Content

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UNIROYAL ELECTRONICS INDUSTRY CO., LTD.

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UniOhm
U Need it!

File Name: KNP Series ±2%、±5%、±10%		Date	2016.3.1	Edition No.	1
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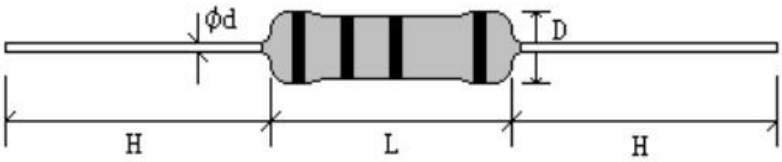
Edition	Description	Page	Date	Amended by	Checked by

1.0 Scope

This file is the specification for Lead-Fee Wire-wound Fixed Resistors manufactured by UNIOHM.

2.0 Ratings & dimension



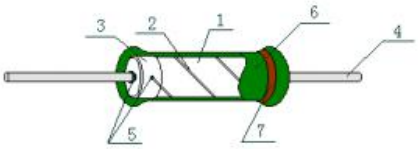
2.1 Normal size

Type	Dimension(mm)				Tolerance	Resistance Range
	D±1	L±1	d±0.05	H±3		
KNP 1/2W	3.5	9.5	0.60	28	±2%	0.05Ω~270Ω
					±5%、±10%	0.01Ω~820Ω
KNP 1W	4.5	11.5	0.65	28	±2%	0.01Ω~390Ω
					±5%、±10%	0.01Ω~1.2KΩ
KNP 2W	5.5	15.5	0.70	28	±2%	0.01Ω~680Ω
					±5%、±10%	0.01Ω~3.0KΩ
KNP 3W	6.5	17.5	0.75	28	±2%	0.01Ω~1KΩ
					±5%、±10%	0.039Ω~3.9KΩ
KNP 5W	8.5	24.5	0.75	38	±2%	0.05Ω~2KΩ
					±5%、±10%	0.082Ω~5.6KΩ
KNP 7W	8.5	29.5	0.75	38	±2%	0.04Ω~2.5KΩ
					±5%、±10%	0.1Ω~8.2KΩ
KNP 8W	8.5	39.5	0.75	38	±2%	0.06Ω~3.6KΩ
					±5%±10%	0.15Ω~12KΩ
KNP 9W	8.5	52.5	0.75	38	±2%	0.08Ω~5.3KΩ
					±5%±10%	0.22Ω~15KΩ

2.2 Small Size & ultra-small Size

Type	Dimension(mm)				Tolerance	Resistance Range
	D±1	L±1	d±0.05	H±3		
KNP 1WS	4.0	9.5	0.60	28	±2%	0.01Ω~510Ω
					±5%、±10%	0.01Ω~820Ω
KNP 2WS	4.5	11.5	0.65	28	±2%	0.01Ω~750Ω
					±5%、±10%	0.01Ω~1.2KΩ
KNP 3WS	5.5	15.5	0.70	28	±2%	0.01Ω~750Ω
					±5%、±10%	0.01Ω~3.0KΩ
KNP 5WS	6.5	17.5	0.75	28	±2%	0.01Ω~2.4KΩ
					±5%、±10%	0.039Ω~3.9KΩ
KNP 7WS	8.5	24.5	0.75	38	±2%	0.03Ω~5.1KΩ
					±5%、±10%	0.082Ω~5.6KΩ
KNP 8WS	8.5	29.5	0.75	38	±2%	0.04Ω~6.8KΩ
					±5%、±10%	0.1Ω~8.2KΩ
KNP 9WS	8.5	39.5	0.75	38	±2%	0.039Ω~10KΩ
					±5%、±10%	0.15Ω~12KΩ
KNP 10WS	8.5	52.5	0.75	38	±2%	0.08Ω~13KΩ
					±5%、±10%	0.22Ω~15KΩ

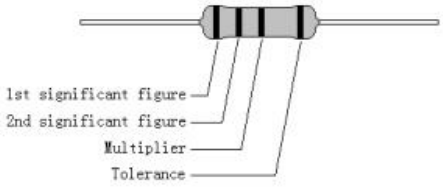
3.0 Structure



No.	Name	Raw materials
1	Basic body	Rod Type Ceramics
2	Resistor	Ni-Cr 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

4.0 Mark

Resistors shall be marked with color coding, and color bands shall be in accordance with JIS C 0802



Label: Label shall be marked with following items:

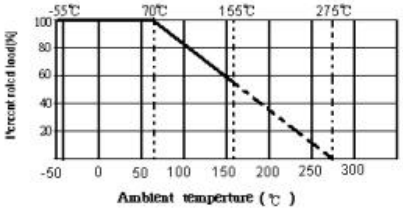
(1) Type and style
(2) Nominal resistance
(3) Resistance tolerance
(4) Quantity
(5) Lot number
(6) PPM

Example:

WIRE-WOUND FIXED RESISTORS	
WATT : 5W-S	VAL: 0.1Ω
Q'TY: 1000	TOL: 5%
LOT: 3021528	PPM:

5.0 Derating curve:

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



6.0 Voltage rating:

Resistors should have a direct-current (DC) continuous voltage rating and an alternating-current (AC) continuous voltage rating relates to Power Rating, formula shown as below:

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

RCWV: Rated dc or RMS ac continuous working voltage (Volt.)
P: Power Rating (Watt.)
R: Nominal Resistance (Ohm)

Resistors will be burned out if it overload, such as higher than the maximum value of series' RCWV. And we named 2.5 times RCWV is OVERLOAD Voltage.

7.0 Performance specification:

Characteristic	Limits	Test Method (JIS-C-5201&5202)
Temperature Coefficient	≧20Ω: ±300PPM/℃ Max.. <20Ω: ±400PPM/℃ Max	4.8 natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1 (T_2 - T_1)} * 10^6 (PPM/℃)$ R_1: Resistance value at room temp. (T_1) R_2:Resistance value at room temp.+100℃ (T_2) Test pattern: room temp. (T_1), room temp. +100℃(T_2)
Short-Time Overload	Resistance change rate is: ±(2%+0.05Ω)Max. With no evidence of mechanical damage.	4.13 Permanent resistance change after the application of a potential of 2.5 times rcwv 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. Test temp. 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 1,000 hours (1.5 hours "ON",0.5 hour "OFF") at RCWV in a humidity test chamber controlled at 40℃±2℃ and 90 to 95% relative humidity.
Load life	Resistance change rate is:±(5%+0.05Ω Max.. With no evidence of mechanical damage.	4.25.1 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of 1.5 hours "ON", 0.5 hour "OFF" at 70℃±2℃ ambient.

8.0 Part No. System

Part No. System has 14 codes:

8.1 1st ~4th codes: Product name.

Example: KNP0= Wire-Wound Fixed Resistors type.

8.2 5th~6th codes:

8.2.1 Power rating.

W=Normal Size; S=Small Size; U=Extra Small Size; "1"~"G": "1"~"16":

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

8.2.2 If power rating is lower than 1 watt:

5th code would be "W", "S" or "U"

6th code would be a number or a letter.

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

8.2.3 If power rating is between 1 t0 16 watts:

5th code would be a number or a letter

6th code would be "W", "S" or "U".

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

8.3 7th code: Resistance Tolerance.

F=±1% G=±2% J=±5% K= ±10%

8.4 8th~11th codes: Resistance Value

8.4.1 If resistance values belong to E-24 series:

8th code would be "0";

9th~10th codes: Significant figures of the resistance;

11th code: Power of ten.

8.4.2 If resistance values belong to E-96 series:

8th~10th codes: Significant figures of the resistance.

11th code: Power of ten.

8.4.3 There are several numbers in 11th code shown as following:

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}

8.5 12th~14th codes.

8.5.1 12th: Packaging Type

A=Tape/Box (Ammo pack) B=Bulk/Box

T=Tape/Reel P=Tape/Box of PT-26 products

8.5.2 13th: Packing Quantity

Packing quantities code:

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

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

8.5.3 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

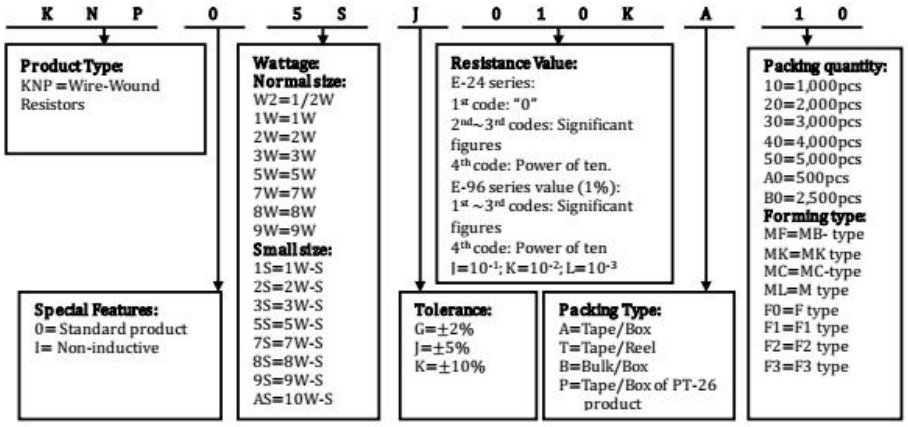
MC= M type with kinked lead and narrow pitch wire F3= F3-type

8.5.4 14th code: Special features of additional information with the following codes:

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

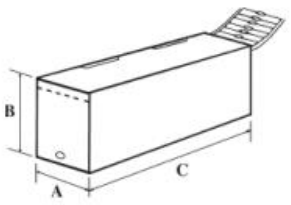
3=Avisert type 3 A=Cutting type CO 1/4W-A type B= Cutting type CO 1/4W-B type

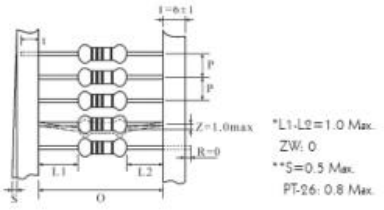
9.0 Order procedure (Example: KNP 5W-S ±5% 0.1Ω T/B-1000)



10.0 Standard packing:

10.1 Tapes in Box Packing

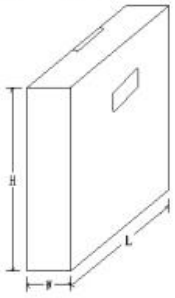


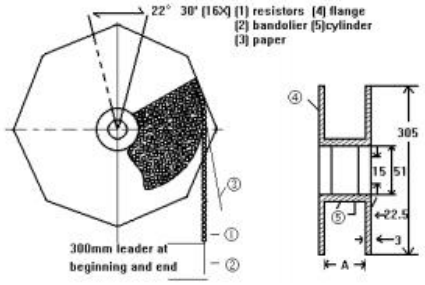


Dimension of T/B (mm)

Part No.	O	P	A±5	B±5	C±5	Qty/Box
KNP 1/2W	58±1	5±0.3	75	70	255	1,000pcs
KNP 1WS	58±1	5±0.3	80	70	255	1,000pcs
KNP 1W	58±1	5±0.5	80	82	255	1,000pcs
KNP 2WS	58±1	5±0.5	80	82	255	1,000pcs
KNP 2W	65±5	10±0.5	90	119	255	1,000pcs
KNP 3WS	65±5	10±0.5	90	119	255	1,000pcs
KNP 3W	65±5	10±0.5	90	88	255	500pcs
KNP 5WS	65±5	10±0.5	90	88	255	500pcs

10.2 Tapes in Reel Packing

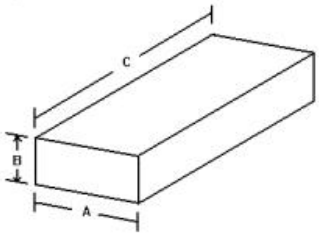




Dimension of Reel (mm)

Part No.	A	W±5	H±5	L±5	Qty/Box
KNP 1/2W	73±2	85	295	293	2,500pcs
KNP 1WS	73±2	85	295	293	2,500pcs
KNP 1W	73±2	85	295	293	2,500pcs
KNP 2WS	73±2	85	295	293	2,500pcs
KNP 2W	80±5	95	295	293	1,000pcs
KNP 3WS	80±5	95	295	293	1,000pcs
KNP 3W	80±5	95	295	293	1,000pcs
KNP 5WS	80±5	95	295	293	1,000pcs

10.3 Bulk in Box Packing



Dimension of Box (mm)

Part No.	A±5	B±5	C±5	Qty/Box
KNP 1/2W	140	80	240	250/5,000pcs
KNP 1WS	140	80	240	250/4,000pcs
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	25/400pcs
KNP 5W	140	80	240	25/400pcs

11.0 Note

11.1 UNIOHM recommends the storage condition as below:

11.1.1 Temperature: 15°C~35°C.

11.1.2 Humidity: 25%~75%RH.

11.1.3 Even under recommended condition, products' solderability will degrade if store more than 1 year.

11.2 Please hold the cartons in correct direction signed on cartons' side during storage and delivery, or else, it will lead the products abnormal to use.

11.3 Resistors' performance and solderability will fail if stored in the following condition:

11.3.1 High electrostatic environment.

11.3.2 Direct sunlight, rain, snow, and so on.

11.3.3 Hold in sea wind or corrosive gases long time, including Cl_2, H_2S, NH_3, SO_2, NO_2, etc.