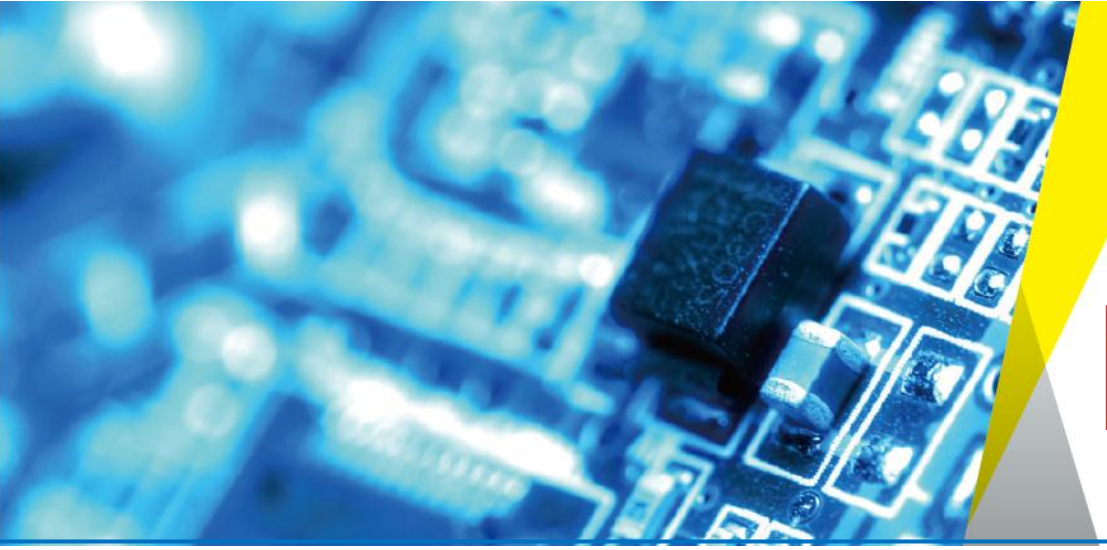

DATA SHEET

Product Name	**Wire-Wound Film Fixed Resistors**
Part Name	**KNS Series**
File No.	**DIP-SP-010**

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	Royal Electronic Factory (Thailand) Co., Ltd.
	Royal Technology (Thailand) Co., Ltd.

1. Scope

1.1 This datasheet is the characteristics of Wire-Wound Film Fixed Resistors manufactured by UNI-ROYAL
1.2 Excellent flame retardant coating
1.3 Too low or too high ohmic value can be supplied on a case to basis
1.4 Non-inductive type available
1.5 Compliant with RoHS directive.
1.6 Halogen free requirement.

2. Part No. System

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

2.1 Wire-Wound Fixed Resistors type, the 1st to 3rd digits are to indicate the product type and 4th digit is the special feature.

Example: KNS= Wire-Wound Fixed Resistors type.

2.2 5th~6th digits:

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

The following codes are used; and please refer to the following chart for detail:

W=Normal Size; "1"~"G"to denotes"1"~"16"as Hexadecimal:

1W~16W (≧1W)

Wattage	1	2	3	5	7	8	9	10	15
Normal Size	1W	2W	3W	5W	7W	8W	9W	AW	FW

2.2.2 For power of 1 watt to 16 watt, the 5th digit will be a number or a letter code and the 6th digit will be the letters of W, S or U.

Example: AW=10W; 3S=3W-S

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.

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 E-24 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 number s and the letter codes are to be used to indicate the number of zeros in the 11th digit:

$0=10^0$ $1=10^1$ $2=10^2$ $3=10^3$ $4=10^4$ $5=10^5$

$6=10^6$ $J=10^{-1}$ $K=10^{-2}$ $L=10^{-3}$ $M=10^{-4}$

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:

A=500pcs B=2500pcs C=10000pcs

D=20000pcs G=25000pcs H=50000pcs

2.4.5 For the FORMED type products, the 13th & 14th digits are used to denote the forming types of the product with the following letter codes:

MF=M-type with flattened lead wire F0= F-type

MK= M-type with kinked lead wire F1= F1-type

ML= M-type with normal lead wire F2= F2-type

MC= M-type with bending lead wire F3= F3-type

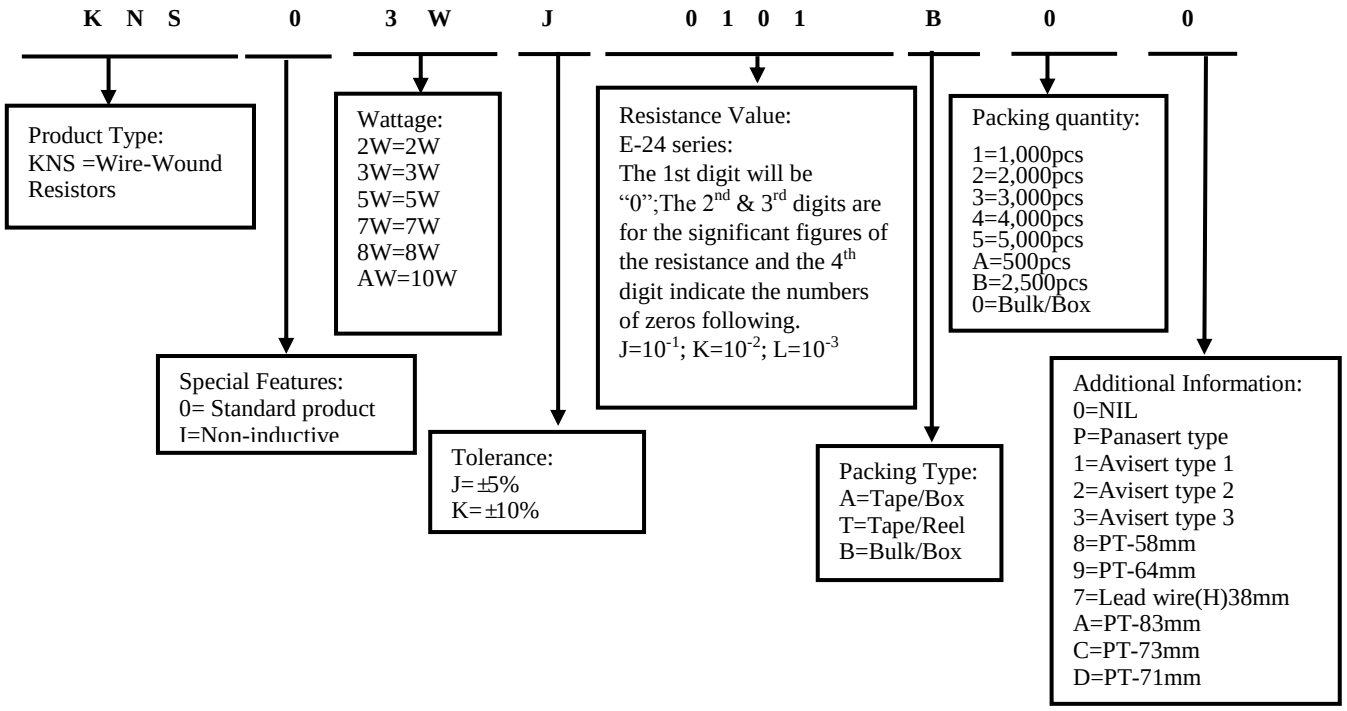
2.4.6 For some items, the 14th digit alone can use to denote special features of additional information with the following codes:

P=Panasert type 1=Avisert type 1 2=Avisert type 2

3=Avisert type 3 A=Cutting type CO 1/4W-A type B= Cutting type CO 1/4W-B type

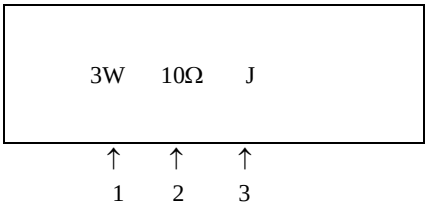
3. Ordering Procedure

(Example: KNS 3W ±5% 100Ω B/B)



4. Marking

Example:

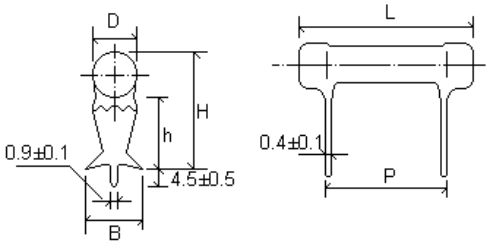


Code description and regulation:

1. Wattage Rating
2. Nominal Resistance Value
3. Resistance Tolerance. J: ± 5%
   K: ± 10%

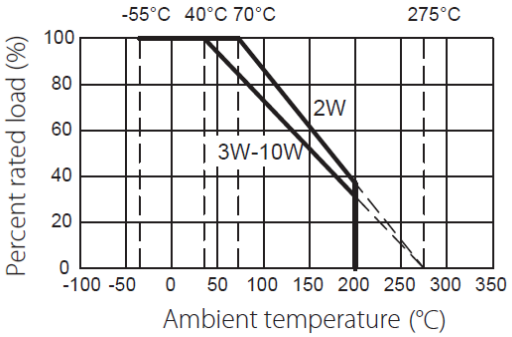
Color of marking: Black Ink

5. Ratings & Dimension



Type	Dimension(mm)						Tolerance	Resistance Range
	D±1.0	L±1.5	P±1.0	H±1.0	h±1.0	B±0.5		
KNS 2W	7.0	19.0	8	19	12	4.5	±5%、±10%	0.05Ω~470Ω
KNS 3W	7.0	21.0	10	19	13	4.5	±5%、±10%	0.068Ω~470Ω
KNS 5W	9.0	26.0	15	21.5	13	6.5	±5%、±10%	0.01Ω~750Ω
KNS 7W	9.0	31.0	20	21.5	13	6.5	±5%、±10%	0.1Ω~1.1KΩ
KNS 8W	9.0	41.0	30	21.5	13	6.5	±5%、±10%	0.2Ω~2.2KΩ
KNS 10W	9.0	54.0	43	21.5	13	6.5	±5%、±10%	0.3Ω~3.3KΩ

6. Derating Curve



6.1 Voltage rating:

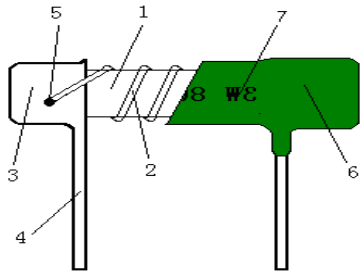
Resistors shall have a rated direct-current (DC) continuous working voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:

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)

7. Structure



No.	Name	Raw Materials
1	Basic body	Rod type ceramics
2	Alloy wire	Alloy
3	End cap	Steel (Tin plated iron surface)
4	Terminal lug	Steel (Tin plated iron surface)
5	Joint	By welding
6	Coating	Color: Deep Green
7	Marking	Epoxy resin

8. Performance Specification

Characteristic	Limits	Test Methods (GB/T5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	≧20Ω: ±300PPM/℃ <20Ω: ±400PPM/℃	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2-R_1}{R_1(t_2-t_1)} \times 10^6$ (PPM/℃) R_1: Resistance Value at room temperature （t_1）; R_2: Resistance at test temperature （t_2） t_1: +25 ℃ or specified room temperature t_2: Test temperature（-55℃or 125℃）
Short-Time Overload	Resistance change rate must be in: ±(2%+0.05Ω) , and no mechanical damage.	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV or Max.Overload Votage whichever less for 5 seconds.
Terminal strength	No evidence of mechanical damage	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.
Resistance to soldering heat	Resistance change rate must be in ± (1%+0.05Ω) , and no mechanical damage.	4.18 Permanent resistance change when leads immersed to a point 2.0-2.5mm from the body in 260℃±5℃ solder for 10±1 seconds.
Solderability	95% Coverage Min.	4.17 The area covered with a new, smooth, clean, shiny and continuous surface free from concentrated pinholes. Temperature of solder:245℃ ±3℃ Dwell time in solder: 2~3seconds.
Load life in humidity	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	7.9 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.
Load life	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	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.
Low Temperature Storage	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	IEC 60068-2-1 (Aa) Lower limit temperature，for 2H.
High Temperature Exposure	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	MIL-STD-202 108A Upper limit temperature ，for 16H.
Rapid change of temperature	Resistance change rate must be in ±(2%+0.05Ω) , and no mechanical damage.	4.19 30 min at -55 ℃ and 30 min at 155 ℃; 100 cycles.

9. Note

9.1. UNI-ROYAL recommend products store in warehouse with temperature between 15 to 35℃ 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.

9.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.

9.3. 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 Cl_2, H_2S, NH_3, SO_2, NO_2, etc.

10. Record

Version	Description	Page	Date	Amended by	Checked by
1	First issue of this specification	1~6	Mar.20, 2018	Haiyan Chen	Nana Chen
2	1.Modify the Derating Curve 2. Modify characteristic	4 5	Feb.19, 2019	Haiyan Chen	Yuhua Xu
3	Modify the temperature coefficient test conditions	5	Oct.28, 2022	Haiyan Chen	Yuhua Xu