Specification for Approval

Customer : **DACHS ELECTRONICA, S.A.**

Product Name : **High Voltage Flat Resistors**

Part Name : **HFR 5W ±1% SERIES**

Part No. : **HFR********B0E**

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File Name: **HFR 5W 1% SERIES**	Date	**2016.01.18**	Edition No.	**1**
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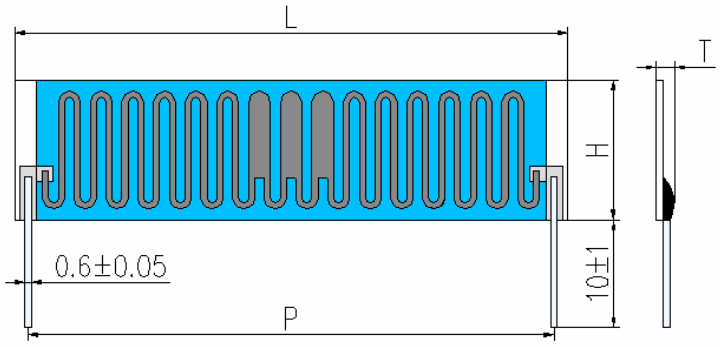
1.0 Scope:

This specification for approve relates to High Voltage Flat Style Resistor HFR Series manufactured by UNIOHMS' specification.

2.0 Ratings & Dimension:

2.1 Dimension：

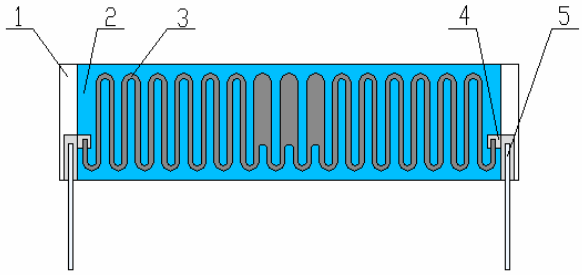


Type	L±0.5	P(±0.5)	H(±0.5)	T(MAX)	Resistance range
HFR 5W	51	48.2	12.9	3	1.1MΩ~24MΩ

2.2 Ratings：

Type	Max Working Voltage	Dielectric Withstanding Voltage	Tolerance	Operating temperature
HFR 5W	22KV	500V	±1%	0℃~225℃

3.0 Construction:



No.	Name
1	Basic body
2	Protective covering
3	Resistance element
4	Electrode
5	Lead wire

4.0 Resistor marked:

Resistors shall be marked with color coding

Color Codes shall be in accordance with JIS C 0802

1）Product company name：UNIOHM

2）Watt：5W=5W

3）Resistance：115=11*10^5=1.1MΩ

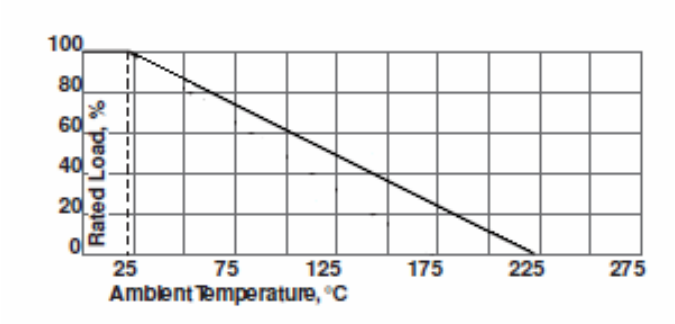
4）Tolerance：F=±1%

5. Power rating:

5.1 Derating curve:

Resistors shall have a power rating based on continuous load operation at an ambient temperature of 21℃. For temperature in excess of 21℃, the load shall be derate as shown in figure 1.

Figure 1



5.2 Voltage rating:

Resistors shall have a rated direct-current (AC) 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)

6.0 Performance Specification:

Characteristic	Limits	Test Method (JIS-C-5201& JIS-C-5202)
Temperature Coefficient	±100PPM/℃ Max.	4.8 natural resistance changes per temp. Degree centigrade $\frac{R_2-R_1}{R_1(T_2-T_1)} \times 10^6$ (PPM/℃) R1: Resistance value at room temp. (T1) R2:Resistance value at room temp.+100℃(T2) Test pattern: room temp. (T1), room temp. +100℃(T2)
Insulation Resistance	≧1000MΩ	4.6 The measuring voltage shall be ,measured with a direct voltage of (100±15)V or a voltage equal to the dielectric withstanding voltage., and apply for 1min
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation breaks down.	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.
Terminal strength	Without 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	± (1%+0.1Ω)	4.18 Dip the resistor into a solder bath having a temperatuer of 260℃±5℃ and hold it for 10±1seconds.
Solderability	95% coverage Min.	Wave Solder: Test temperature of solder: 245℃±3℃ Dipping time in solder: 2-3seconds

Temperature cycling	Resistance change rate is: ±(1%+0.1Ω) max.. With no evidence of mechanical damage.	4.19 Resistance change after continuous five cycles for duty cycle specified:

Step	Temperature	Time
1	-55℃ ± 3℃	30Mins
2	Room temp.	10 – 15Mins
3	+155℃ ± 2℃	30Mins
4	Room temp.	10 – 15Mins

Thermal Shock	±(1%+0.1Ω)	4.21 Load V, Room temp., 30Mins. Unliad,-55℃,15Mins. Over 2 hours in room temp. before measuring
Load life in humidity	Resistance change rate must be in ±(3%+0.05Ω), without 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 must be in ±(3%+0.05Ω), without 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.

7.0 Explanation of Part No. System

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

7.1 The 1st to 3rd digits are to indicate the product type and 4th digit is the special feature.

Example: HFR0=High Voltage Flat Resistor

7.2 5th~6th digits:

7.2.1 This is to indicate the wattage or power rating. The 5th digit to the 6th digit is to denote the significant figures of the wattage.

Example:

1W=1W

7.3 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% M=±20%

7.4 The 8th to 11th digits is to denote the Resistance Value.

7.4.1 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;

$0=10^0$ $1=10^1$ $2=10^2$

$3=10^3$ $4=10^4$ $5=10^5$ $J=10^{-1}$

7.5 The 12th, 13th & 14th digits.

7.5.1 The 12th digit is to denote the Packaging Type with the following codes:

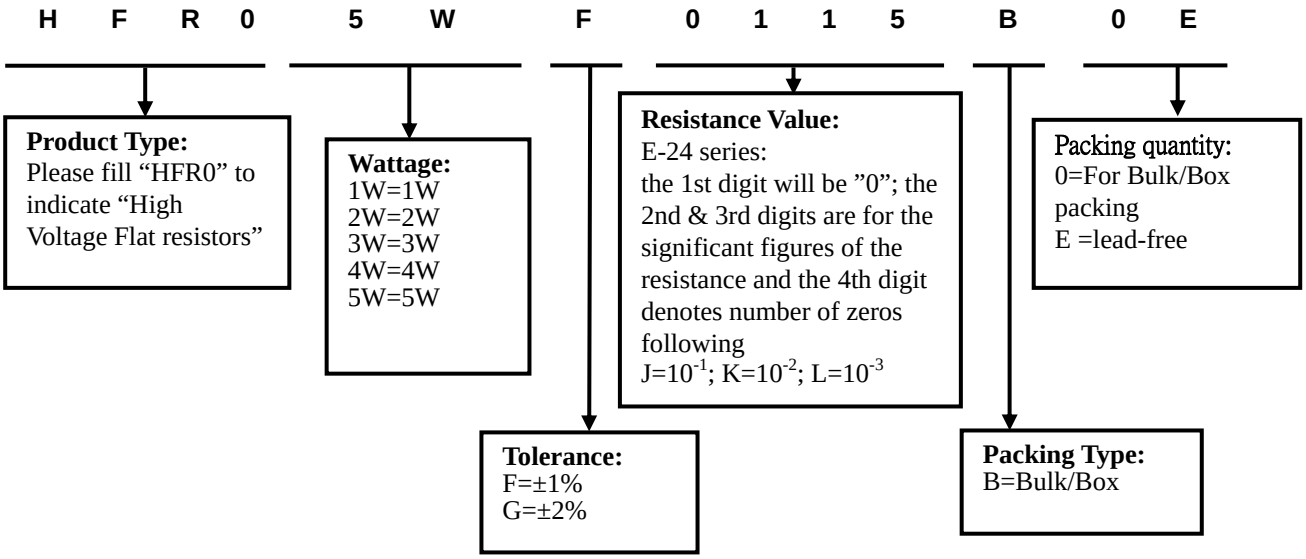
B=Bulk/Box

7.5.2 The 13th digit is normally to indicate the Packing Quantity, This digit should be filled with "0" for the Cement products with "Bulk/Box" packing requirements.

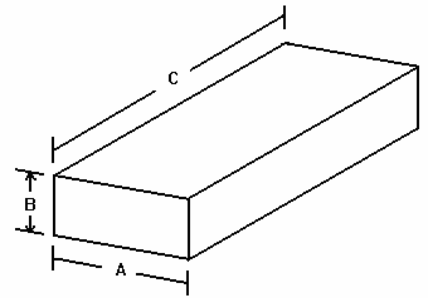
7.5.3 For Network, the 14th digit alone can use to denote special features of additional information with the following codes or standard product

Example: E=For "Environmental Protection, Lead Free type" of Flat Resistors.

8.0 Ordering Procedure (Example: HFR 5W ±1% 1.1MΩ B/B)



9.0 Bulk in Box Packing



Dimension of Box (mm)

TYPE	Quantity Per Bag (pcs)	Quantity Per Box (pcs)	Quantity Per Carton (pcs)
HFR 5W	50	500	15000

10.0 Precaution for storage/Transportation:

10.1 UNIOHM recommend the storage condition temperature: 15℃~35℃, humidity :25%~75%.
(Put condition for individual product)
Even under UNIOHM 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_3 NH_3, SO_2, NO_2.