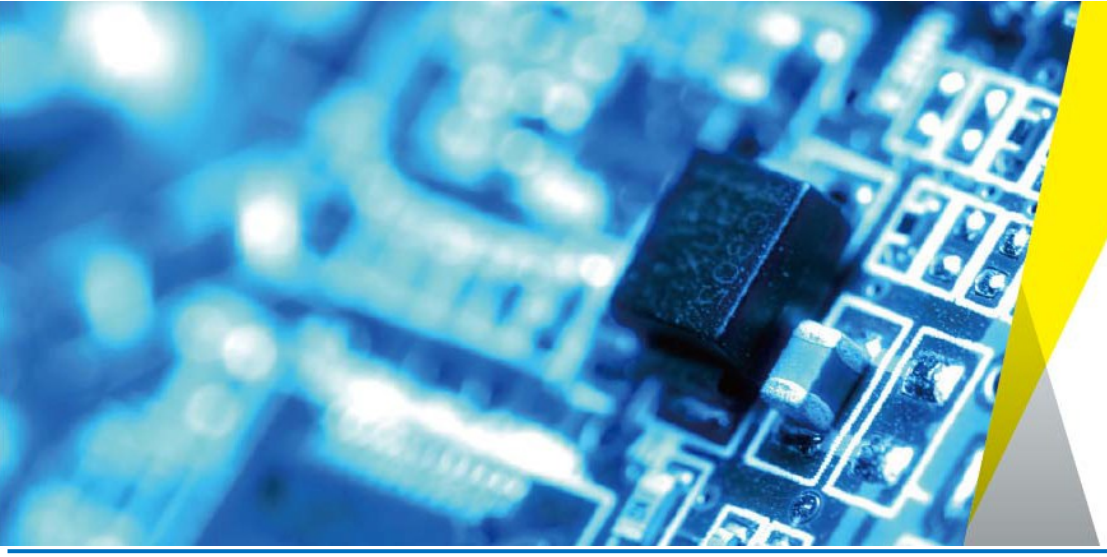

DATA SHEET

Product Name **Metal Foil Long side Terminal current sensing Chip Resistor**

Part Name **MW08、MW12、MW15、MW25 Series**

File No. **SMD-SP-030**

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1. Scope

1.1 This specification for approve relates to the Metal Foil Long side Terminal current sensing Chip Resistor manufactured by UNI-ROYAL.
1.2 Low Resistance / TCR / EMF / Inductance
1.3 Excellent long term stability
1.4 RoHs compliant and halogen free.
1.5 Lead free.
1.6 High precision current sensing and voltage division.

2. Part No. System

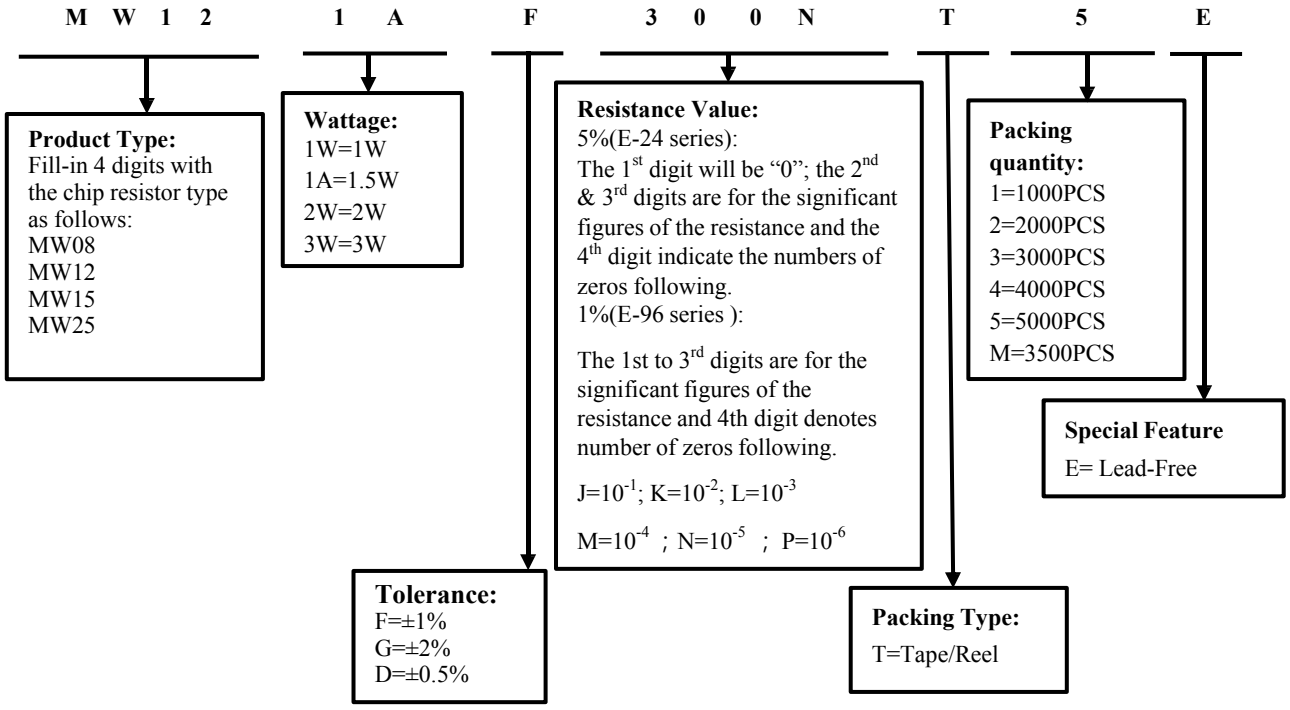
Part No. includes 14 codes shown as below:
2.1 1st~4th codes: Part name. E.g.: MW08,MW12,MW15,MW25
2.2 5th~6th codes: Power rating.

Wattage	1	2	3	1.5
Normal Size	1W	2W	3W	1A

2.3 7th code: Tolerance. E.g.: D=±0.5% F=±1% G=±2%
2.4 8th~11th codes: Resistance Value.
2.4.1 If value belongs to standard value of ≥5% series, 8th code would be zero,9th~10th codes are significant figures of the resistance and 11th code is the power of ten.
2.4.2 If value belongs to standard value of ≤2% series, 8th~10th codes are significant figures of the resistance, and 11th code is the power of ten.
2.4.3 11th codes listed as following:
0=10^0 1=10^1 2=10^2 3=10^3 4=10^4 5=10^5 6=10^6 J=10^{-1} K=10^{-2} L=10^{-3} M=10^{-4} N=10^{-5} P=10^{-6}
2.5 12th~14th codes.
2.5.1 12th code: Packaging Type. E.g.: T=Tape/Reel
2.5.2 13th code: Standard Packing Quantity.
1=1000pcs 2=2000pcs 3=3000pcs 4=4000pcs 5=5000pcs M=3500pcs
2.5.3 14th code: Special features.
E = Environmental Protection, Lead Free, or Standard type.

3. Ordering Procedure

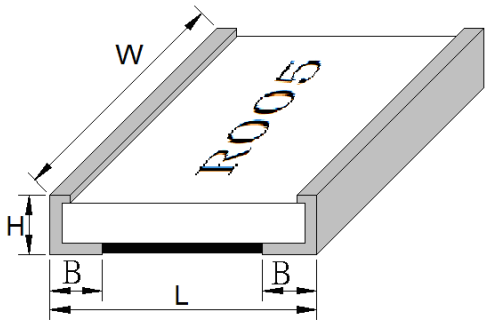
(Example: MW12 1.5W ±1% 3mΩ T/R-5000)



4. Standard Electrical Specifications

Type	Rating Power at 70℃	T.C.R. (ppm/℃)	Max. Rating Current	Max. Overload Current	Resistance Range (mΩ)			Operating Temperature Range (℃)
					0.5%(D)	1.0% (F)	2.0%(G)	
MW08	1W	±100	31.62A	50A	/	/	1	- 55 ~ + 155
		±100	22.36A	35.35A		2~9	/	
		±50	10A	15.81A	10~100		/	
MW12	1.5W	±100	38.72A	61.23A	/	/	1	
		±100	27.38A	43.30A		2~9	/	
		±50	12.24A	19.36A	10~100		/	
MW15	2W	±100	44.72A	70.71A	/	/	1	
		±100	31.62A	50A	/	2~9	/	
		±50	14.14A	22.36A	10`20		/	
MW25	3W	±100	54.77A	86.60A	/	1~9	/	
		±50	17.32A	27.38A	10~100		/	

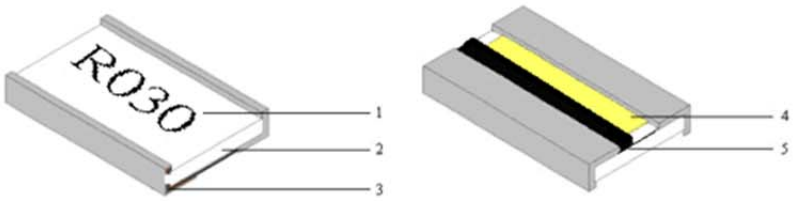
5. Dimension



Unit:mm

Type	Power Rating	Resistance Range	L	W	H	B
MW08 (0508)	1W	1~100mΩ	1.35±0.20	2.10±0.20	0.65±0.20	0.43±0.20
MW12 (0612)	1.5W	1mΩ	1.60±0.25	3.20±0.25	0.65±0.20	0.50±0.30
		2mΩ~100mΩ				0.40±0.20
MW15 (0815)	2W	1~20mΩ	2.20±0.20	3.80±0.20	0.65±0.20	0.61±0.20
MW25 (1225)	3W	1~100mΩ	3.20±0.30	6.40±0.30	0.65±0.20	0.60±0.20

6. Structure



1	Marking	4	Resistance layer
2	Alumina Substrate	5	Protective layer
3	Terminal (Cu/Ni/ Sn)		

7. Marking

"R" designates the decimal location in ohms

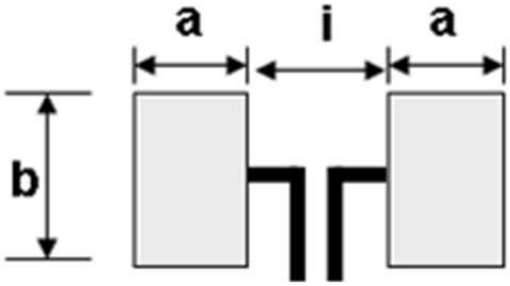
e.g. 1mΩ the product marking is R001.

20mΩ the product marking is R020.

"M" designates the decimal location in milli-ohms

e.g. 5.5mΩ the product marking is 5M50.

8. Recommend land pattern (Unit:mm)

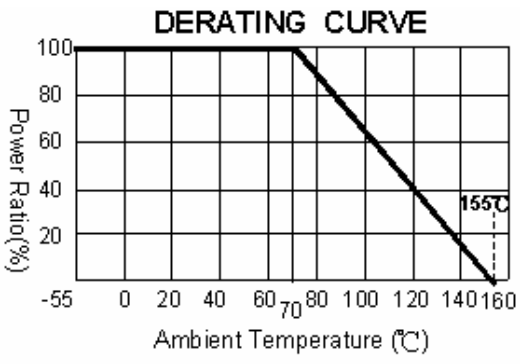


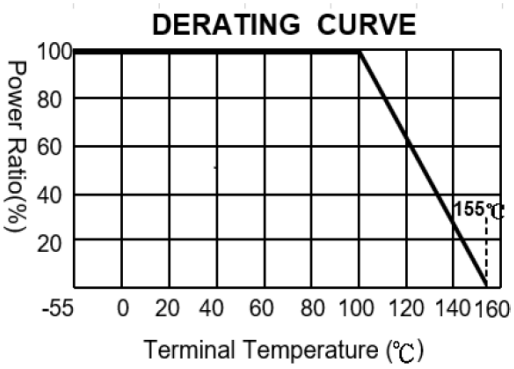
Type	Resistance Range	a	b	i
MW08 1W	1~100mΩ	1.10	2.30	0.60
MW12 1.5W	1mΩ	1.35	3.68	0.50
	2mΩ~100mΩ	1.30	3.68	0.60
MW15 2W	1~20mΩ	1.40	4.26	0.70
MW25 3W	1~100mΩ	2.35	7.25	1.40

9. Derating Curve

The Operating Temperature Range: -55°C ~+155°C.

For resistors operated in ambient temperatures above 70°C, power rating must be derated in accordance with the curve below(Terminal temperature derating from above 100°C)





The following equation may be used to determine the DC (Direct Current) or AC (Alternating Current) (RMS, root mean square value) of normal rated power. However, if the result value exceeds the highest current of regulated standards (paragraph 5), the highest normal rated power is to be used

$$I=\sqrt{P/R}$$

I = Rating current (A)

P= Rating Power (W)

R= Resistance(Ω)

10. Performance Specification

Test Item	Test Method	Procedure	Requirements
Temperature Coefficient of Resistance (T.C.R)	JIS C 5201-1 clause 4.8	At 25 ℃ /+125 ℃ , 25 ℃ is the reference temperature.	Refer to Ratings
Short Time Overload	JIS C 5201-1 clause 4.13	The number of rated power are as follows: 2.5 times of rated power for 5secs	±1.0%+0.5mΩ
High Temperature Exposure	JIS C 5201-1 clause 4.23.2	At 155 °C for 1,000hrs	±1.0%+0.5mΩ
Low Temp. Storage	JIS C 5201-1 clause 4.23.4	At -55 °C for 1,000hrs	±1.0%+0.5mΩ
Soldering Heat	JIS C 5201-1 clause 4.18	260±5℃ for 10±1 seconds.	±1.0%+0.5mΩ
Moisture Load Life	JIS C 5201-1 clause 4.24	T=40±2°C,RH=90~95%,Load with Rated Current or Max Rated Current whichever is less for 1000h with 1.5hrs “ON”, 0.5hrs “OFF”.	±2.0%+0.5mΩ
Temperature Cycling	JIS C 5201-1 clause 4.19	-55°C to +155°C, 100 cycles	±1.0%+0.5mΩ

Load Life	JIS C 5201-1 clause 4.25	T=70±2 °C, Load with Rated Current or Max Rated Current whichever is less for 1000h with 1.5hrs "ON", 0.5hrs "OFF".	±2.0%+0.5mΩ
Solderability	JIS C 5201-1 clause 4.17	245±5°C for 3±0.5secs	The covered area >95%
Mechanical Shock	JIS C 5202 clause 6.7	a =50G , t =11ms, 5 times shock	±1.0%+0.5mΩ
Bending Strength	JIS-C-5201-1 4.33 IEC-60115-1 4.33	Bending once 2mm for 10 seconds	±1.0%+0.5mΩ

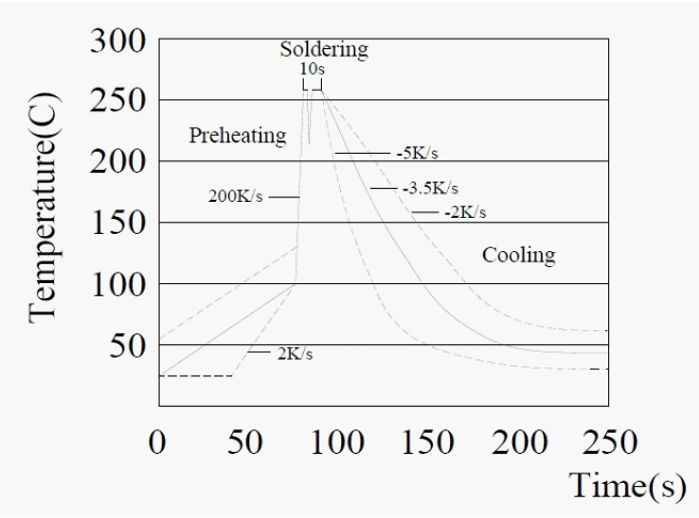
11. Recommended Customer Soldering Parameters

11.1. Wave solder Temperature condition

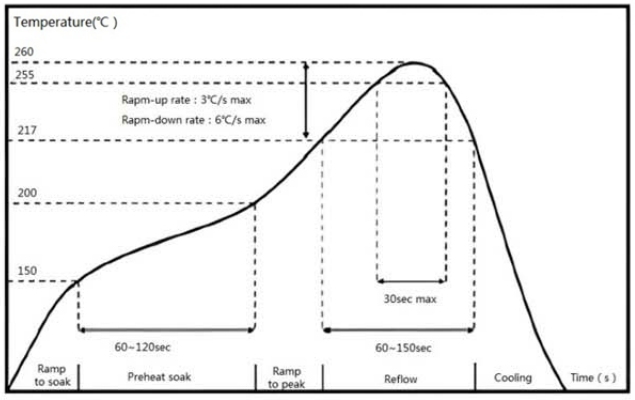
Preheating : 100℃~130℃, max.100 sec.

Soldering: 250℃~265℃ max. 10 sec.

Maximum temperature : 260±5℃, max. 10sec.



11.2 Solder reflow Temperature condition



· The peak temperature of soldering heat is 260 for 10s

11.3 Rework temperature（hot air equipment）：350℃, 3~5 seconds

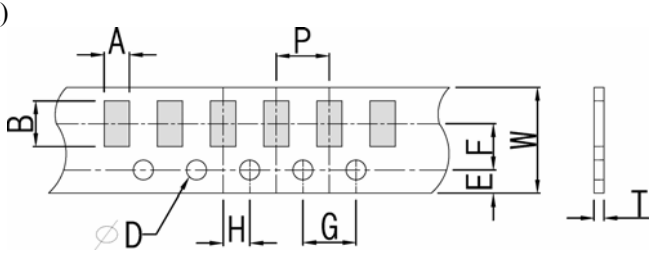
11.4 Recommended reflow methods

IR, vapor phase oven, hot air oven

If reflow temperatures exceed the recommended profile, devices may not meet the performance requirements.

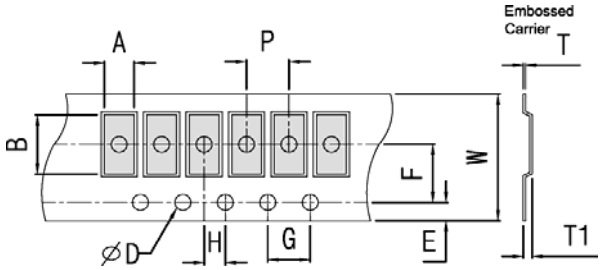
12. Packing

12.1 Carrier Dimensions:(Unit: mm)



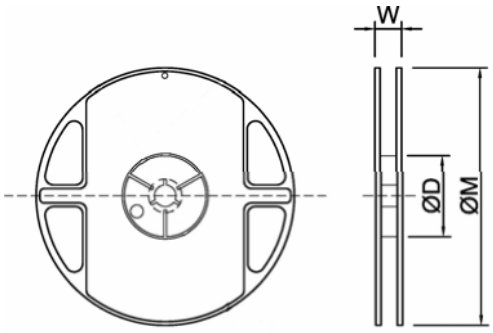
Item	W	P	E	F	ψD	G	H	A	Bo	T
MW08	8.0±0.30	4.0±0.10	1.75±0.10	3.5±0.10	1.50+0.1/-0	4.0±0.10	2.0±0.10	1.68±0.20	2.38±0.20	0.87±0.20
MW12								2.05±0.20	3.65±0.20	0.87±0.10

12.2 Embossed Dimensions:(Unit: mm)



Item	W	P	E	F	φD	G	H	A	B	T1	T
MW15	12.0±0.30	4.0±0.10	1.75±0.10	5.5±0.10	1.50+0.1/-0	4.0±0.10	2.0±0.10	2.40±0.20	4.10±0.20	0.75±0.20	0.25±0.10
MW25	12.0±0.30	4.0±0.10	1.75±0.10	5.5±0.10	1.50+0.1/-0	4.0±0.10	2.0±0.10	3.40±0.20	6.75±0.20	1.00±0.20	0.25±0.10

12.3 Reel Dimensions：(Unit: mm)



TYPE	Qty/Reel	ΦD	W	ΦM
MW08	5,000pcs	60±2	9.0±1	178±5
MW12	5,000pcs	60±2	9.0±1	178±5
MW15	4,000pcs	60±2	13.0±1	178±5
MW25	4,000pcs	60±2	13.0±1	178±5

12. Note

13.1 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.

13.2 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.

13.3 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, Br, etc.

13. Record

Version	Description of amendment	Page	Date	Amended by	Checked by
1	First issue of this specification	1~7	Jun.05, 2019	Haiyan Chen	Yuhua Xu
2	Add the MW08 MW25 Type	1~7	Nov.11, 2019	Haiyan Chen	Yuhua Xu
3	Modify product name	1~7	Nov.26, 2019	Haiyan Chen	Yuhua Xu
4	1. Add the MW15 2. Add the 2% tolerance 3. Add the terminal temperature	1~8 3 5	May.26, 2020	Haiyan Chen	Yuhua Xu
5	1.Modify the pad size of MW15 Update 2.Solder reflow Temperature condition	4 6	Jun.21,2022	Song Nie	Haiyan Chen
6	Update the Embossed Dimensions of MW15	7	Nov.01,2022	Song Nie	Haiyan Chen
7	Modify the Solder reflow Temperature condition	6	Jul.08, 2024	Haiyan Chen	Yuhua Xu