

**UNI-ROYAL**  
厚聲集團

# DATA SHEET

**Product Name** High Power Wire-wound Flat Aluminum Shell Fixed Resistors

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**Part Name** HFWR Series

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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

## 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 1<sup>st</sup> to 4<sup>th</sup> digits are to indicate the product type.

Example: HFWR= High Power Wire-wound Flat Aluminum Shell Fixed Resistors

- 2.2 5<sup>th</sup>~6<sup>th</sup> 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 ( $\geq 1W$ )

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

- 2.3 The 7<sup>th</sup> 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 8<sup>th</sup> to 11<sup>th</sup> digits is to denote the Resistance Value.

- 2.4.1 For the standard resistance values of E-24 series, the 8<sup>th</sup> digit is "0", the 9<sup>th</sup> & 10<sup>th</sup> digits are to denote the significant figures of the resistance and the 11<sup>th</sup> digit is the zeros following;

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

0=10<sup>0</sup> 1=10<sup>1</sup> 2=10<sup>2</sup> 3=10<sup>3</sup> 4=10<sup>4</sup> 5=10<sup>5</sup> 6=10<sup>6</sup> J=10<sup>-1</sup> K=10<sup>-2</sup> L=10<sup>-3</sup> M=10<sup>-4</sup> N=10<sup>-5</sup> P=10<sup>-6</sup>

- 2.4.3 The 12<sup>th</sup>, 13<sup>th</sup> & 14<sup>th</sup> digits.

The 12<sup>th</sup> digit is to denote the Packaging Type with the following codes:

B=Bulk /Box

- 2.4.4 Current Sense Resistors, The 13<sup>th</sup> digit should be filled with "0"

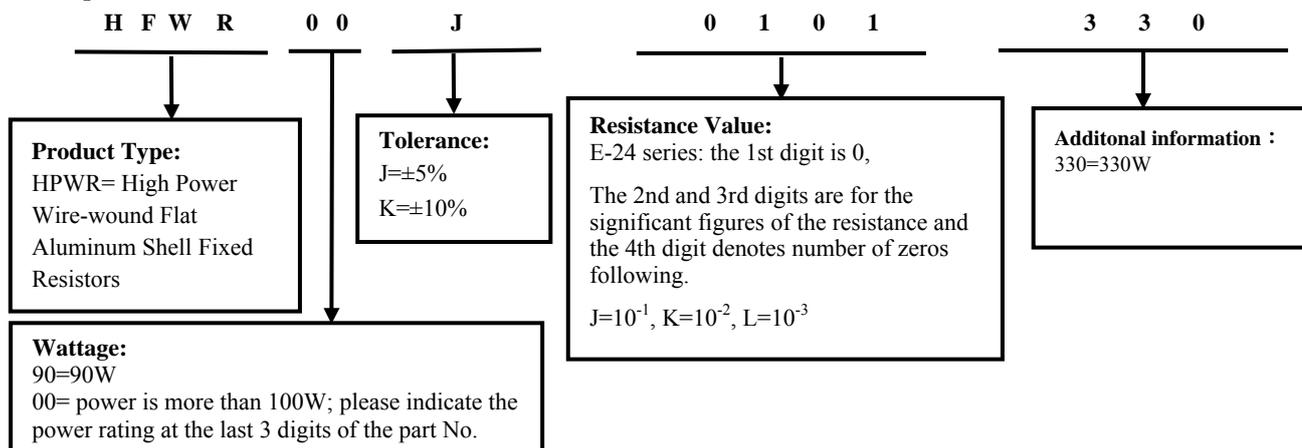
- 2.4.5 Current Sense Resistors, The 14<sup>th</sup> digit should be filled with "0"

- 2.4.6 For power rating over 100watt, the 12<sup>th</sup> to the 14<sup>th</sup> digits are to denote the actual wattage of the products

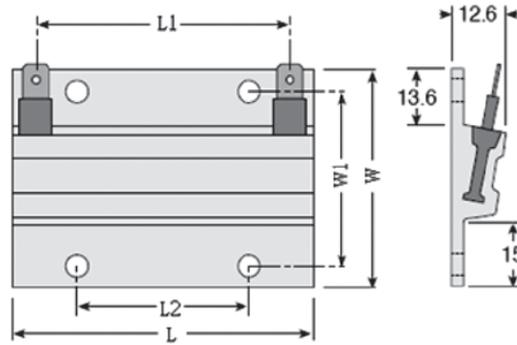
Example: 100 = 100W ; 150 = 150W; 225 = 225W

## 3. Ordering Procedure

(Example: HFWR 330W ±5% 100Ω B/B)



#### 4. Dimension

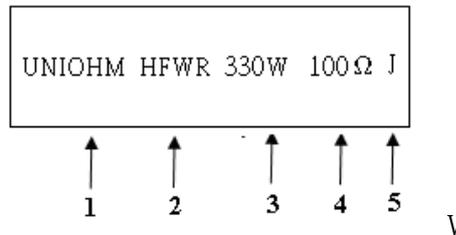


Unit:mm

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

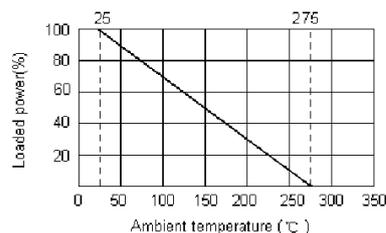


##### Code description and regulation:

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

marking: LASER PRINT

#### 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. Performance Specification**

Characteristic	Limits	Test method (GB/T 5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	±300 PPM/°C	4.8 Natural resistance changes per temp. Degree centigrade $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (PPM/°C)}$ R <sub>1</sub> : Resistance Value at room temperature (t <sub>1</sub> ) ; R <sub>2</sub> : Resistance at test temperature (Upper limit temperature or Lower limit temperature) t <sub>1</sub> : +25°C or specified room temperature t <sub>2</sub> : Upper limit temperature or Lower limit temperature test temperature
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°C±2°C 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 without load in a humidity test chamber controlled at 25°C±2°C 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°C 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°C±5°C and hold it for 10±1 seconds.

**8. Note**

- 6.1. 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.
- 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:
- Stored in high electrostatic environment
  - Stored in direct sunshine, rain, snow or condensation.
  - Exposed to sea wind or corrosive gases, such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>, etc.

**9. Record**

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~4	Apr.25, 2019	Haiyan Chen	Yuhua Xu