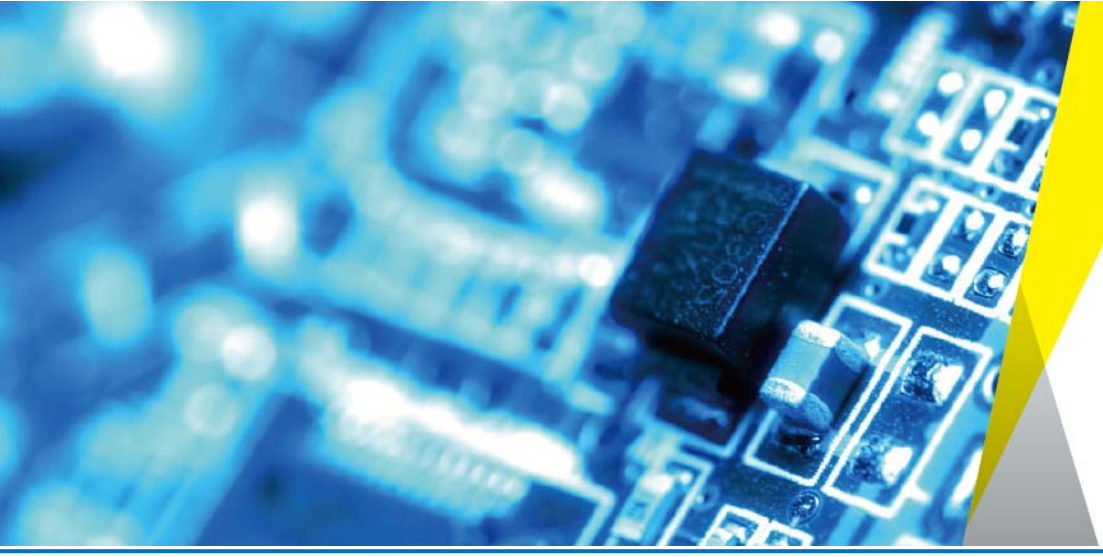

DATASHEET

Product Name	**High Power Wire-wound Flat Aluminum Shell Fixed Resistors**
Part Name	**HFWR Series**
File No.	**DIP-SP-052**

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1. Scope

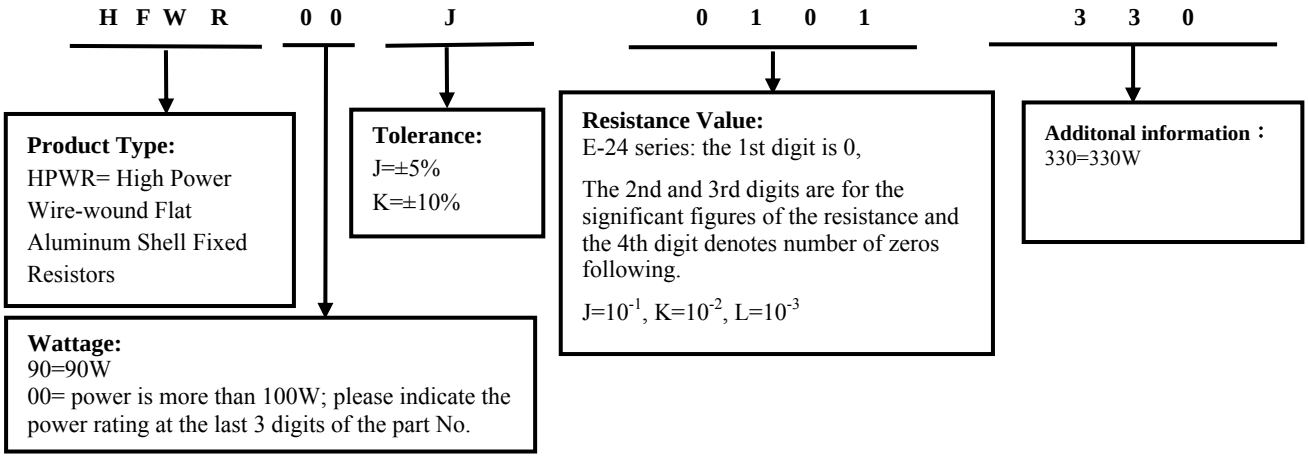
1.1 This datasheet is the characteristics of High Power Wire-wound Flat Aluminum Shell Fixed Resistors manufactured by UNI-ROYAL.
1.2 Completely flame-retardant materia
1.3 Anti-vibration, high stability
1.4 Flat structure with great saving space
1.5 Wire-wound process, good resistance to current impact
1.6 Application：Overload current protection of lithium battery pack in the start of new energy vehicle
1.7 Compliant with RoHS directive.
1.8 Halogen free requirement.

2. Part No. System

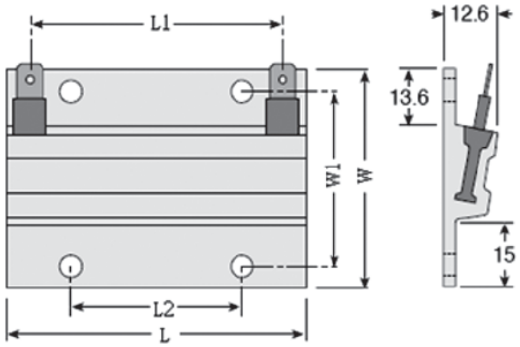
The standard Part No. includes 14 digits with the following explanation:
2.1 High Power Wire-wound Flat Aluminum Shell Fixed Resistors the 1st to 4rd digits are to indicate the product type.
Example: HFWR= High Power Wire-wound Flat Aluminum Shell Fixed Resistors
2.2 5th~6th digits:
2.2.1 This is to 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:
Example: 90=90W
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 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 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} N=10^{-5} P=10^{-6}
2.4.3 The 12th, 13th & 14th digits.
The 12th digit is to denote the Packaging Type with the following codes:
B=Bulk /Box
2.4.4 Current Sense Resistors, The 13th digit should be filled with "0"
2.4.5 Current Sense Resistors, The 14th digit should be filled with "0"
2.4.6 For power rating over 100watt, the 12th to the 14th digits are to denote the actual wattage of the products
Example: 330 = 330W ;

3. Ordering Procedure

(Example: HFWR 330W ±5% 100Ω B/B)



4. Dimension

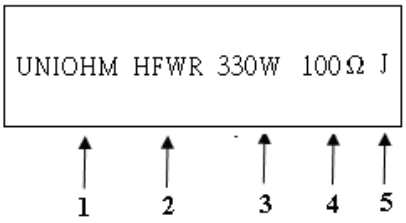


Unit:mm

Type	L±1.0	L1±0.5	L2±0.3	W±0.3	W1±0.3
HFWR 90W	70	53	39.7	51	41
HFWR 330W	280	263	2*100	51	41

***Remark: For further information, please contact our sales team.**

5. Resistor marked



V

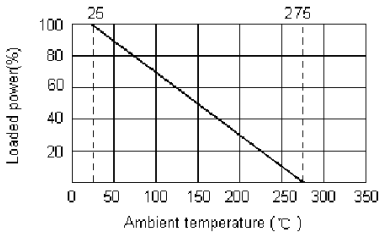
Code description and regulation:

1. Trademark
2. Resisters type
3. Wattage rating
4. Nominal resistance value
5. Resistance tolerance. J: ± 5%

marking: LASER PRINT

Note：The marking code shall be prevailed in kind!

6. Derating Curve



6.1Voltage 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. Performance Specification

Characteristic	Limits	Test method (GB/T 5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	±300 PPM/℃	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	Resistance change rate is:±(5%+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 or the max. Overload voltage respectively specified in the above list, whichever less for 5 seconds.
Humidity (Steady State)	Resistance change rate is:±(5%+0.05Ω)max. With no evidence of mechanical damage.	7.9 Resistance change after 240 hours without load 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 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℃ ambient.
Rapid change of temperature	Resistance change rate is: ±(5%+0.05Ω)max. With no evidence of mechanical damage.	4.19 30 min at -55 °C and 30 min at 155°C; 100 cycles.
Dielectric withstanding voltage	No evidence of flashover mechanical damage,(2000V).	4.7 Resistors shall be clamped in the trough of a 90℃metallic v-block and shall be tested at ac potential respectively specified in the given list of each product type for 60-70 seconds.
Resistance to Soldering heat	△R/R ≤ ±(1%+0.05Ω)	4.18 Dip the resistor into a solder bath having a temperature of 260℃±5℃ and hold it for 10±1 seconds.

8. Note

6.1. 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.

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

6.3. 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, Br etc.

9. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~4	Apr.25, 2019	Haiyan Chen	Yuhua Xu
2	Modify the temperature coefficient test conditions	4	Nov.08, 2022	Haiyan Chen	Yuhua Xu