω)Max.. With no evidence of mechanical damage.	JIS-C-5202 4.24 Resistance change after 1000 hours (1.5hours “ON” , 0.5hours “OFF”) at RCWV or Max.Working Voltage whichever less in a humidity test chamber controlled at 40±2° C and 93%±3% RH.				
Fusing test	Resistance should be opened (The Resistance value is over than 50 times from before test value)follow fusing curve condition <table border="1"><tr><td>Magnification of power</td><td>Fusing</td></tr><tr><td>35 times</td><td>120s (max)</td></tr></table>	Magnification of power	Fusing	35 times	120s (max)	UL1412 
Magnification of power	Fusing					
35 times	120s (max)					
Low Temperature Storage	Resistance change rate is :±(5%+0.05Ω Max.. With no evidence of mechanical damage.	IEC 60068-2-1 (Aa) Lower limit temperature , for 2H.				
High Temperature Exposure	Resistance change rate is :±(5%+0.05Ω Max.. With no evidence of mechanical damage.	MIL-STD-202 108A Upper limit temperature , for 16H.				
Rapid change of temperature	Resistance change rate is :±(5%+0.05Ω Max.. With no evidence of mechanical damage.	JIS-C-5201 4.19 30 min at lower limit temperature and 30 min at upper limit temperature , 100 cycles.				

9. Packing

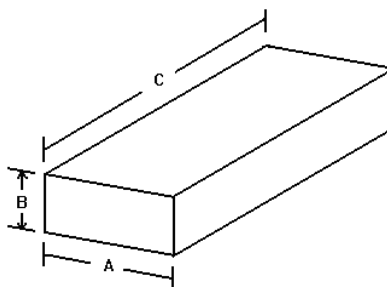
9.1 Tapes in Box Packing



Dimension of T/B (mm)						
Part No.	O	P	A±5	B±5	C±5	Qty/Box
KNPU 1W	52±1	5±0.3	80	82	255	1,000pcs
KNPU 2W	64±5	10±0.5	90	119	255	1,000pcs
KNPU 3W	64±5	10±0.5	90	88	255	500pcs
KNPU 1WSS	52±1	5±0.3	75	98	255	1,000pcs
KNPU 1WS	52±1	5±0.3	75	70	255	1,000pcs
KNPU 2WS	52±1	5±0.3	80	82	255	1,000pcs
KNPU 3WS	64±5	10±0.5	90	119	255	1,000pcs

*The packing quantity depends on the actual packing quantity

9.2 Bulk in Box Packing:



Part No.	A±5	B±5	C±5	Qty/Box
KNPU7W	140	80	240	25/400pcs

*The packing quantity depends on the actual packing quantity

10. Note

- 10.1. UNI-ROYAL recommend products store in warehouse with temperature between 15 to 35°C under humidity between 25 to 75%RH. Even under storage conditions recommended above, solder ability of products will be degraded stored over 1 year old.
- 10.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.
- 10.3. Storage conditions as below are inappropriate:
 - a. Stored in high electrostatic environment
 - b. Stored in direct sunshine, rain, snow or condensation.
 - c. Exposed to sea wind or corrosive gases, such as Cl₂, H₂S, NH₃, SO₂, NO₂, etc.

11. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~6	Mar.20, 2018	Haiyan Chen	Nana Chen
2	1.Modify the Derating Curve 2.Modify characteristic	5~6	Feb.23, 2019	Haiyan Chen	Yuhua Xu
3	Modify characteristic	4~5	Nov.15, 2019	Haiyan Chen	Yuhua Xu
4	Delete a 1WS dimension	3	May.13, 2020	Haiyan Chen	Yuhua Xu
5	Modify the color ring label	3	Aug.18, 2021	Haiyan Chen	John Zhao
6	Modify the temperature coefficient test conditions	4	Oct.28, 2022	Haiyan Chen	Yuhua Xu
7	Increased standard color code system	3	Apr.01, 2024	Haiyan Chen	Yuhua Xu
8	Modify the derating curve	4	Jun.11, 2025	Haiyan Chen	Yuhua Xu
9	Modify the packaging size and the number of packages	6	Jul.30, 2025	Haiyan Chen	Yuhua Xu
10	Modify the dimension	3	Jan.06, 2026	Haiyan Chen	Yuhua Xu
11	Modify the "H" value dimensions of 1W and 2WS	3	Apr.25, 2026	Haiyan Chen	Yuhua Xu

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