



**UniRoyal**

# DATASHEET

**Product Name** Resistors of Capacitor Voltage Balance

---

**Part Name** PRTM Series

**File No.** DIP-SP-045

## **Uniroyal Electronics Global Co., Ltd.**

88#, Longteng Road, Economic & Technical Development Zone, Kunshan, Jiangsu, China

Tel +86 512 5763 1411 / 22 /33

Email [marketing@uni-royal.cn](mailto:marketing@uni-royal.cn)

Manufacture Plant Uniroyal Electronics Industry Co., Ltd.

Aeon Technology Corporation

Royal Electronic Factory (Thailand) Co., Ltd.

Royal Technology (Thailand) Co., Ltd.

## 1. Scope

- 1.1 This datasheet is the characteristics of Resistors of Capacitor Voltage Balance manufactured by UNI-ROYAL.
- 1.2 Self-extinguishing .
- 1.3 Extremely small & sturdy mechanically safe .
- 1.4 Excellent flame & moisture resistance .
- 1.5 Too low or too high values on Wire-Wound & Power-film type can be supplied on a case to case basis.
- 1.6 Compliant with RoHS directive.
- 1.7 Halogen free requirement.

## 2. Part No. System

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

### 2.1 1<sup>th</sup> ~4<sup>th</sup> digits

This is to indicate the Chip Resistor. Example: PRTM= Resistors of Capacitor Voltage Balance

1W~16W ( $\geq 1W$ )

Wattage	4	7
Normal Size	4W	7W

2.2.1 For power rating of 1watt to 16watt, the 5<sup>th</sup> digit will be a number or a letter code and the 6<sup>th</sup> digit will be the letters of W.

Example: 4W=4W

2.2.2 For power rating between 20 watt to 99 watt, the 5<sup>th</sup> and the 6<sup>th</sup> digit will show the whole numbers of the power rating itself

Example: 20=20W

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.

G=±2% J=±5% K= ±10%

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

2.4.1 For Cement Fixed Resistors the 8<sup>th</sup> digits will be coded with “W” or “P” to denote Wire-wound type or Power Film type respectively of the Cement Fixed Resistor product. The 9<sup>th</sup> to 11<sup>th</sup> please refer to point a) of item 4.

Example:

W12J=1.2Ω W12I=120Ω P503=50KΩ

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

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

B=Bulk/Box

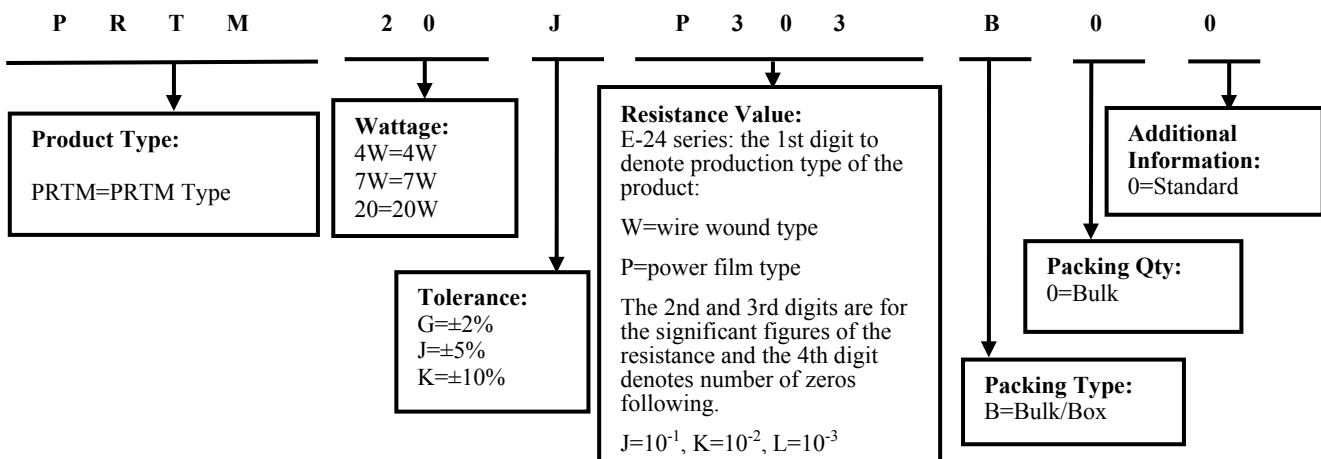
2.5.2 The 13<sup>th</sup> digit is normally to indicate the Packing Quantity, This digit should be filled with “0” for the Cement products with “Bulk/Box” packing requirements.

2.5.3 For some items, the 14<sup>th</sup> digit alone can use to denote special features of additional information with the following codes or standard product

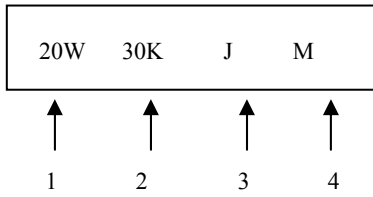
Example: 0= standard product

## 3. Ordering Procedure

(Example: PRTM 20W ±5% 30KΩ B/B)



## 4. Marking



Code description and regulation:

1. Wattage Rating
2. Nominal Resistance Value
3. Resistance Tolerance. J:  $\pm 5\%$  ; K:  $\pm 10\%$
4. Pattern:

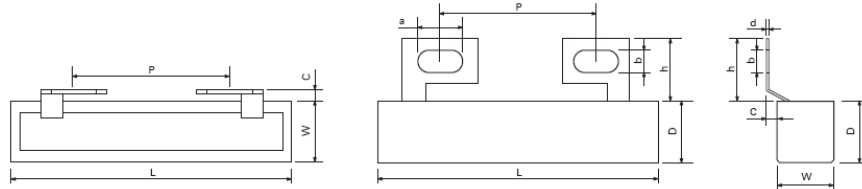
M: Power film

W: Wire wound

Color of marking: Black Ink

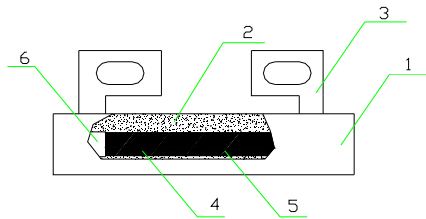
Note: The marking code shall be prevailed in kind!

## 5. Dimension



Type	Resistance Range	Dimension(mm)								
		W $\pm 1.0$	D $\pm 1.5$	L $\pm 1.5$	P $\pm 1.5$	a $\pm 0.8$	b $\pm 0.5$	c $\pm 0.5$	d $\pm 0.1$	h $\pm 1.0$
PRTM 4W	1.3K $\Omega$ ~200K $\Omega$	12.5	12.5	48.0	27.0	11.0	5.2	1.0	0.5	12.5
PRTM 7W		12.5	12.5	63.0	27.0	11.0	5.2	1.0	0.5	12.5
PRTM 20W		12.5	13.5	63.0	35.0	10.0	5.0	2.5	0.8	14.0

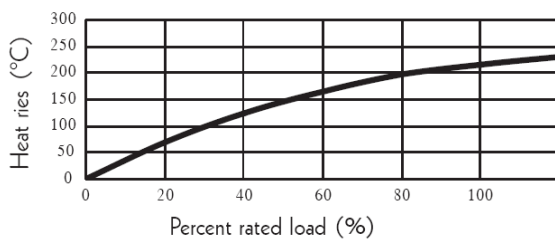
## 6. Construction



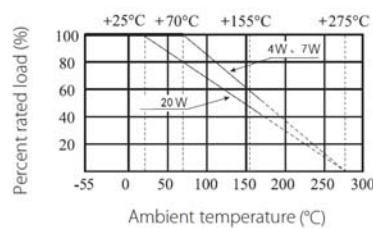
NO.	NAME	MATERIAL GENERIC NAME
1	Ceramic case	Al <sub>2</sub> O <sub>3</sub> CaO
2	Filling materials	SiO <sub>2</sub>
3	Bracket	Iron
4	Resistor	Metal Oxide Film
5	Body	Al <sub>2</sub> O <sub>3</sub>
6	Cap	Iron

## 7. Derating Curve

Heat rise chart:



Derating curve:



### 7.1 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)

## 8. Performance Specification

Characteristic	Limits	Test Methods (GB/T5729&JIS-C-5201&IEC60115-1)
Temperature Coefficient	±350PPM/°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 ( t <sub>2</sub> ) t <sub>1</sub> : +25°C or specified room temperature t <sub>2</sub> : Test temperature ( -55°C or 125°C )
Short-time overload	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	4.13 Permanent resistance change after the application of a potential of 2.5 times RCWV or Max.Overload Votage whichever less for 5 seconds.
Dielectric withstanding voltage	No evidence of flashover mechanical damage, arcing or insulation break 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 above list for 60-70 seconds.for cement fixed resistors the testing voltage is 1000V.
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 2.0-2.5mm from the body in 260°C±5°C solder for 10±1 seconds.
Humidity (Steady state)	Resistance change rate must be in ±(5%+0.05Ω) , and no mechanical damage.	4.24 Temporary resistance change after 240 hours exposure in a humidity test chamber controlled at 40±2°C and 90~95%RH relative humidity
Load life in humidity	Resistance change rate must be in Wire-wound: ±5% Power Film:<100KΩ: ±5% ≥ 100KΩ: ±10%	7.9 Resistance change after 1000 hours (1.5 hours “ON” , 0.5 hours “OFF” ) at RCWV or Max.Working Voltage whichever less in a humidity test chamber controlled at 40±2°C and 93%±3% RH.
Load life	Resistance change rate must be in Wire-wound: ±5% Power Film:<100KΩ: ±5% ≥ 100KΩ: ±10%	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 25±2°C or 70±2°C ambient.
Low Temperature Storage	Resistance change rate must be in Wire-wound: ±5% Power Film:<100KΩ: ±5% ≥ 100KΩ: ±10%	IEC 60068-2-1 (Aa) Lower limit temperature , for 2H.
High Temperature Exposure	Resistance change rate must be in Wire-wound: ±5% Power Film:<100KΩ: ±5% ≥ 100KΩ: ±10%	MIL-STD-202 108A Upper limit temperature , for 16H.

## 9. Note

- 9.1. 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.
- 9.2. Cartons must be placed in correct direction which indicated on carton, otherwise the reel or wire will be deformed.
- 9.3. 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>, Br etc.

## 10. Record

Version	Description	Page	Date	Amended by	Checked by
1	First version	1~5	Mar.20, 2018	Haiyan Chen	Nana Chen
2	Modify characteristic	4~5	Feb.26, 2019	Haiyan Chen	Yuhua Xu
3	Modify characteristic	5	Nov.20,2020	Song Nie	Yuhua Xu
4	Modify the temperature coefficient test conditions	4	Nov.07, 2022	Haiyan Chen	Yuhua Xu
5	Modify the load life test conditions	4	Sep.28, 2024	Haiyan Chen	Yuhua Xu

© Uniroyal Electronics Global Co., Ltd. All rights reserved. Specification herein will be changed at any time without prior notice