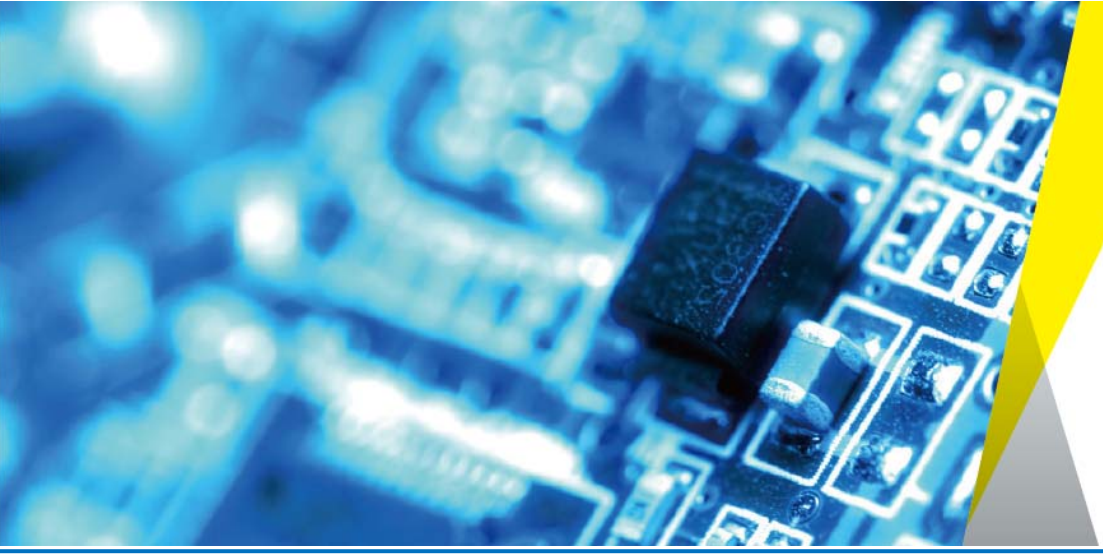

DATASHEET

Product Name	**Wire-Wound Fixed Resistors**
Part Name	**KNP Series**
File No.	**DIP-SP-008**

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Aeon Technology Corporation

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1. Scope

1.1 This datasheet is the characteristics of Wire-Wound 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:

KNP= 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; S=Small Size; U=Extra Small Size; "1"~"G"to denotes"1"~"16"as Hexadecimal:

1/16W~1/2W (＜1W)

Wattage	1/2	1/3	1/4	1/5	1/6	1/8	1/10	1/16
Normal Size	W2	W3	W4	W5	W6	W8	WA	WG
Small Size	S2	S3	S4	S5	S6	S8	SA	SG

1W~16W (≧1W)

Wattage	1	2	3	5	7	8	9	10	15
Normal Size	1W	2W	3W	5W	7W	8W	9W	AW	FW
Small Size	1S	2S	3S	5S	7S	8S	9S	AS	FS

2.2.2 For power rating less than 1 watt, the 5th digit will be the letters W, S or U to represent the size required & the 6th digit will be a number or a letter code.

Example: WA=1/10W; U2=1/2W-SS.

2.2.3 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.

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 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.;

For the standard resistance values of E-96 series, the 8th digit to the 10th digits is to denote the significant figures of the resistance and the 11th digit is the 11th digit is the 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:

0=NIL 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: KNP 2W ±5% 100Ω T/B-1000)

K	N	P	0	2	W	J	0	1	0	1	A	1	0

Product Type:
KNP= Wire-Wound Fixed Resistors type.

Special Features:
0=Standard

Wattage:
Normal size:
W4=1/4W
W2=1/2W
1W=1W
2W=2W
3W=3W
5W=5W
7W=7W
8W=8W
9W=9W
Small size:
S2=1/2WS
1S=1W-S
2S=2W-S
3S=3W-S
5S=5W-S
7S=7W-S
8S=8W-S
9S=9W-S
AS=10W-S

Tolerance:
F=±1%
G=±2%
J=±5%
K=±10%

Resistance Value:
E-24 series:
The 1st digit will be "0";The 2nd & 3rd digits are for the significant figures of the resistance and the 4th digit indicate the numbers of zeros following.
E-96 series value (1% tol.): the 1st to 3rd digits are for the significant figures OF the resistance and 4th digit denotes number of zeros following.
$J=10^{-1}$; $K=10^{-2}$; $L=10^{-3}$

Packing Type:
A=Tape/Box
T=Tape/Reel
B=Bulk/Box
P=Tape/Box of PT-26 product

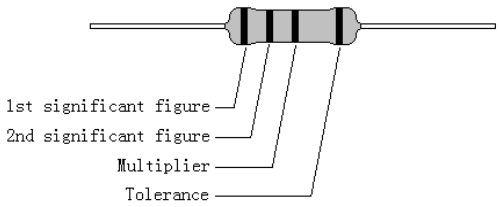
Packing quantity:
1=1,000pcs
2=2,000pcs
3=3,000pcs
4=4,000pcs
5=5,000pcs
A=500pcs
B=2,500pcs
0= Bulk/Box

Additional Information:
0=NIL
P=Panasert type
1=Avisert type 1
2=Avisert type 2
3=Avisert type 3
8=PT-58mm
9=PT-64mm
7=Lead wire(H)38mm
A=PT-83mm
C=PT-73mm
D=PT-71mm

4. Color Code

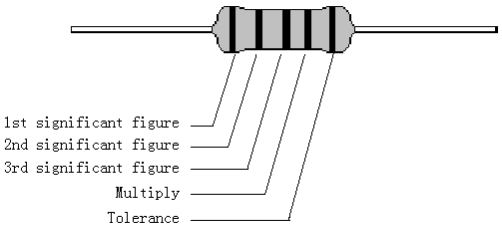
Resistors shall be marked with color coding
Colors shall be in accordance with JIS C 0802

≥±2% Series



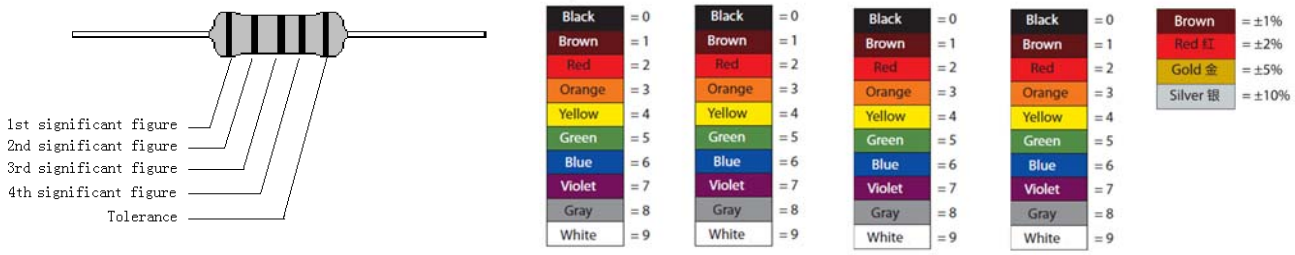
1st Band	2nd Band	3rd Band	4th Band
Black = 0	Black = 0	Black = Multiply by 1 (10^0)	Red = ±2%
Brown = 1	Brown = 1	Brown = Multiply by 10 (10^1)	Gold = ±5%
Red = 2	Red = 2	Red = Multiply by 100 (10^2)	Silver = ±10%
Orange = 3	Orange = 3	Orange = Multiply by 1,000 (10^3)	
Yellow = 4	Yellow = 4	Yellow = Multiply by 10,000 (10^4)	
Green = 5	Green = 5	Green = Multiply by 100,000 (10^5)	
Blue = 6	Blue = 6	Blue = Multiply by 1,000,000 (10^6)	
Violet = 7	Violet = 7	Violet = Multiply by 10,000,000 (10^7)	
Gray = 8	Gray = 8	Gold = Multiply by 0.1 (10^{-1})	
White = 9	White = 9	Silver = Multiply by 0.01 (10^{-2})	

±1% Series



1st Band	2nd Band	3rd Band	4th Band	5th Band
Black = 0	Black = 0	Black = 0	Black = Multiply by 1 (10^0)	Brown = ±1%
Brown = 1	Brown = 1	Brown = 1	Brown = Multiply by 10 (10^1)	
Red = 2	Red = 2	Red = 2	Red = Multiply by 100 (10^2)	
Orange = 3	Orange = 3	Orange = 3	Orange = Multiply by 1,000 (10^3)	
Yellow = 4	Yellow = 4	Yellow = 4	Yellow = Multiply by 10,000 (10^4)	
Green = 5	Green = 5	Green = 5	Green = Multiply by 100,000 (10^5)	
Blue = 6	Blue = 6	Blue = 6	Blue = Multiply by 1,000,000 (10^6)	
Violet = 7	Violet = 7	Violet = 7	Violet = Multiply by 10,000,000 (10^7)	
Gray = 8	Gray = 8	Gray = 8	Gold = Multiply by 0.1 (10^{-1})	
White = 9	White = 9	White = 9	Silver = Multiply by 0.01 (10^{-2})	

Remark：For ultra-low resistance, the above method can not be expressed, with the following color ring identification



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

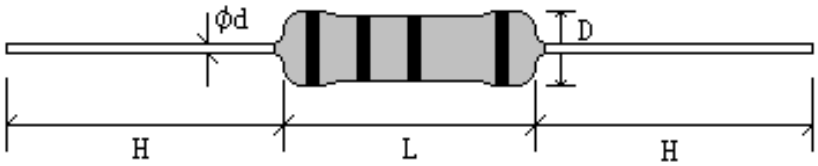
Example:

WIRE-WOUND FIXED RESISTORS

WATT : 1W	VAL: 1Ω
Q'TY: 1000	TOL: 5%
LOT: 5021528	PPM:

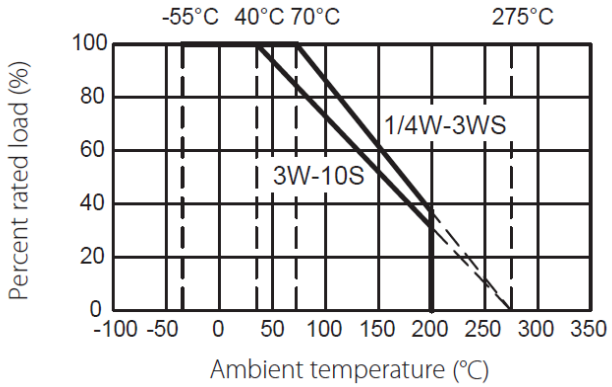
Shall be prevailed in kind!

5. Ratings & Dimension



Type	Dimension(mm)					Tolerance	Resistance Range
	D±1	L±1	d±0.05	H±3	PT		
KNP 1/4W	2.5	6.5	0.54	28	52	±1%、±2%、±5%、±10%	0.01Ω~200Ω
KNP 1/2WS	2.5	6.5	0.54	28	52	±1%、±2%、±5%、±10%	0.01Ω~200Ω
KNP 1/2W	3.0	9.5	0.54	28	52	±1%、±2%、±5%、±10%	0.01Ω~390Ω
KNP 1WS	3.0	9.5	0.54	28	52	±1%、±2%、±5%、±10%	0.01Ω~390Ω
KNP 1W	4.5	11.5	0.70	25	52	±1%、±2%、±5%、±10%	0.01Ω~1.2KΩ
KNP 2WS	4.5	11.5	0.70	25	52	±1%、±2%、±5%、±10%	0.01Ω~1.2KΩ
KNP 2W	5.5	15.5	0.70	28	64	±1%、±2%、±5%、±10%	0.01Ω~3.0KΩ
KNP 3WS	5.5	15.5	0.70	28	64	±1%、±2%、±5%、±10%	0.01Ω~3.0KΩ
KNP 3W	6.5	17.5	0.75	28	64	±1%、±2%、±5%、±10%	0.039Ω~3.9KΩ
KNP 5WS	6.5	17.5	0.75	28	64	±1%、±2%、±5%、±10%	0.039Ω~3.9KΩ
KNP 5W	8.5	24.5	0.75	38	90	±1%、±2%、±5%、±10%	0.082Ω~5.6KΩ
KNP 7WS	8.5	24.5	0.75	38	90	±1%、±2%、±5%、±10%	0.082Ω~5.6KΩ
KNP 7W	8.5	29.5	0.75	38	B/B	±1%、±2%、±5%、±10%	0.1Ω~8.2KΩ
KNP 8WS	8.5	29.5	0.75	38	B/B	±1%、±2%、±5%、±10%	0.1Ω~8.2KΩ
KNP 8W	8.5	39.5	1.00	38	B/B	±1%、±2%、±5%、±10%	0.15Ω~12KΩ
KNP 9WS	8.5	39.5	1.00	38	B/B	±1%、±2%、±5%、±10%	0.15Ω~12KΩ
KNP 9W	8.5	52.5	1.00	38	B/B	±1%、±2%、±5%、±10%	0.22Ω~15KΩ
KNP 10WS	8.5	52.5	1.00	38	B/B	±1%、±2%、±5%、±10%	0.22Ω~15KΩ

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:

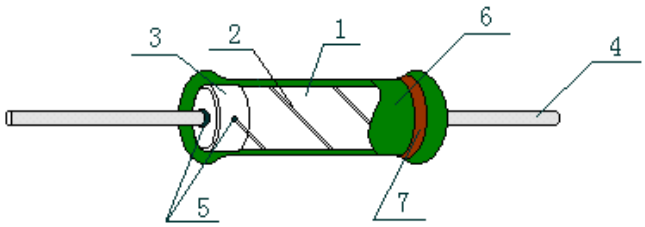
$RCWV = \sqrt{P \times R}$

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



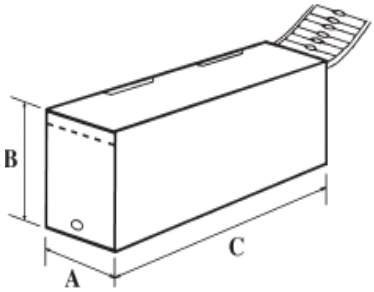
No.	Name	Raw materials
1	Basic body	Rod Type Ceramics
2	Resistor	Alloys
3	End cap	Steel (Tin Plated iron Surface)
4	Lead wire	Tin solder coated copper wire
5	Joint	By welding
6	Coating	Normal size & Insulated Non-Flame Paint Color: Deep Green (Normal size) Light Green (small size)
7	Marking	Epoxy Resin

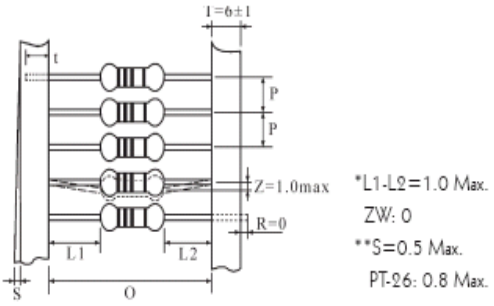
8. Performance Specification

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°C or specified room temperature t_2: Test temperature（-55℃or 125℃）
Short-Time Overload	ΔR/R ≤ ±(2%+0.05 Ω)Max, with no evidence of 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 is: ± (1%+0.05Ω) Max. With no evidence of 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 is:±(5%+0.05Ω) Max.. With no evidence of 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 is:±(5%+0.05Ω) Max.. With no evidence of 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℃or 40±2℃ ambient.
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: ±(2%+0.05Ω)Max. With no evidence of mechanical damage.	4.19 30 min at -55 °C and 30 min at 155°C; 100 cycles.

9. Packing

9.1 Tapes in Box Packing

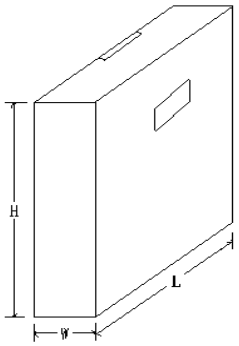


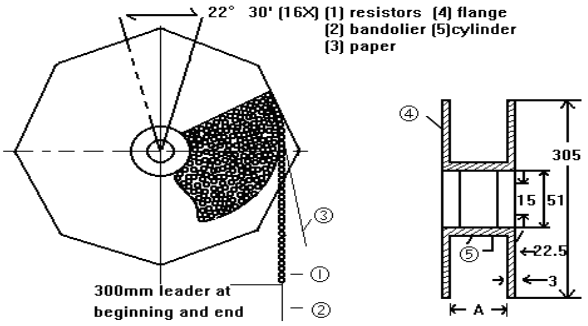


Dimension of T/B (mm)

Part No.	O	P	A±5	B±5	C±5	Qty/Box
KNP 1/4W	52±1	5±0.3	75	116	255	5,000pcs
KNP 1/2WS	52±1	5±0.3	75	116	255	5,000pcs
KNP 1/2W	52±1	5±0.3	75	45	255	1,000pcs
KNP 1WS	52±1	5±0.3	75	45	255	1,000pcs
KNP 1W	52±1	5±0.3	80	82	255	1,000pcs
KNP 2WS	52±1	5±0.3	80	82	255	1,000pcs
KNP 2W	64±5	10±0.5	90	119	255	1,000pcs
KNP 3WS	64±5	10±0.5	90	119	255	1,000pcs
KNP 3W	64±5	10±0.5	90	88	255	500pcs
KNP 5WS	64±5	10±0.5	90	88	255	500pcs
KNP 5W	90±5	10±0.5	115	124	500	500pcs
KNP 7WS	90±5	10±0.5	115	124	500	500pcs

9.2 Tapes in Reel Packing

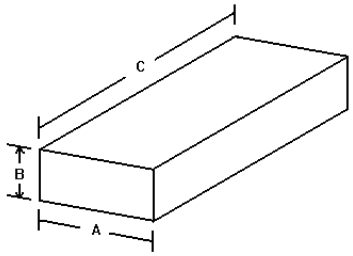




Dimension of Reel (mm)

Part No.	O	A	W±5	H±5	L±5	Qty/Box
KNP 1/4W	52±1	73±2	85	294	293	5,000pcs
KNP 1/2WS	52±1	73±2	85	294	293	5,000pcs
KNP 1/2W	52±1	73±2	85	294	293	4,000pcs
KNP 1WS	52±1	73±2	85	294	293	4,000pcs
KNP 1W	52±1	73±2	85	294	293	2,500pcs
KNP 2WS	52±1	73±2	85	294	293	2,500pcs
KNP 2W	64±5	80±5	95	294	293	1,000pcs
KNP 3WS	64±5	80±5	95	294	293	1,000pcs
KNP 3W	64±5	80±5	95	294	293	1,000pcs
KNP 5WS	64±5	80±5	95	294	293	1,000pcs
KNP 5W	90±5	115±5	110	310	310	700pcs
KNP 7WS	90±5	115±5	110	310	310	700pcs

9.3 Bulk in Box Packing



Dimension of Box (mm)

Part No.	A±5	B±5	C±5	Qty/Box
KNP 1/4W	140	80	240	500/10,000pcs
KNP 1/2WS	140	80	240	500/10,000pcs
KNP 1/2W	140	80	240	200/4,000pcs
KNP 1WS	140	80	240	200/4,000pcs
KNP 1W	140	80	240	100/2,500pcs
KNP 2WS	140	80	240	100/2,500pcs
KNP 2W	140	80	240	100/1,500pcs
KNP 3WS	140	80	240	100/1,500pcs
KNP 3W	140	80	240	100/1,000pcs
KNP 5WS	140	80	240	100/1,000pcs
KNP 5W	140	80	240	25/400pcs
KNP 7WS	140	80	240	25/400pcs
KNP 7W	140	80	240	25/300pcs
KNP 8WS	140	80	240	25/300pcs
KNP 8W	140	80	240	25/200pcs
KNP 9WS	140	80	240	25/200pcs
KNP 9W	140	80	240	25/200pcs
KNP 10WS	140	80	240	25/200pcs

10. Note

10.1 UNI-ROYALrecommend the storage condition temperature: 15℃~35℃, humidity :25%~75%.
(Put condition for individual product).
Even under UNI-ROYAL recommended storage condition, solderability of products over 1 year old. (Put condition for each product) may be degraded.

10.2 Store / transport cartons in the correct direction, which is indicated on a carton as a symbol.
Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

10.3 Product performance and soldered connections may deteriorate if the products are stored in the following places:
a. Storage in high Electrostatic.
b. Storage in direct sunshine、rain and snow or condensation.
c. Where the products are exposed to sea winds or corrosive gases, including Cl_2, H_2S、NH_3, SO_2, NO_2, Br etc.

11. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~7	Mar.20, 2018	Haiyan Chen	Nana Chen
2	1.Modify the Derating Curve 2. Modify characteristic	4 5~6	Feb.19, 2019	Haiyan Chen	Yuhua Xu
3	Modify the size of 8W to 10WS wires from “0.75” to “1.00”	4	Mar.15, 2022	Haiyan Chen	Yuhua Xu
4	Modify the temperature coefficient test conditions	5	Oct.28, 2022	Haiyan Chen	Yuhua Xu
5	1.Increased standard color code system 2.Add the 1% tolerance	3 3~4	Apr.01, 2024	Haiyan Chen	Yuhua Xu
6	Modify the ultra-low resistance color code	4	Mar.05,2025	Haiyan Chen	Yuhua Xu
7	Modify the packaging size and the number of packages	7~8	Jun.23, 2025	Haiyan Chen	Yuhua Xu