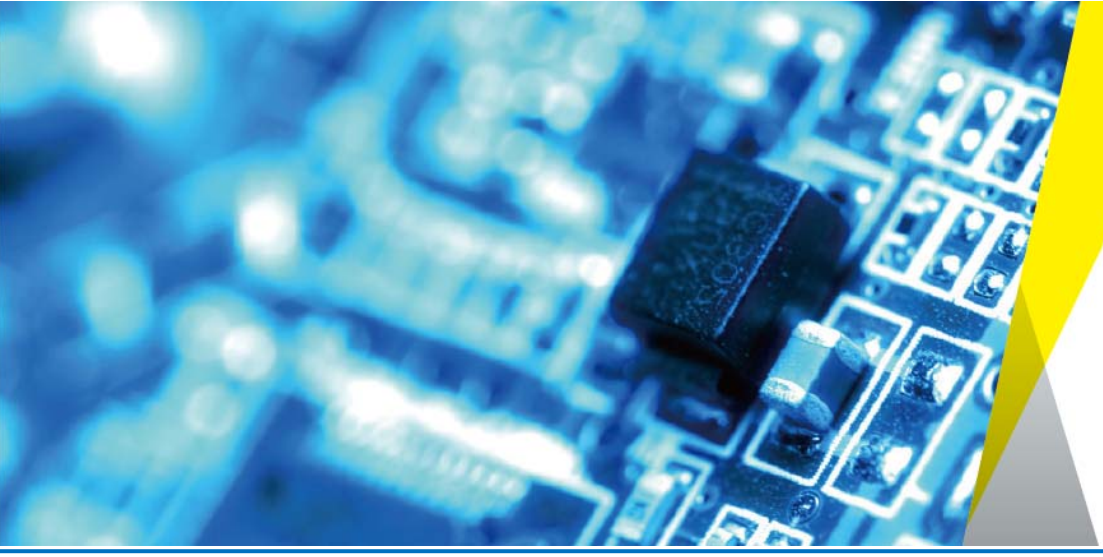

DATA SHEET

Product Name **Thermal Fusing Wire-wound Fixed Resistors**

Part Name **TFR Series**

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1. Scope

1.1 This datasheet is the characteristics of Thermal Fusing Wire-wound Fixed Resistors manufactured by UNI-ROYAL.

1.2 Low resistance value with higher power dissipation

1.3 Wire-wound resistor with thermal fuse protection

1.4 Used in Electronic ballast 、other lighting applications

2. Part No. System

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

2.1 Coated type, the 1st to 3rd digits are to indicate the product type and 4th digit is the special feature.

Example: PMR0= Power Metal 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:

W=Normal Size "1"~"G"to denotes"1"~"16"as Hexadecimal:

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 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: 1W=1W; 3W=3W

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=100 1=101 2=102 3=103 4=104 5=105

6=106 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

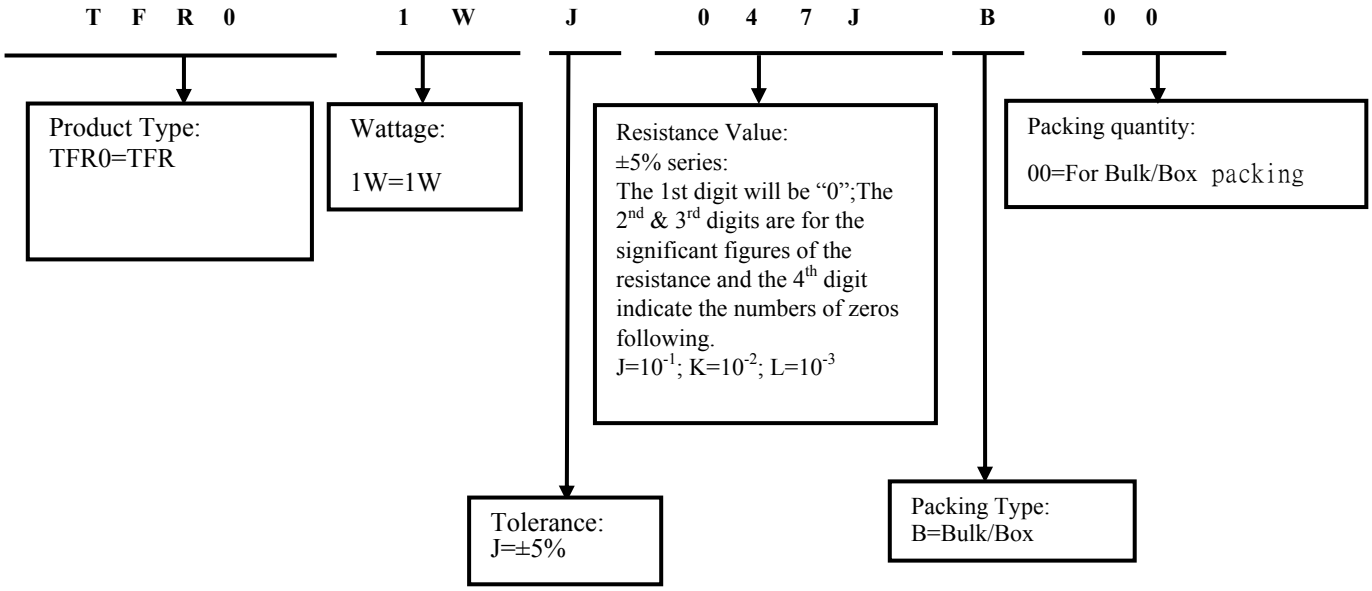
2.4.4 The 13th digit is normally to indicate the Packing Quantity of Tape/Box packaging types. The following number is to be used for some packing quantities:

1=1000pcs 2=2000pcs 3=3000pcs 4=4000pcs 5=5000pcs

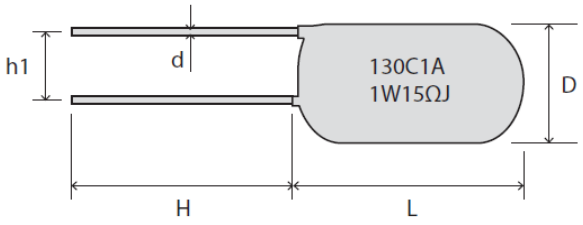
2.4.5 For some items, the 14th digit alone can use to denote special features of additional information with the following codes: 0=NIL

3. Ordering Procedure

(Example: TFR 1W ±5% 4.7Ω B/B)



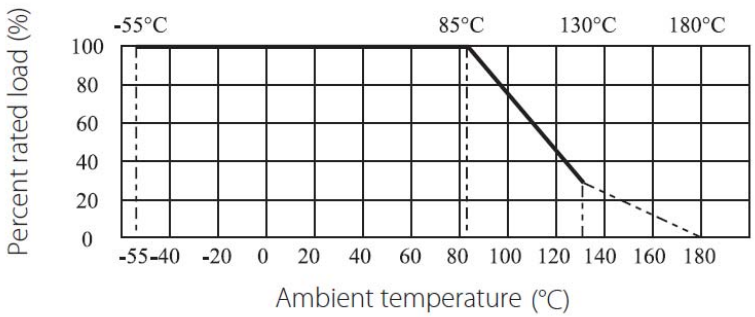
4. Ratings & Dimension



Type	Rated power (70℃)	Dimension（mm）											Resistance Range
		D	L	H (min)	H 1(min)	D ±0.02	Current Rating	TF (℃)	TH/TC (℃)	TM (℃)	Ir (A)	Ur (V)	
TFR	1W	5.5±0.5	14±1	12	3.5	0.53	2A	130	102	180	2	250	2.2Ω~4.7Ω
TFR	1W	5.5+1/-0.5	11(Max)	12	3.5	0.53	1A	130	102	180	1	250	2.2Ω~4.7Ω

5. Derating Curve

Resistors shall have a power rating based on continuous full load operation at an ambient temperature of 85°c. For temperature in excess of 85℃, the load shall be derated as shown in the figure 1.



Voltage rating:

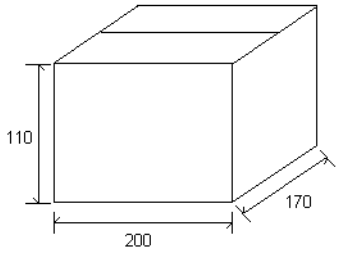
Resistors shall have a rated direct-current (DC) continuous working
Voltage or an approximate sine-wave root-mean-square (RMS) alternating-current (AC) continuous working voltage at commercial-line frequency and waveform corresponding to the power rating, as determined from the following formula:
$RCWV = \sqrt{P \times R}$
Where: RCWV commercial-line frequency and waveform (Volt.)
P = power rating (WATT.) R = nominal resistance (OHM)
In no case shall the rated DC or RMS AC continuous working voltage be greater than the applicable maximum value.
The overload voltage is 2.5 times RCWV or Max. Overload voltage whichever is less

6. Performance Specification

Characteristic	Limits	Test Methods (GB/T5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	±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 (Upper limit temperature or Lower limit temperature) t_1: +25°C or specified room temperature t_2: Upper limit temperature or Lower limit temperature test temperature
Short-time overload	Resistance change rate must be in ±(2%+0.05Ω) , and no mechanical damage.	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds.
Insulation Resistance	≥20,000MΩ	4.6. DC 500V
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break down.	4.7 DC 350V 1Min
Resistance to soldering heat	Resistance change rate must be in ± (1%+0.05Ω) , and no mechanical damage.	4.18 Permanent resistance change when leads immersed to a point 10mm from the body in 260℃±5℃solder for 10±1 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.
Humidity (steady state)	Resistance change rate must be in ±(3%+0.05Ω) , and no mechanical damage.	4.24Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at 40±2℃ and 90-95% relative humidity,
Load life in humidity	Resistance change rate must be in ±(5%+0.05Ω) , and no 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 ±(5%+0.05Ω) , and no 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.

Low Temperature Storage	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	4.23.4 Lower limit temperature，for 2H.
High Temperature Exposure	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	4.23.4 Lower limit temperature，for 2H.
Rapid change of temperature	Resistance change rate must be in ±(2%+0.05Ω) , and no mechanical damage.	4.19 30 min at -55 °C and 30 min at 155°C; 100 cycles.

7. Packing



INNER BOX OF PLASTIC BAG PACKING

TYPE	QTY. PER BAG/INNER BOX	QTY. PER OUTER CARTON	CARTON DIMENSION (mm)
TFR 1W	100/3300	19800	531×213×246

8. Note

8.1. 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.

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

8.3. 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, etc.

9. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~5	Mar.20, 2018	Chen Haiyan	Chen Nana
2	Modify characteristic	4	Feb.23, 2019	Chen Haiyan	Xu Yuhua