

DATASHEET

Product Name **Resistors of Capacitor Voltage Balance**

Part Name **PRTM Series**

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

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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 1th~4th 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 5th digit will be a number or a letter code and the 6th digit will be the letters of W.

Example: 4W=4W

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

Example: 20=20W

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.

G=±2% J=±5% K=±10%

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

2.4.1 For Cement Fixed Resistors the 8th 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 9th to 11th please refer to point a) of item 4.

Example:

W12J=1.2Ω W12I=120Ω P503=50KΩ

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

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

B=Bulk/Box

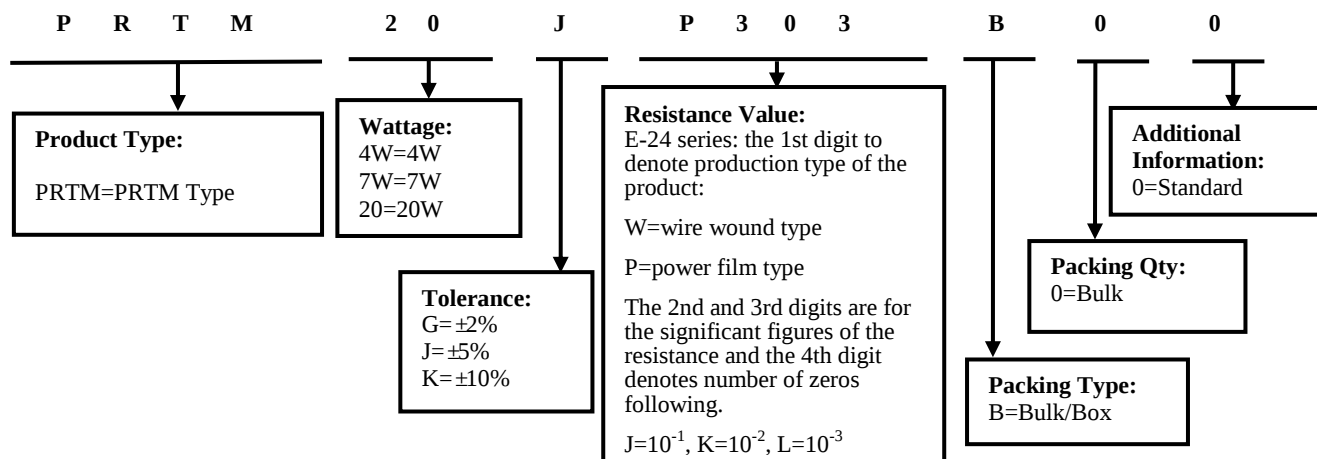
2.5.2 The 13th digit is normally to indicate the Packing Quantity, This digit should be filled with “0” for the Cement products with “Bulk/Box” packing requirements.

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

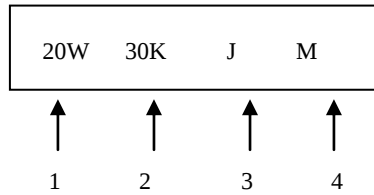
Example: 0= standard product

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:

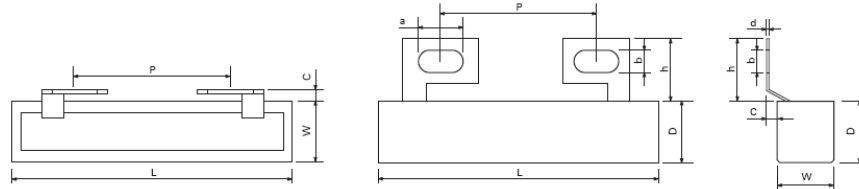
M: Power film

W: Wire wound

Color of marking: Black Ink

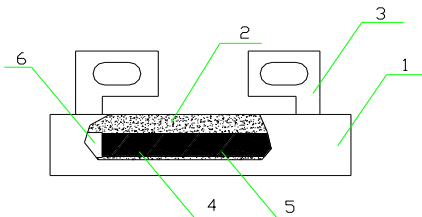
Note: The marking code shall be prevailed in kind!

5. Dimension



Type	Resistance Range	Dimension(mm)								
		W ± 1.0	D ± 1.5	L ± 1.5	P ± 1.5	a ± 0.8	b ± 0.5	c ± 0.5	d ± 0.1	h ± 1.0
PRTM 4W	1.3K Ω ~200K Ω	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

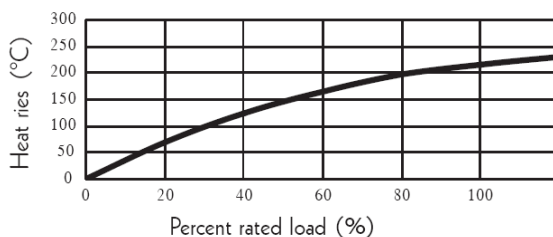
6. Construction



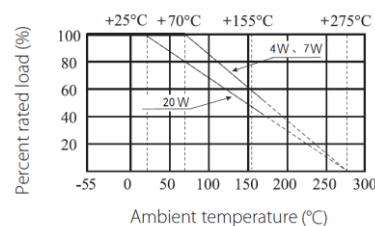
NO.	NAME	MATERIAL GENERIC NAME
1	Ceramic case	Al ₂ O ₃ CaO
2	Filling materials	SiO ₂
3	Bracket	Iron
4	Resistor	Metal Oxide Film
5	Body	Al ₂ O ₃
6	Cap	Iron

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_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°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℃ 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:
- 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 Cl₂, H₂S, NH₃, SO₂, NO₂, 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

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